

FCC Test Report

Client Information:

Applicant: ioSafe, Inc.
Applicant add.: 12760 Earhart Rd., Auburn, California, USA

Product Information:

Product Name: ioSafe 1515+ (Network Storage Array)
Model No.: ioSafe 1515+
Derivative model No.: N/A
Brand Name: ioSafe

Applied Standard: FCC Part 15 Subpart B: 2016

Prepared By:

Dongguan Yaxu (AiT) Technology Limited

Add. : No. 22, Jinqianling Third Street, Jitigang, Huangjiang,
Donghuan, Guangdong, China.

Date of Receipt: May. 04, 2016 Date of Test: May. 04~ May. 21, 2016
Date of Issue: May. 21, 2016 Test Result: Pass

This device described above has been tested by Dongguan Yaxu (AiT) Technology Limited, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Reviewed by: Seal-Chan

Approved by: James

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2 Test Summary

| Test | Test Requirement | Test Method | Criterion | Result |
|--|-----------------------------|------------------|-----------|--------|
| Mains Terminals Disturbance Voltage, 150kHz to 30MHz | FCC Part 15 Subpart B: 2016 | ANSI C63.4: 2009 | Limits | PASS |
| Radiated Emissions 30MHz to 1GHz | FCC Part 15 Subpart B: 2016 | ANSI C63.4: 2009 | Limits | PASS |
| Radiated Emissions 1GHz to 6GHz | FCC Part 15 Subpart B: 2016 | ANSI C63.4: 2009 | Limits | PASS |
| Remark: None | | | | |
| Model description: None | | | | |

2.1 Measurement Uncertainty

The report uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty Multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95% .

| No. | Item | Frequency Range | U , Value |
|-----|-------------------------------|-----------------|-----------|
| 1 | Power Line Conducted Emission | 150KHz~30MHz | 1.20 dB |
| 2 | Radiated Emission Test | 30MHz~1GHz | 3.30 dB |
| 3 | Radiated Emission Test | 1 GHz~6 GHz | 3.52 dB |

3 Test Facility

The test facility is recognized, certified or accredited by the following organizations:

.CNAS- Registration No: L6177

Dongguan Yaxu (AiT) technology Limited is accredited to ISO/IEC 17025:2005 general Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the competence of testing and calibration laboratories) on Apr. 18, 2013

.FCC- Registration No: 248337

The 3m Semi-Anechoic Chamber, 3m/10m Open Area Test Site and Shielding Room of Asia Institute Technology (Dongguan) Limited have been registered by Federal Communications Commission (FCC) on Aug.29, 2014.

.Industry Canada(IC)-Registration No: IC6819A-1

The 3m Semi-Anechoic Chamber and 3m/10m Open Area Test Site of Asia Institute Technology (Dongguan) Limited have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing on Oct. 01, 2014.

.VCCI- Registration No: 2705

The 3m/10m Open Area Test Site, Shielding Room and 3m Chamber of Dongguan Yaxu (AiT) Technology Limited have been registered by Voluntary Control Council for Interference on Nov. 21, 2012. The Telecommunication Ports Conducted Disturbance Measurement of Dongguan Yaxu (AiT) Technology Limited have been registered by Voluntary Control Council for Interference on July. 13, 2013.

.TUV NORD

Dongguan Yaxu (AiT) Technology Limited has been assessed on Jun. 13, 2013 that it can carry out EMC tests by order and under supervision of TUV NORD.

.ITS- Registration No: TMPSHA031

Dongguan Yaxu (AiT) Technology Limited has been assessed and included in Intertek Shanghai TMP Program regarding Laboratory facilities and test equipment on Jul.22, 2012.

3.1 Deviation from standard

None

3.2 Abnormalities from standard conditions

None

4 General Information

4.1 General Description of EUT

| | |
|-----------------------|--|
| Manufacturer: | ioSafe, Inc. |
| Manufacturer Address: | 12760 Earhart Rd., Auburn, California, USA |
| EUT Name: | ioSafe 1515+ (Network Storage Array) |
| Model No: | ioSafe 1515+ |
| FCC ID | 2AEQ31515 |
| Derivative model No.: | N/A |
| Power Supply Range: | AC 120V/60Hz |
| Test Power Supply: | AC 120V/60Hz |
| Power Cord: | N/A |
| Signal Cable: | N/A |

4.2 Test Location

All tests were performed at:

Dongguan Yaxu (AiT) Technology Limited
No. 22, Jinqianling Third Street, Jitigang, Huangjiang, Donghuan, Guangdong, China.

Tel.: +86.769.82020499 Fax.: +86.769.82020495

4.3 Description of Test setup

4.3.1 EUT Test Mode

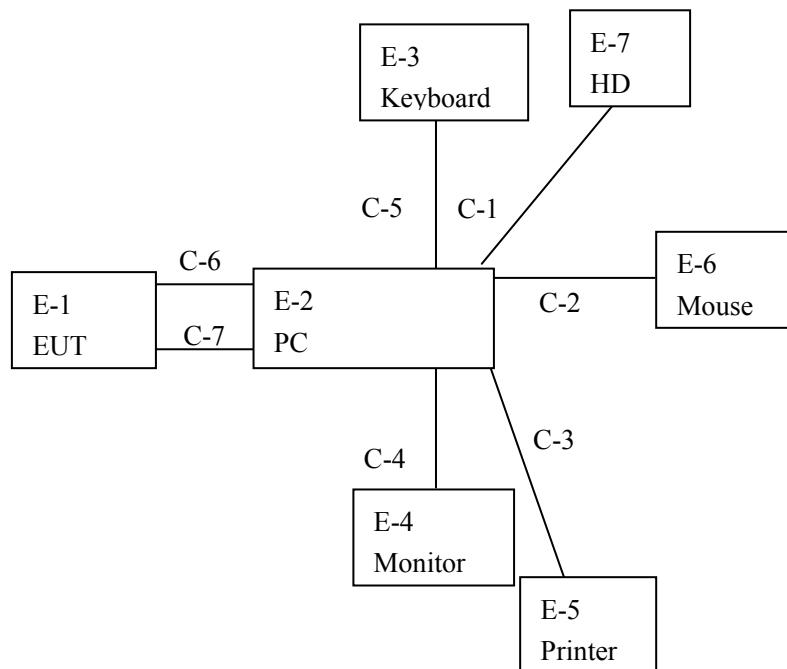
Mode 1

The EUT is data transmission.

EUT was tested in normal configuration (Please See following Block diagram)

1. Block diagram of EUT configuration

Mode 1:



4.4 EUT Peripheral List

| Item | Equipment | Mfr/Brand | Model/Type No. | Series No. | Note |
|------|--|--------------|----------------|--------------------------|------|
| E-1 | ioSafe 1515+ (Network Storage Array) | ioSafe | ioSafe 1515+ | N/A | EUT |
| E-2 | Printer | Canon | L11121E | LBP2900 | |
| E-3 | Mouse | DELL | MS111-P | cn-011d3v-71581-11e-1th7 | |
| E-4 | Keyboard | DELL | SK-8185 | OY526KUS | |
| E-5 | PC | DELL | FT4Y23X | 34413561645 | |
| E-6 | Monitor | DELL | IN2020MB | cn-0y6mhx-74261-11f-67es | |
| E-7 | HD | Buffalo inc. | HD-PET320U2 | 55571500924085 | |

| Item | Shielded Type | Ferrite Core | Length | Note |
|------|---------------|--------------|--------|------|
| C-1 | NO | NO | 120cm | USB |
| C-2 | NO | YES | 150cm | USB |
| C-3 | NO | YES | 180cm | LPF |
| C-4 | NO | YES | 150cm | VGA |
| C-5 | NO | YES | 120cm | USB |
| C-6 | NO | NO | 120cm | LAN |

5 Equipments List for All Test Items

| <input checked="" type="checkbox"/> Radiation Test Equipment | | | | | | |
|--|-------------------------------------|--------------|------------------|------------|------------|---------------|
| No | Test Equipment | Manufacturer | Model No | Serial No | Cal. Date | Cal. Due Date |
| 1 | EMI Measuring Receiver | R&S | ESR | 101660 | 2015.06.29 | 2016.06.28 |
| 2 | Low Noise Pre Amplifier | Tsj | MLA-10K01-B01-27 | 1205323 | 2015.06.29 | 2016.06.28 |
| 3 | TRILOG Super Broadband test Antenna | SCHWARZBECK | VULB9160 | 9160-3206 | 2015.06.29 | 2016.06.28 |
| 4 | 50Ω Coaxial Switch | Anritsu | MP59B | 6200264416 | 2015.06.29 | 2016.06.28 |
| 5 | Spectrum Analyzer | ADVANTEST | R3182 | 150900201 | 2015.06.29 | 2016.06.28 |
| 6 | Low Noise Pre Amplifier | Tsj | MLA-0120-A02-34 | 2648A04738 | 2015.06.29 | 2016.06.28 |
| 7 | Broadband Horn Antenna | SCHWARZBECK | BBHA9120D | 452 | 2015.06.29 | 2016.06.28 |

| <input checked="" type="checkbox"/> Conduction Test equipment | | | | | | |
|---|--------------------|--------------|----------|--------------|------------|---------------|
| No | Test Equipment | Manufacturer | Model No | Serial No | Cal. Date | Cal. Due Date |
| 1 | EMI Test Receiver | R&S | ESCI | 100124 | 2015.06.29 | 2016.06.28 |
| 2 | LISN | Kyoritsu | KNW-242 | 8-837-4 | 2015.06.29 | 2016.06.28 |
| 3 | LISN | Kyoritsu | KNW-407 | 8-1789-3 | 2015.06.29 | 2016.06.28 |
| 4 | Pulse limiter | R&S | ESH3-Z2 | 0357.8810.54 | 2015.06.29 | 2016.06.28 |
| 5 | 50Ω Coaxial Switch | Anritsu | MP59B | 6200264417 | 2015.06.29 | 2016.06.28 |

Note:

- is not applicable in this Test Report. is applicable in this Test Report.

6 Emission Test Results

6.1 Mains Terminals Disturbance Voltage Measurement

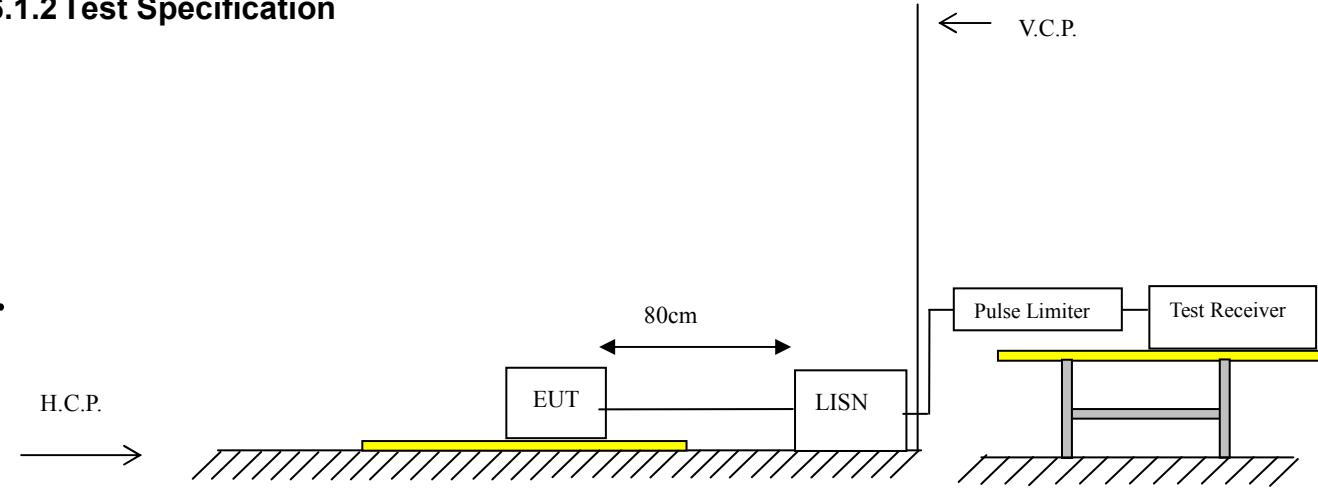
| Frequency (MHz) | <input type="checkbox"/> Class A (dB μ V) | | <input checked="" type="checkbox"/> Class B (dB μ V) | |
|-----------------|---|----------------|--|----------------|
| | Q.P. (Quasi-Peak) | A.V. (Average) | Q.P. (Quasi-Peak) | A.V. (Average) |
| 0.15 ~ 0.50 | 79 | 66 | 66 to 56 | 56 to 46 |
| 0.50 ~ 5.0 | 73 | 60 | 56 | 46 |
| 5.0 ~ 30 | 73 | 60 | 60 | 50 |

| | |
|-----------|---|
| Detector: | Peak for pre-scan (9kHz Resolution Bandwidth) Quasi-Peak & Average if maximized peak within 6dB of Average Limit |
|-----------|---|

6.1.1 E.U.T. Operation

| | | | | | | |
|--------------|--------|-----------|--------|-----------------------|--------|-----|
| Temperature: | 25°C | Humidity: | 54% RH | Atmospheric Pressure: | 101 | Kpa |
| Test Mode: | Mode 1 | | | The Worst Mode: | Mode 1 | |

6.1.2 Test Specification



EUT was placed upon a wooden test plane above the horizontal metal reference plane and 0.4m from the vertical ground plane, and it was connected to an AMN. The closest distance between the boundary of the EUT and the surface of the AMN is 0.8m. All peripherals were connected to another AMN, and placed at a distance of 10cm from each other. A spectrum and receiver was connected to the RF output port of the AMN. Both average and quasi-peak value were detected.

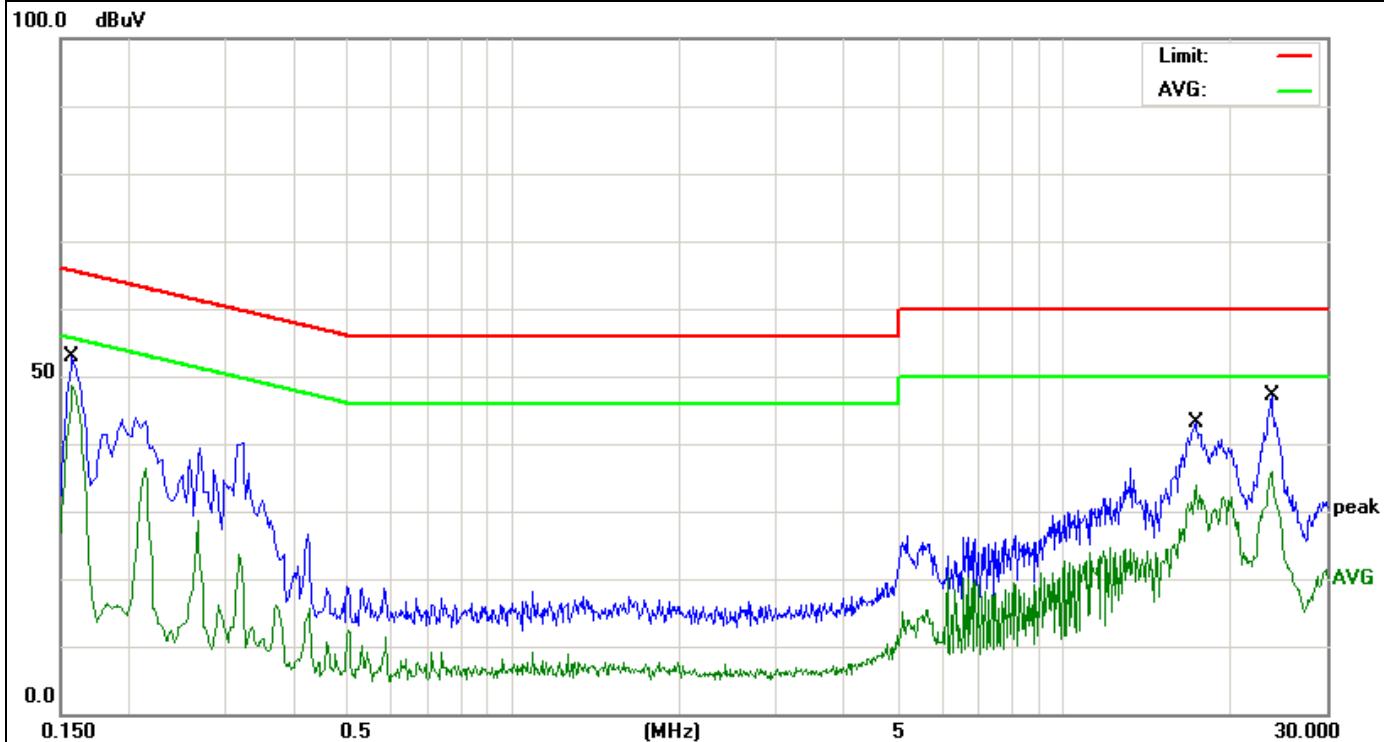
6.1.3 Measurement Data

An initial pre-scan was performed on the live and neutral lines.

Quasi-peak or average measurements were performed at the frequency which maximum peak emissions were detected.

Please refer to the attached quasi-peak & average measurement data for reference.

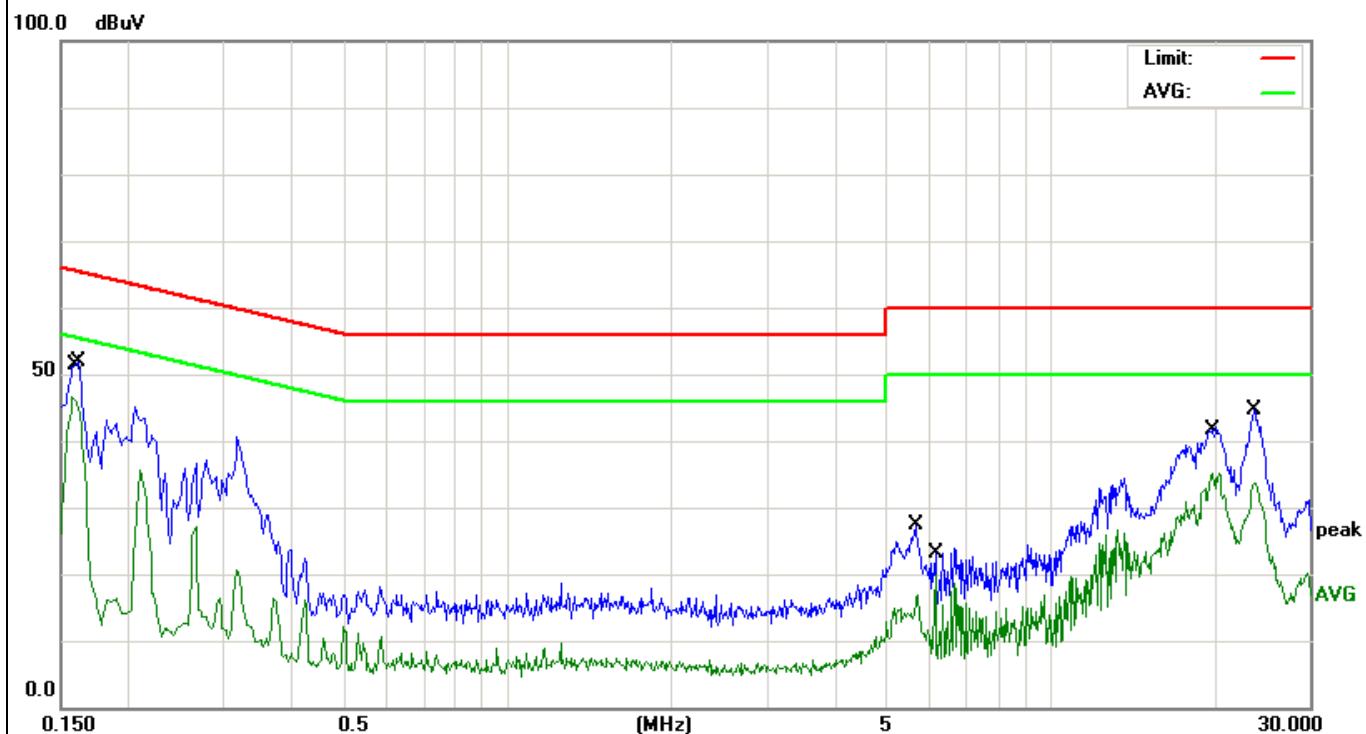
| | | | |
|---------------|--------------|-------------|------------|
| Model name: | ioSafe 1515+ | Test Date : | 2016-05-11 |
| Test Mode: | Mode 1 | Phase : | Line |
| Test Voltage: | AC 120V/60Hz | | |



Remark: Factor = LISN factor + Cable Loss + Pulse limiter factor.

| No. Mk. | Freq. | Reading | Correct | Measure- | Limit | Over | | |
|---------|---------|---------|---------|----------|-------|--------|----------|---------|
| | | Level | Factor | ment | | | | |
| | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | 0.1580 | 41.07 | 11.75 | 52.82 | 65.56 | -12.74 | QP | |
| 2 * | 0.1580 | 36.84 | 11.75 | 48.59 | 55.56 | -6.97 | AVG | |
| 3 | 17.3700 | 41.31 | 1.70 | 43.01 | 60.00 | -16.99 | QP | |
| 4 | 17.3700 | 32.25 | 1.70 | 33.95 | 50.00 | -16.05 | AVG | |
| 5 | 23.7860 | 45.15 | 2.10 | 47.25 | 60.00 | -12.75 | QP | |
| 6 | 23.7860 | 33.83 | 2.10 | 35.93 | 50.00 | -14.07 | AVG | |

| | | | |
|---------------|--------------|-------------|------------|
| Model name: | ioSafe 1515+ | Test Date : | 2016-05-11 |
| Test Mode: | Mode 1 | Phase : | Neutral |
| Test Voltage: | AC 120V/60Hz | | |



Remark: Factor = LISN factor + Cable Loss + Pulse limiter factor.

| No. | Mk. | Freq. | Reading | Correct | Measure- | Limit | Over | Detector | Comment |
|-----|-----|---------|---------|---------|----------|-------|--------|----------|---------|
| | | | Level | Factor | ment | | | | |
| 1 | * | 0.1580 | 34.79 | 11.75 | 46.54 | 55.56 | -9.02 | | AVG |
| 2 | | 0.1620 | 40.23 | 11.68 | 51.91 | 65.36 | -13.45 | | QP |
| 3 | | 5.6340 | 17.18 | 10.12 | 27.30 | 60.00 | -32.70 | | QP |
| 4 | | 6.1220 | 9.65 | 10.13 | 19.78 | 50.00 | -30.22 | | AVG |
| 5 | | 19.8940 | 33.20 | 2.03 | 35.23 | 50.00 | -14.77 | | AVG |
| 6 | | 23.7099 | 42.51 | 2.10 | 44.61 | 60.00 | -15.39 | | QP |

6.1.4 Test Setup Photograph



6.2 Radiated Emission Measurement

Limits of Radiated Emission Measurement

| Frequency (MHz) | <input type="checkbox"/> Class A (10m) | <input checked="" type="checkbox"/> Class B (3m) |
|-----------------|--|--|
| | Quasi-Peak dB(μ V/m) | Quasi-Peak dB(μ V/m) |
| 30 ~ 88 | 39.0 | 40.0 |
| 88 ~ 216 | 43.5 | 43.5 |
| 216 ~ 960 | 46.5 | 46.0 |
| Above 960 | 49.5 | 54.0 |

| | |
|-----------|---|
| Detector: | Peak for pre-scan (120kHz resolution bandwidth) Quasi-Peak if maximum peak within 6dB of limit |
|-----------|---|

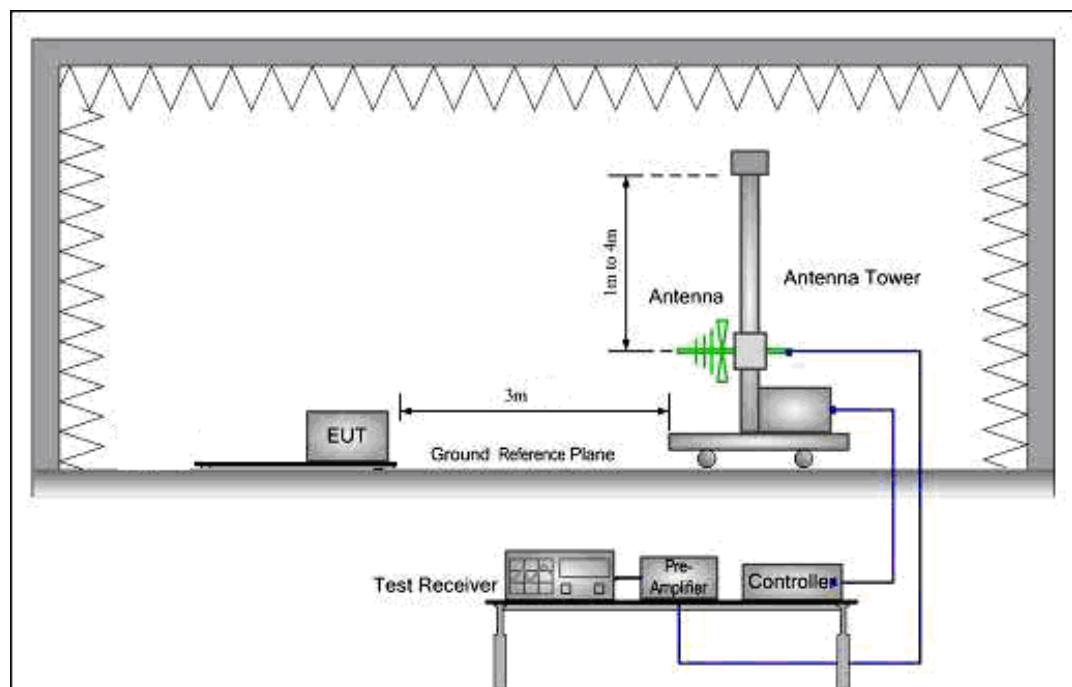
6.2.1 E.U.T. Operation

| | | | | | | |
|--------------|--------|-----------|--------|-----------------------|-----|-----|
| Temperature: | 25°C | Humidity: | 55% RH | Atmospheric Pressure: | 101 | Kpa |
| Test Mode: | Mode 1 | | | | | |

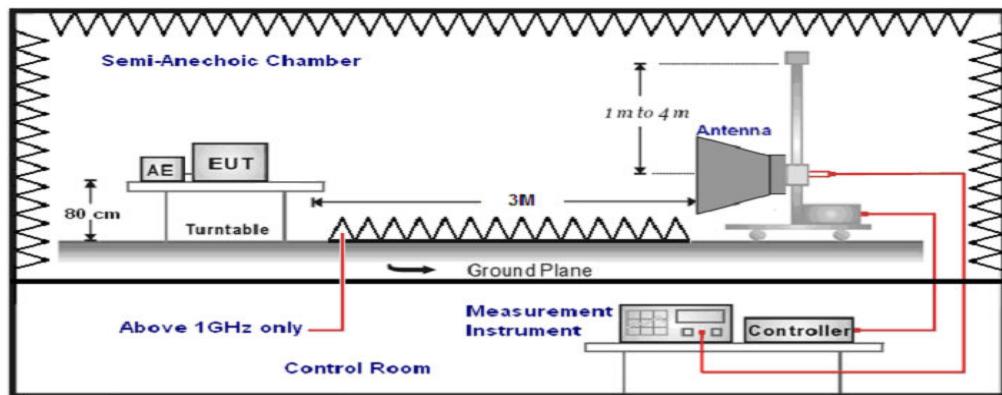
6.2.2 Test Specification

EUT was placed upon a wooden test plane was placed on the turn table above the horizontal metal ground plane, and operating in the mode as mentioned above. A receiving antenna was placed 3m away from the EUT. During testing, turn around the turn table and move the antenna from 1m to 4m to find the maximum field-strength reading. All peripherals were placed at a distance of 10cm between each other. Both horizontal and vertical antenna polarities were tested.

30 MHz to 1 GHz emissions:



1 GHz to 6 GHz emissions:

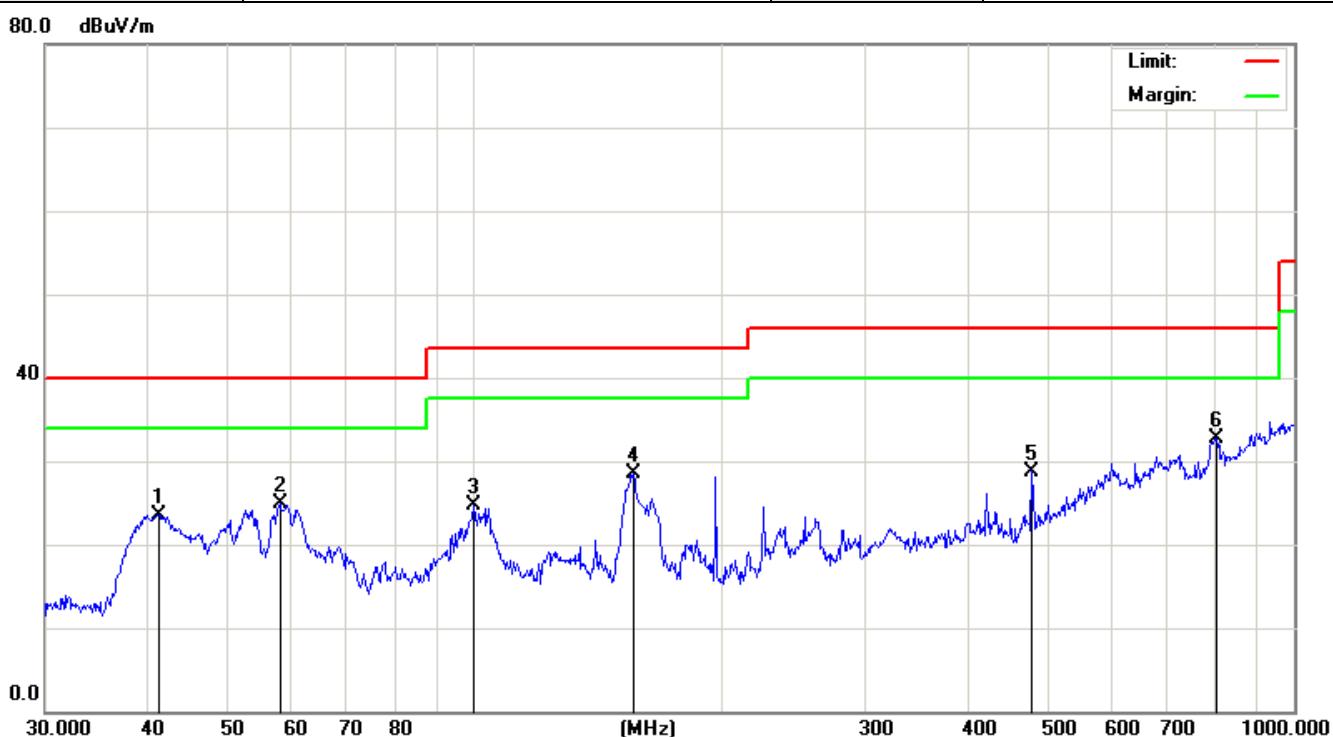


6.2.3 Measurement Data

An initial pre-scan was performed in the 3m chamber using the spectrum analyzers in peak detection mode. The EUT was measured by Biology antenna with 2 orthogonal polarities and peak emissions from the EUT were detected within 6dB of the class B limit line.

The following quasi-peak measurements were performed on the EUT.

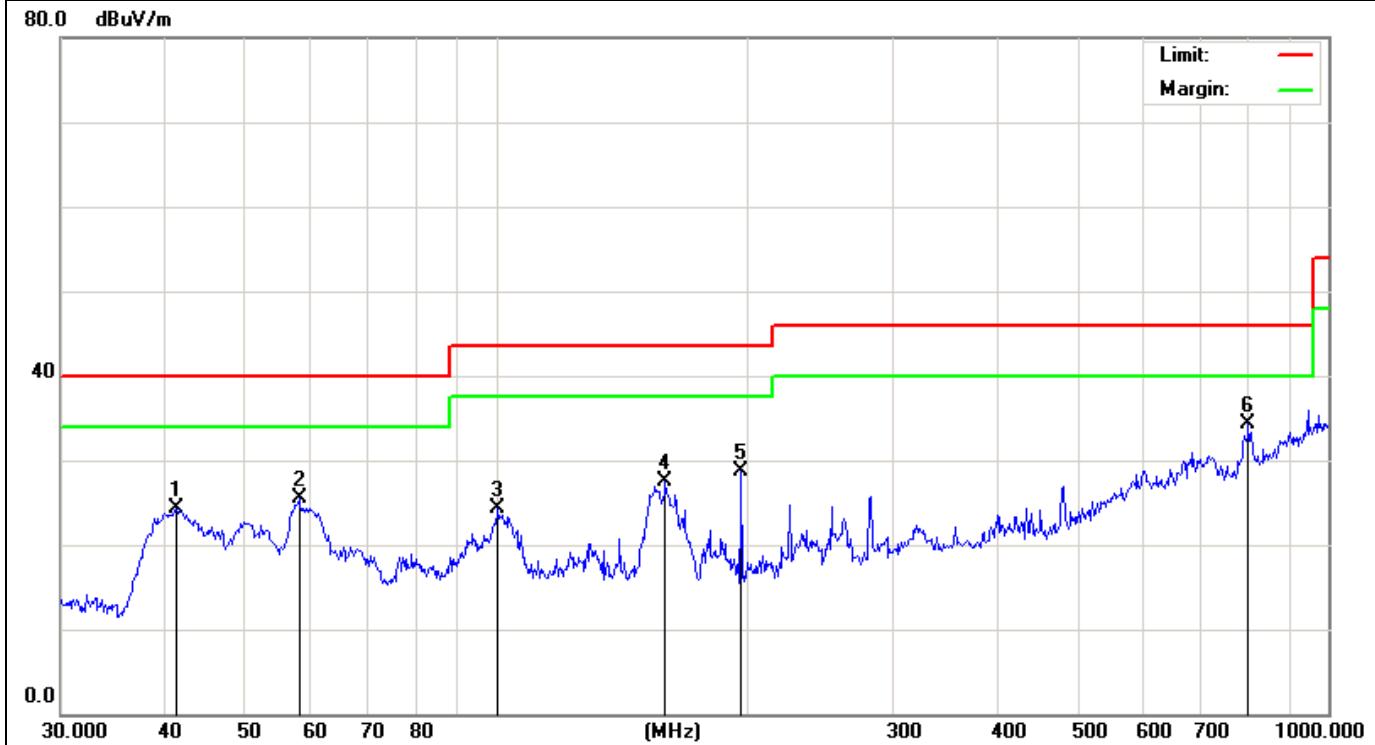
| | | | |
|---------------|--------------|------------------|---------------|
| Model name: | ioSafe 1515+ | Test Date : | 2016-05-11 |
| Test Mode: | Mode 1 | Polarization : | Vertical |
| Test Voltage: | AC 120V/60Hz | frequency range: | 30MHz-1000MHz |



Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

| No. Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure-ment dBuV/m | Limit dBuV/m | Over dB | Antenna Height cm | Table Degree degree | Comment |
|---------|-----------|--------------------|-------------------|---------------------|--------------|---------|-------------------|---------------------|---------|
| 1 | 41.2764 | 40.48 | -16.91 | 23.57 | 40.00 | -16.43 | QP | | |
| 2 | 57.9992 | 44.54 | -19.70 | 24.84 | 40.00 | -15.16 | QP | | |
| 3 | 99.8777 | 38.77 | -14.08 | 24.69 | 43.50 | -18.81 | QP | | |
| 4 | 156.4577 | 43.78 | -15.32 | 28.46 | 43.50 | -15.04 | QP | | |
| 5 | 478.8455 | 34.74 | -5.94 | 28.80 | 46.00 | -17.20 | QP | | |
| 6 * | 804.6028 | 29.87 | 2.82 | 32.69 | 46.00 | -13.31 | QP | | |

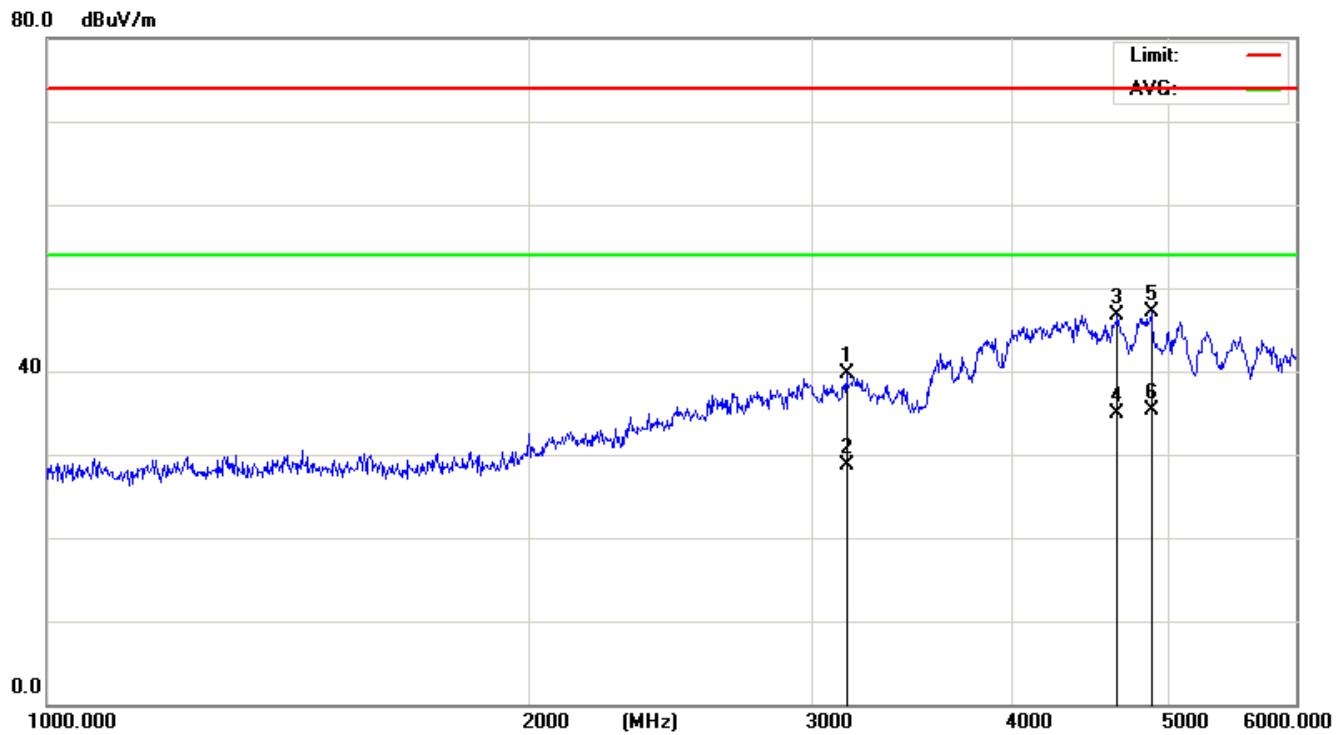
| | | | |
|---------------|--------------|------------------|---------------|
| Model name: | ioSafe 1515+ | Test Date : | 2016-05-11 |
| Test Mode: | Mode 1 | Polarization : | Horizontal |
| Test Voltage: | AC 120V/60Hz | frequency range: | 30MHz-1000MHz |



Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

| No. | Mk. | Freq. | Reading | Correct | Measure- | Limit | Over | Antenna | Table | | | |
|-----|-----|----------|---------|---------|----------|--------|--------|---------|----------|--------|--------|---------|
| | | | Level | Factor | ment | | | | | Height | Degree | |
| | | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 41.2765 | 41.12 | -16.91 | 24.21 | 40.00 | -15.79 | QP | | | | |
| 2 | | 57.9993 | 45.26 | -19.70 | 25.56 | 40.00 | -14.44 | QP | | | | |
| 3 | | 100.5806 | 38.31 | -13.95 | 24.36 | 43.50 | -19.14 | QP | | | | |
| 4 | | 159.7844 | 42.54 | -15.01 | 27.53 | 43.50 | -15.97 | QP | | | | |
| 5 | | 197.2001 | 45.52 | -16.81 | 28.71 | 43.50 | -14.79 | QP | | | | |
| 6 | * | 801.7863 | 30.99 | 3.30 | 34.29 | 46.00 | -11.71 | QP | | | | |

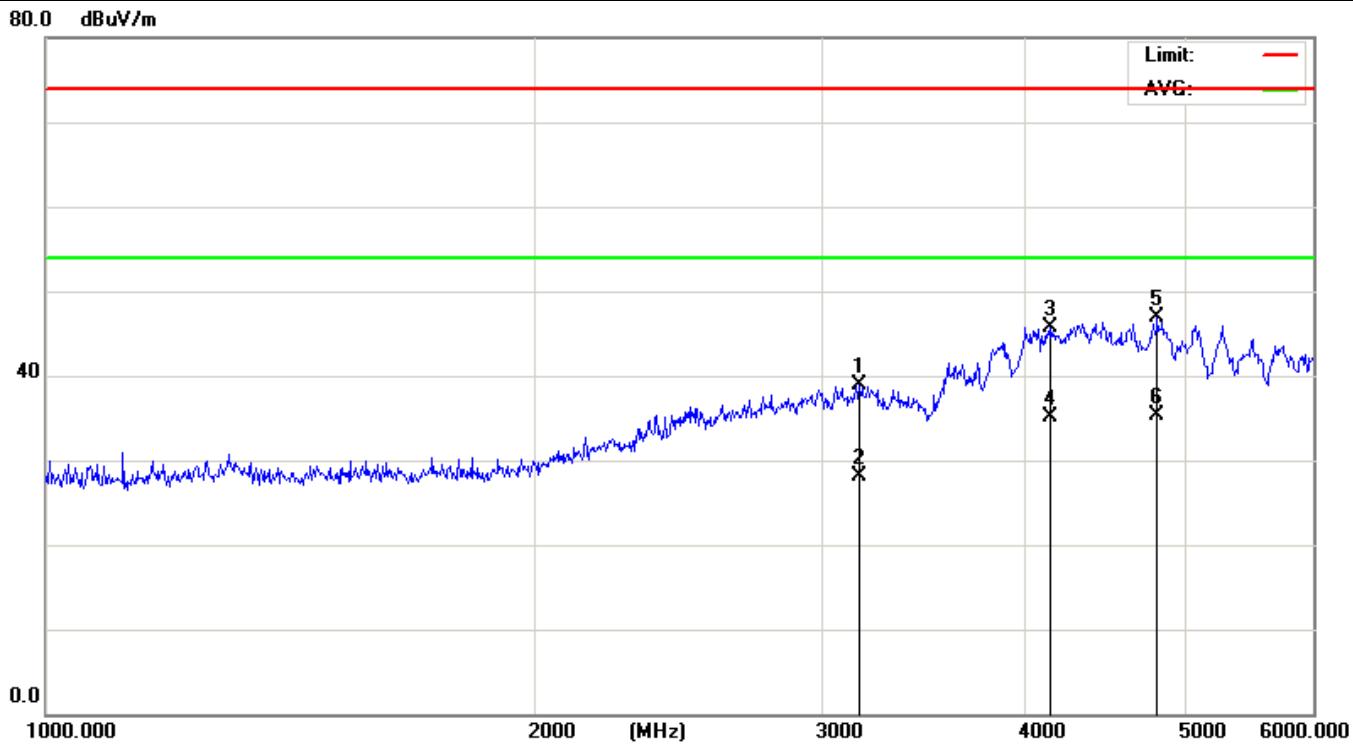
| | | | |
|---------------|--------------|------------------|-----------------|
| Model name: | ioSafe 1515+ | Test Date : | 2016-05-11 |
| Test Mode: | Mode 1 | Polarization : | Vertical |
| Test Voltage: | AC 120V/60Hz | frequency range: | 1000MHz-6000MHz |



Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

| No. | Mk. | Freq. | Reading | Correct | Measure- | Limit | Over | Antenna | Table | | |
|-----|------------|-------|---------|---------|----------|--------|------|----------|--------|--------|---------|
| | | | Level | Factor | ment | | | Height | Degree | | |
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | 3147.870 | 41.05 | -1.32 | 39.73 | 74.00 | -34.27 | peak | | | | |
| 2 | 3147.870 | 30.08 | -1.32 | 28.76 | 54.00 | -25.24 | AVG | 100 | 0 | | |
| 3 | 4643.823 | 41.55 | 5.07 | 46.62 | 74.00 | -27.38 | peak | | | | |
| 4 | 4643.823 | 29.86 | 5.07 | 34.93 | 54.00 | -19.07 | AVG | 100 | 0 | | |
| 5 | 4874.002 | 41.88 | 5.13 | 47.01 | 74.00 | -26.99 | peak | | | | |
| 6 | * 4874.002 | 30.26 | 5.13 | 35.39 | 54.00 | -18.61 | AVG | 100 | 0 | | |

| | | | |
|---------------|--------------|------------------|-----------------|
| Model name: | ioSafe 1515+ | Test Date : | 2016-05-11 |
| Test Mode: | Mode 1 | Polarization : | Horizontal |
| Test Voltage: | AC 120V/60Hz | frequency range: | 1000MHz-6000MHz |



Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

| No. Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | Antenna Height | Table Degree | Comment |
|---------|----------|---------------|----------------|--------------|--------|--------|----------------|--------------|---------|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree |
| 1 | 3159.171 | 40.15 | -1.30 | 38.85 | 74.00 | -35.15 | peak | | |
| 2 | 3159.171 | 29.43 | -1.30 | 28.13 | 54.00 | -25.87 | AVG | 100 | 0 |
| 3 | 4140.702 | 41.63 | 4.05 | 45.68 | 74.00 | -28.32 | peak | | |
| 4 | 4140.702 | 31.01 | 4.05 | 35.06 | 54.00 | -18.94 | AVG | 100 | 0 |
| 5 | 4813.252 | 41.79 | 5.08 | 46.87 | 74.00 | -27.13 | peak | | |
| 6 * | 4813.252 | 30.25 | 5.08 | 35.33 | 54.00 | -18.67 | AVG | 100 | 0 |

6.2.4 Test Setup photograph

30-1000MHz



1000-6000MHz

