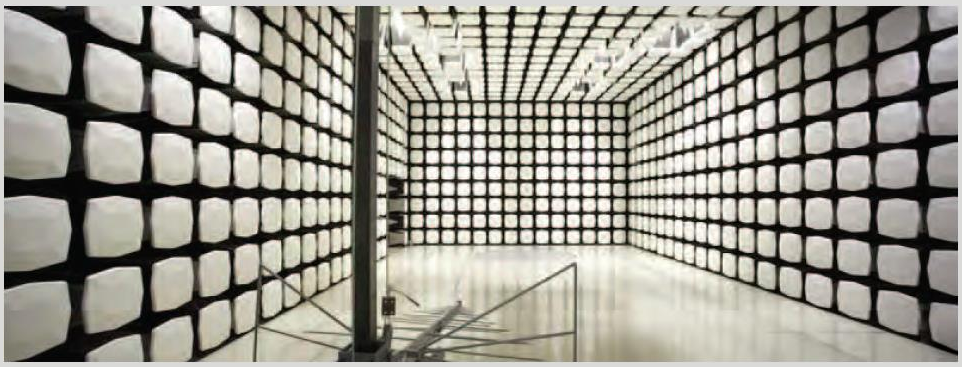
Ossia Inc.

COTA Tx203

Report: OSSI0011 Rev. 1, Issue Date: August 18, 2021



ACCREDITED
CERT #3310.06

CERTIFICATE OF TEST

Last Date of Test: June 24, 2021
Ossia Inc.
EUT: COTA Tx203

Emissions

Standards

Specification	Method
EN 55011:2009 (Amended by A1:2010) Class B	CISPR 11:2015 +A1:2016 +A2:2019
EN 61000-3-2:2014	IEC 61000-3-2:2018
EN 61000-3-3:2013	IEC 61000-3-3:2013 +A1:2017

Results

Test Description	Applied	Results	Comments
Radiated Emissions	Yes	Pass	
Radiated Emissions High Frequency	Yes	Pass	
Conducted Emissions	Yes	Pass	
Harmonic Current Emissions	Yes	Pass	
Voltage Fluctuations and Flicker	Yes	Pass	

Deviations From Test Standards

None

Approved By:

Rod Munro, Operations Manager

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information. As indicated in the Statement of Work sent with the quotation, Element's standard process is to always use the latest published version of the test methods even when earlier versions are cited in the test specification. Issuance of a purchase order was de facto acceptance of this approach. Otherwise, the client would have advised Element in writing of the specific version of the test methods they wanted applied to the subject testing.

CERTIFICATE OF TEST

Last Date of Test: June 24, 2021
Ossia Inc.
EUT: COTA Tx203

Immunity

Standards

Specification	Method
EN 61000-6-1:2007	IEC 61000-4-2:2008
	IEC 61000-4-3:2010
	IEC 61000-4-4:2012
	IEC 61000-4-5:2014 +A1:2017
	IEC 61000-4-6:2013
	IEC 61000-4-8:2009
	IEC 61000-4-11:2004 + A1:2017

Results

Test Description	Performance Criteria			Comments
	Applied	Standard Specified	Observed Criteria	
Electrostatic Discharge (ESD)	Yes	B	A	
Radiated Immunity	Yes	A	A	
Electrical Fast Transients and Bursts (EFT)	Yes	B	A	
Surge	Yes	B	A	
Conducted Immunity	Yes	A	A	
Magnetic Field Immunity	Yes	A	A	
Voltage Interruptions	Yes	C	C	
Voltage Dips	Yes	B/C	A/A	

Details on the application of the performance criteria, as well as any manufacturer provided performance criteria or acceptable degradation of performance, are all contained within the report.

Deviations From Test Standards

None

Approved By:

Rod Munro, Operations Manager

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REVISION HISTORY

Revision Number	Description	Date (yyyy-mm-dd)	Page Number
01	Revised the reference in the functional description from Rx203 to Rx201.	2021-08-18	10
	Added missing an Rx201 in the configuration.	2021-08-18	11
	Changed the data from "vert" to para to GND" for clarity.	2021-08-18	19
	Removed the references to the radios.	2021-08-18	42
	Changed to 2.48 GHz because this report is focused on the WPT.	2021-08-18	10

ACCREDITATIONS AND AUTHORIZATIONS

United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Each laboratory is accredited by A2LA to ISO / IEC 17025, and as a product certifier to ISO / IEC 17065 which allows Element to certify transmitters to FCC and IC specifications.

Canada

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB) and as a CAB for the acceptance of test data.

European Union

European Commission – Recognized as an EU Notified Body validated for the EMCD and RED Directives.

United Kingdom

BEIS – Recognized by the UK as an Approved Body under the UK Radio Equipment and UK EMC Regulations.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

MSIT / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Israel

MOC – Recognized by MOC as a CAB for the acceptance of test data.

Hong Kong

OFCA – Recognized by OFCA as a CAB for the acceptance of test data.

Vietnam

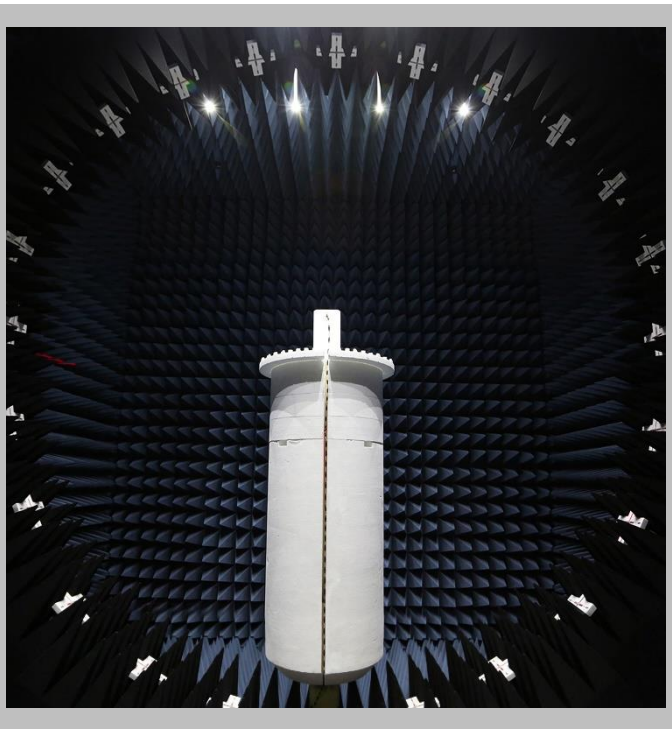
MIC – Recognized by MIC as a CAB for the acceptance of test data.

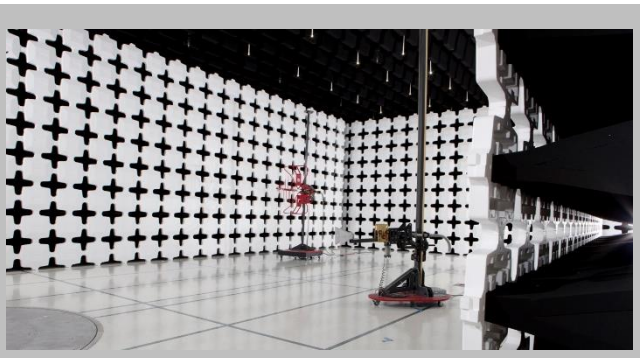
SCOPE

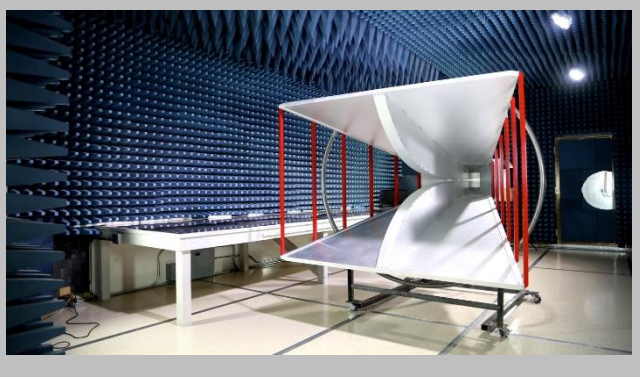
For details on the Scopes of our Accreditations, please visit:
https://www.nwemc.com/emc-testing-accreditations

FACILITIES

California	Minnesota	Oregon	Texas	Washington
Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-11 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Labs NC01-05 19201 120th Ave NE Bothell, WA 98011 (425)984-6600
A2LA				
Lab Code: 3310.04	Lab Code: 3310.05	Lab Code: 3310.02	Lab Code: 3310.03	Lab Code: 3310.06
Innovation, Science and Economic Development Canada				
2834B-1, 2834B-3	2834E-1, 2834E-3	2834D-1	2834G-1	2834F-1
BSMI				
SL2-IN-E-1154R	SL2-IN-E-1152R	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI				
A-0029	A-0109	A-0108	A-0201	A-0110
Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA				
US0158	US0175	US0017	US0191	US0157







Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable test description page. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

Measurement Bandwidths

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

Measurements were made using the bandwidths and detectors specified. No video filter was used.

Sample Calculations

Radiated Emissions:

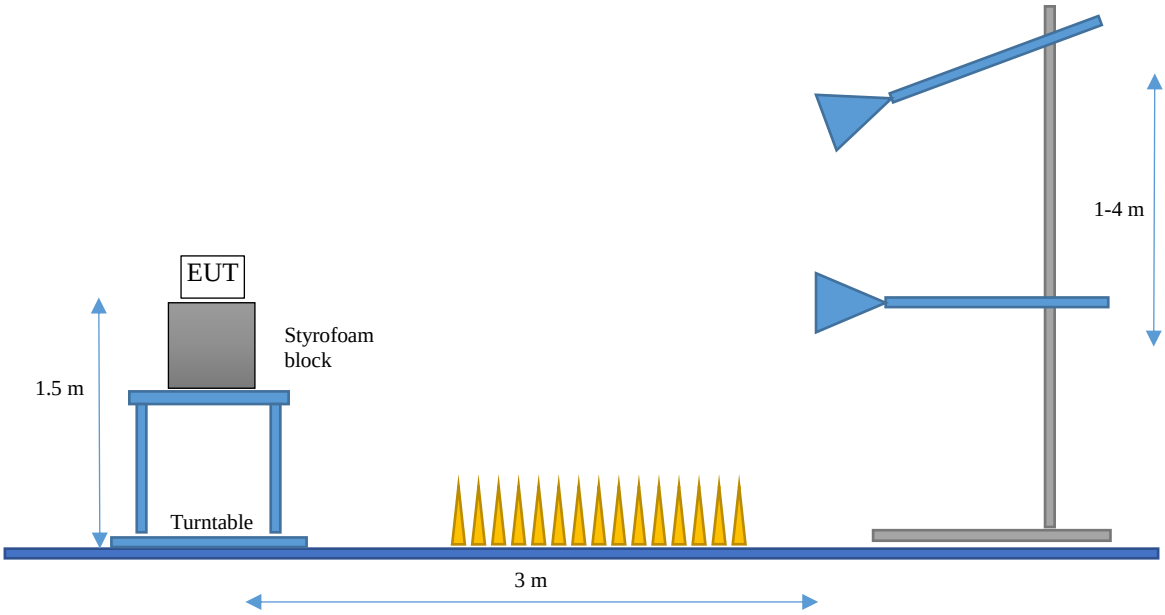
Field Strength		Measured Level		Antenna Factor		Cable Factor		Amplifier Gain		Distance Adjustment Factor		External Attenuation
33.5	=	42.6	+	28.6	+	3.1	-	40.8	+	0.0	+	0.0

Conducted Emissions:

Adjusted Level		Measured Level		Transducer Factor		Cable Factor		External Attenuation
47.1	=	26.7	+	0.3	+	0.1	+	20.0

Bore Sighting (>1GHz)

The diameter of the illumination area is the dimension of the line tangent to the EUT formed by 3 dB beamwidth of the measurement antenna at the measurement distance. At a 3 meter test distance, the diameter of the illumination area was 3.8 meters at 1 GHz and greater than 2.1 meters up to 6 GHz. Above 1 GHz, when required by the measurement standard, the antenna is pointed for both azimuth and elevation to maintain the receive antenna within the cone of radiation from the EUT. The specified measurement detectors were used for comparison of the emissions to the peak and average specification limits.



EXPLANATION OF ELEMENT PERFORMANCE CRITERIA

How Important Is It To Understand Performance Criteria?

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this quote were agreed upon by the client, prior to testing. It is the responsibility of the test laboratory to observe the performance of the equipment under test (EUT) and to accurately report those results. The test specification may define the acceptable performance criteria, but in the absence of this the manufacturer has the obligation to express the performance criteria in terms which relate to the performance of its specific product when used as intended, typically based on what the product data sheet or product specification defines.

Examples of functions defined by the manufacturer to be evaluated during testing include, but are not limited to, the following:

- Essential operational modes and states;
- Tests of all peripheral access (hard disks, LAN, printers, keyboard, mouse, etc.);
- Quality of software execution;
- Quality of data display and transmission;
- Quality of speech transmission;
- Any separate “Error” condition mode; ie, it can be a bigger risk that a function happens when it is not supposed to. Both intended operation and error conditions should be considered and tested.
- Ensuring that a radio transmitter continues to transmit and data/speech is not corrupted (additional details provided in the appropriate ETSI EN standard).
- Radio equipment with standby mode(s) of operation. ie, if a radio is supposed to be “idle/standing by” and an EMC test causes the device to transmit when it is not supposed to which triggers an event. See applicable EN 301 489 standard for details;

There is additional guidance related to this concept located in EUANB TGN 34 (section 4). The variety and the diversity of the apparatus within the scope of the EMC Directive make it difficult to define precise criteria for the evaluation of the immunity test results for every product. The manufacturer should consider the risks of not testing a mode or configuration and having potential problems when the device reaches the end-user. Additional testing does add cost, but it can be far cheaper than having to issue a product recall or selling a device that does not work in the real world due to EMC issues.

If a product specific specification is provided that defines a precise performance criterion, this will be used as the basis of the performance assessment. If we are not provided a test plan or a generic performance is defined in the test standard, we will use the following:

- Performance Criteria A
  - The EUT exhibited no change in performance when operating as specified by the manufacturer. In this case no changes were observed during the test.
- Performance Criteria B
  - The EUT exhibited a change in performance when operating as specified by the manufacturer. In this case the equipment returned to previous operation without any operator intervention, once the test stimulus was removed.
- Performance Criteria C
  - The EUT exhibited a change in performance when operating as specified by the manufacturer. In this case the equipment required some operator intervention in order to return to previous operation.
- Performance Criteria D
  - The EUT exhibited a change in performance when operating as specified by the manufacturer. In this case the equipment appears to have been damaged and would not recover.

If we are provided a test plan or information detailing the precise criteria for evaluating the test results, we will use that information and reference it as part of the test data.

PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Ossia Inc.
Address:	2425 152nd Ave, NE, Suite 2425
City, State, Zip:	Redmond, WA 98052
Test Requested By:	Jim Cottrell
EUT:	COTA Tx203
First Date of Test:	June 17, 2021
Last Date of Test:	June 24, 2021
Receipt Date of Samples:	June 14, 2021
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:

The Cota Wireless Power Transfer (WPT) power source (Tx203) transmits power by using the radio waves in the 2.4GHz Industrial, Scientific, and Medical (ISM) band defined by the ITU. The Cota WPT power source (Tx203) system constantly communicates with the Cota WPT client (Rx201) to identify paths along which power can be delivered and sends power along these paths. The Cota WPT client is designed to receive RF power from the Cota Tx203 power source and may be used to provide stable power to a variety of devices through its 5V USB port. The Cota WPT client may be placed on a table-top or mounted on a wall or other stable surface.

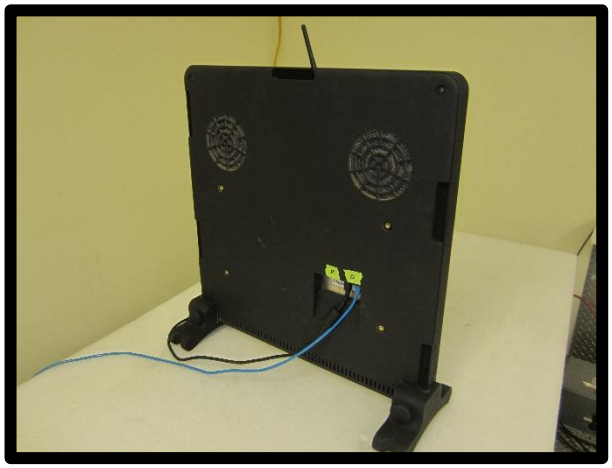
Highest frequency generated or used in the device:

2.48 GHz

Testing Objective:

Provide the specific EMC testing requested by the customer.

EUT Photo



CONFIGURATIONS

Configuration OSSI0011- 4

Software/Firmware Running during test	
Description	**Version**
Proxy Firmware	0.18_TC9

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
COTA Tx203	Ossia, Inc.	COTA Tx203	1

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Supply (Tx203)	Mean Well	GST220A12-R7B	EB85A13469
COTA Rx201	Ossia, Inc.	COTA Rx201	61, 034A

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop PC	Dell	Lattitude 5310	N/A

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power Cable	No	1m	No	AC Mains	AC/DC Power Supply (Tx203)
DC Power Cable	No	0.9m	Yes	AC/DC Power Supply (Tx203)	Tx203
Ethernet Cable	No	20m	No	Laptop PC	Tx203

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2021-06-17	Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	2021-06-17	Conducted Immunity	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	2021-06-18	Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
4	2021-06-18	Radiated Emissions High Frequency	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
5	2021-06-18	Harmonic Current Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
6	2021-06-18	Voltage Fluctuations and Flicker	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
7	2021-06-18	Magnetic Field Immunity	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
8	2021-06-21	Radiated Immunity	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
9	2021-06-21	Electrical Fast Transients and Bursts (EFT)	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
10	2021-06-21	Voltage Dips and Interruptions (VDI)	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
11	2021-06-24	Electrostatic Discharge (ESD)	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
12	2021-06-24	Surge	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

RADIATED EMISSIONS

element
WTD.2021.04.01.1
EmiR5 2021.05.14.0
PSA-ESCI 2021.03.17.0

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, a final radiated emissions test was performed. The frequency range investigated (scanned), is also noted in this report. Radiated emissions measurements were made at the EUT azimuth and antenna height such that the maximum radiated emissions level was detected. This required the use of a turntable and an antenna positioner. The preferred method of a continuous azimuth search was utilized for frequency scans of the EUT field strength with both polarities of the measuring antenna. A calibrated, linearly polarized antenna was positioned at the specified distance from the periphery of the EUT. Tests were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. Though specified in the report, the measurement distance was 3 meters or 10 meters (from antenna to boundary of EUT). At any measurement distance, the antenna height was varied from 1 meter to 4 meters. These height scans apply for both horizontal and vertical polarization, except that for vertical polarization the minimum height of the center of the antenna was increased so that the lowest point of the bottom of the antenna cleared the ground surface by at least 25 cm.

The EUT arrangement is configured as equivalent to that occurring in normal use. Tabletop equipment is placed on a 0.8 meter high non-conductive table & for Floor-standing equipment, it is placed on, but insulated from a ground reference plane by the use of its own rollers or stand-off supports. If measurements above 1 GHz were required, the test setup was modified to meet the regulatory requirements for higher frequency measurements. If required, RF absorber was placed on the floor between the measurement antenna and EUT. If required, per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables.

The diameter of the illumination area is the dimension of the line tangent to the EUT formed by 3 dB beamwidth of the measurement antenna at the measurement distance. At a 3 meter test distance, the diameter of the illumination area was 3.8 meters at 1 GHz and greater than 2.1 meters up to 6 GHz. Above 1 GHz, when required by the measurement standard, the antenna is pointed for both azimuth and elevation to maintain the receive antenna within the cone of radiation from the EUT. The specified measurement detectors were used for comparison of the emissions to the peak and average specification limits.

The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	2020-10-28	2021-10-28
Filter - Low Pass	Micro-Tronics	LPM50004	LFF	2020-11-06	2021-11-06
Cable	Northwest EMC	Bilog Cables	NC1	2021-01-28	2022-01-28
Antenna - Biconilog	Teseq	CBL 6141B	AYL	2019-09-25	2021-09-25
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAB	2021-01-28	2022-01-28

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	4.9 dB	-4.9 dB

FREQUENCY RANGE INVESTIGATED

30 MHz TO 1000 MHz

POWER INVESTIGATED

230VAC/50Hz

CONFIGURATIONS INVESTIGATED

OSSI0011-4

MODES INVESTIGATED

Wireless Power Transfer active to the Rx201.

RADIATED EMISSIONS

element
WTD.2021.04.01.1
EmiR5 2021.05.14.0
PSA-ESCI 2021.03.17.0

EUT:	COTA Tx203	Work Order:	OSSI0011
Serial Number:	1	Date:	2021-06-18
Customer:	Ossia Inc.	Temperature:	22.9°C
Attendees:	Luis Mendez, Travis Farley	Relative Humidity:	41.6%
Customer Project:	None	Bar. Pressure:	1022 mb
Tested By:	Brian Fahey	Job Site:	NC01
Power:	230VAC/50Hz	Configuration:	OSSI0011-4

TEST SPECIFICATIONS

Specification:	Method:
EN 55011:2009 (Amended by A1:2010) Class B Group 2	CISPR 11:2015 +A1:2016 +A2:2019

TEST PARAMETERS

Run #:	31	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

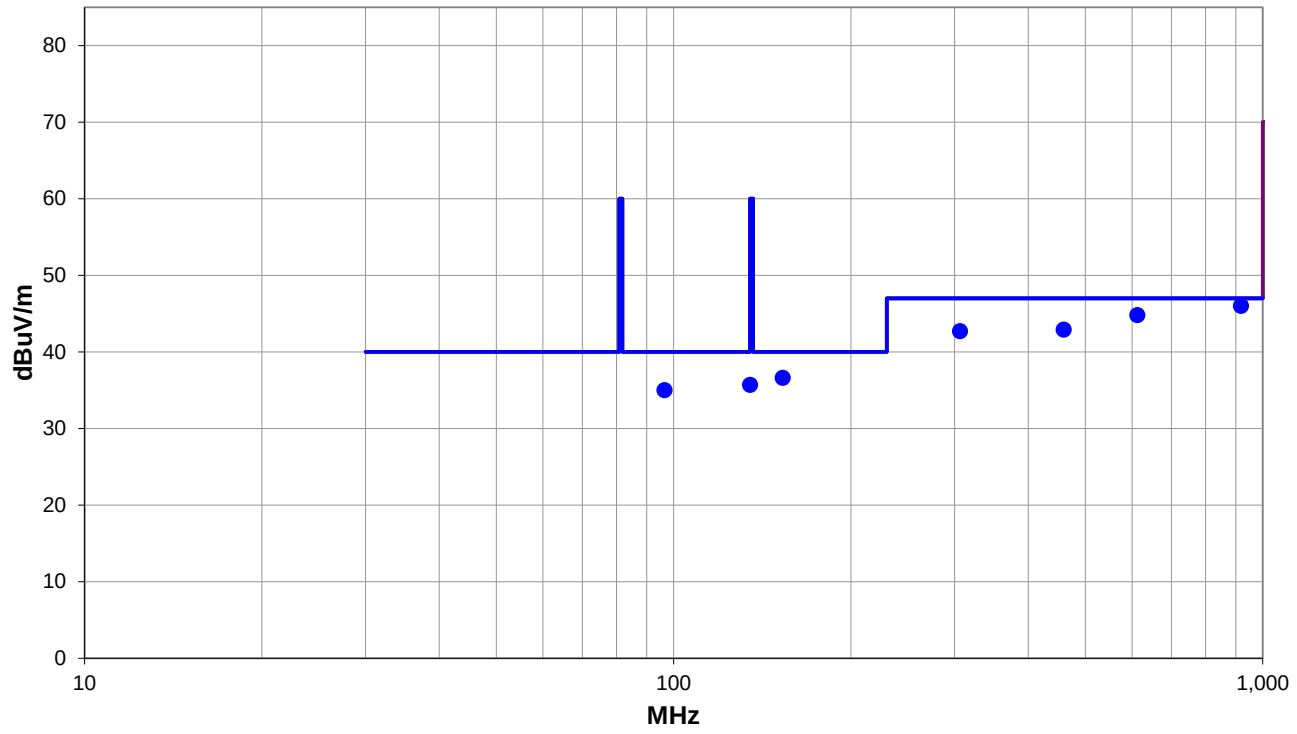
Tx203 and Rx201 are spaced 0.5 meter apart. Additional absorber material on the clock buffers. Common mode at 0.8V and amplitude is 130mV.

EUT OPERATING MODES

Wireless Power Transfer active to the Rx201.

DEVIATIONS FROM TEST STANDARD

None



Run #: 31 ■ PK ◆ AV ● QP

RADIATED EMISSIONS

element
WTD.2021.04.01.1
EmiR5 2021.05.14.0
PSA-ESCI 2021.03.17.0

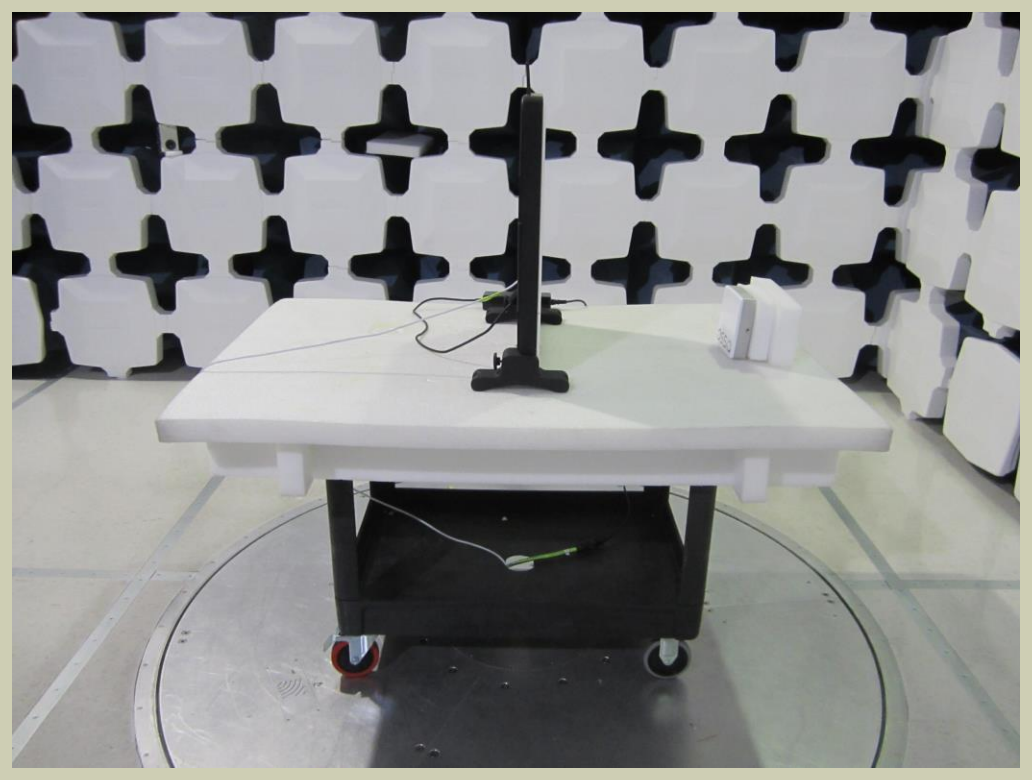
RESULTS - Run #31

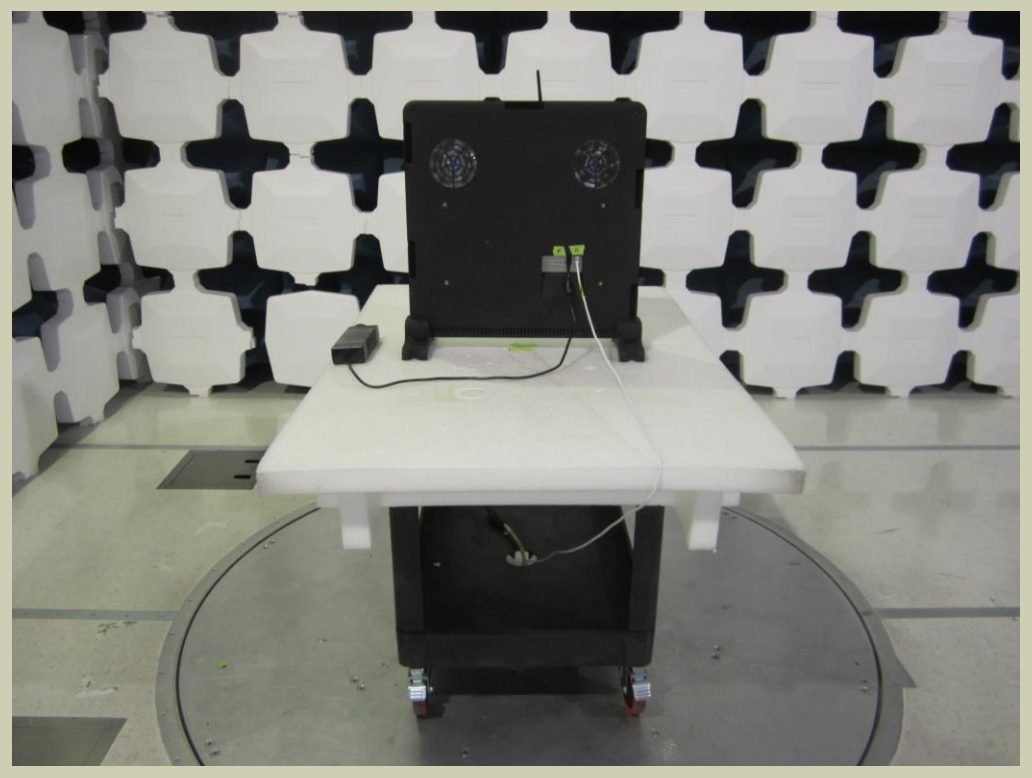
Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
918.752	32.3	13.7	1.5	105.0	3.0	0.0	Vert	QP	0.0	46.0	47.0	-1.0
612.509	36.0	8.8	1.17	156.0	3.0	0.0	Horz	QP	0.0	44.8	47.0	-2.2
153.131	38.2	-1.6	1.5	110.0	3.0	0.0	Horz	QP	0.0	36.6	40.0	-3.4
459.381	37.4	5.5	1.66	128.0	3.0	0.0	Vert	QP	0.0	42.9	47.0	-4.1
306.256	41.3	1.4	1.0	116.0	3.0	0.0	Horz	QP	0.0	42.7	47.0	-4.3
96.459	39.6	-4.6	1.0	315.0	3.0	0.0	Vert	QP	0.0	35.0	40.0	-5.0
134.860	37.2	-1.5	2.0	262.0	3.0	0.0	Horz	QP	0.0	35.7	60.0	-24.3

CONCLUSION

Pass

Tested By





RADIATED EMISSIONS

element
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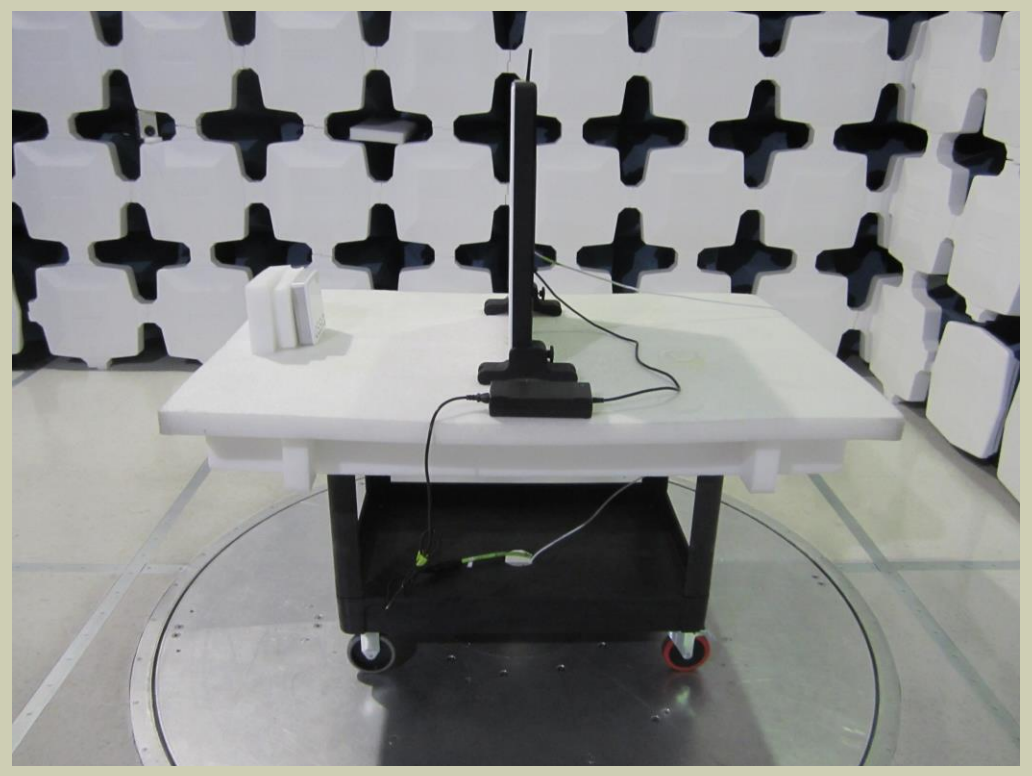
EmiR5 2021.05.14.0
PSA-ESCI 2021.03.17.0



RADIATED EMISSIONS

element
WTD.2021.04.01.1
EmiR5 2021.05.14.0
PSA-ESCI 2021.03.17.0

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, a final radiated emissions test was performed. The frequency range investigated (scanned), is also noted in this report. Radiated emissions measurements were made at the EUT azimuth and antenna height such that the maximum radiated emissions level was detected. This required the use of a turntable and an antenna positioner. The preferred method of a continuous azimuth search was utilized for frequency scans of the EUT field strength with both polarities of the measuring antenna. A calibrated, linearly polarized antenna was positioned at the specified distance from the periphery of the EUT. Tests were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. Though specified in the report, the measurement distance was 3 meters or 10 meters (from antenna to boundary of EUT). At any measurement distance, the antenna height was varied from 1 meter to 4 meters. These height scans apply for both horizontal and vertical polarization, except that for vertical polarization the minimum height of the center of the antenna was increased so that the lowest point of the bottom of the antenna cleared the ground surface by at least 25 cm.

The EUT arrangement is configured as equivalent to that occurring in normal use. Tabletop equipment is placed on a 0.8 meter high non-conductive table & for Floor-standing equipment, it is placed on, but insulated from a ground reference plane by the use of its own rollers or stand-off supports. If measurements above 1 GHz were required, the test setup was modified to meet the regulatory requirements for higher frequency measurements. If required, RF absorber was placed on the floor between the measurement antenna and EUT. If required, per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables.

The diameter of the illumination area is the dimension of the line tangent to the EUT formed by 3 dB beamwidth of the measurement antenna at the measurement distance. At a 3 meter test distance, the diameter of the illumination area was 3.8 meters at 1 GHz and greater than 2.1 meters up to 6 GHz. Above 1 GHz, when required by the measurement standard, the antenna is pointed for both azimuth and elevation to maintain the receive antenna within the cone of radiation from the EUT. The specified measurement detectors were used for comparison of the emissions to the peak and average specification limits.

The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	2020-10-28	2021-10-28
Cable	Northwest EMC	Bilog Cables	NC1	2021-01-28	2022-01-28
Antenna - Loop	EMCO	6502	AOA	2020-07-06	2022-07-06

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	1.7 dB	-1.7 dB

FREQUENCY RANGE INVESTIGATED

150 kHz TO 30 MHz

POWER INVESTIGATED

230VAC/50Hz

CONFIGURATIONS INVESTIGATED

OSSI0011-4

MODES INVESTIGATED

Wireless Power Transfer active to the Rx201.

RADIATED EMISSIONS

element
WTD.2021.04.01.1
EmiR5 2021.05.14.0
PSA-ESCI 2021.03.17.0

EUT:	COTA Tx203	Work Order:	OSSI0011
Serial Number:	1	Date:	2021-06-18
Customer:	Ossia Inc.	Temperature:	22.9°C
Attendees:	Luis Mendez, Travis Farley	Relative Humidity:	41.6%
Customer Project:	None	Bar. Pressure:	1022 mb
Tested By:	Brian Fahey	Job Site:	NC01
Power:	230VAC/50Hz	Configuration:	OSSI0011-4

TEST SPECIFICATIONS

Specification:	Method:
EN 55011:2009 (Amended by A1:2010) Class B Group 2	CISPR 11:2015 +A1:2016 +A2:2019

TEST PARAMETERS

Run #:	35	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

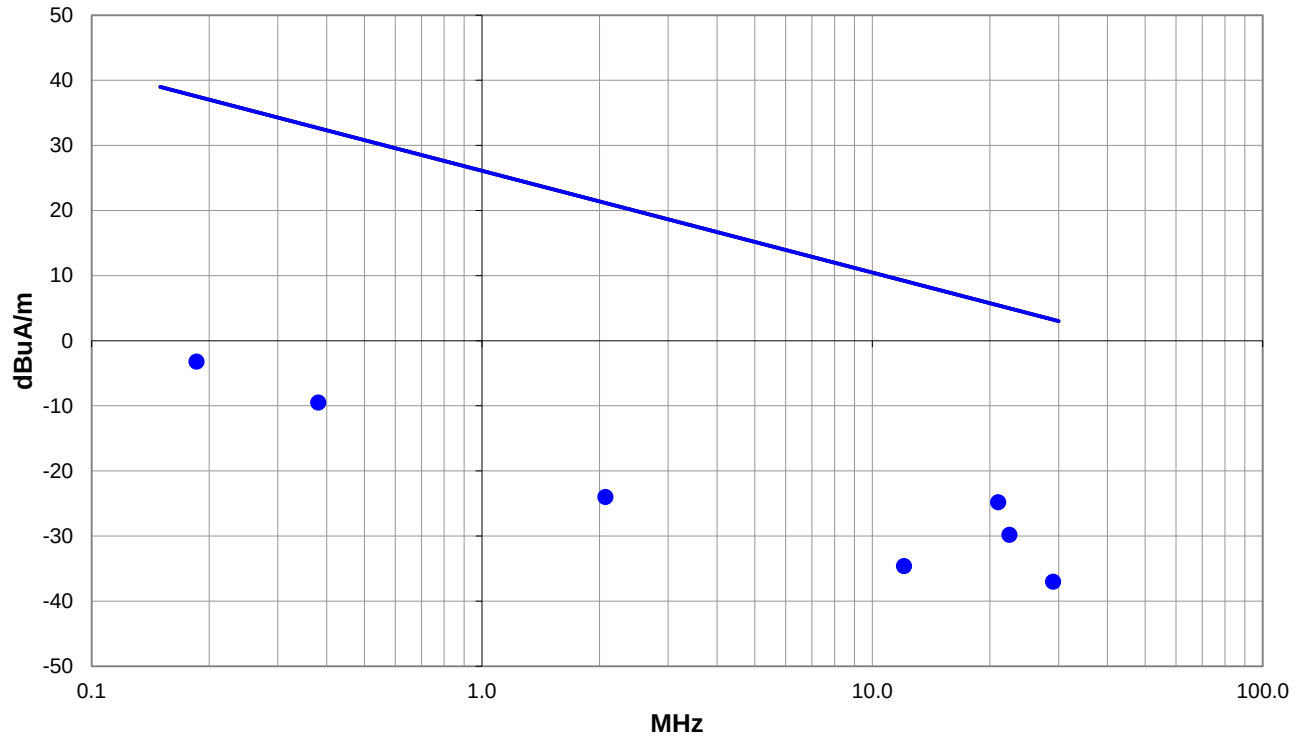
Tx203 and Rx201 are spaced 0.5 meter apart. Additional absorber material on the clock buffers. Common mode at 0.8V and amplitude is 130mV. Antenna parallel to ground.

EUT OPERATING MODES

Wireless Power Transfer active to the Rx201.

DEVIATIONS FROM TEST STANDARD

None



Run #: 35 ■ PK ◆ AV ● QP

RADIATED EMISSIONS

element
WTD.2021.04.01.1
EmiR5 2021.05.14.0
PSA-ESCI 2021.03.17.0

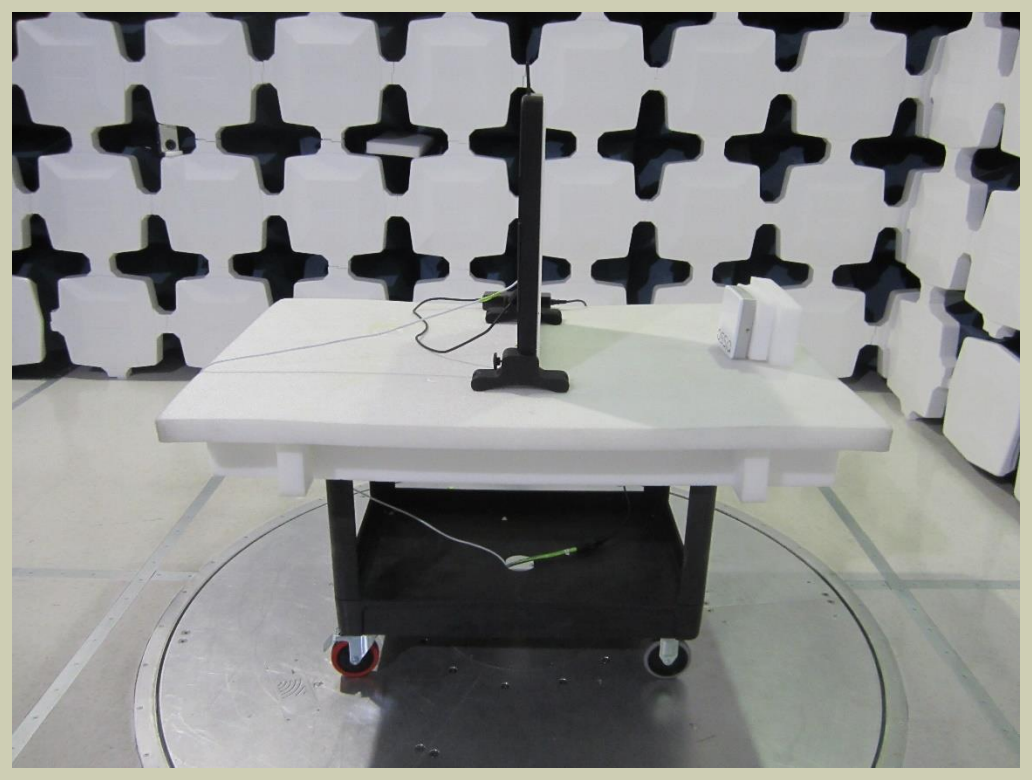
RESULTS - Run #35

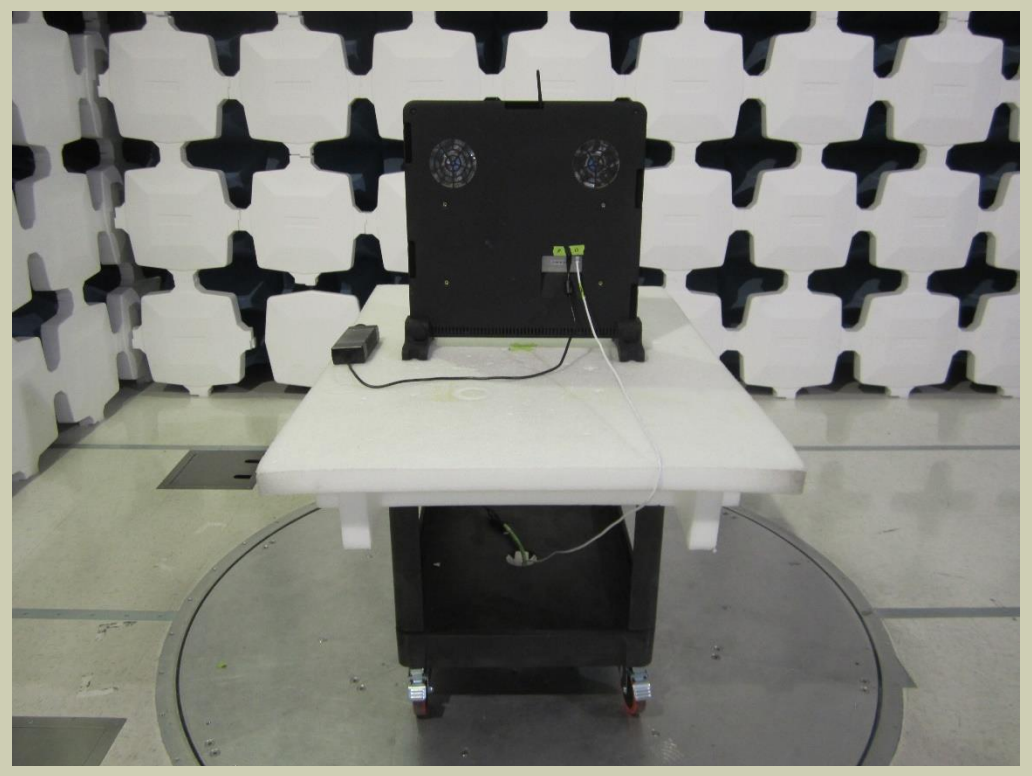
Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuA/m)	Spec. Limit (dBuA/m)	Compared to Spec. (dB)
21.015	15.7	-40.5	1.0	201.0	3.0	0.0	Para to GND	QP	0.0	-24.8	5.4	-30.2
22.454	10.9	-40.7	1.0	78.0	3.0	0.0	Para to GND	QP	0.0	-29.8	5.0	-34.8
29.039	5.3	-42.3	1.0	100.0	3.0	0.0	Para to GND	QP	0.0	-37.0	3.2	-40.2
0.186	38.1	-41.3	1.0	309.0	3.0	0.0	Para to GND	QP	0.0	-3.2	37.5	-40.7
0.381	31.9	-41.4	1.0	63.0	3.0	0.0	Para to GND	QP	0.0	-9.5	32.7	-42.2
12.050	5.5	-40.1	1.0	286.0	3.0	0.0	Para to GND	QP	0.0	-34.6	9.2	-43.8
2.071	16.9	-40.9	1.0	144.0	3.0	0.0	Para to GND	QP	0.0	-24.0	21.2	-45.2

CONCLUSION

Pass

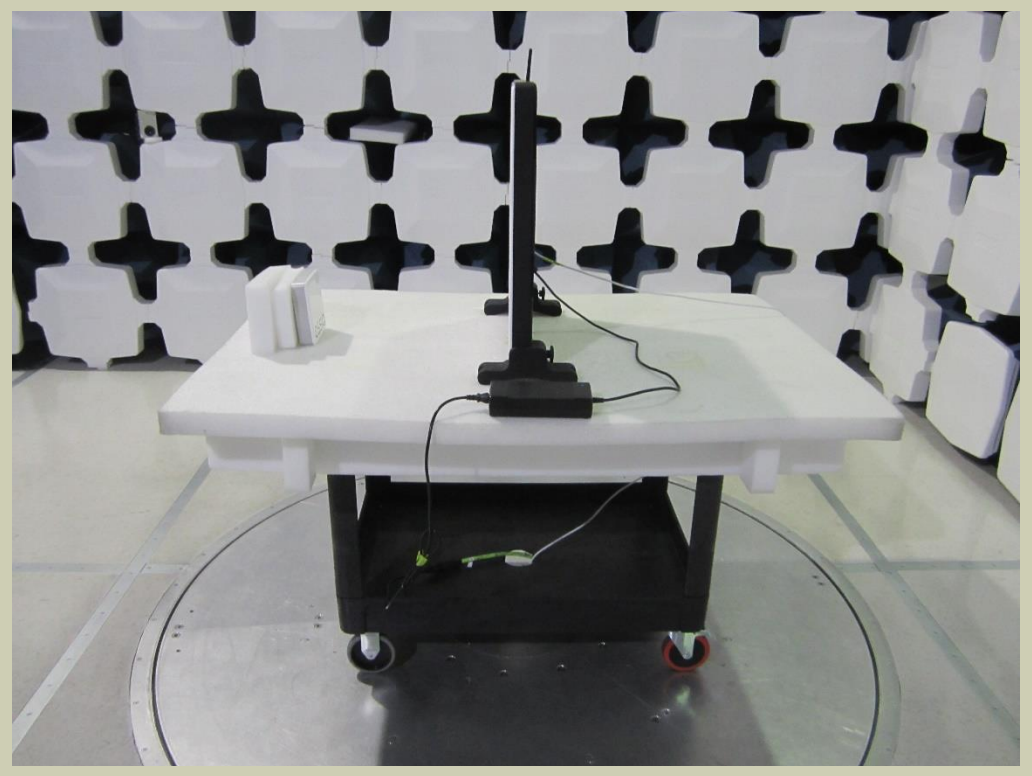
Tested By





RADIATED EMISSIONS

element
WTD.2021.04.01.1
EmiR5 2021.05.14.0
PSA-ESCI 2021.03.17.0



RADIATED EMISSIONS HIGH FREQUENCY

element
WTD.2021.04.01.1
EmiR5 2021.05.14.0
PSA-ESCI 2021.03.17.0

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, a final radiated emissions test was performed. The frequency range investigated (scanned), is also noted in this report. Radiated emissions measurements were made at the EUT azimuth and antenna height such that the maximum radiated emissions level was detected. This required the use of a turntable and an antenna positioner. The preferred method of a continuous azimuth search was utilized for frequency scans of the EUT field strength with both polarities of the measuring antenna. A calibrated, linearly polarized antenna was positioned at the specified distance from the periphery of the EUT. Tests were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. Though specified in the report, the measurement distance was 3 meters or 10 meters (from antenna to boundary of EUT). At any measurement distance, the antenna height was varied from 1 meter to 4 meters. These height scans apply for both horizontal and vertical polarization, except that for vertical polarization the minimum height of the center of the antenna was increased so that the lowest point of the bottom of the antenna cleared the ground surface by at least 25 cm.

The EUT arrangement is configured as equivalent to that occurring in normal use. Tabletop equipment is placed on a 0.8 meter high non-conductive table & for Floor-standing equipment, it is placed on, but insulated from a ground reference plane by the use of its own rollers or stand-off supports. If measurements above 1 GHz were required, the test setup was modified to meet the regulatory requirements for higher frequency measurements. If required, RF absorber was placed on the floor between the measurement antenna and EUT. If required, per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables.

The diameter of the illumination area is the dimension of the line tangent to the EUT formed by 3 dB beamwidth of the measurement antenna at the measurement distance. At a 3 meter test distance, the diameter of the illumination area was 3.8 meters at 1 GHz and greater than 2.1 meters up to 6 GHz. Above 1 GHz, when required by the measurement standard, the antenna is pointed for both azimuth and elevation to maintain the receive antenna within the cone of radiation from the EUT. The specified measurement detectors were used for comparison of the emissions to the peak and average specification limits.

The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	2020-10-28	2021-10-28
Antenna - Double Ridge	EMCO	3115	AHM	2020-07-01	2022-07-01
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVZ	2021-04-13	2022-04-13
Cable	Northwest EMC	3115 Horn Cable	NC2	2021-04-13	2022-04-13
Attenuator	Fairview Microwave	SA18E-20	AQV	2020-07-28	2021-07-28
Filter - High Pass	Micro-Tronics	HPM50111	HHI	2020-09-25	2021-09-25
Antenna - Standard Gain	EMCO	3160-07	AHP	NCR	NCR
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOK	2020-08-26	2021-08-26
Cable	High Speed Interconnects	EW292A-NGNG-300	NC3	2020-08-28	2021-08-28
Antenna - Standard Gain	EMCO	3160-08	AHO	NCR	NCR
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AOJ	2020-08-26	2021-08-26

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	5.2 dB	-5.2 dB

FREQUENCY RANGE INVESTIGATED

1 GHz TO 18 GHz

POWER INVESTIGATED

230VAC/50Hz

RADIATED EMISSIONS HIGH FREQUENCY

element
WTD.2021.04.01.1
EmiR5 2021.05.14.0
PSA-ESCI 2021.03.17.0

CONFIGURATIONS INVESTIGATED

OSSI0011-4

MODES INVESTIGATED

Wireless Power Transfer active to the Rx201.

RADIATED EMISSIONS HIGH FREQUENCY

element
WTD.2021.04.01.1
EmiR5 2021.05.14.0
PSA-ESCI 2021.03.17.0

EUT:	COTA Tx203	Work Order:	OSSI0011
Serial Number:	1	Date:	2021-06-18
Customer:	Ossia Inc.	Temperature:	22.9°C
Attendees:	Luis Mendez, Travis Farley	Relative Humidity:	41.6%
Customer Project:	None	Bar. Pressure:	1022 mb
Tested By:	Brian Fahey	Job Site:	NC01
Power:	230VAC/50Hz	Configuration:	OSSI0011-4

TEST SPECIFICATIONS

Specification:	Method:
EN 55011:2009 (Amended by A1:2010) Class B Group 2	CISPR 11:2015 +A1:2016 +A2:2019

TEST PARAMETERS

Run #:	41	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

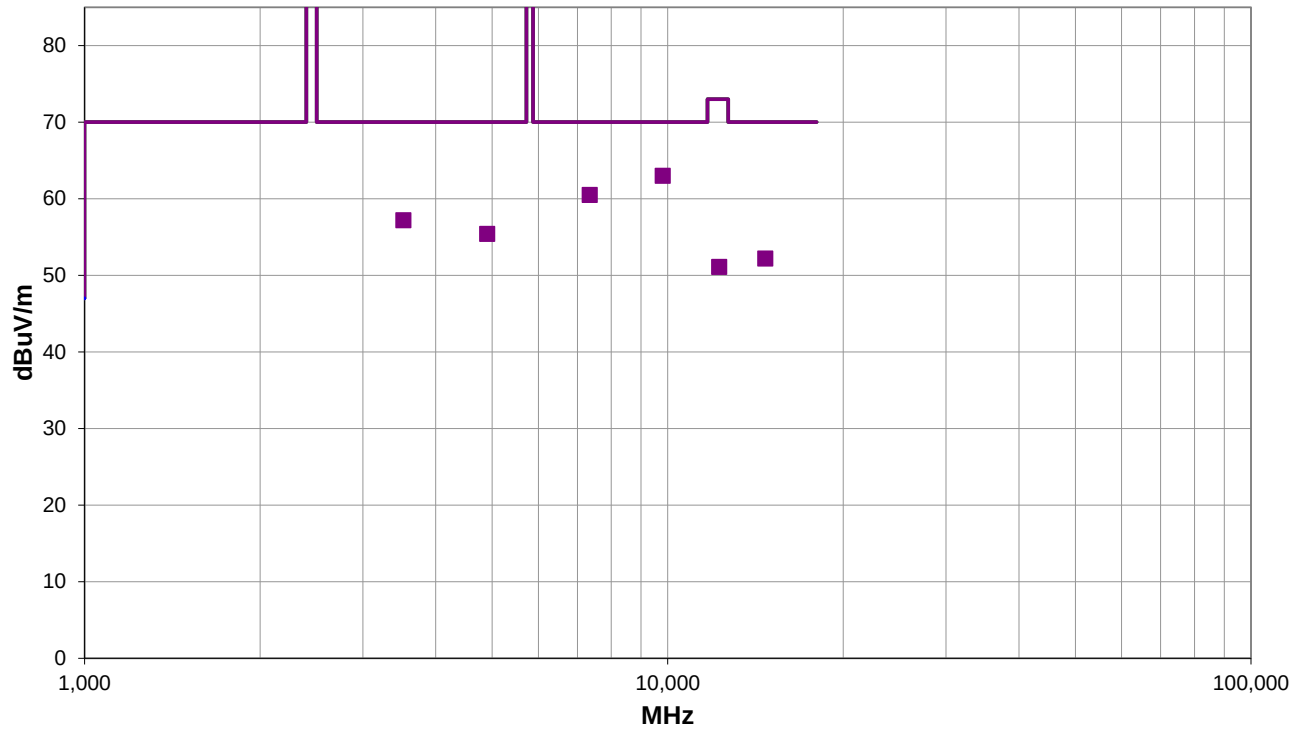
Tx203 and Rx201 are spaced 0.5 meter apart. Additional absorber material on the clock buffers. Common mode at 0.8V and amplitude is 130mV.

EUT OPERATING MODES

Wireless Power Transfer active to the Rx201.

DEVIATIONS FROM TEST STANDARD

None



Run #: 41 ■ PK ◆ AV ● QP

RADIATED EMISSIONS HIGH FREQUENCY

element
WTD.2021.04.01.1
EmiR5 2021.05.14.0
PSA-ESCI 2021.03.17.0

RESULTS - Run #41

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
9800.017	65.6	-2.6	1.31	302.0	3.0	0.0	Horz	PK	0.0	63.0	70.0	-7.0
7349.800	44.8	15.7	1.16	313.0	3.0	0.0	Vert	PK	0.0	60.5	70.0	-9.5
3521.842	53.1	4.1	1.68	128.0	3.0	0.0	Horz	PK	0.0	57.2	70.0	-12.8
4899.892	45.1	10.3	1.22	328.0	3.0	0.0	Vert	PK	0.0	55.4	70.0	-14.6
14700.180	45.2	7.0	1.22	232.0	3.0	0.0	Vert	PK	0.0	52.2	70.0	-17.8
12250.210	51.7	-0.6	1.2	99.0	3.0	0.0	Horz	PK	0.0	51.1	73.0	-21.9

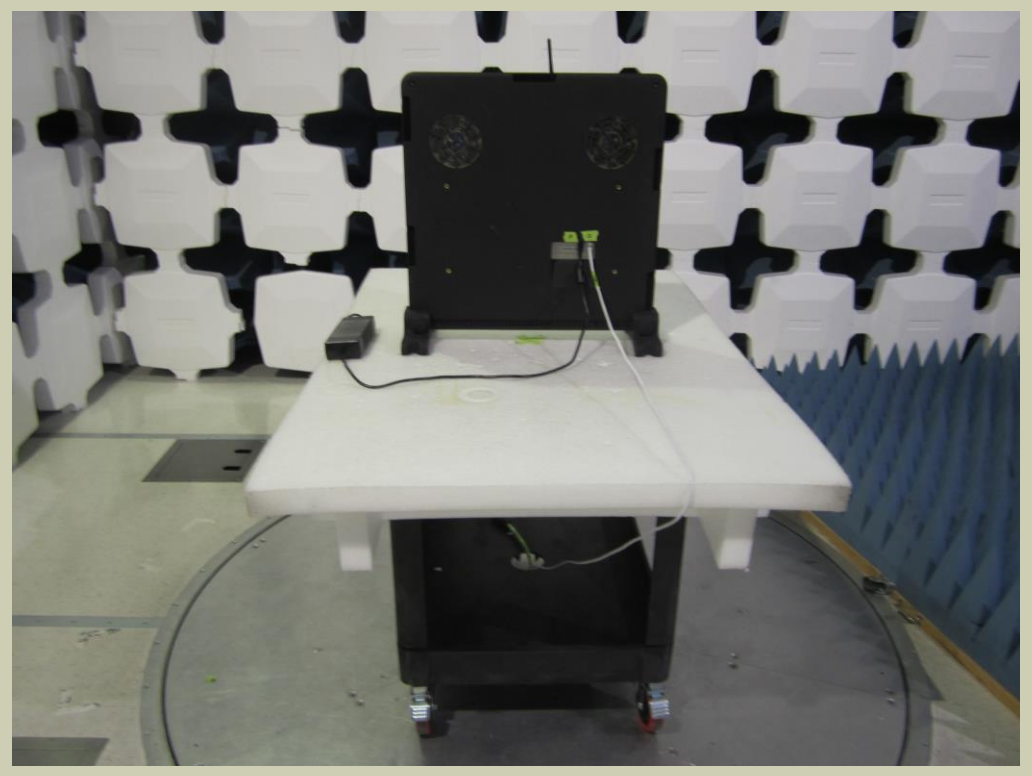
CONCLUSION

Pass

Tested By

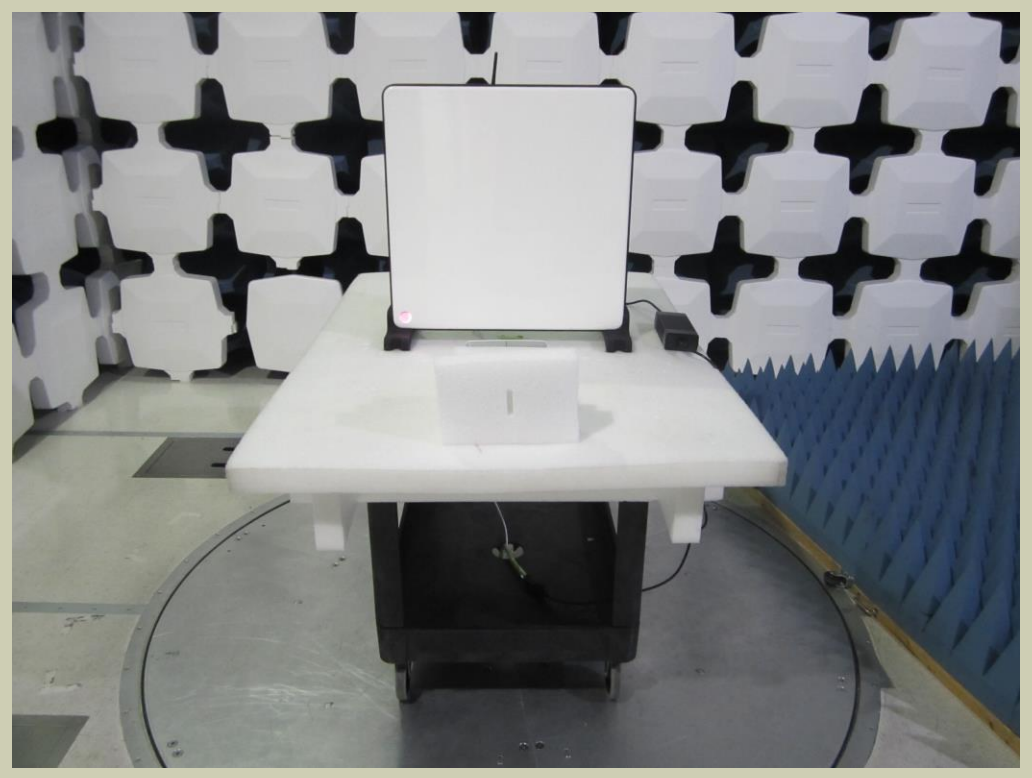
RADIATED EMISSIONS HIGH FREQUENCY

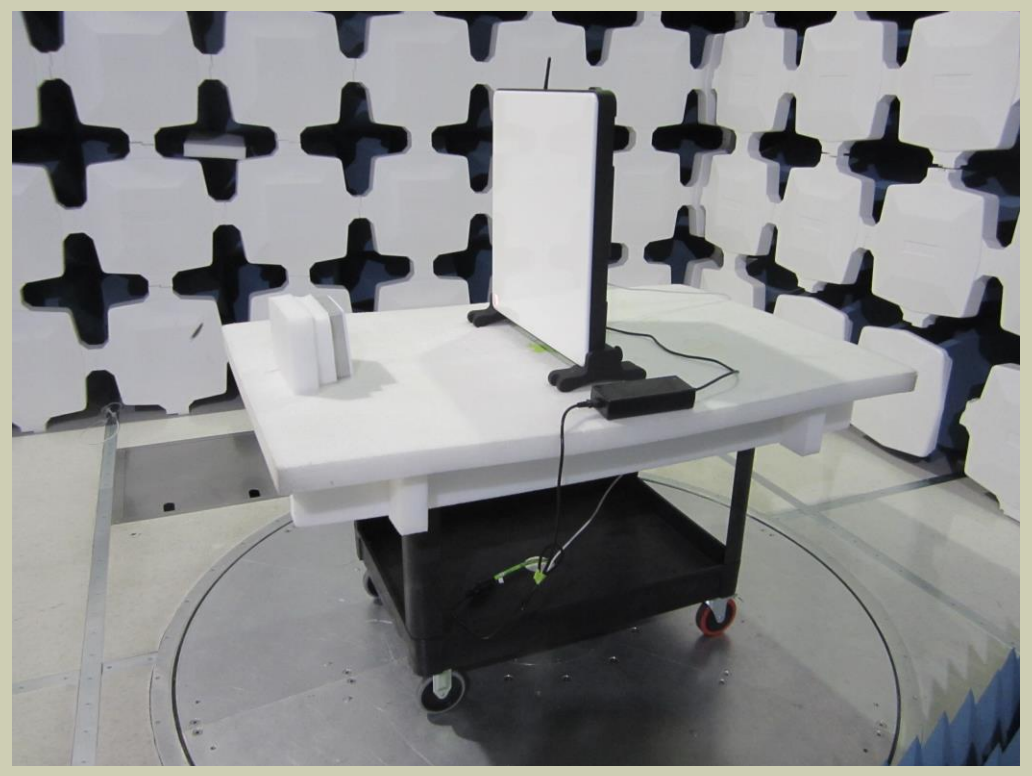
element
WTD.2021.04.01.1
EmiR5 2021.05.14.0
PSA-ESCI 2021.03.17.0



RADIATED EMISSIONS HIGH FREQUENCY

element
WTD.2021.04.01.1
EmiR5 2021.05.14.0
PSA-ESCI 2021.03.17.0





CONDUCTED EMISSIONS

element
WTD.2021.04.01.1
EmiR5 2021.05.14.0
PSA-ESCI 2021.03.17.0

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50ohm measuring port is terminated by a 50ohm EMI meter or a 50ohm resistive load. All 50ohm measuring ports of the LISN are terminated by 50ohm. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Rohde & Schwarz	ESCI	ARE	2020-10-01	2021-10-01
Cable - Conducted Cable Assembly	Northwest EMC	NC4, HHF, TYL	NC4A	2021-02-26	2022-02-26
LISN	Solar Electronics	9252-50-R-24-BNC	LIM	2020-07-09	2021-07-09

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.6 dB	-2.6 dB

CONFIGURATIONS INVESTIGATED

OSSI0011-4

MODES INVESTIGATED

Wireless Power Transfer active to the Rx201.

CONDUCTED EMISSIONS

element
WTD.2021.04.01.1
EmiR5 2021.05.14.0
PSA-ESCI 2021.03.17.0

EUT:	COTA Tx203	Work Order:	OSSI0011
Serial Number:	1	Date:	2021-06-17
Customer:	Ossia Inc.	Temperature:	22.6°C
Attendees:	Luis Mendez, Travis Farley	Relative Humidity:	44.4%
Customer Project:	None	Bar. Pressure:	1024 mb
Tested By:	Brian Fahey	Job Site:	NC05
Power:	230VAC/50Hz	Configuration:	OSSI0011-4

TEST SPECIFICATIONS

Specification: Equipment Class B	Method:
EN 55011:2009 (Amended by A1:2010) Class B Group 2	CISPR 11:2015 +A1:2016 +A2:2019

TEST PARAMETERS

Run #:	16	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

Tx203 and Rx201 are spaced 0.75 meter apart.

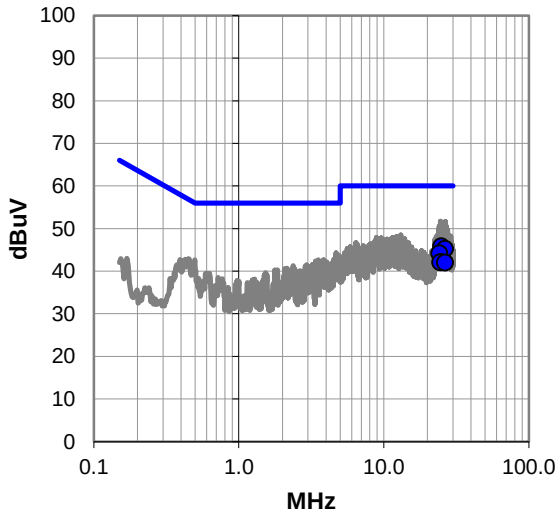
EUT OPERATING MODES

Wireless Power Transfer active to the Rx201.

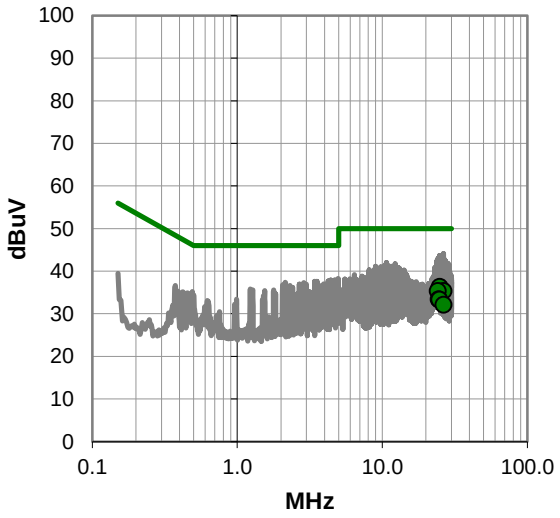
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



CONDUCTED EMISSIONS

element
WTD.2021.04.01.1
EmiR5 2021.05.14.0
PSA-ESCI 2021.03.17.0

RESULTS - Run #16

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
24.916	23.7	22.1	45.8	60.0	-14.2
26.499	22.9	22.3	45.2	60.0	-14.8
24.201	22.1	22.1	44.2	60.0	-15.8
24.847	20.0	22.1	42.1	60.0	-17.9
24.582	20.0	22.1	42.1	60.0	-17.9
26.475	19.7	22.3	42.0	60.0	-18.0

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
24.916	14.2	22.1	36.3	50.0	-13.7
26.499	13.0	22.3	35.3	50.0	-14.7
24.201	13.2	22.1	35.3	50.0	-14.7
24.582	11.3	22.1	33.4	50.0	-16.6
24.847	11.2	22.1	33.3	50.0	-16.7
26.475	9.8	22.3	32.1	50.0	-17.9

CONCLUSION

Pass

Tested By

CONDUCTED EMISSIONS

element
WTD.2021.04.01.1
EmiR5 2021.05.14.0
PSA-ESCI 2021.03.17.0

EUT:	COTA Tx203	Work Order:	OSSI0011
Serial Number:	1	Date:	2021-06-17
Customer:	Ossia Inc.	Temperature:	22.6°C
Attendees:	Luis Mendez, Travis Farley	Relative Humidity:	44.4%
Customer Project:	None	Bar. Pressure:	1024 mb
Tested By:	Brian Fahey	Job Site:	NC05
Power:	230VAC/50Hz	Configuration:	OSSI0011-4

TEST SPECIFICATIONS

Specification: Equipment Class B	Method:
EN 55011:2009 (Amended by A1:2010) Class B Group 2	CISPR 11:2015 +A1:2016 +A2:2019

TEST PARAMETERS

Run #:	17	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

Tx203 and Rx201 are spaced 0.75 meter apart.

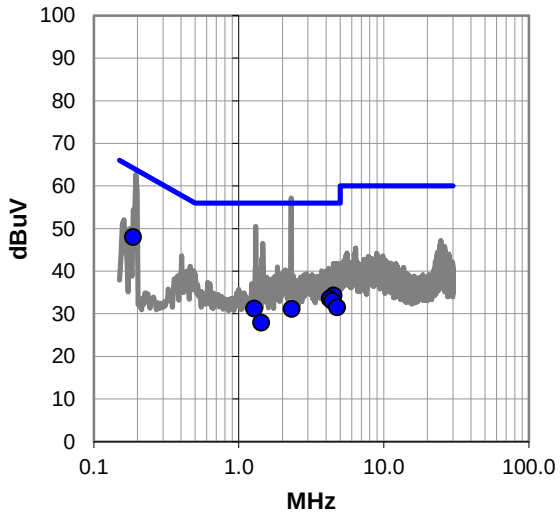
EUT OPERATING MODES

Wireless Power Transfer active to the Rx201.

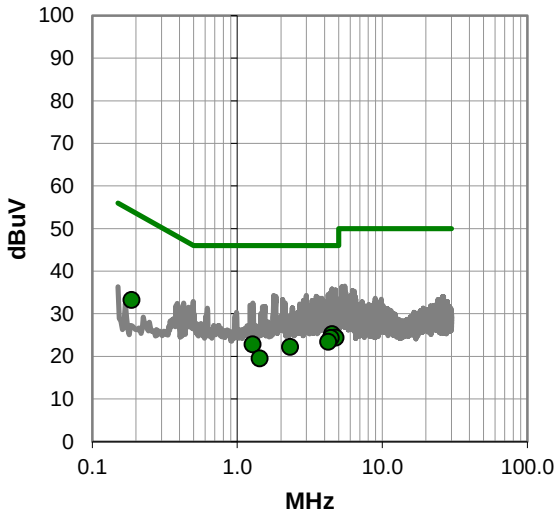
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



CONDUCTED EMISSIONS

element
WTD.2021.04.01.1
EmiR5 2021.05.14.0
PSA-ESCI 2021.03.17.0

RESULTS - Run #17

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.187	27.6	20.4	48.0	64.2	-16.2
4.509	13.7	20.6	34.3	56.0	-21.7
4.249	12.9	20.6	33.5	56.0	-22.5
4.418	12.4	20.6	33.0	56.0	-23.0
4.767	10.9	20.6	31.5	56.0	-24.5
1.275	10.9	20.3	31.2	56.0	-24.8
2.317	10.6	20.5	31.1	56.0	-24.9
1.429	7.6	20.3	27.9	56.0	-28.1

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
4.509	4.6	20.6	25.2	46.0	-20.8
0.187	12.8	20.4	33.2	54.2	-21.0
4.767	3.8	20.6	24.4	46.0	-21.6
4.418	3.7	20.6	24.3	46.0	-21.7
4.249	2.8	20.6	23.4	46.0	-22.6
1.275	2.5	20.3	22.8	46.0	-23.2
2.317	1.7	20.5	22.2	46.0	-23.8
1.429	-0.8	20.3	19.5	46.0	-26.5

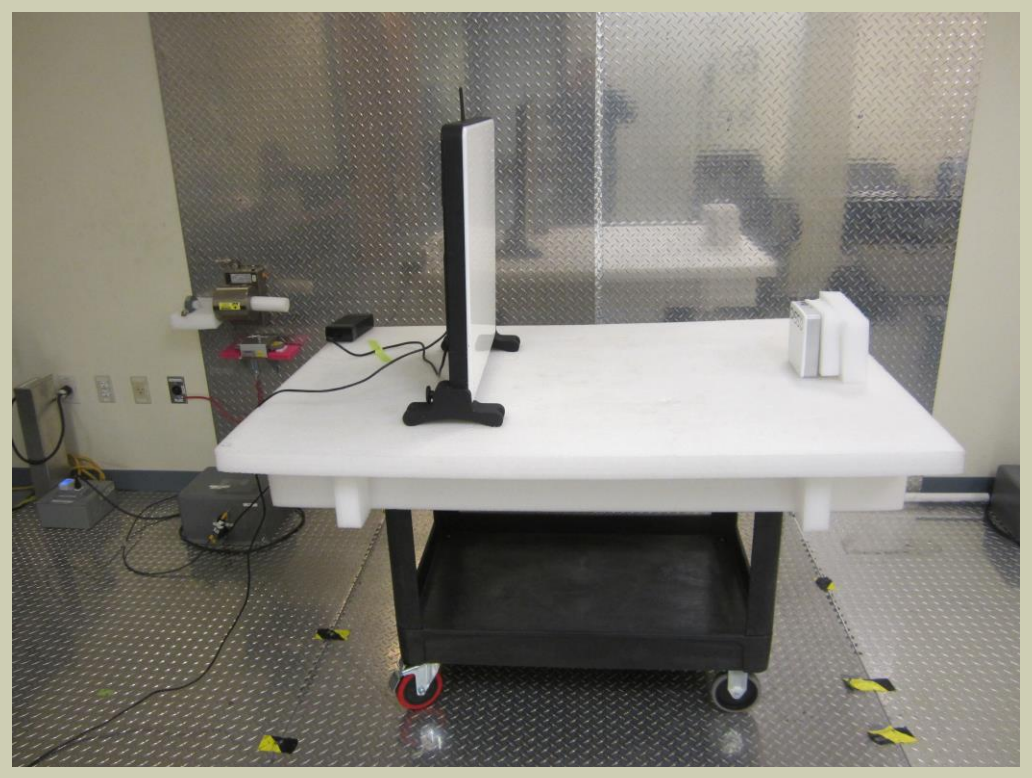
CONCLUSION

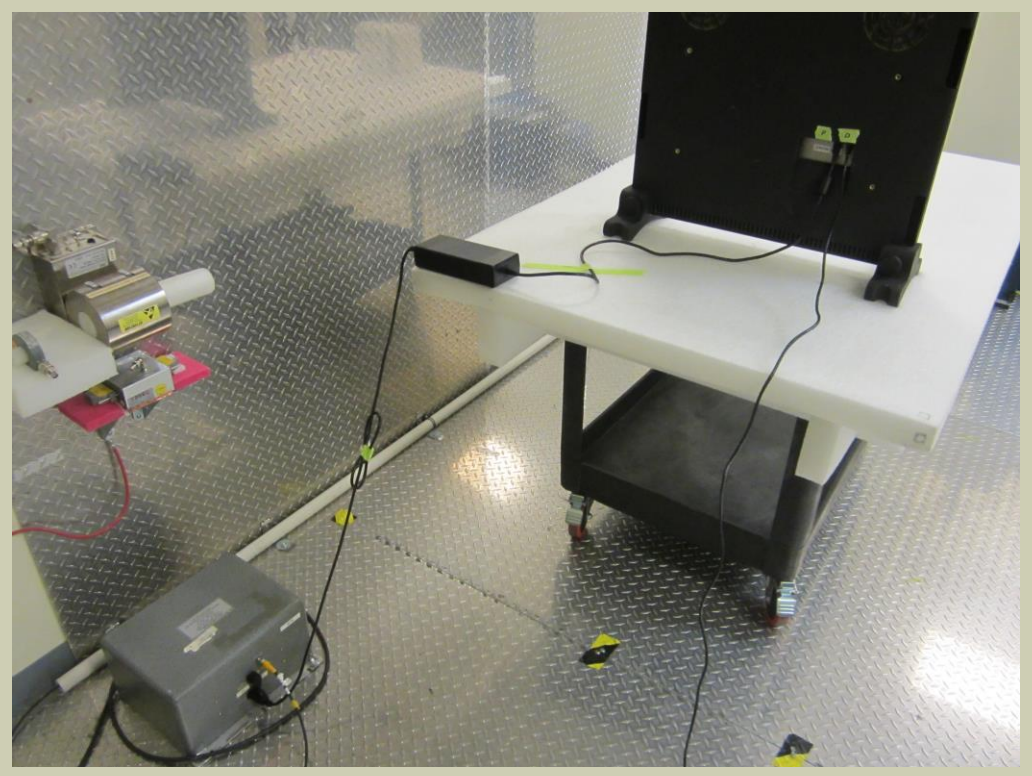
Pass

Tested By

CONDUCTED EMISSIONS

element
WTD.2021.04.01.1
EmiR5 2021.05.14.0
PSA-ESCI 2021.03.17.0





HARMONIC CURRENT EMISSIONS

element
WTD.2021.04.01.1

TEST DESCRIPTION

This test measures the harmonic currents injected into the AC mains by the EUT. It is applicable to electrical and electronic equipment having an input current up to and including 16A per phase, and intended to be connected to public low-voltage distribution systems of between 220 V and 250 V at 50 Hz line to neutral.

The test is conducted using frequency domain instrumentation as described in EN 61000-3-2 Annex B. The amplitude of each specific harmonic is measured.

The necessary observation period for the test is determined by the repeating the test until the repeatability requirement, as stated in standard in paragraph 6.3.2.1 has been met.

The repeatability of the average value for the individual harmonic currents over the entire test observation period shall be better than ±5 % of the applicable limit, when the following conditions are met:
– the same equipment under test (EUT);
– identical test conditions;
– the same test system;
– identical climatic conditions, if relevant.

Equipment Classification

Class A: *Balanced three-phase equipment, household appliances, tools (excluding portable), dimmers for incandescent lamps, audio equipment.*
Equipment not specified in one of the three other classes shall be Class A

Class B: *Portable tools, Arc welding equipment*

Class C: *Lighting equipment*

Class D: *Equipment having specified power according to EN 61000-3-2 of P≤ 600 W, of the following equipment types:*
Personal Computers, Personal Computer Monitors and Television Receivers.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Harmonics/Flicker Tester	Teseq	5001IX-CTS-160-413-TSQ	THV	2021-02-11	2022-02-11
Power Supply - AC	Teseq	NSG 1007-5	THW	2021-02-11	2022-02-11

CONFIGURATIONS INVESTIGATED

OSSI0011-4

MODES INVESTIGATED

Wireless Power Transfer active to the Rx201.

HARMONIC CURRENT EMISSIONS

element
WTD.2021.04.01.1

EUT:	COTA Tx203	Work Order:	OSSI0011
Serial Number:	1	Date:	2021-06-18
Customer:	Ossia Inc.	Temperature:	24.1°C
Attendees:	Travis Farley	Relative Humidity:	41.2%
Customer Project:	None	Bar. Pressure:	1014.8 mbar
Tested By:	Brian Fahey	Job Site:	NC03
Power:	230VAC/50Hz	Configuration:	OSSI0011-4

TEST SPECIFICATIONS

Specification:	Method:
EN 61000-3-2:2014	IEC 61000-3-2:2018

TEST PARAMETERS

Equipment Class:	A	Fund. Current (A):	0.353	Power Factor:	0.839	Test Duration (min):	2.5
Ave. Input Curr. (A):	0.385	Maximum THC (A):	0.102	Meas. Power (W):	71.2		

COMMENTS

None

EUT OPERATING MODES

Wireless Power Transfer active to the Rx201.

DEVIATIONS FROM TEST STANDARD

None

RESULTS

Pass
Repeatability of results of measurements Passed.

Tested By

HARMONIC CURRENT EMISSIONS

element
WTD.2021.04.01.1

TEST 1

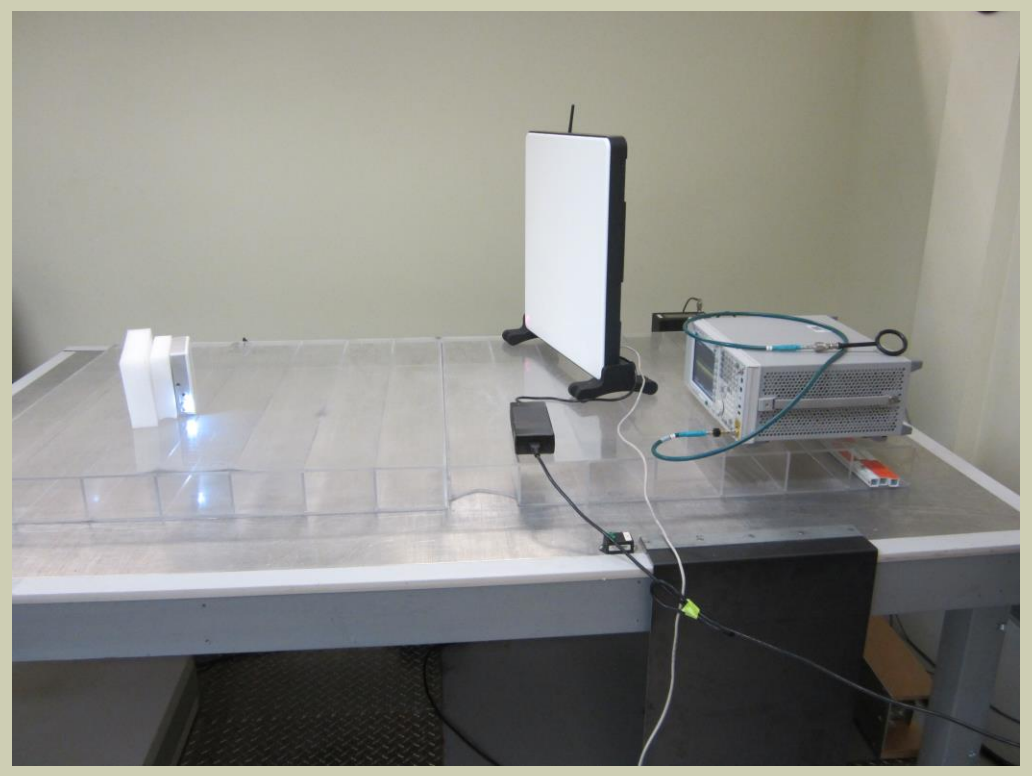
Harmonic	Limit 1 (L1)	Limit 2 (L2)	Average (AV) Reading	AV < L1	AV < L2	Max Reading	Max < L2	Pass/Fail
2	1.080A	1.620A	0.001A	Y	Y	0.002A	Y	Pass
3	2.300A	3.450A	0.092A	Y	Y	0.094A	Y	Pass
4	0.430A	0.645A	0.001A	Y	Y	0.001A	Y	Pass
5	1.140A	1.710A	0.035A	Y	Y	0.035A	Y	Pass
6	0.300A	0.450A	0.000A	Y	Y	0.001A	Y	Pass
7	0.770A	1.155A	0.015A	Y	Y	0.015A	Y	Pass
8	0.230A	0.345A	0.000A	Y	Y	0.001A	Y	Pass
9	0.400A	0.600A	0.010A	Y	Y	0.011A	Y	Pass
10	0.184A	0.276A	0.000A	Y	Y	0.001A	Y	Pass
11	0.330A	0.495A	0.009A	Y	Y	0.009A	Y	Pass
12	0.153A	0.230A	0.000A	Y	Y	0.001A	Y	Pass
13	0.210A	0.315A	0.008A	Y	Y	0.008A	Y	Pass
14	0.131A	0.197A	0.000A	Y	Y	0.001A	Y	Pass
15	0.150A	0.225A	0.005A	Y	Y	0.006A	Y	Pass
16	0.115A	0.173A	0.000A	Y	Y	0.001A	Y	Pass
17	0.132A	0.198A	0.006A	Y	Y	0.006A	Y	Pass
18	0.102A	0.153A	0.000A	Y	Y	0.001A	Y	Pass
19	0.118A	0.178A	0.009A	Y	Y	0.009A	Y	Pass
20	0.092A	0.138A	0.001A	Y	Y	0.001A	Y	Pass
21	0.107A	0.161A	0.005A	Y	Y	0.005A	Y	Pass
22	0.084A	0.125A	0.000A	Y	Y	0.001A	Y	Pass
23	0.098A	0.147A	0.003A	Y	Y	0.003A	Y	Pass
24	0.077A	0.115A	0.000A	Y	Y	0.001A	Y	Pass
25	0.090A	0.135A	0.007A	Y	Y	0.007A	Y	Pass
26	0.071A	0.107A	0.000A	Y	Y	0.001A	Y	Pass
27	0.083A	0.125A	0.004A	Y	Y	0.005A	Y	Pass
28	0.066A	0.099A	0.001A	Y	Y	0.001A	Y	Pass
29	0.078A	0.116A	0.004A	Y	Y	0.004A	Y	Pass
30	0.061A	0.092A	0.000A	Y	Y	0.001A	Y	Pass
31	0.073A	0.109A	0.003A	Y	Y	0.003A	Y	Pass
32	0.058A	0.086A	0.001A	Y	Y	0.001A	Y	Pass
33	0.068A	0.102A	0.003A	Y	Y	0.004A	Y	Pass
34	0.054A	0.081A	0.000A	Y	Y	0.001A	Y	Pass
35	0.064A	0.096A	0.003A	Y	Y	0.003A	Y	Pass
36	0.051A	0.077A	0.000A	Y	Y	0.001A	Y	Pass
37	0.061A	0.091A	0.003A	Y	Y	0.003A	Y	Pass
38	0.048A	0.073A	0.000A	Y	Y	0.001A	Y	Pass
39	0.058A	0.087A	0.004A	Y	Y	0.004A	Y	Pass
40	0.046A	0.069A	0.001A	Y	Y	0.001A	Y	Pass

TEST 2

Harmonic	Limit 1 (L1)	Limit 2 (L2)	Average (AV) Reading	AV < L1	AV < L2	Max Reading	Max < L2	Pass/Fail
2	1.080A	1.620A	0.001A	Y	Y	0.002A	Y	Pass
3	2.300A	3.450A	0.092A	Y	Y	0.094A	Y	Pass
4	0.430A	0.645A	0.001A	Y	Y	0.001A	Y	Pass
5	1.140A	1.710A	0.035A	Y	Y	0.035A	Y	Pass
6	0.300A	0.450A	0.000A	Y	Y	0.001A	Y	Pass
7	0.770A	1.155A	0.015A	Y	Y	0.015A	Y	Pass
8	0.230A	0.345A	0.000A	Y	Y	0.001A	Y	Pass
9	0.400A	0.600A	0.010A	Y	Y	0.011A	Y	Pass
10	0.184A	0.276A	0.000A	Y	Y	0.001A	Y	Pass
11	0.330A	0.495A	0.009A	Y	Y	0.009A	Y	Pass
12	0.153A	0.230A	0.000A	Y	Y	0.001A	Y	Pass
13	0.210A	0.315A	0.008A	Y	Y	0.008A	Y	Pass
14	0.131A	0.197A	0.000A	Y	Y	0.001A	Y	Pass
15	0.150A	0.225A	0.005A	Y	Y	0.006A	Y	Pass
16	0.115A	0.173A	0.000A	Y	Y	0.001A	Y	Pass
17	0.132A	0.198A	0.006A	Y	Y	0.006A	Y	Pass
18	0.102A	0.153A	0.000A	Y	Y	0.001A	Y	Pass
19	0.118A	0.178A	0.009A	Y	Y	0.009A	Y	Pass
20	0.092A	0.138A	0.000A	Y	Y	0.001A	Y	Pass
21	0.107A	0.161A	0.005A	Y	Y	0.006A	Y	Pass
22	0.084A	0.125A	0.000A	Y	Y	0.000A	Y	Pass
23	0.098A	0.147A	0.003A	Y	Y	0.003A	Y	Pass
24	0.077A	0.115A	0.000A	Y	Y	0.000A	Y	Pass
25	0.090A	0.135A	0.007A	Y	Y	0.007A	Y	Pass
26	0.071A	0.107A	0.000A	Y	Y	0.001A	Y	Pass
27	0.083A	0.125A	0.004A	Y	Y	0.005A	Y	Pass
28	0.066A	0.099A	0.001A	Y	Y	0.001A	Y	Pass
29	0.078A	0.116A	0.004A	Y	Y	0.004A	Y	Pass
30	0.061A	0.092A	0.000A	Y	Y	0.001A	Y	Pass
31	0.073A	0.109A	0.003A	Y	Y	0.003A	Y	Pass
32	0.058A	0.086A	0.001A	Y	Y	0.001A	Y	Pass
33	0.068A	0.102A	0.003A	Y	Y	0.004A	Y	Pass
34	0.054A	0.081A	0.000A	Y	Y	0.001A	Y	Pass
35	0.064A	0.096A	0.002A	Y	Y	0.003A	Y	Pass
36	0.051A	0.077A	0.000A	Y	Y	0.000A	Y	Pass
37	0.061A	0.091A	0.003A	Y	Y	0.004A	Y	Pass
38	0.048A	0.073A	0.000A	Y	Y	0.001A	Y	Pass
39	0.058A	0.087A	0.004A	Y	Y	0.004A	Y	Pass
40	0.046A	0.069A	0.001A	Y	Y	0.001A	Y	Pass

HARMONIC CURRENT EMISSIONS

element
WTD.2021.04.01.1



VOLTAGE FLUCTUATIONS AND FLICKER

element
WTD.2021.04.01.1

TEST DESCRIPTION

This test measures the voltage fluctuations and flicker impressed on the AC mains by the EUT. It is applicable to electrical and electronic equipment having an input current up to and including 16A per phase, and intended to be connected to public low-voltage distribution systems of between 220 V and 250 V at 50 Hz line to neutral.

The test is conducted using frequency domain instrumentation as described in EN 61000-3-3 Section 4. All types of voltage fluctuations are assessed at the supply terminals of the EUT by direct measurement using a flickermeter, which complies with the specification given in IEC 868.

The percentage total harmonic distortion of the supply voltage shall be less than 3%.

Equipment that employs varying duty cycle or multiple loads operating simultaneously is evaluated against the Plt (Long Term Flicker) requirement. The value is made up of 12 consecutive Pst (Short Term Flicker) values per the specified formula. All other equipment is assessed against the Pst requirement.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Harmonics/Flicker Tester	Teseq	5001IX-CTS-160-413-TSQ	THV	2021-02-11	2022-02-11
Power Supply - AC	Teseq	NSG 1007-5	THW	2021-02-11	2022-02-11

CONFIGURATIONS INVESTIGATED

OSSI0011-4

MODES INVESTIGATED

Wireless Power Transfer active to the Rx201.

VOLTAGE FLUCTUATIONS AND FLICKER

element
WTD.2021.04.01.1

EUT:	COTA Tx203	Work Order:	OSSI0011
Serial Number:	1	Date:	2021-06-18
Customer:	Ossia Inc.	Temperature:	24°C
Attendees:	Travis Farley	Relative Humidity:	41.9%
Customer Project:	None	Bar. Pressure:	1015.8 mbar
Tested By:	Brian Fahey	Job Site:	NC03
Power:	230VAC/50Hz	Configuration:	OSSI0011-4

TEST SPECIFICATIONS

Specification:	Method:
EN 61000-3-3:2013	IEC 61000-3-3:2013 +A1:2017

COMMENTS

None

EUT OPERATING MODES

Wireless Power Transfer active to the Rx201.

DEVIATIONS FROM TEST STANDARD

None

TEST PARAMETERS

Periods Run	N = 1

TEST DATA

Parameter	Limit	Reading	Result
dc - the relative steady-state voltage change	3.3%	0	Pass
dmax - the maximum relative voltage change	4% (without additional conditions)	0	Pass
d(t) - the relative voltage change **	Shall not exceed 3.3% for more than 500ms	0	Pass
Pst - short-term flicker	1.0	0.064	Pass
Plt - long-term flicker	0.65	0.064	Pass

The time function of the r.m.s. voltage change evaluated as a single value for each successive half period between zero-crossings of the source voltage between time intervals in which the voltage is in a steady-state condition for at least 1 s.

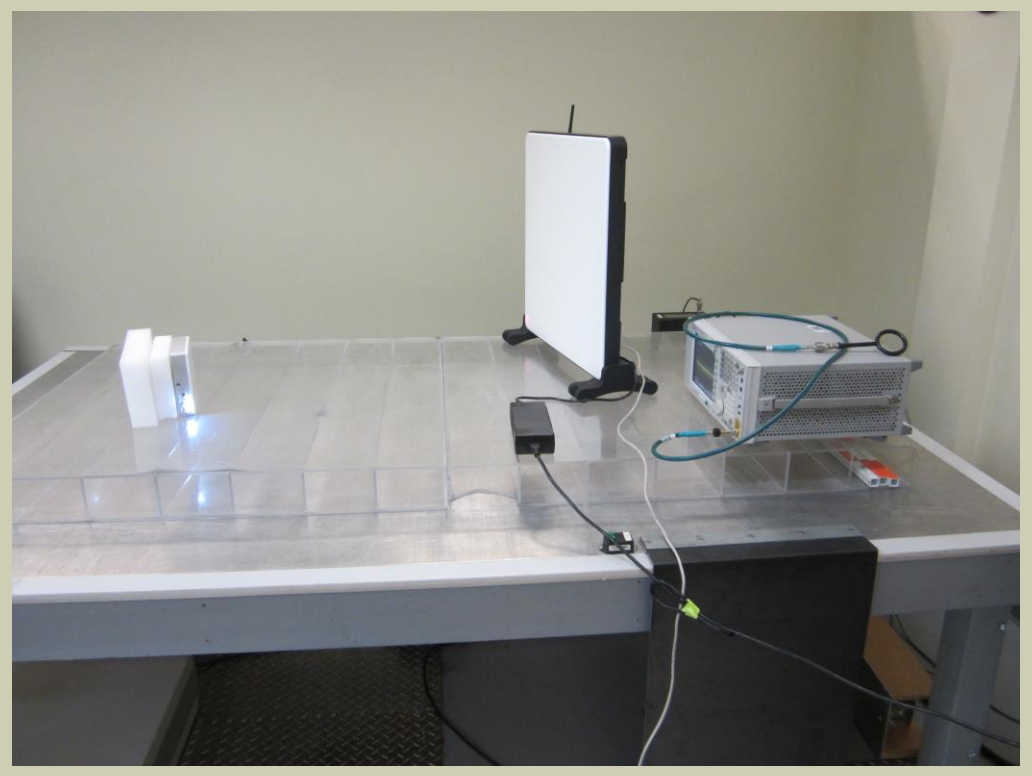
RESULTS

Pass

Tested By

VOLTAGE FLUCTUATIONS AND FLICKER

element
WTD.2021.04.01.1



ELECTROSTATIC DISCHARGE (ESD)

element
WTD.2021.04.01.1

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, the ESD Immunity test was performed according to the test method and the product related standard(s) listed on the data sheets. If called out, contact discharges were applied to the conductive accessible surfaces of the EUT and the coupling plane(s). If called out, air discharges were applied to accessible insulating surfaces and conductive non-accessible portions of accessible parts of the EUT as required by the product related standard. The number of discharges specified on the data sheets applies to each test voltage, preselected point, and each polarity (ie 25 at +4 kV and 25 at -4 kV). If the EUT was tested with a vertical coupling plane, testing on all four sides (front, back, left, right) was performed unless otherwise noted. The pictures depict one of those orientations. For devices isolated from protective earth, a resistor network was used to drain residual charges between ESD pulses, and where allowable by the standard, additional time greater than one second may have been used between discharges. If a response was detected after discharge, the type of response, discharge level, and location were noted.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
ESD Gun	Teseq	NSG 437	IGM	2021-03-25	2021-09-25
Meter - Multimeter	Fluke	111	MMM	2019-02-28	2022-02-28

CONFIGURATIONS INVESTIGATED

OSSI0011-4

MODES INVESTIGATED

Wireless Power Transfer active to the Rx201.

ELECTROSTATIC DISCHARGE (ESD)

element
WTD.2021.04.01.1

EUT:	COTA Tx203	Work Order:	OSSI0011
Serial Number:	1	Date:	2021-06-24
Customer:	Ossia Inc.	Temperature:	23.9°C
Attendees:	Travis Farley	Relative Humidity:	44.4%
Customer Project:	None	Bar. Pressure:	1013.8 mbar
Tested By:	Brian Fahey	Job Site:	NC05
Power:	230VAC/50Hz	Configuration:	OSSI0011-4

TEST SPECIFICATIONS

Specification:	Method:
EN 61000-6-1:2007	IEC 61000-4-2:2008

TEST PARAMETERS

Energy Storage Capacitor:	150pf	Discharge Resistance:	330 ohms
Polarity of Output Voltage:	Positive and Negative	Time Between Successive Discharges:	>= 1 sec

COMMENTS

None

EUT OPERATING MODES

Power Transfer active to the Rx201.

DEVIATIONS FROM TEST STANDARD

None

EUT FUNCTIONS MONITORED

Monitored the WPT via a remote laptop and verified that there were no anomalies.

TEST RESULT

See the following data sheets.

CONCLUSION

Meets Element Performance Criteria	A

The EUT exhibited no change in performance when operating as specified by the manufacturer.

Tested By

ELECTROSTATIC DISCHARGE (ESD)

element
WTD.2021.04.01.1

TEST LEVELS

Discharge Type	Discharge Level (kV)		Number Of Discharges Per Location (Each Polarity)
	Positive	Negative	
Air – Direct	8	8	10
Contact – Direct	4	4	10
Contact – Indirect	4	4	10

OBSERVATIONS (Direct Discharges: Air)

Test Point	Voltage (kV)	Polarity	Result
1	8	+/-	1
2	8	+/-	1
3	8	+/-	1
4	8	+/-	1
5	8	+/-	1
6	8	+/-	1
7	8	+/-	1
8	8	+/-	1
9	8	+/-	2
10	8	+/-	2
11	8	+/-	2
12	8	+/-	2
13	8	+/-	2
21	8	+/-	2
22	8	+/-	1
23	8	+/-	1
24	8	+/-	1
25	8	+/-	1
26	8	+/-	1
27	8	+/-	1

OBSERVATIONS (Direct Discharges: Contact)

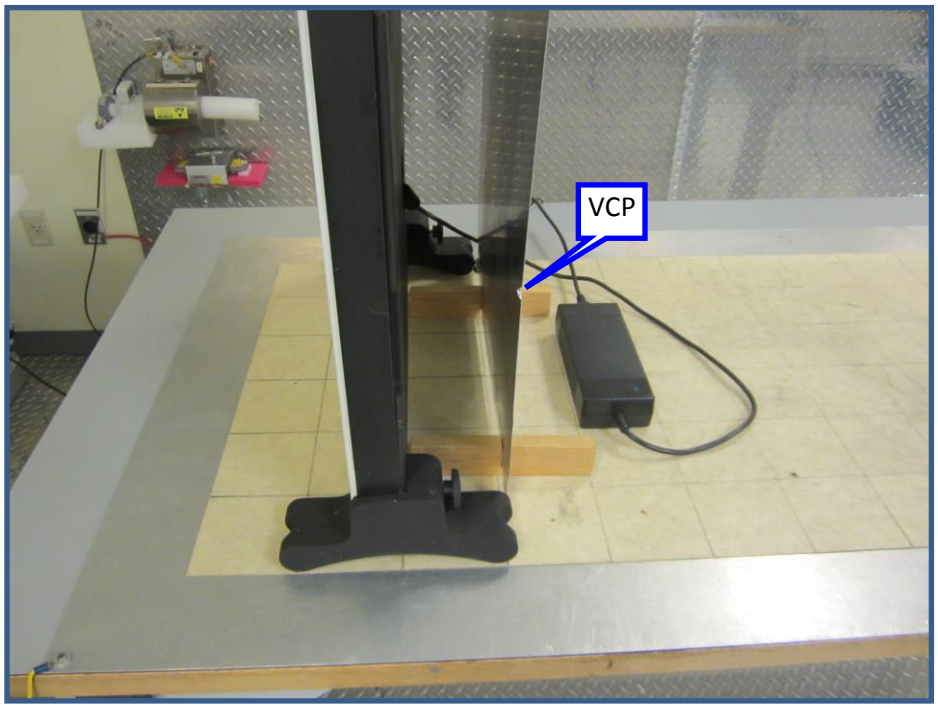
Test Point	Voltage (kV)	Polarity	Result
14	4	+/-	2
15	4	+/-	2
16	4	+/-	2
17	4	+/-	2
18	4	+/-	2
19	4	+/-	2
20	4	+/-	2

OBSERVATIONS (Indirect Discharges)

Test Point	Voltage (kV)	Polarity	Result
VCP - Front	4	+/-	1
VCP - Rear	4	+/-	1
VCP - Left	4	+/-	1
VCP - Right	4	+/-	1
HCP - Top	4	+/-	1
HCP - Bottom	4	+/-	1

RESULT DESCRIPTIONS

Result Number	Description
X	Not performed nor required.
1	Criteria A – No perceived discharge, no observed response from EUT.
2	Criteria A – Discharge observed, no observed response from EUT.



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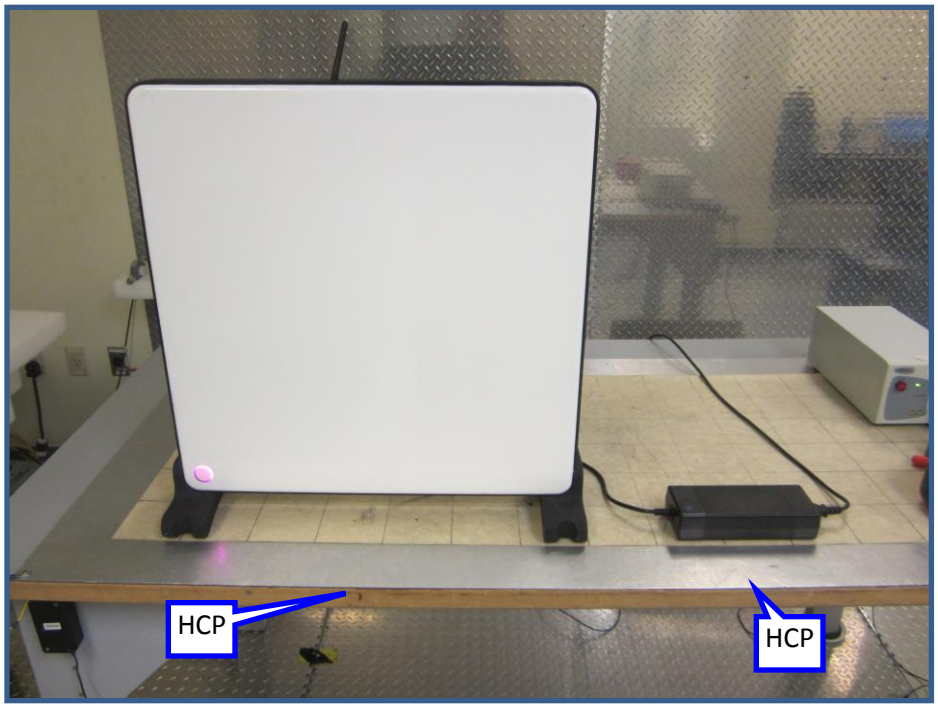


Image 2

ELECTROSTATIC DISCHARGE (ESD)

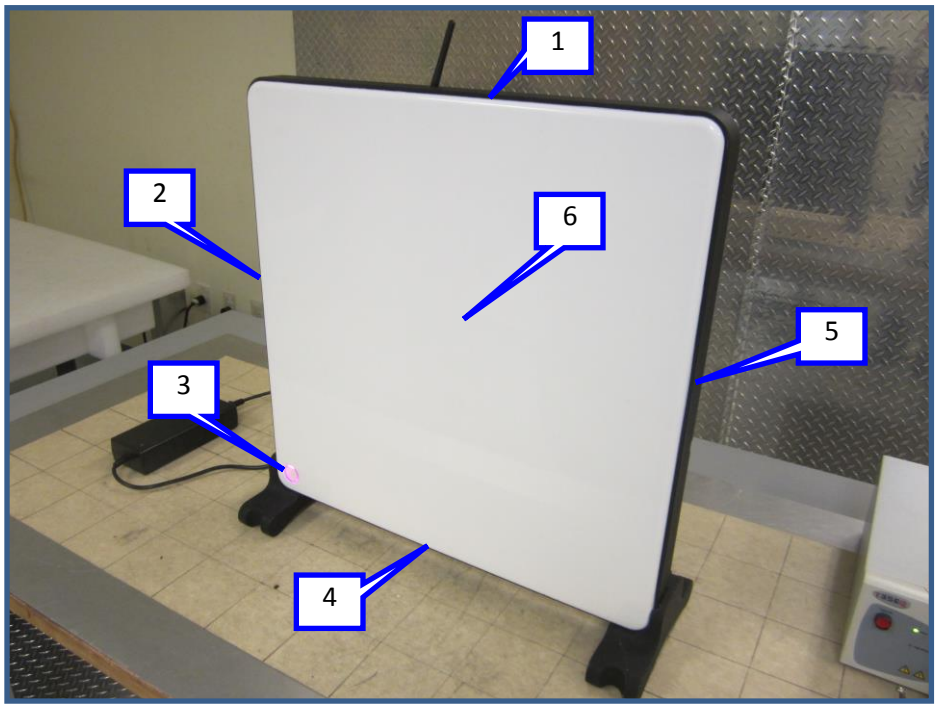


Image 3

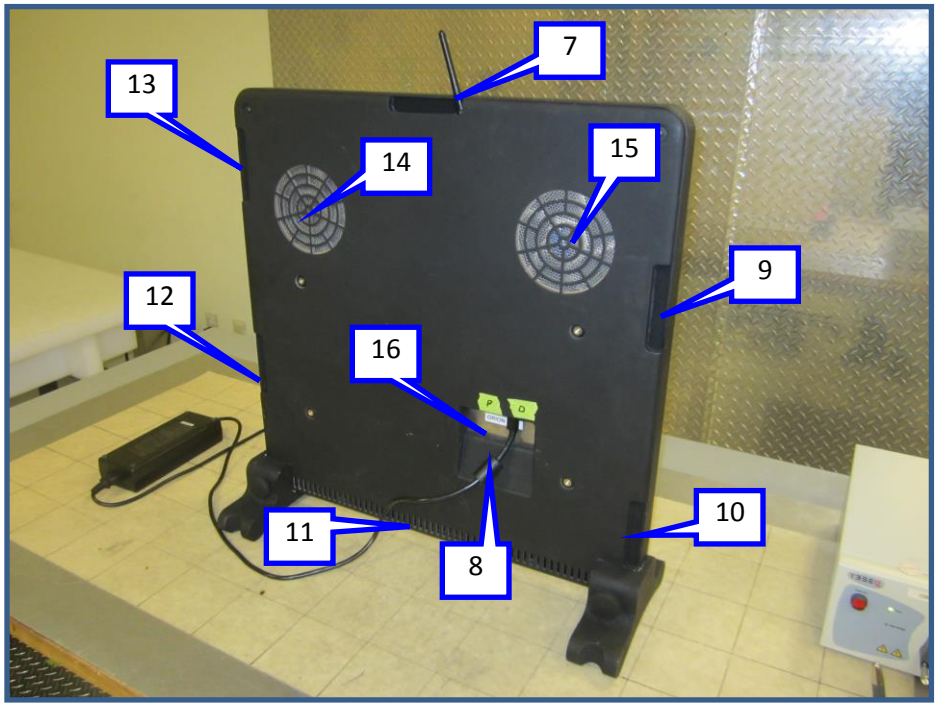


Image 4

ELECTROSTATIC DISCHARGE (ESD)

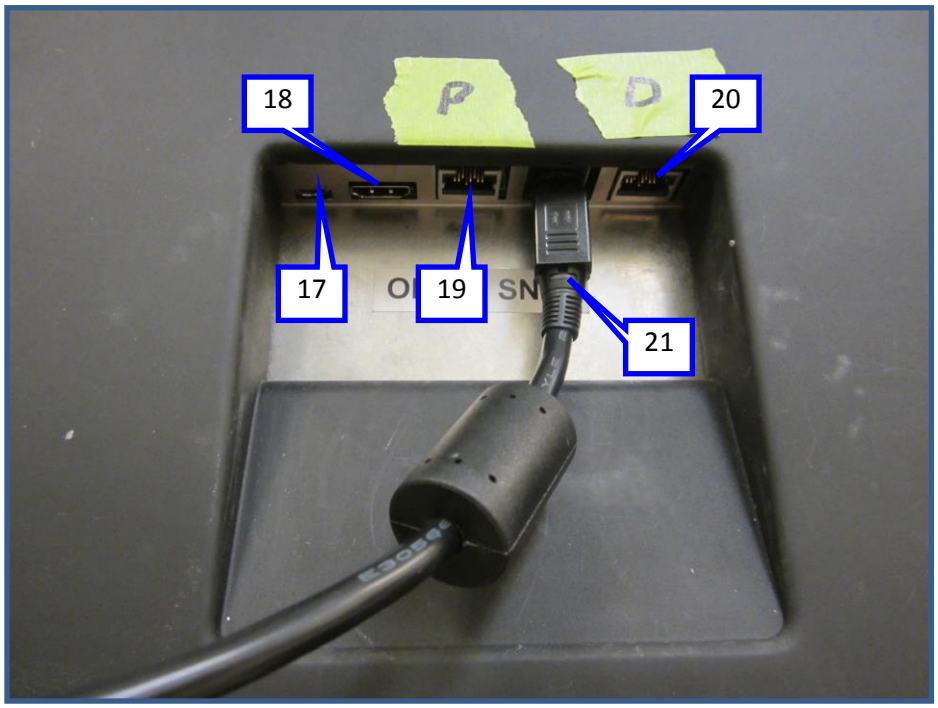


Image 5

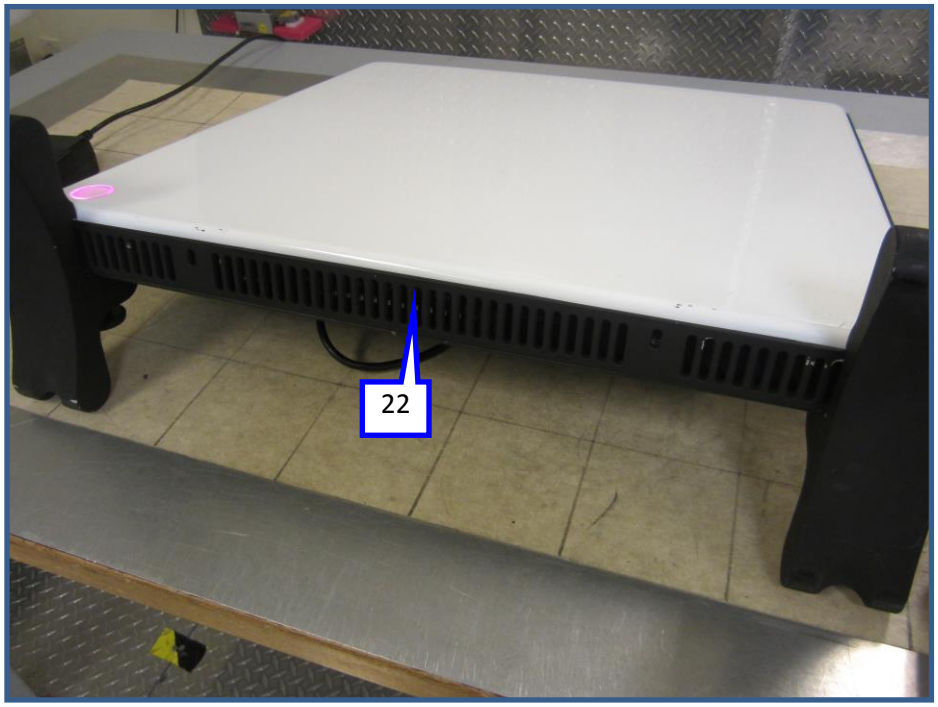


Image 6

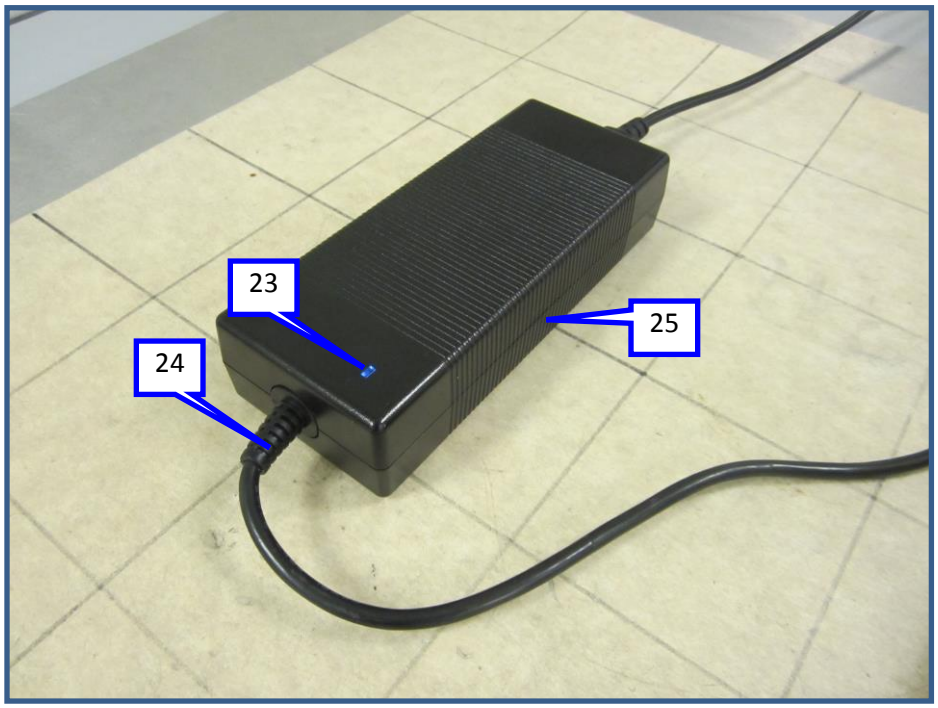


Image 7

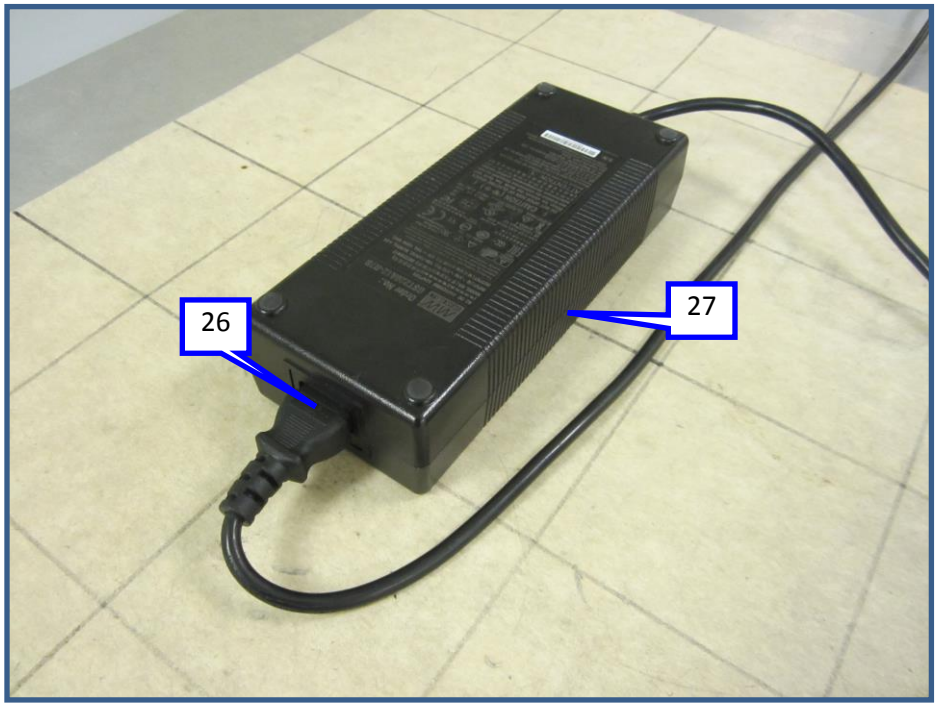
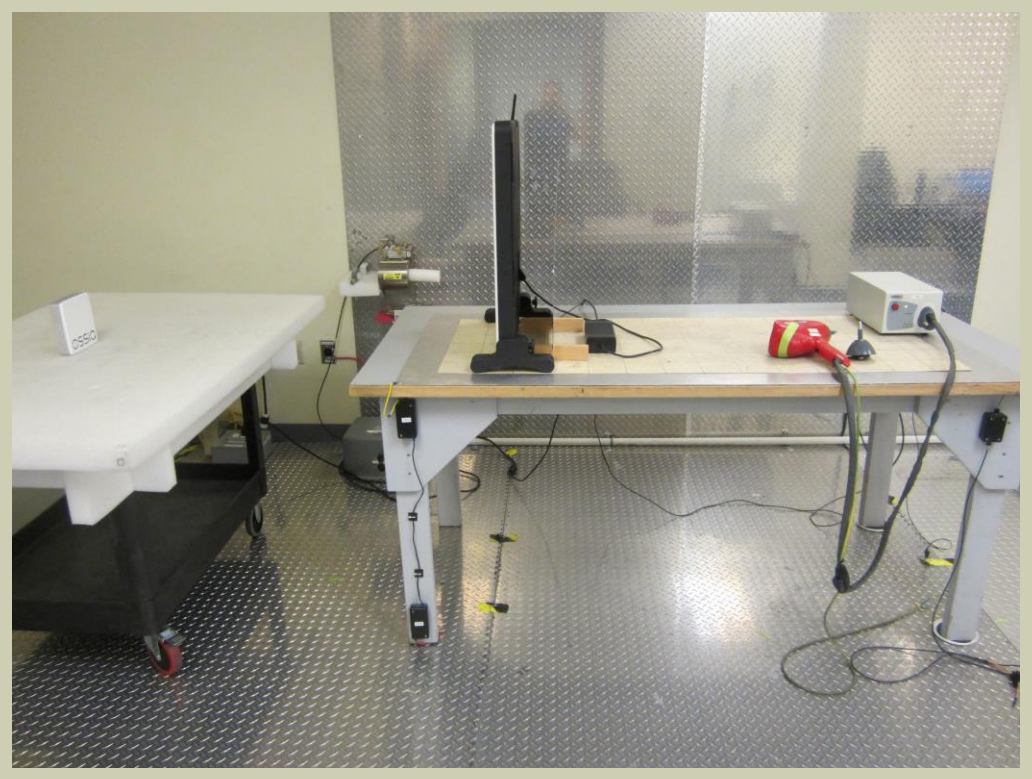


Image 8

ELECTROSTATIC DISCHARGE (ESD)

element
WTD.2021.04.01.1



RADIATED IMMUNITY

element
WTD.2021.04.01.1

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, a Radiated RF Immunity test was performed according to IEC 61000-4-3. The field was first established with no EUT present then maintained at the specified level. If an error is detected, the field strength may have been reduced to a level in which the error disappeared. This would be determined as the threshold of susceptibility. The test was conducted using horizontal and vertical antenna orientations.

Where additional spot frequency test is required for equipment, the separation distance is not the test distance as defined in IEC 61000-4-3, but the expected operating distance between the EUT and the interfering wireless communication device. The 3 meters distance noted in the datasheets is the calibrated test distance used to generate the test levels noted by the standard.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5181A	TGZ	2018-08-31	2021-08-31
Amplifier	Amplifier Research	500W1000B	R288	NCR	NCR
Amplifier	Amplifier Research	250S1G6	TBZ	NCR	NCR
Meter - Power	Amplifier Research	PM2002	SPF	2020-06-22	2021-06-22
Antenna - Log Periodic	EMCO	3144	ALI	NCR	NCR
Antenna - Double Ridge	Electro Metrics	RGA-60	AJD	NCR	NCR
Power Sensor	Amplifier Research	PH2000A	SRM	2020-06-22	2021-06-22
Power Sensor	Amplifier Research	PH2000	SPY	2020-06-22	2021-06-22
Directional Coupler	Werlatone, Inc.	C10117-10	RHO	NCR	NCR
Directional Coupler	Werlatone, Inc.	C5982-10	RHK	NCR	NCR

CONFIGURATIONS INVESTIGATED

OSSI0011-4

MODES INVESTIGATED

Wireless Power Transfer active to the Rx201.

RADIATED IMMUNITY

element
WTD.2021.04.01.1

EUT:	COTA Tx203	Work Order:	OSSI0011
Serial Number:	1	Date:	2021-06-21
Customer:	Ossia Inc.	Temperature:	24.2°C
Attendees:	Travis Farley	Relative Humidity:	42.5%
Customer Project:	None	Bar. Pressure:	1005.8 mbar
Tested By:	Brian Fahey	Job Site:	NC04
Power:	230VAC/50Hz	Configuration:	OSSI0011-4

TEST SPECIFICATIONS

Specification:	Method:
EN 61000-6-1:2007	IEC 61000-4-3:2010

TEST PARAMETERS

Test Level:	>= 3 V/m	Spec. Level:	3 V/m	Mod. Type:	AM
Start Frequency:	80MHz	Stop Frequency:	6000MHz	Mod. Frequency:	1kHz
Mod. Depth:	80%	Step Size:	1%	Dwell Time:	1 Sec.

SIDES TESTED

Front, Back, Left, Right

POLARITIES TESTED

Horizontal, Vertical

TEST DISTANCE

3m

COMMENTS

None

EUT OPERATING MODES

Wireless Power Transfer active to the Rx201.

DEVIATIONS FROM TEST STANDARD

None

EUT FUNCTIONS MONITORED

Monitored the WPT status of the Tx203 via a remote laptop.

CLOCKS AND OSCILLATORS

No clock nor oscillator frequencies were provided by the customer prior to testing. No specific frequencies were tested.

OBSERVATIONS

No Phenomena Observed.

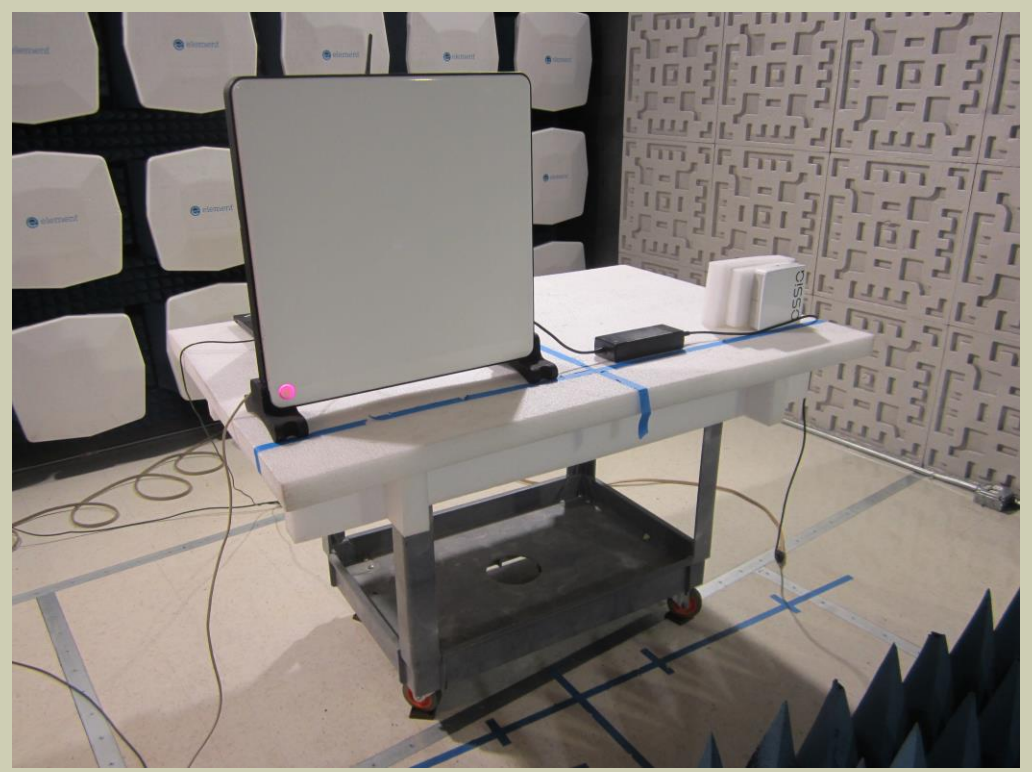
CONCLUSION

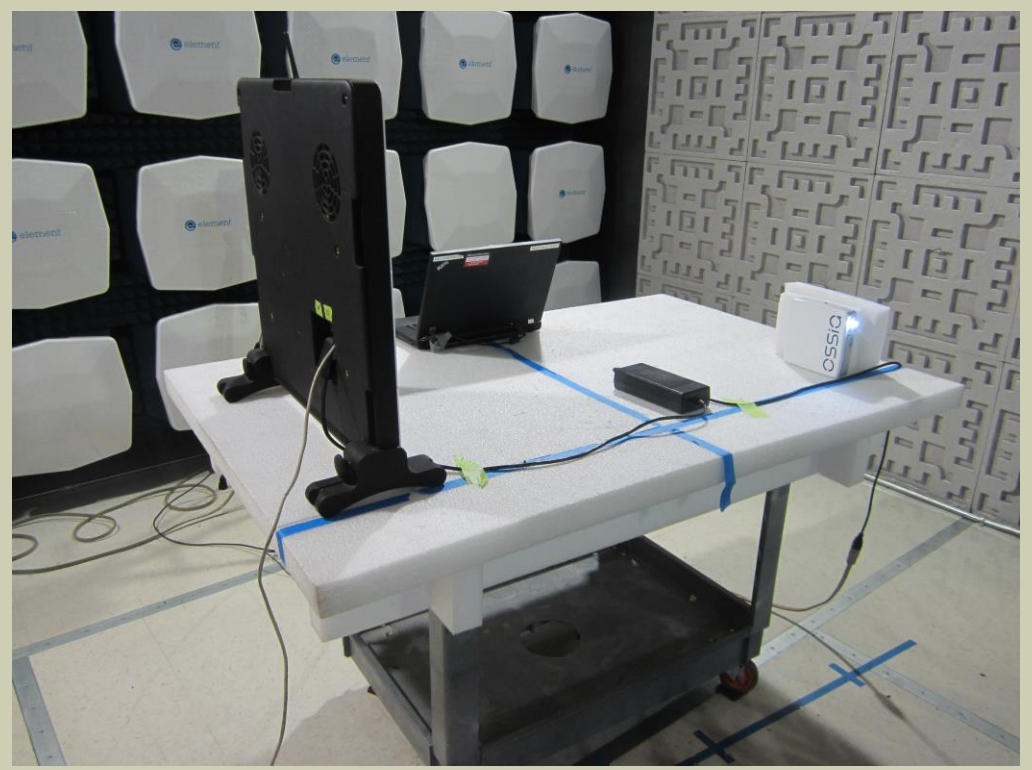
Meets Element Performance Criteria	A

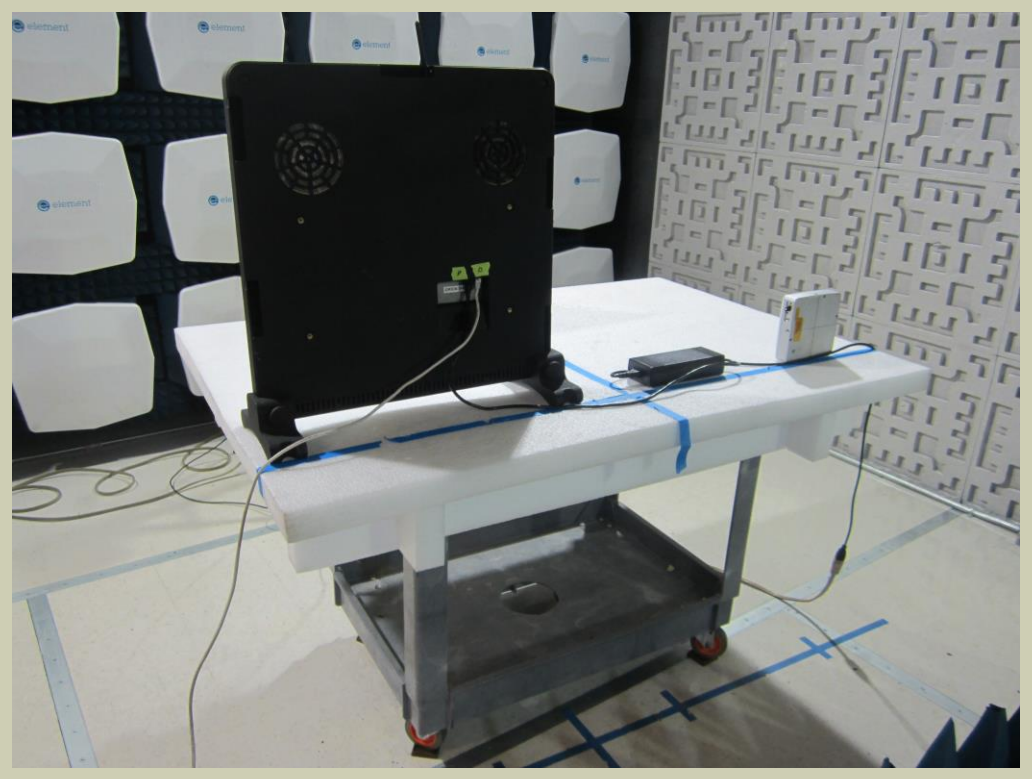
The EUT exhibited no change in performance when operating as specified by the manufacturer.

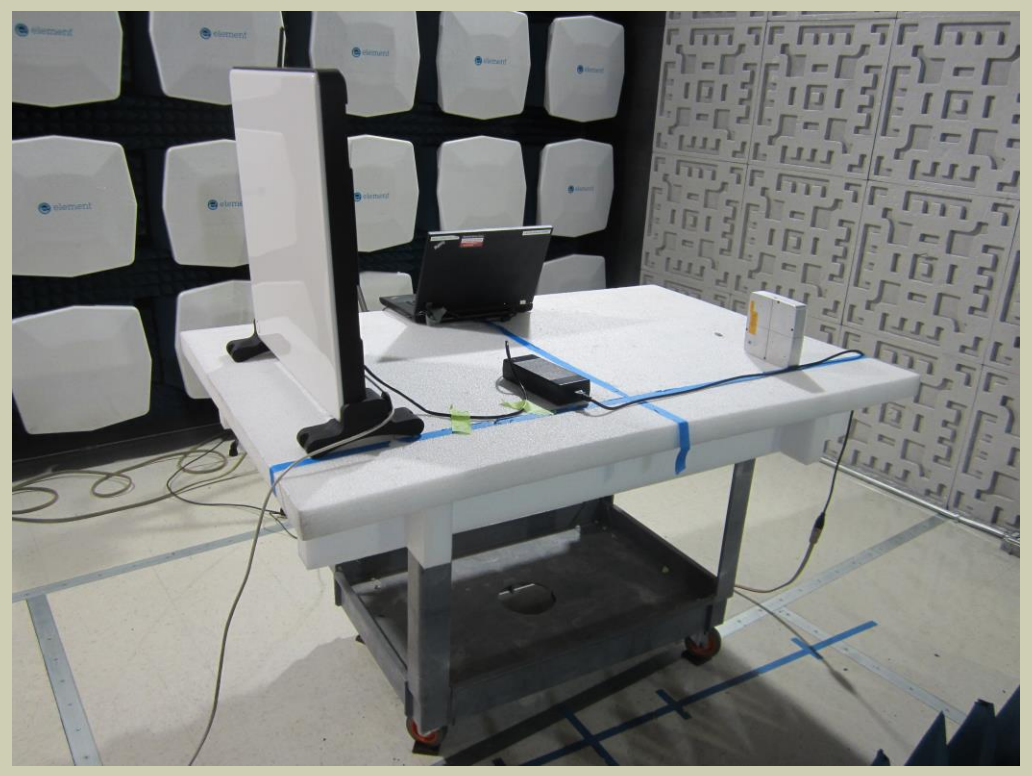
Tested By

RADIATED IMMUNITY









ELECTRICAL FAST TRANSIENTS AND BURSTS (EFT)

element
WTD.2021.04.01.1

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, an EFT/Burst Immunity test was performed. The test is intended to demonstrate the immunity of electrical and electronic equipment when subjected to types of transient disturbances such as those originating from switching transients (interruption of inductive loads, relay contact bounce, etc.). The repetitive fast transient test is a test with bursts consisting of a number of fast transients, coupled into power supply, control and signal ports of electrical and electronic equipment. Significant for the test is short rise time, the repetition rate and the low energy of the transients. Unless noted, AC Terminals are tested using common mode coupling (simultaneous coupling to all lines versus the ground reference plane). The cable between the EUT and the coupling device, if detachable, shall be as short as possible to comply with the requirements. If the manufacturer provides a cable exceeding the distance between the coupling device end the point of entry of the EUT, the excess length of this cable shall be bundled and situated at a distance of 0.1m above the ground plane.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Transient Generator	Haefely	ECOMPACT 4	IBJ	2021-02-12	2021-08-12
Clamp - EFT	Haefely	Haefely Trench	ICM	2021-02-12	2022-02-12

CONFIGURATIONS INVESTIGATED

OSSI0011-4

MODES INVESTIGATED

Wireless Power Transfer active to the Rx201.

ELECTRICAL FAST TRANSIENTS AND BURSTS (EFT)

element
WTD.2021.04.01.1

EUT:	COTA Tx203	Work Order:	OSSI0011
Serial Number:	1	Date:	2021-06-21
Customer:	Ossia Inc.	Temperature:	24.2°C
Attendees:	Travis Farley	Relative Humidity:	47.4%
Customer Project:	None	Bar. Pressure:	1008.8 mbar
Tested By:	Brian Fahey	Job Site:	NC03
Power:	230VAC/50Hz	Configuration:	OSSI0011-4

TEST SPECIFICATIONS

Specification:	Method:
EN 61000-6-1:2007	IEC 61000-4-4:2012

TEST PARAMETERS

Period Time:	300mS ± 20%	Duration of Burst:	15mS ±20%, 0.75mS ±20%
Relation of Power Supply:	Asynchronous	Risetime of One Pulse:	5nS ± 30%
Frequency of Burst:	5kHz, 100kHz	Impulse Duration:	50nS ± 30%
Test Duration per Port:	60 sec.		

COMMENTS

None

EUT OPERATING MODES

Power Transfer active to the Rx201.

DEVIATIONS FROM TEST STANDARD

None

EUT FUNCTIONS MONITORED

Monitored the WPT status of the Tx203 via a remote laptop.

OBSERVATIONS

Line	Voltage	Observation (5kHz)	Observation (100kHz)
AC Terminals (L1,N,Gnd)	+1kV	No Phenomena Observed	No Phenomena Observed
AC Terminals (L1,N,Gnd)	-1kV	No Phenomena Observed	No Phenomena Observed
Ethernet Cable	+1kV	No Phenomena Observed	No Phenomena Observed
Ethernet Cable	-1kV	No Phenomena Observed	No Phenomena Observed

CONCLUSION

Meets Element Performance Criteria	A

The EUT exhibited no change in performance when operating as specified by the manufacturer.

Tested By

ELECTRICAL FAST TRANSIENTS AND BURSTS (EFT)

element
WTD.2021.04.01.1

ELECTRICAL FAST TRANSIENTS AND BURSTS (EFT)

element
WTD.2021.04.01.1

SURGE

element
WTD.2021.04.01.1

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, a Surge Immunity test was performed. The task of the defined laboratory test is to find the reaction of the EUT under specified operational conditions caused by surge voltages from switching and lightning effects at certain threat levels.

The major mechanisms by which lightning produces surge voltages are the following:
a) A direct lightning strike to an external circuit (outdoor) injecting high currents
producing voltages by either flowing through earth resistance or flowing through the impedance of the external circuit;

b) An indirect lightning strike (i.e. a strike between or within clouds or to nearby objects which produces electromagnetic fields) that induces voltages/currents on the conductors outside and/or inside a building;

c) Lightning earth current flow resulting from nearby direct-to-earth discharges coupling into the common earth paths of the earthing system of the installation.

If not otherwise specified the power cord between the EUT and the coupling/decoupling network shall not exceed 2 m in length.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Transient Generator	Haefely	ECOMPACT 4	IBJ	2021-02-12	2021-08-12

CONFIGURATIONS INVESTIGATED

OSSI0011-4

MODES INVESTIGATED

Wireless Power Transfer active to the Rx201.

SURGE

element
WTD.2021.04.01.1

EUT:	COTA Tx203	Work Order:	OSSI0011
Serial Number:	1	Date:	2021-06-24
Customer:	Ossia Inc.	Temperature:	23.5°C
Attendees:	Travis Farley	Relative Humidity:	50.8%
Customer Project:	None	Bar. Pressure:	1014.8 mbar
Tested By:	Brian Fahey	Job Site:	NC03
Power:	230VAC/50Hz	Configuration:	OSSI0011-4

TEST SPECIFICATIONS

Specification:	Method:
EN 61000-6-1:2007	IEC 61000-4-5:2014 +A1:2017

TEST PARAMETERS

Open Circuit Voltage, Risetime:	1.2 µs ± 30%	Short Circuit Current, Risetime:	8 µs ± 20%
Open Circuit Voltage, Time to ½ Value:	50 µs ± 20%	Short Circuit Current, Time to ½ Value:	20 µs ± 20%
Time Between Successive Pulses:	20 seconds		

COMMENTS

None

EUT OPERATING MODES

Wireless Power Transfer active to the Rx201.

DEVIATIONS FROM TEST STANDARD

None

EUT FUNCTIONS MONITORED

Monitored the WPT status of the Tx203 via a remote laptop.

RESULTS

5 Surges Each Setting

	COMMON MODE LOW LINE TO GROUND (12Ω IMPEDANCE)				COMMON MODE HIGH LINE TO GROUND (12Ω IMPEDANCE)				DIFFERENTIAL MODE HIGH LINE TO LOW LINE (2Ω IMPEDANCE)			
kV	**0°**	**90°**	**180°**	**270°**	**0°**	**90°**	**180°**	**270°**	**0°**	**90°**	**180°**	**270°**
+0.5	1	1	1	1	1	1	1	1	1	1	1	1
-0.5	1	1	1	1	1	1	1	1	1	1	1	1
+1.0	1	1	1	1	1	1	1	1	1	1	1	1
-1.0	1	1	1	1	1	1	1	1	1	1	1	1
+2.0	1	1	1	1	1	1	1	1	2	2	2	2
-2.0	1	1	1	1	1	1	1	1	2	2	2	2

OBSERVATIONS

Item	Observation
1	No Phenomena Observed
2	Not Required
3	Not Tested

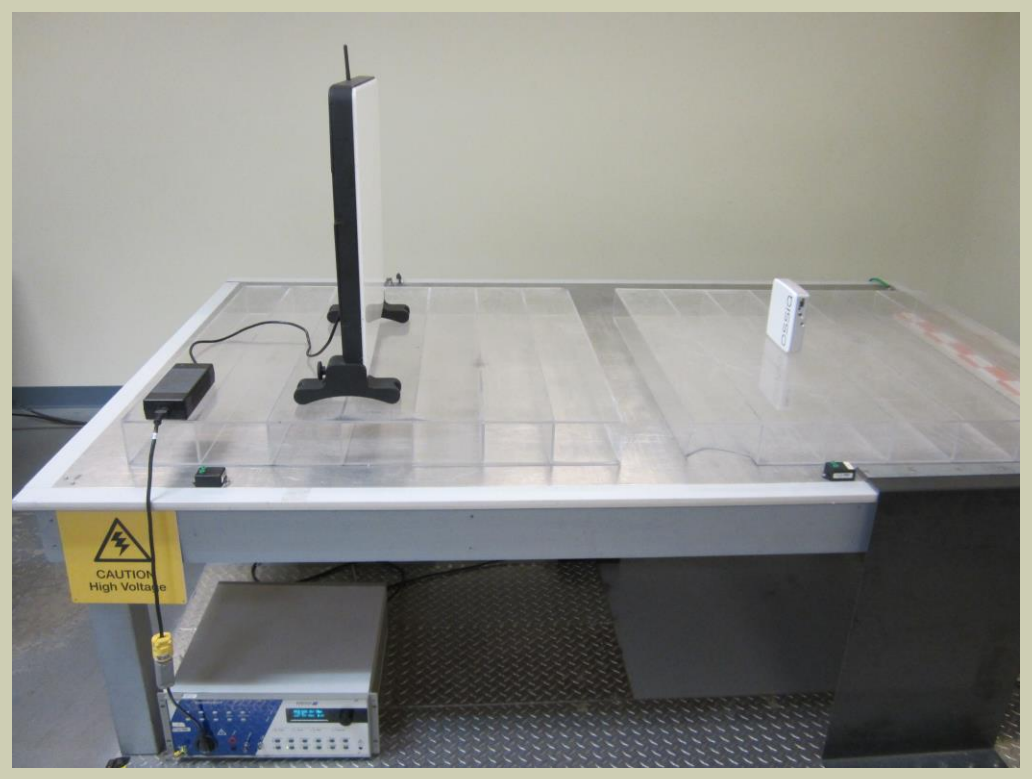
CONCLUSION

Meets Element Performance Criteria	A

The EUT exhibited no change in performance when operating as specified by the manufacturer.

Tested By

SURGE



CONDUCTED IMMUNITY

element
WTD.2021.04.01.1

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, a Conducted RF Immunity test was performed. The source of disturbance covered by the standard is basically an electromagnetic field, coming from intended RF transmitters, that may act on the whole length of cables connected to installed equipment. The dimensions of the disturbed equipment, mostly a sub-part of a larger system, are assumed to be small compared with the wavelengths involved. The ingoing and outgoing leads: e.g. mains, communication lines, and interface cables, behave as passive receiving antenna networks because they can be several wavelengths long. The use of coupling and decoupling devices to apply the disturbing signal to one cable at a time, while keeping all other cables non-excited, can only approximate the real situation where disturbing sources act on all cables simultaneously, with a range of different amplitudes and phases. Coupling and decoupling devices are defined by their characteristics. Any coupling and decoupling device fulfilling these characteristics can be used. Unless permanently attached, the power cable between the coupling and decoupling devices and the EUT shall be as short as possible and shall not be bundled or wrapped. Their height above the ground reference plane shall be between 30 mm and 50 mm.

During testing, if anomalies are observed, the current is monitored by inserting an additional current probe in between the injection clamp and the EUT. If the current, exceeds the nominal circuit current value, then the test generator output level is reduced until the current equals the nominal circuit current level. The reduced test generator output value is recorded.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Rohde & Schwarz	SML01	TGV	2018-07-03	2021-07-03
Amplifier - RF	Amplifier Research	75A250	TRM	NCR	NCR
Meter - Power	Amplifier Research	PM2002	SQB	2020-06-22	2021-06-22
Directional Coupler	Amplifier Research	DC3400A	IRM	NCR	NCR
Power Sensor	Amplifier Research	PH2000	SPO	2020-06-22	2021-06-22
Power Sensor	Amplifier Research	PH2000	SQH	2020-06-22	2021-06-22
Attenuator	JFW Industries	50FH-020	RBF	2020-07-27	2021-07-27
Probe	Fischer Custom Communications	F-120-9	IIA	NCR	NCR
Probe - Current	Fischer Custom Communications	F-35	IIG	2020-10-19	2022-10-19
Attenuator	JFW Industries	50FHA0-06-100	RFC	2021-02-26	2022-02-26
CDN	Dressler	M3	INR	2020-09-17	2021-09-17
CDN	Dressler	CDN-M2	INL	2020-09-17	2021-09-17
CDN - 50-150 Ohm Adapters	Dressler	R-100	RAN	2020-07-10	2021-07-10
CDN - 50-150 Ohm Adapters	Dressler	R-100	RAO	2020-07-10	2021-07-10
Fixture/Kit - Calibration/Verification	Fischer Custom Communications	FCC-BCICF-1	VPS	2020-07-10	2021-07-10
Terminator	Fairview Microwave	ST4N-5WA	TWT	2020-07-02	2021-07-02

CONFIGURATIONS INVESTIGATED

OSSI0011-4

MODES INVESTIGATED

Wireless Power Transfer active to the Rx201.

CONDUCTED IMMUNITY

element
WTD.2021.04.01.1

EUT:	COTA Tx203	Work Order:	OSSI0011
Serial Number:	1	Date:	2021-06-17
Customer:	Ossia Inc.	Temperature:	23.2°C
Attendees:	Luis Mendez, Travis Farley	Relative Humidity:	41.4%
Customer Project:	None	Bar. Pressure:	1016.8 mbar
Tested By:	Brian Fahey	Job Site:	NC03
Power:	230VAC/50Hz	Configuration:	OSSI0011-4

TEST SPECIFICATIONS

Specification:	Method:
EN 61000-6-1:2007	EN 61000-4-6:2013

TEST PARAMETERS

Test Level:	>= 3 VRMS	Spec. Level:	3 VRMS	Mod. Type:	AM
Start Frequency:	150kHz	Stop Frequency:	80MHz	Mod. Frequency:	1kHz
Mod. Depth:	80%	Step Size:	1%	Dwell Time:	1sec.

CABLES TESTED

AC Mains	Data Ethernet Cable

COMMENTS

Tx203 and Rx201 are spaced 1 meter apart.

EUT OPERATING MODES

Wireless Power Transfer active to the Rx201.

DEVIATIONS FROM TEST STANDARD

None

EUT FUNCTIONS MONITORED

Monitored the WPT status of the Tx203 via a remote laptop.

CLOCKS AND OSCILLATORS

No clock nor oscillator frequencies were provided by the customer prior to testing. No specific frequencies were tested.

OBSERVATIONS

No Phenomena Observed.

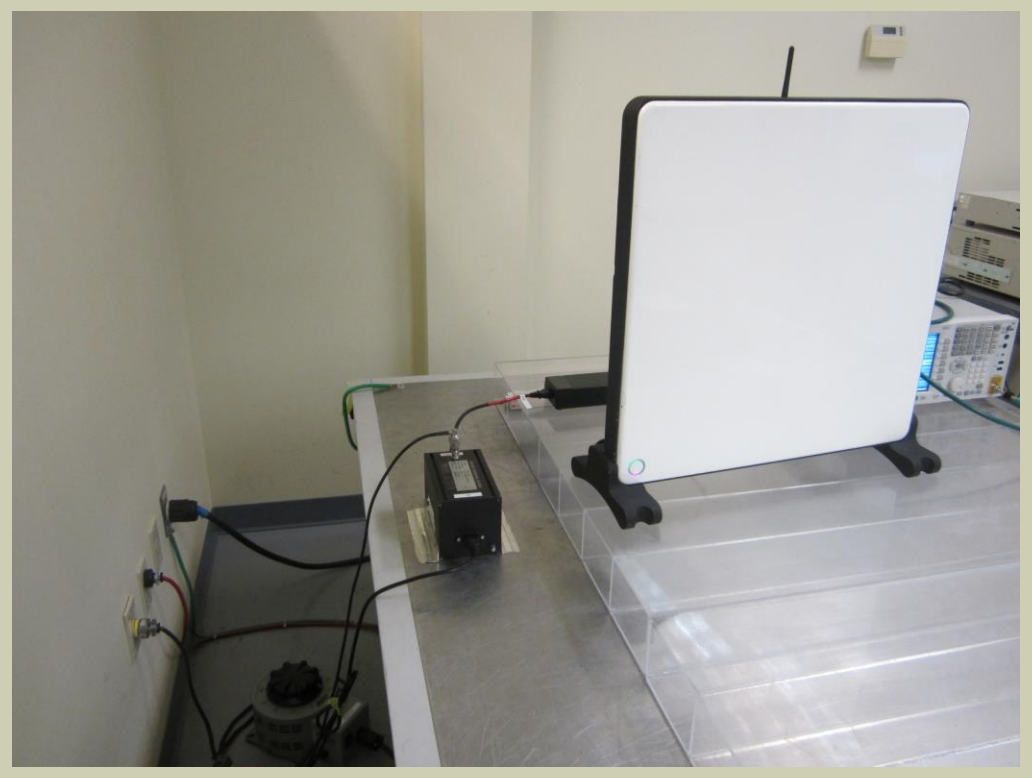
CONCLUSION

Meets Element Performance Criteria	A

The EUT exhibited no change in performance when operating as specified by the manufacturer.

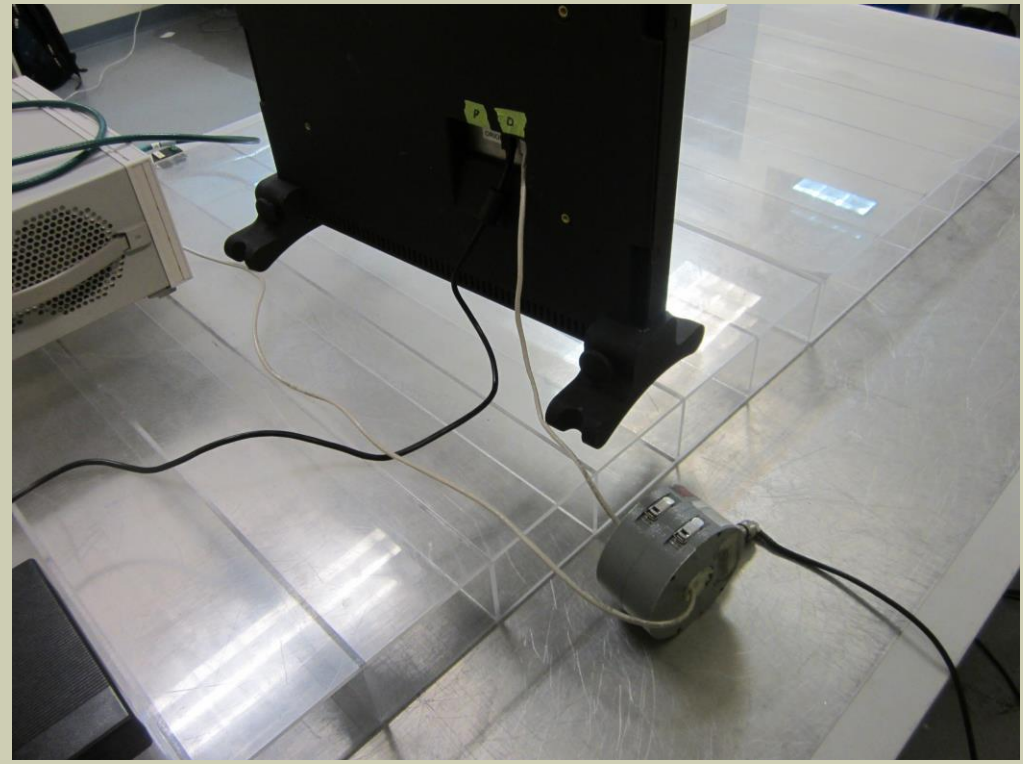
Tested By

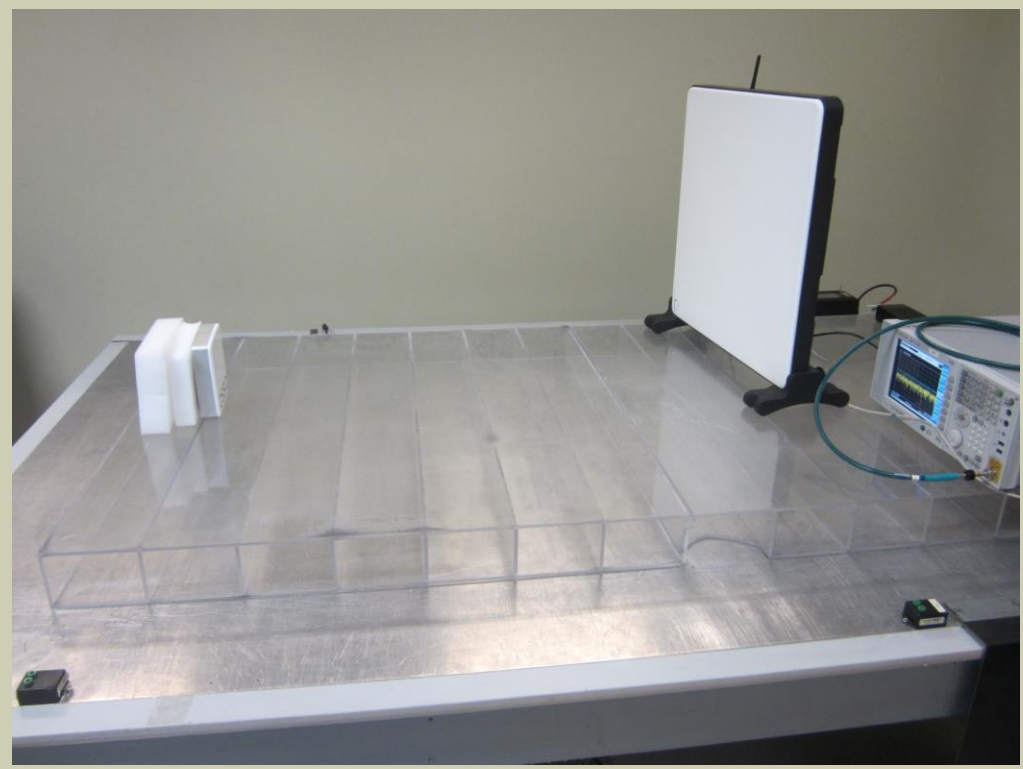
CONDUCTED IMMUNITY



CONDUCTED IMMUNITY

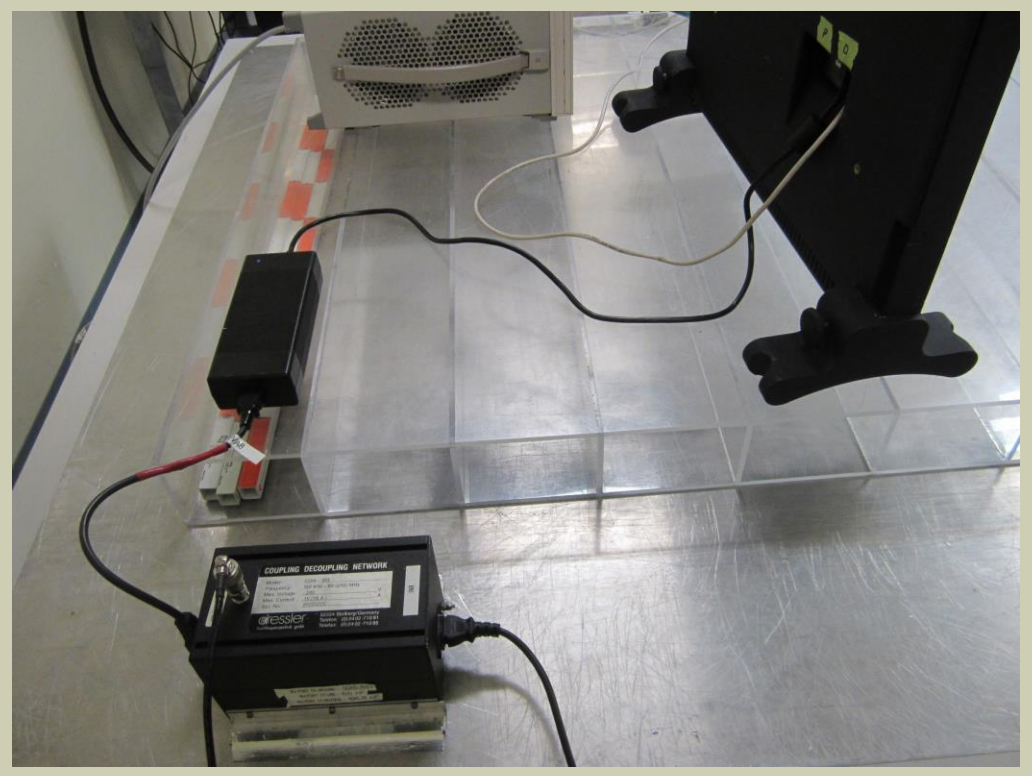
element
WTD.2021.04.01.1





CONDUCTED IMMUNITY

element
WTD.2021.04.01.1



MAGNETIC FIELD IMMUNITY

element
WTD.2021.04.01.1

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, a Power Frequency Magnetic Field Immunity test was performed. The tests are intended to demonstrate the immunity of equipment when subjected to power frequency magnetic fields related to the specific location and installation condition of the equipment (e.g. proximity of equipment to the disturbance source). The power frequency magnetic field is generated by power frequency current in conductors or, rarely, from other devices (e.g. leakage or transformers) in the proximity of equipment.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Harmonics/Flicker Tester	Teseq	5001IX-CTS-160-413-TSQ	THV	2021-02-11	2022-02-11
Power Supply - AC	Teseq	NSG 1007-5	THW	2021-02-11	2022-02-11
Coil - Helmholtz	Northwest EMC	N/A	IMI	2021-03-04	2024-03-04

CONFIGURATIONS INVESTIGATED

OSSI0011-4

MODES INVESTIGATED

Wireless Power Transfer active to the Rx201.

MAGNETIC FIELD IMMUNITY

element
WTD.2021.04.01.1

EUT:	COTA Tx203	Work Order:	OSSI0011
Serial Number:	1	Date:	2021-06-18
Customer:	Ossia Inc.	Temperature:	24°C
Attendees:	Travis Farley	Relative Humidity:	40.7%
Customer Project:	None	Bar. Pressure:	1014.8 mbar
Tested By:	Brian Fahey	Job Site:	NC03
Power:	230VAC/50Hz	Configuration:	OSSI0011-4

TEST SPECIFICATIONS

Specification:	Method:
EN 61000-6-1:2007	IEC 61000-4-8:2009

TEST PARAMETERS

Test Level:	3 A/m	Test Frequency:	50Hz, 60Hz

COMMENTS

None

EUT OPERATING MODES

Wireless Power Transfer active to the Rx201.

DEVIATIONS FROM TEST STANDARD

None

EUT FUNCTIONS MONITORED

Monitored the WPT status of the Tx203 via a remote laptop.

OBSERVATIONS

X	No Phenomena Observed
Y	No Phenomena Observed
Z	No Phenomena Observed

CONCLUSION

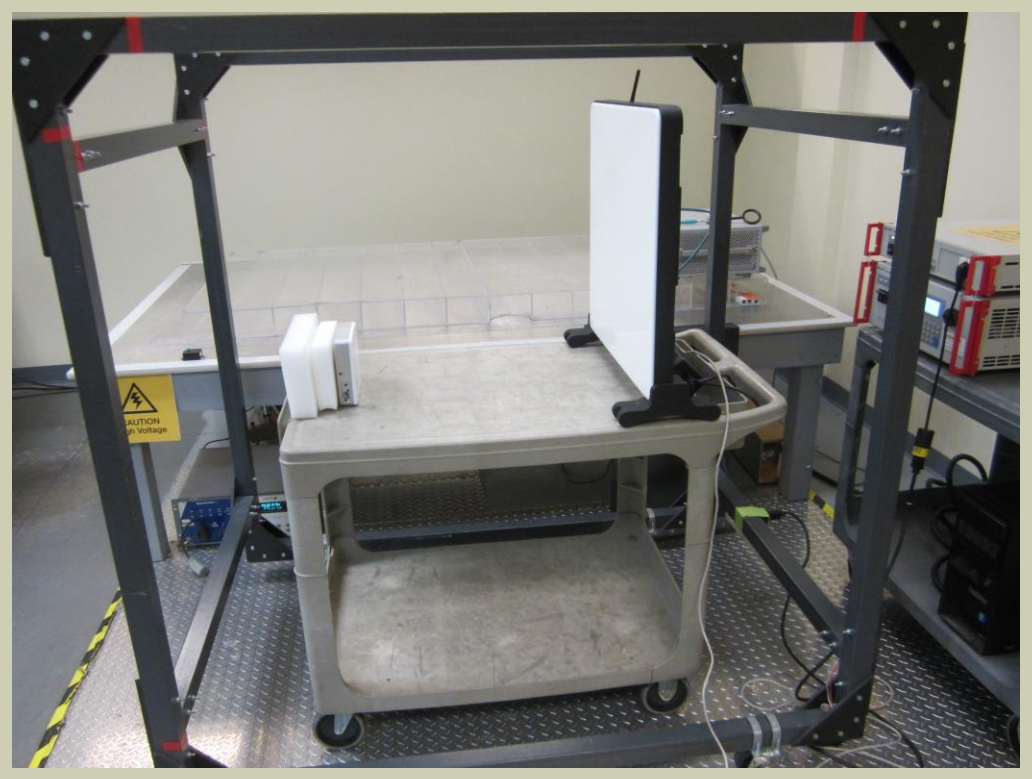
Meets Element Performance Criteria	A

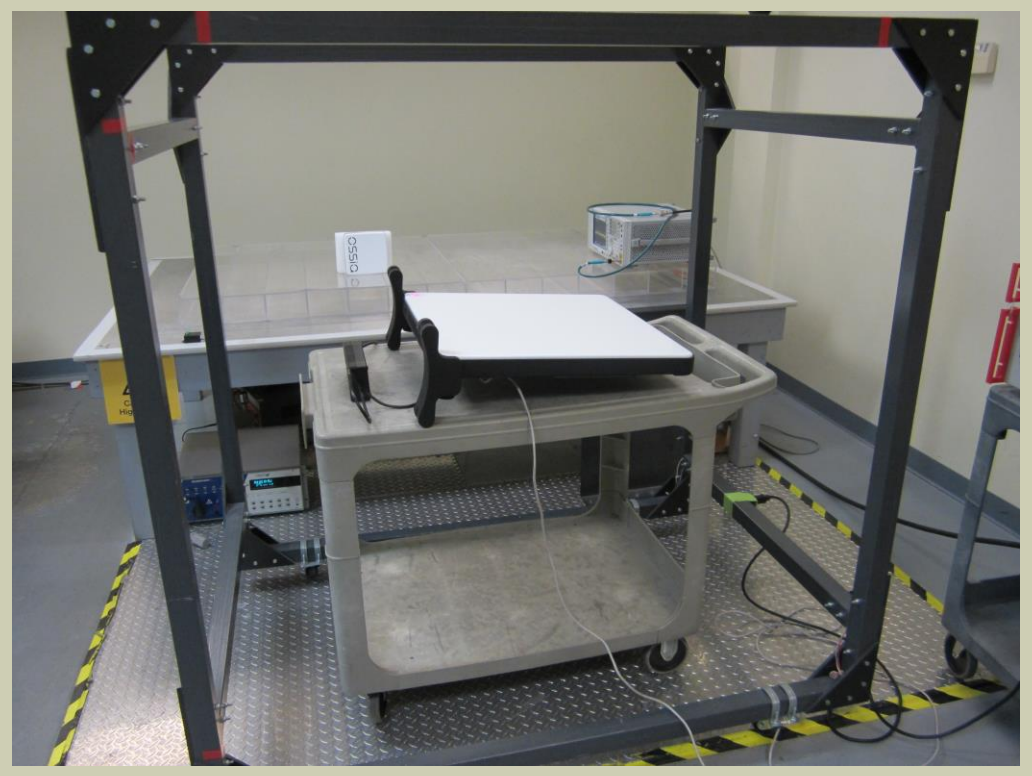
The EUT exhibited no change in performance when operating as specified by the manufacturer.

Tested By

MAGNETIC FIELD IMMUNITY

element
WTD.2021.04.01.1





MAGNETIC FIELD IMMUNITY

element
WTD.2021.04.01.1

VOLTAGE DIPS AND INTERRUPTIONS (VDI)

element
WTD.2021.04.01.1

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, a Voltage interruption and dip Immunity test was performed. The standard applies to electrical and electronic equipment having a rated input current not exceeding 16 A per phase. It does not apply to electrical and electronic equipment for connection to D.C. networks or 400 Hz A.C. networks. Electrical and electronic equipment may be affected by voltage dips, short interruptions or voltage variations of power supply. Voltage dips and short interruptions are caused by faults in the network, in installations or by a sudden large change of load. In certain cases, two or more consecutive dips or interruptions may occur. The continuously varying loads connected to the network cause voltage variations. The test shall be performed with the EUT connected to the test generator with the shortest power supply cable as specified by the EUT manufacturer.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Transient Generator	Haefely	ECOMPACT 4	IBJ	2021-02-12	2021-08-12
Capacitor	Northwest EMC	30uF	CPB	NCR	NCR

CONFIGURATIONS INVESTIGATED

OSSI0011-4

MODES INVESTIGATED

Wireless Power Transfer active to the Rx201.

VOLTAGE DIPS AND INTERRUPTIONS (VDI)

element
WTD.2021.04.01.1

EUT:	COTA Tx203	Work Order:	OSSI0011
Serial Number:	1	Date:	2021-06-21
Customer:	Ossia Inc.	Temperature:	24.1°C
Attendees:	Travis Farley	Relative Humidity:	47.8%
Customer Project:	None	Bar. Pressure:	1008.8 mbar
Tested By:	Brian Fahey	Job Site:	NC03
Power:	100VAC/50Hz	Configuration:	OSSI0011-4

TEST SPECIFICATIONS

Specification:	Method:
EN 61000-6-1:2007	IEC 61000-4-11:2004 + A1:2017

COMMENTS

None

EUT OPERATING MODES

Wireless Power Transfer active to the Rx201.

DEVIATIONS FROM TEST STANDARD

None

EUT FUNCTIONS MONITORED

Monitored the WPT status of the Tx203 via a remote laptop.

OBSERVATIONS

Number of Events	Percentage Reduction	Duration	Phase Angle	Standard Specified Performance Criteria	Conclusion Observed Performance Criteria	Observation
3 (Dips)	100%	0.5 Cycles (50Hz)	0°	B	A	No Phenomena Observed
3 (Dips)	100%	0.5 Cycles (50Hz)	180°	B	A	No Phenomena Observed
3 (Dips)	100%	1 Cycle (50Hz)	0°	B	A	No Phenomena Observed
3 (Dips)	100%	1 Cycle (50Hz)	180°	B	A	No Phenomena Observed
3 (Dips)	30%	25/30 Cycles (50Hz)	0°	C	A	No Phenomena Observed
3 (Dips)	30%	25/30 Cycles (50Hz)	180°	C	A	No Phenomena Observed
1 (Interrupt)	100%	250/300 Cycles (50Hz)	0°	C	C	The Tx203 turned off during the 5 second voltage drop out. User intervention was required to get back to normal operation.

Tested By

VOLTAGE DIPS AND INTERRUPTIONS (VDI)

element
WTD.2021.04.01.1

EUT:	COTA Tx203	Work Order:	OSSI0011
Serial Number:	1	Date:	2021-06-21
Customer:	Ossia Inc.	Temperature:	24.1°C
Attendees:	Travis Farley	Relative Humidity:	47.8%
Customer Project:	None	Bar. Pressure:	1008.8 mbar
Tested By:	Brian Fahey	Job Site:	NC03
Power:	240VAC/50Hz	Configuration:	OSSI0011-4

TEST SPECIFICATIONS

Specification:	Method:
EN 61000-6-1:2007	IEC 61000-4-11:2004 + A1:2017

COMMENTS

None

EUT OPERATING MODES

Wireless Power Transfer active to the Rx201.

DEVIATIONS FROM TEST STANDARD

None

EUT FUNCTIONS MONITORED

Monitored the WPT status of the Tx203 via a remote laptop.

OBSERVATIONS

Number of Events	Percentage Reduction	Duration	Phase Angle	Standard Specified Performance Criteria	Conclusion Observed Performance Criteria	Observation
3 (Dips)	100%	0.5 Cycles (50Hz)	0°	B	A	No Phenomena Observed
3 (Dips)	100%	0.5 Cycles (50Hz)	180°	B	A	No Phenomena Observed
3 (Dips)	100%	1 Cycle (50Hz)	0°	B	A	No Phenomena Observed
3 (Dips)	100%	1 Cycle (50Hz)	180°	B	A	No Phenomena Observed
3 (Dips)	30%	25/30 Cycles (50Hz)	0°	C	A	No Phenomena Observed
3 (Dips)	30%	25/30 Cycles (50Hz)	180°	C	A	No Phenomena Observed
1 (Interrupt)	100%	250/300 Cycles (50Hz)	0°	C	C	The Tx203 turned off during the 5 second voltage drop out. User intervention was required to get back to normal operation.

Tested By

VOLTAGE DIPS AND INTERRUPTIONS (VDI)

element
WTD.2021.04.01.1

End of Test Report