

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:



Approved by:



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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

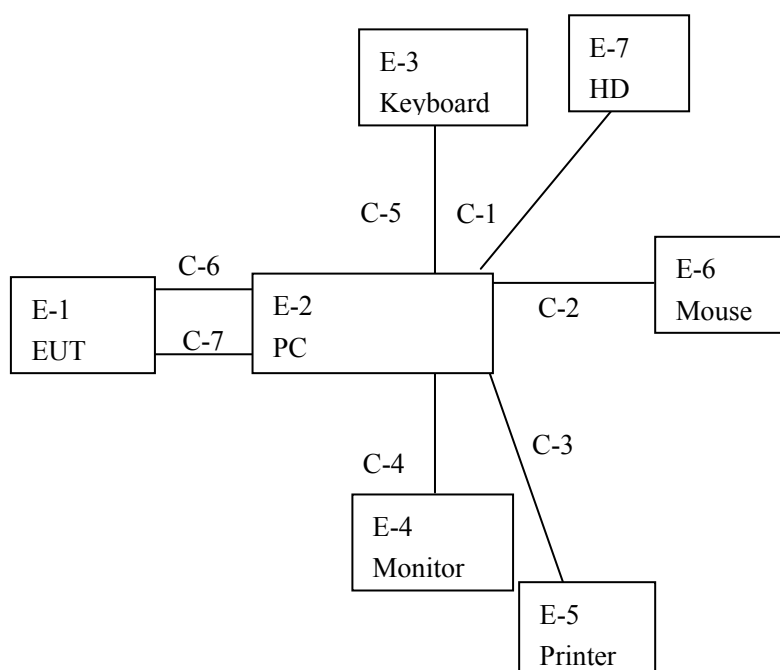
4.3.1 EUT Test Mode

Mode 1	The EUT is data transmission.
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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:

1. ☐ is not applicable in this Test Report. ☒ is applicable in this Test Report.

6 Emission Test Results

6.1 Mains Terminals Disturbance Voltage Measurement

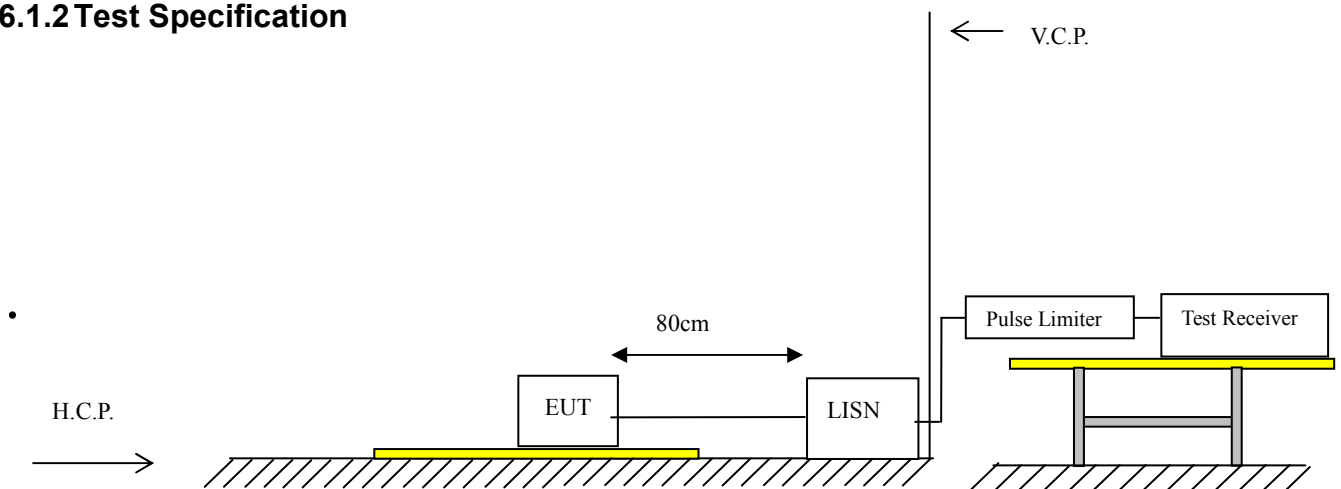
Frequency (MHz)	<input type="checkbox"/> Class A (dBμV)		<input checked="" type="checkbox"/> Class B (dBμV)	
	Q.P. (Quasi-Peak)	A.V. (Average)	Q.P. (Quasi-Peak)	A.V. (Average)
0.15 ~ 0.50	79	66	66 to 56	56 to 46
0.50 ~ 5.0	73	60	56	46
5.0 ~ 30	73	60	60	50

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

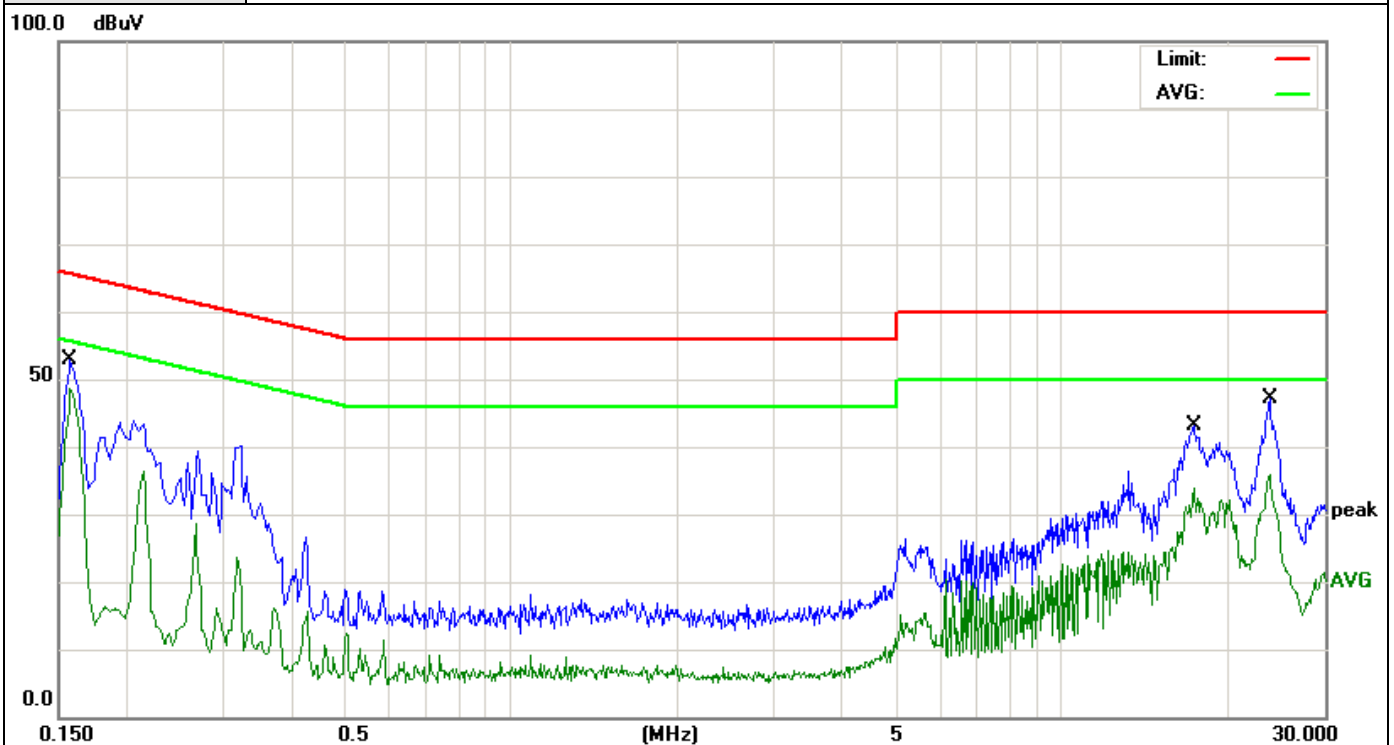
6.1.3 Measurement Data

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.

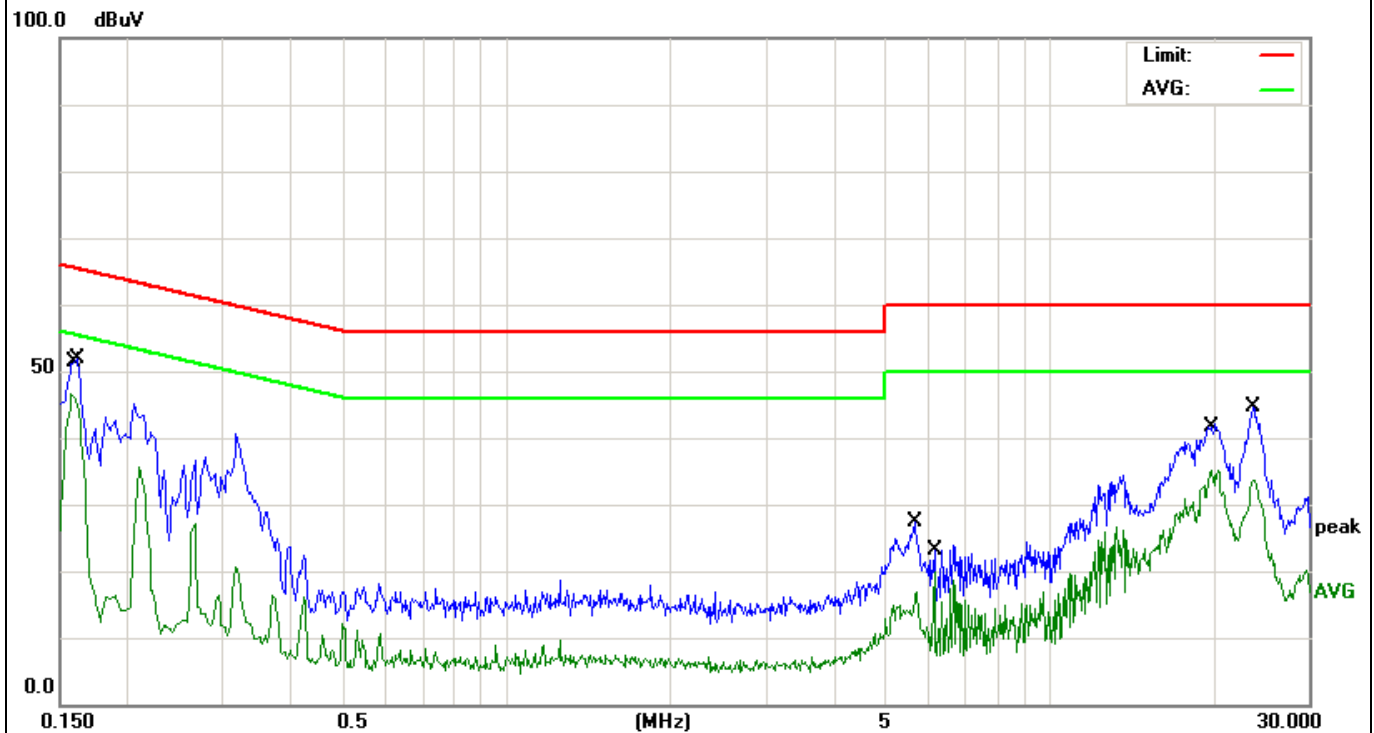
Model name:	ioSafe 1515+	Test Date :	2016-05-11
Test Mode:	Mode 1	Phase :	Line
Test Voltage:	AC 120V/60Hz		



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

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over 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. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
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

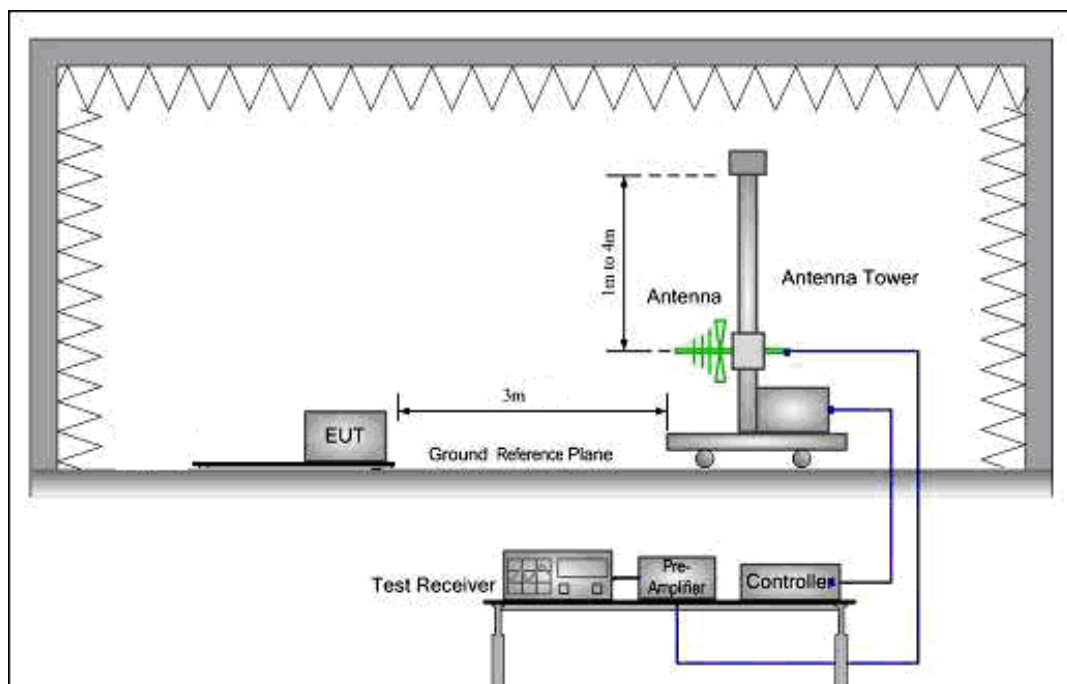
6.2.1 E.U.T. Operation

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

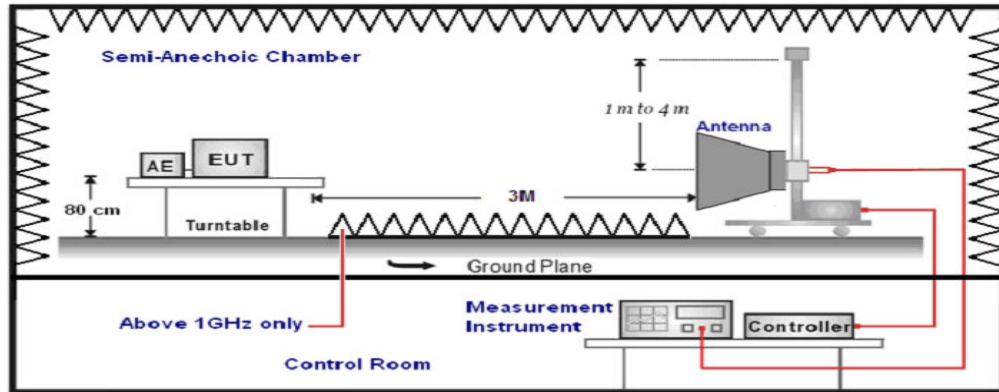
6.2.2 Test Specification

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:

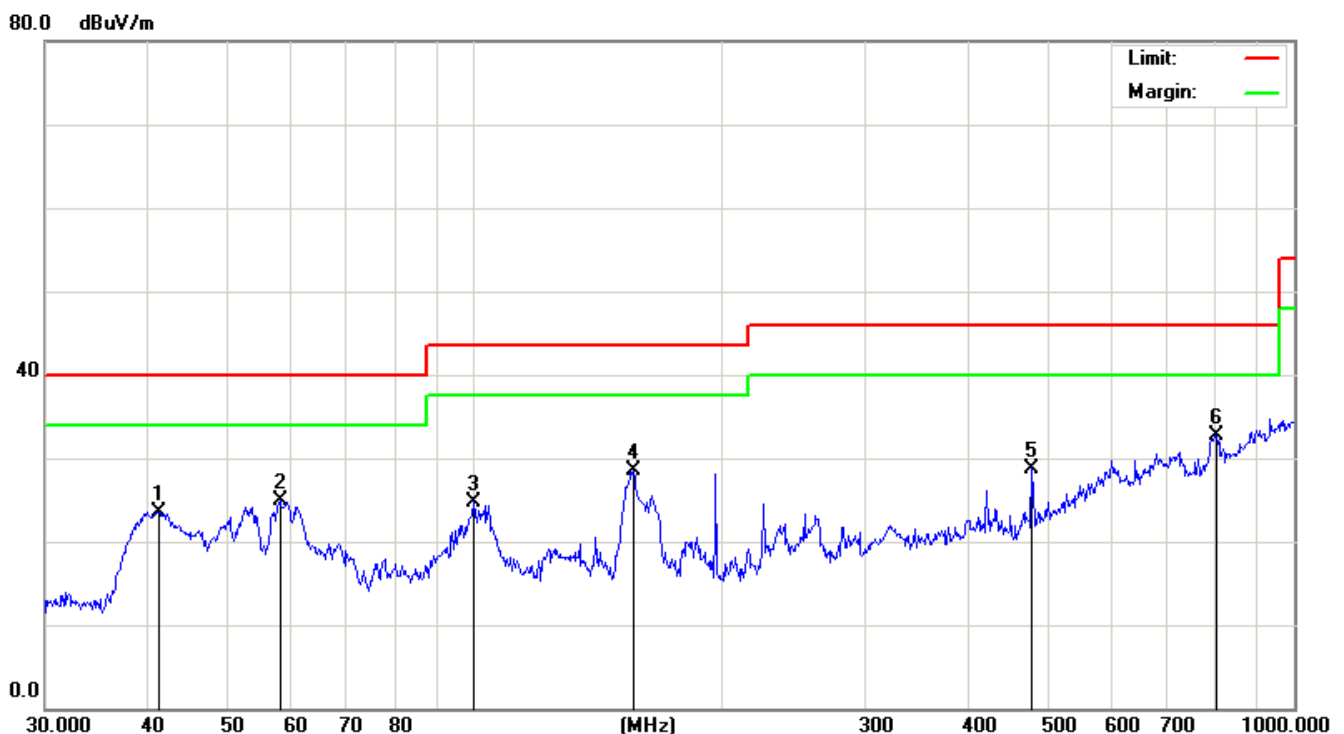


6.2.3 Measurement Data

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.

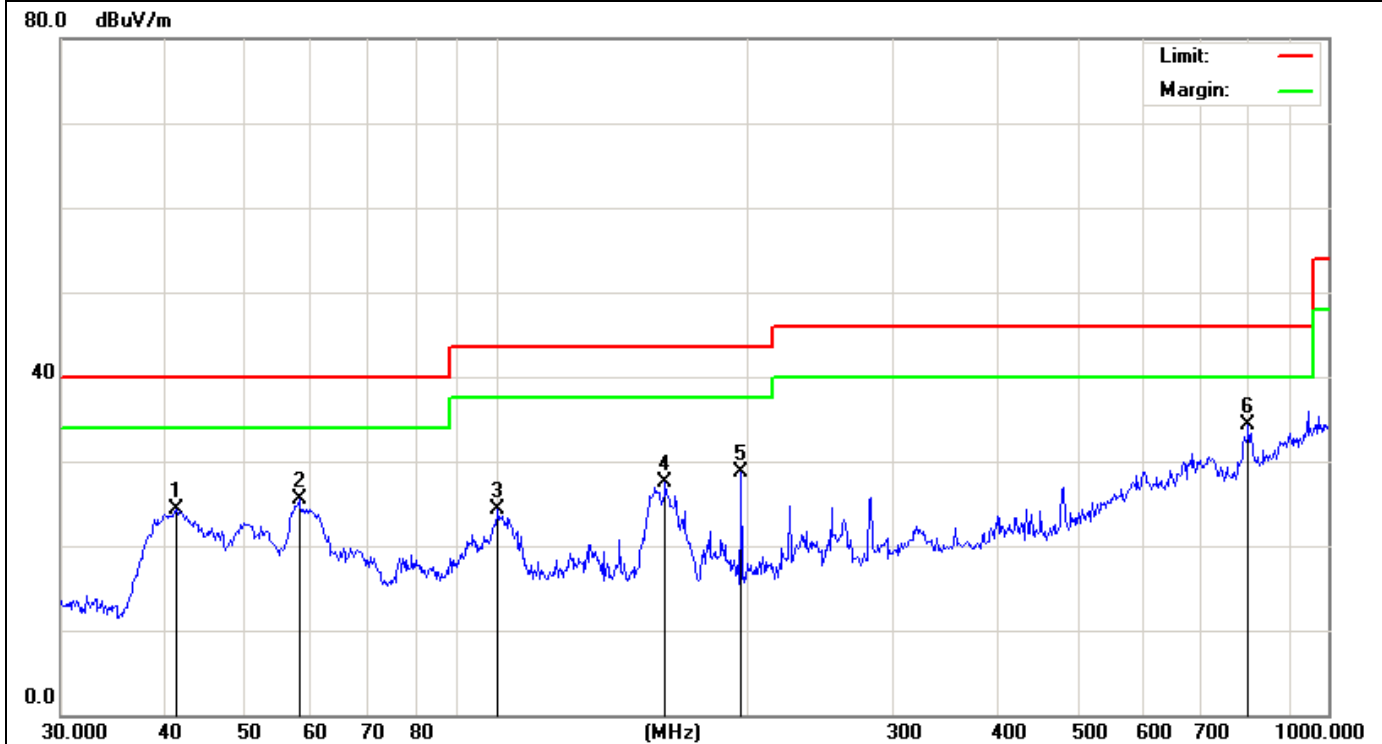
Model name:	ioSafe 1515+	Test Date :	2016-05-11
Test Mode:	Mode 1	Polarization :	Vertical
Test Voltage:	AC 120V/60Hz	frequency range:	30MHz-1000MHz



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	Detector	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			

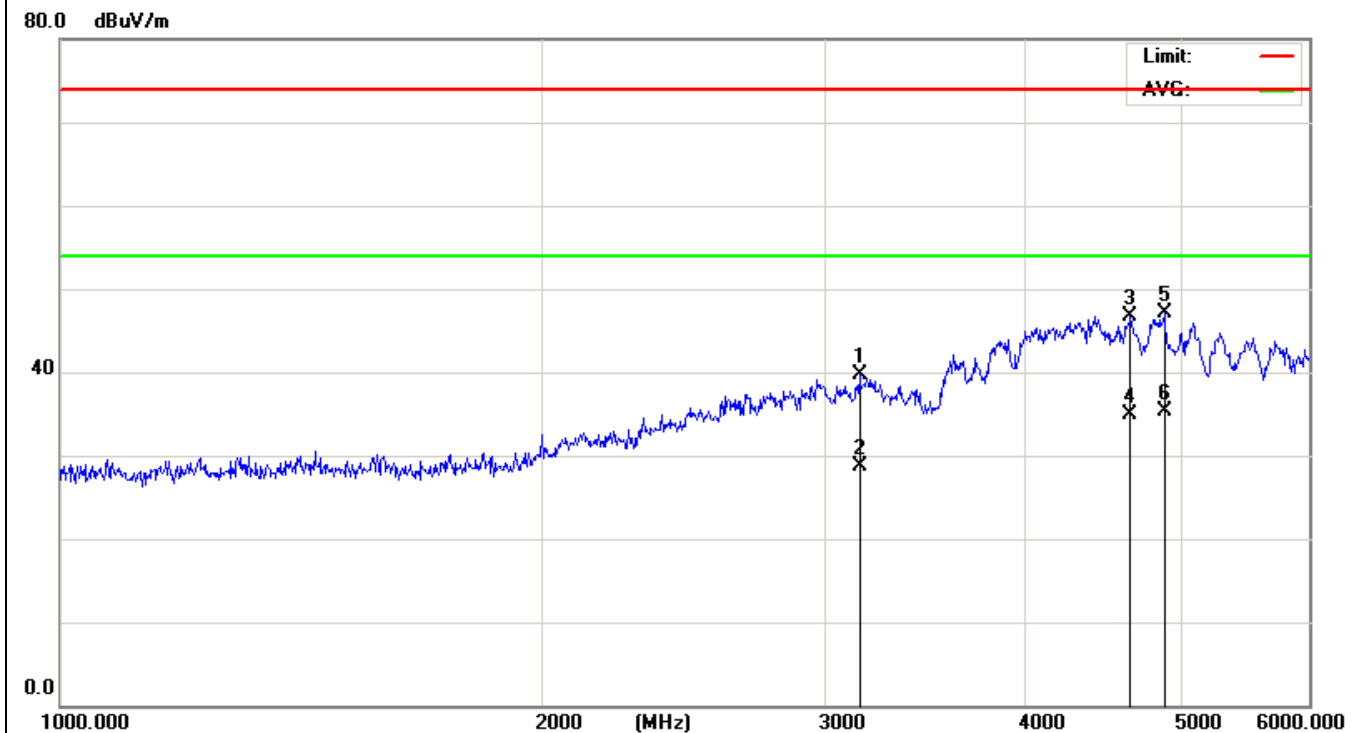
Model name:	ioSafe 1515+	Test Date :	2016-05-11
Test Mode:	Mode 1	Polarization :	Horizontal
Test Voltage:	AC 120V/60Hz	frequency range:	30MHz-1000MHz



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

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree 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			

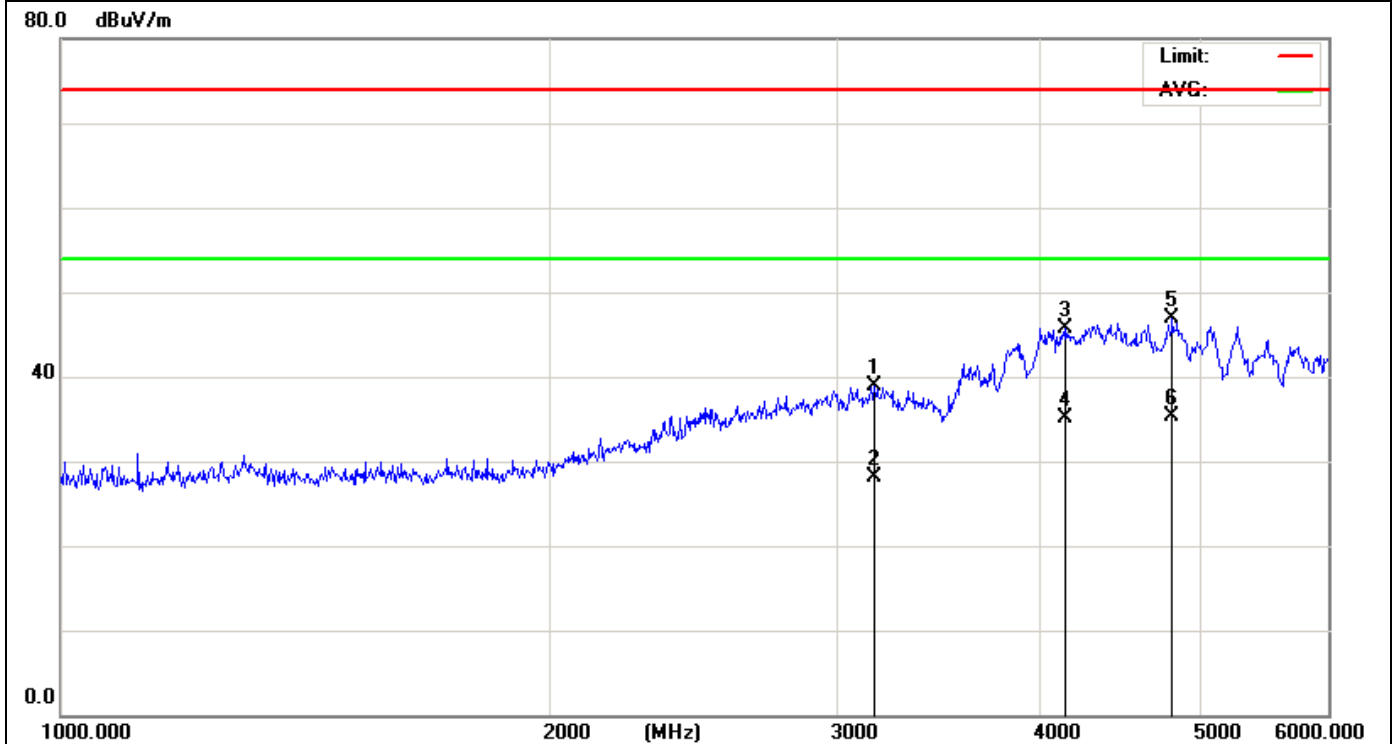
Model name:	ioSafe 1515+	Test Date :	2016-05-11
Test Mode:	Mode 1	Polarization :	Vertical
Test Voltage:	AC 120V/60Hz	frequency range:	1000MHz-6000MHz



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

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree 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

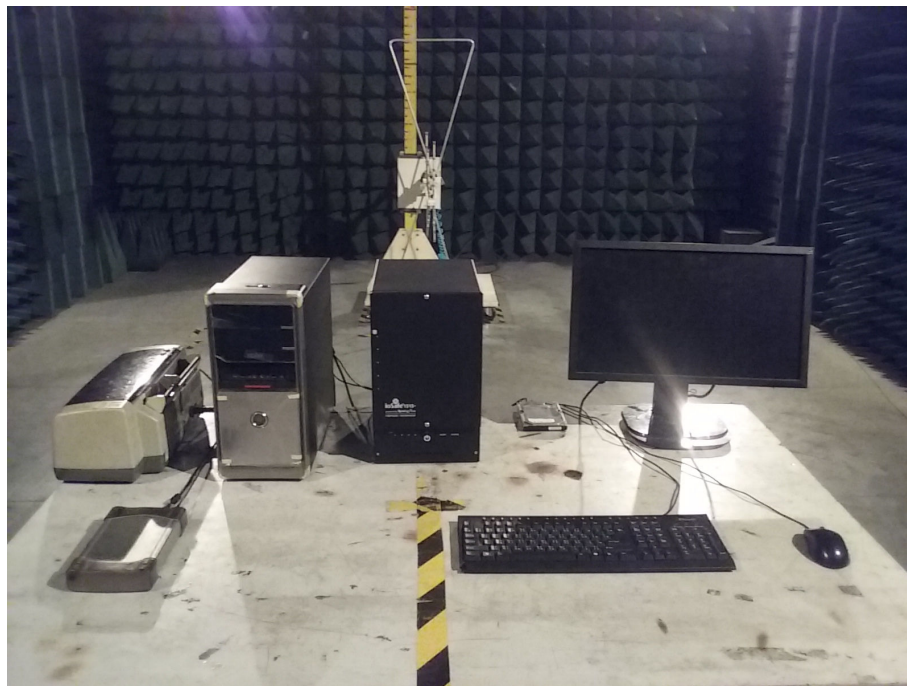


Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
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

