Onity Inc.

SERENE WALL READER

Regulatory Model Number (RMN): 10108350P1, WALL READER, RFID, BLE5
Commercial Model Number (CMN): 10108351P1, WALL READER, RFID, BLE5

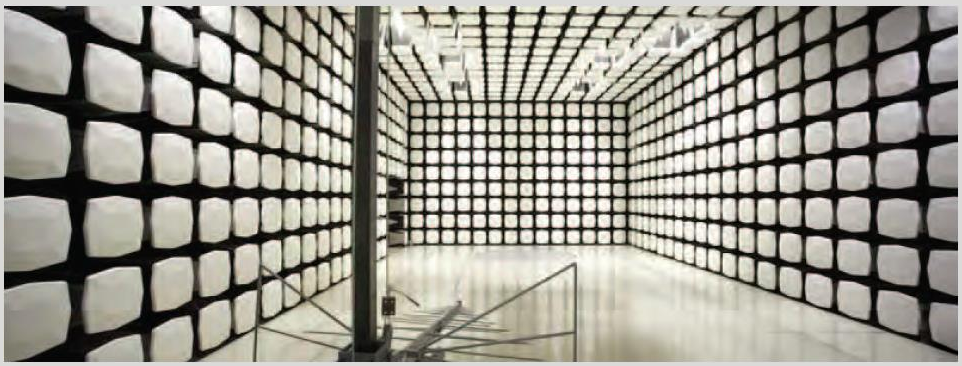
FCC 15.225:2024

RSS-210 Issue 10:2019+A1:2020

RSS-Gen Issue 5:2018+A1:2019+A2:2021

13.56 MHz Radio

Report: ONIT0116.1 Rev. 2, Issue Date: June 5, 2024



ACCREDITED
CERT #3310.02

TABLE OF CONTENTS

element
2023.04.17

Section	Page Number

CERTIFICATE OF TEST

Last Date of Test: February 8, 2024
Onity Inc.
EUT: SERENE WALL READER
Regulatory Model Number (RMN): 10108350P1, WALL READER, RFID, BLE5
Commercial Model Number (CMN): 10108351P1, WALL READER, RFID, BLE5

Radio Equipment Testing

Standards

Specification	Method
FCC 15.225:2024	ANSI C63.10:2013
RSS-210 Issue 10:2019+A1:2020	
RSS-Gen Issue 5:2018+A1:2019+A2:2021	

Guidance

Notice 2020 - DRS0023

Results

Test Description	Result	FCC Section(s)	RSS Section(s)	ANSI C63.10 Section(s)	Comments
Powerline Conducted Emissions	Pass	15.207	RSS-Gen 8.8	6.2	
Emissions Bandwidth (20 dB)	Pass	15.215(c)	N/A	6.9.2	
Field Strength of Fundamental	Pass	15.225(a)-(c)	RSS-210 B.6(a)(i-iv)	6.4	
Field Strength of Spurious Emissions (Less Than 30 MHz)	Pass	15.225(d), 15.209	RSS-210 B.6(a)(iv)	6.4	
Field Strength of Spurious Emissions (Greater Than 30 MHz)	Pass	15.225(d), 15.209	RSS-210 B.6(a)(iv)	6.5	
Frequency Stability	Pass	15.225(e), 15.31(e), 15.215(c), 2.1055	RSS-210 B.6(b)	6.8	
Occupied Bandwidth (99%)	Pass	N/A	RSS-Gen 6.7	6.9.3	

Deviations From Test Standards

None

Approved By:

Mark Baytan, Department Manager
Signed for and on behalf of Element

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.

REVISION HISTORY

Revision Number	Description	Date (yyyy-mm-dd)	Page Number
01	Added Field Strength of Fundamental data and updated modifications page.	2024-04-22	15, 24-26
02	Updated the distance correction factor in the f Field Strength of Fundamental data.	2024-06-04	25, 26

ACCREDITATIONS AND AUTHORIZATIONS

element
2021.09.01

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:

California Minnesota Oregon Texas Washington

FACILITIES

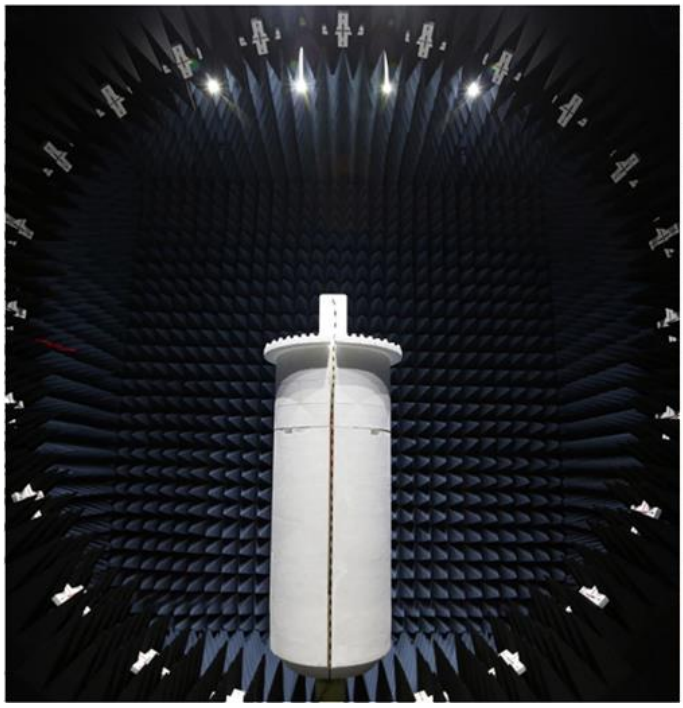
element
2023.09.21

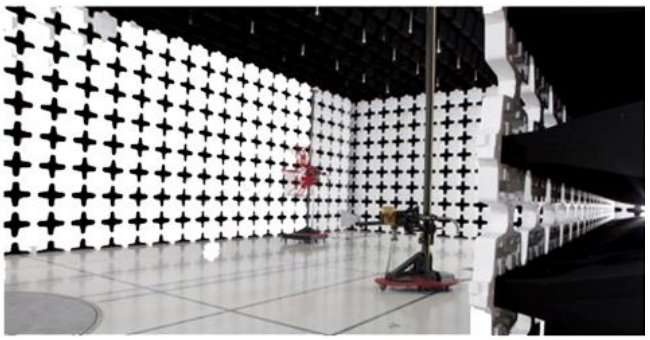
Testing was performed at the following location(s)

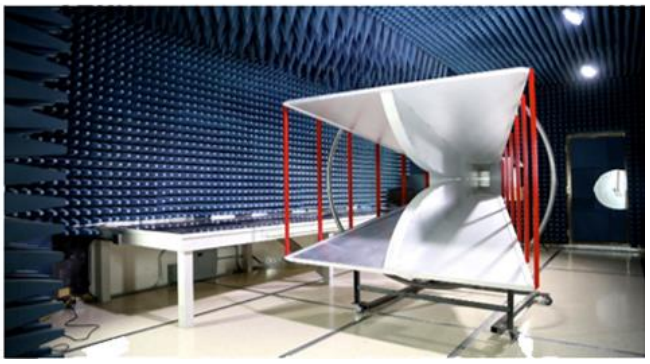
	Location	Labs (1)	Address	A2LA (2)	ISED (3)	BSMI (4)	VCCI (5)	CAB (6)	FDA (7)
☐	California	OC01-17	41 Tesla Irvine, CA 92618 (949) 861-8918	3310.04	2834B	SL2-IN-E-1154R	A-0029	US0158	TL-55
☐	Minnesota	MN01-11	9349 W Broadway Ave. Brooklyn Park, MN 55445 (612) 638-5136	3310.05	2834E	SL2-IN-E-1152R	A-0109	US0175	TL-57
☒	Oregon	EV01-12	6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	3310.02	2834D	SL2-IN-E-1017	A-0108	US0017	TL-56
☐	Texas	TX01-09	3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	3310.03	2834G	SL2-IN-E-1158R	A-0201	US0191	TL-54
☐	Washington	NC01-05	19201 120th Ave NE Bothell, WA 98011 (425) 984-6600	3310.06	2834F	SL2-IN-E-1153R	A-0110	US0157	TL-67
☐	Offsite	N/A	See Product Description	N/A	N/A	N/A	N/A	N/A	N/A

See data sheets for specific labs

(1) The lab designations denote individual rooms within each location. (OC01, OC02, OC03, etc.)
(2) A2LA Certificate No.
(3) ISED Company No.
(4) BSMI No.
(5) VCCI Site Filing No.
(6) CAB Identifier. Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA
(7) FDA ASCA No.







MEASUREMENT UNCERTAINTY

element
TMU.2015.07.10

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 in the table below. A lab specific value may also be found in the applicable test description section. 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.

The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

Test	+ MU	- MU
Frequency Accuracy	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	1.2 dB	-1.2 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	3.2 dB	-3.2 dB

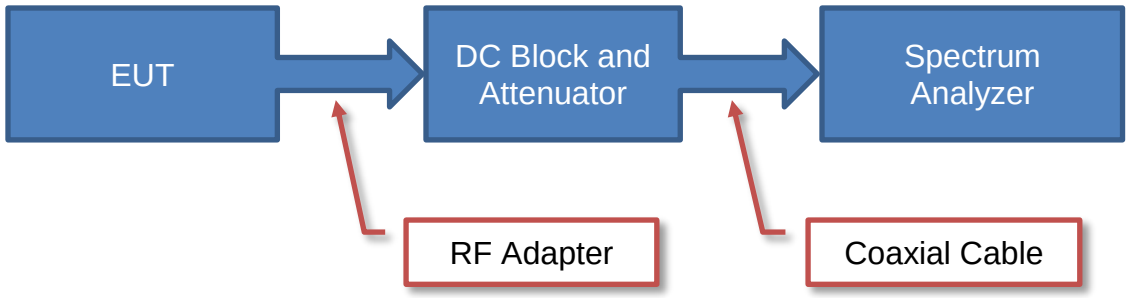
TEST SETUP BLOCK DIAGRAMS

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

Unless otherwise stated, measurements were made using the bandwidths and detectors specified. No video filter was used.

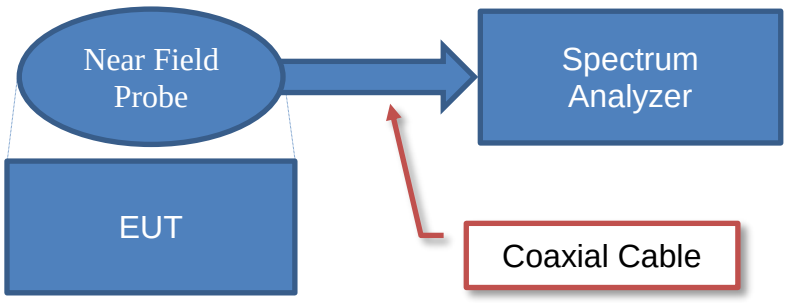
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

Measured Value		Measured Level		Reference Level Offset
71.2	=	42.6	+	28.6

Near Field Test Fixture Measurements

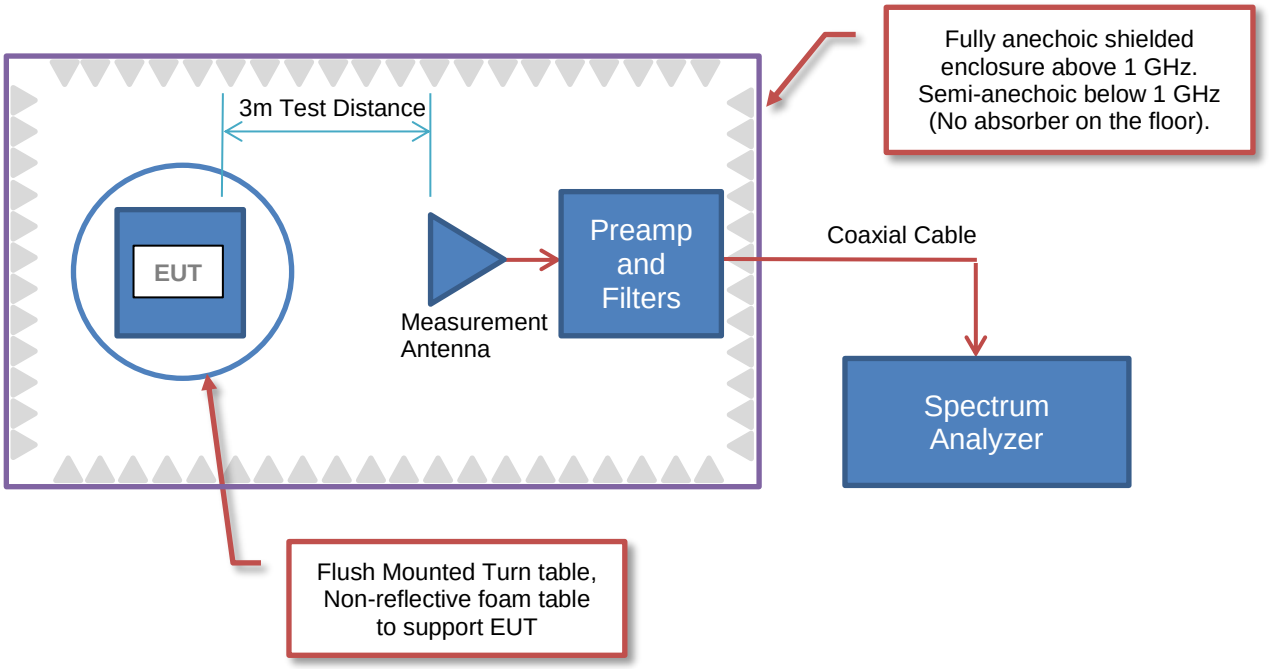


Sample Calculation (logarithmic units)

Measured Value		Measured Level		Reference Level Offset
71.2	=	42.6	+	28.6

TEST SETUP BLOCK DIAGRAMS

Emissions Measurements



Sample Calculation (logarithmic units)

Radiated Emissions:

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

Conducted Emissions:

Measured Level (Amplitude)		Factor: Transducer Factor		Factor: Cable Factor		External Attenuation		Adjusted Level
26.7	+	0.3	+	0.1	+	20.0	=	**47.1**

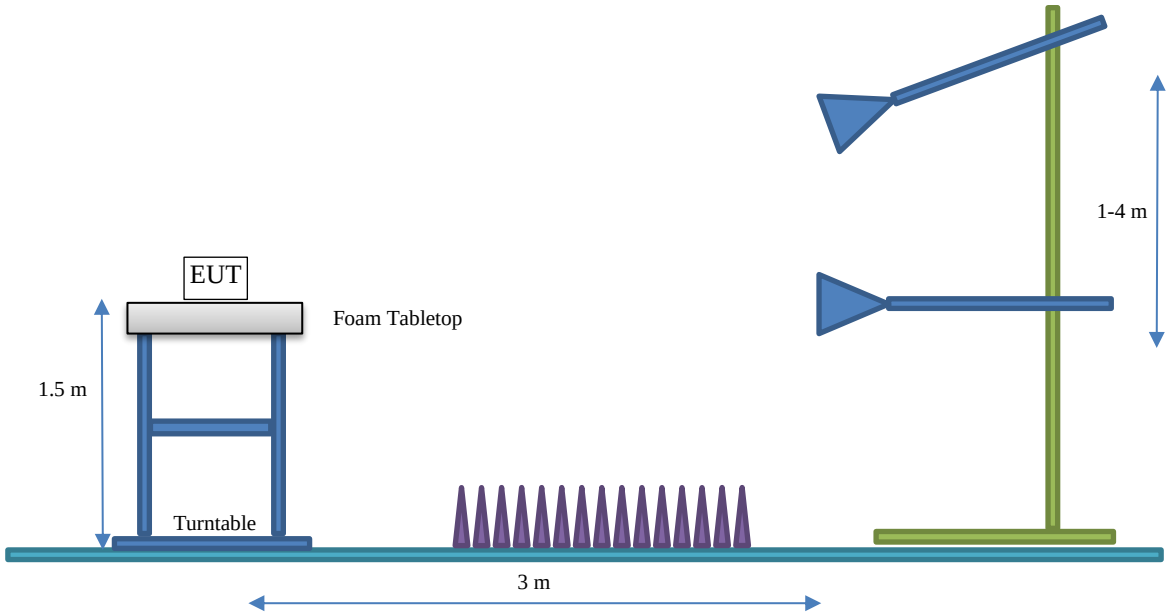
Radiated Power (ERP/EIRP) – Substitution Method:

Measured Level into Substitution Antenna (Amplitude dBm)		Substitution Antenna Factor (dBi)		EIRP to ERP (if applicable)		Measured power (dBm ERP/EIRP)
10.0	+	6.0	-	2.15	=	**13.9/16.0**

TEST SETUP BLOCK DIAGRAMS

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.



PRODUCT DESCRIPTION

Client and Equipment under Test (EUT) Information

Company Name:	Onity Inc.
Address:	4001 Fairview Industrial Drive
City, State, Zip:	Salem, OR 97302-1142
Test Requested By:	Troy Klopfenstein
EUT:	SERENE WALL READER Regulatory Model Number (RMN): 10108350P1, WALL READER, RFID, BLE5 Commercial Model Number (CMN): 10108351P1, WALL READER, RFID, BLE5
First Date of Test:	February 5, 2024
Last Date of Test:	February 8, 2024
Receipt Date of Samples:	February 5, 2024
Equipment Design Stage:	Prototype
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Key Reader containing both a 13.56 MHz RFID reader and a Bluetooth Low Energy

Testing Objective:
To demonstrate compliance of the 13.56 MHz radio to FCC 15.225 requirements. and RSS-210 Annex B.6 specifications.

POWER SETTINGS AND ANTENNAS

The power settings, antenna gain value(s) and cable loss (if applicable) used for the testing contained in this report were provided by the customer and will affect the validity of the results. Element assumes no responsibility for the accuracy of this information. The power settings below reflect the maximum power that the EUT is allowed to transmit at during normal operation.

ANTENNA INFORMATION

Type	Provided by:	Dimensions
Trace - 4 turns, 0.01" copper.	Onity Inc.	Oval 0.85" x 2.89"

The EUT was tested using the power settings provided by the manufacturer which were based upon:

X Test software settings Test software/firmware installed on EUT: 1.0

☐ Rated power settings

SETTINGS FOR ALL TESTS IN THIS REPORT

Radio	Modulation	Protocol	Data Rate (kbps)	Frequency (MHz)	Power Setting (V)
RFID	ASK	ISO/IEC 14443a	106	13.56	5.0

CONFIGURATIONS

Configuration ONIT0116-1

Software/Firmware Running During Test	
Description	**Version**
BT Excel Program	1.0

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RFID reader with BLE	Onity Inc.	Serene Wall Reader	70000036

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Power Supply/Charger	Onity Inc.	AL120T	None
Tablet	Venturer	10.1 inch display	GDLD8Z0035W0

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC / IO Cable	No	5.5	No	Power Supply/Charger	RFID reader with BLE
AC Power	No	1.8	No	AC Mains	Power Supply/Charger

CONFIGURATIONS

Configuration ONIT0116-3

Software/Firmware Running During Test	
Description	**Version**
BT Excel Program	1.0

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RFID reader with BLE	Onity Inc.	Serene Wall Reader	70000036

Peripherals in Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Power Supply/Charger	Onity Inc.	AL120T	None

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Tablet	Venturer	10.1 inch display	GDLD8Z0035W0

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC / IO Cable	No	5.5	No	Power Supply/Charger	RFID reader with BLE
AC Power	No	1.8	No	AC Mains	Power Supply/Charger

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2024-02-05	Field Strength of Fundamental	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	2024-02-05	Field Strength of Spurious Emissions (Greater Than 30 MHz)	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	2024-02-05	Field Strength of Spurious Emissions (Less Than 30 MHz)	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	2024-02-06	Emissions Bandwidth (20 dB)	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	2024-02-06	Occupied Bandwidth (99%)	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	2024-02-07	Frequency Stability	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	2024-02-08	Powerline Conducted Emissions	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWERLINE CONDUCTED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

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
LISN	Solar Electronics	9252-50-R-24-BNC	LIR	2023-09-11	2024-09-11
Cable - Conducted Cable Assembly	Northwest EMC	EVG, HHD, RKT, VAB	EVGA	2023-05-16	2024-05-16
Receiver	Gauss Instruments	TDEMI 30M	ARN	2023-05-08	2024-05-08

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	3.2 dB	-3.2 dB

CONFIGURATIONS INVESTIGATED

ONIT0116-3

MODES INVESTIGATED

Transmitting RFID, ISO 14443a, 13.56 MHz

POWERLINE CONDUCTED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

EUT:	SERENE WALL READER	Work Order:	ONIT0116
Serial Number:	70000036	Date:	2024-02-08
Customer:	Onity Inc.	Temperature:	21.8°C
Attendees:	Ali Elmi	Relative Humidity:	37.9%
Customer Project:	None	Bar. Pressure (PMSL):	1016 mb
Tested By:	Christopher Ladwig and Jeff Alcoke	Job Site:	EV07
Power:	12 VDC via 110VAC/60Hz	Configuration:	ONIT0116-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2024	ANSI C63.10:2013
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	7	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

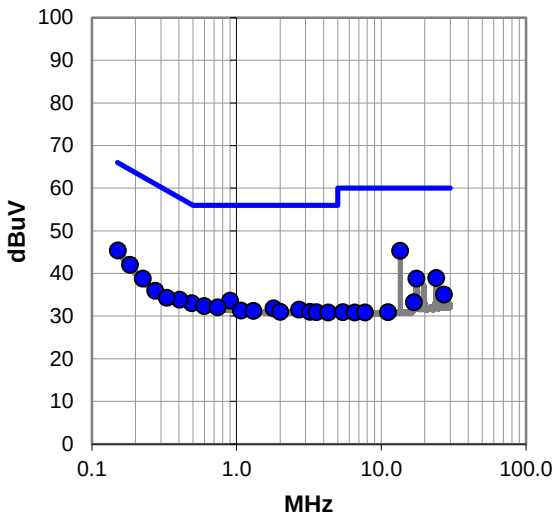
EUT OPERATING MODES

Transmitting RFID, ISO 14443a, 13.56 MHz

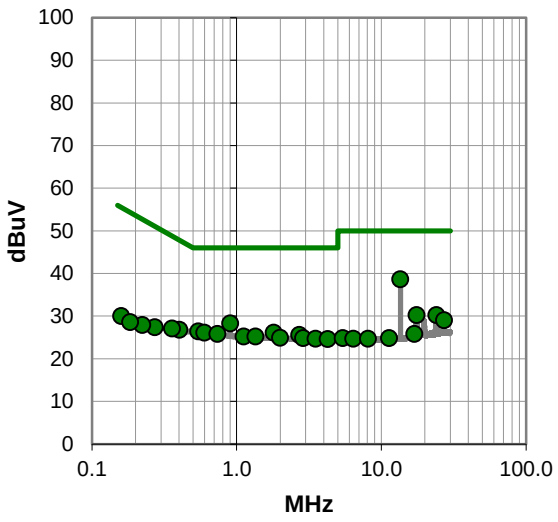
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #7

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	24.5	20.8	45.3	60.0	-14.7
0.152	25.3	20.1	45.4	65.9	-20.5
24.050	17.5	21.4	38.9	60.0	-21.1
17.520	17.8	21.0	38.8	60.0	-21.2
0.184	22.0	20.0	42.0	64.3	-22.3
0.902	13.6	20.0	33.6	56.0	-22.4
0.490	13.1	19.9	33.0	56.2	-23.2
0.597	12.3	20.0	32.3	56.0	-23.7
0.225	18.8	20.0	38.8	62.6	-23.8
0.403	13.9	19.9	33.8	57.8	-24.0
0.742	12.0	20.0	32.0	56.0	-24.0
1.802	11.7	20.1	31.8	56.0	-24.2
2.706	11.4	20.1	31.5	56.0	-24.5
1.076	11.3	20.0	31.3	56.0	-24.7
1.313	11.1	20.1	31.2	56.0	-24.8
2.004	10.9	20.1	31.0	56.0	-25.0
3.215	10.8	20.2	31.0	56.0	-25.0
27.120	13.4	21.6	35.0	60.0	-25.0
0.275	15.9	20.0	35.9	61.0	-25.1
3.563	10.7	20.2	30.9	56.0	-25.1
4.305	10.6	20.2	30.8	56.0	-25.2
0.330	14.4	19.9	34.3	59.5	-25.2
16.853	12.2	21.0	33.2	60.0	-26.8
5.431	10.6	20.3	30.9	60.0	-29.1
11.154	10.2	20.7	30.9	60.0	-29.1

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	17.8	20.8	38.6	50.0	-11.4
0.902	8.3	20.0	28.3	46.0	-17.7
0.542	6.5	19.9	26.4	46.0	-19.6
17.500	9.2	21.0	30.2	50.0	-19.8
24.015	8.8	21.4	30.2	50.0	-19.8
0.597	6.1	20.0	26.1	46.0	-19.9
1.804	6.0	20.1	26.1	46.0	-19.9
0.737	5.8	20.0	25.8	46.0	-20.2
2.706	5.5	20.1	25.6	46.0	-20.4
1.117	5.2	20.0	25.2	46.0	-20.8
1.351	5.1	20.1	25.2	46.0	-20.8
0.402	6.9	19.9	26.8	47.8	-21.0
27.120	7.4	21.6	29.0	50.0	-21.0
2.002	4.8	20.1	24.9	46.0	-21.1
2.881	4.7	20.1	24.8	46.0	-21.2
3.508	4.5	20.2	24.7	46.0	-21.3
4.273	4.4	20.2	24.6	46.0	-21.4
0.358	7.2	19.9	27.1	48.8	-21.7
0.272	7.4	20.0	27.4	51.1	-23.7
16.920	4.8	21.0	25.8	50.0	-24.2
0.223	7.9	20.0	27.9	52.7	-24.8
5.409	4.5	20.3	24.8	50.0	-25.2
11.339	4.1	20.7	24.8	50.0	-25.2
6.391	4.3	20.4	24.7	50.0	-25.3
8.083	4.2	20.5	24.7	50.0	-25.3

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

EUT:	SERENE WALL READER	Work Order:	ONIT0116
Serial Number:	70000037	Date:	2024-02-08
Customer:	Onity Inc.	Temperature:	21.8°C
Attendees:	Ali Elmi	Relative Humidity:	37.9%
Customer Project:	None	Bar. Pressure (PMSL):	1016 mb
Tested By:	Christopher Ladwig and Jeff Alcoke	Job Site:	EV07
Power:	12 VDC via 110VAC/60Hz	Configuration:	ONIT0116-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2024	ANSI C63.10:2013
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	8	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

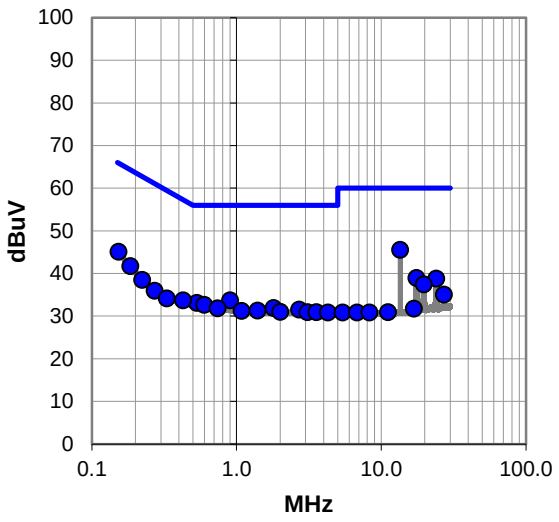
EUT OPERATING MODES

Transmitting RFID, ISO 14443a, 13.56 MHz

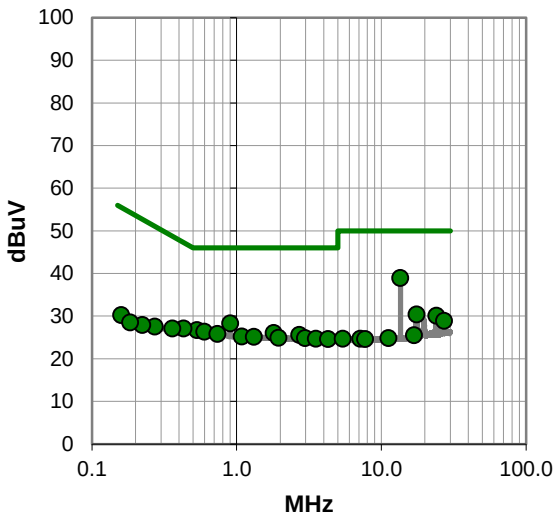
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #8

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	24.7	20.8	45.5	60.0	-14.5
0.153	25.0	20.1	45.1	65.8	-20.7
17.517	17.9	21.0	38.9	60.0	-21.1
24.047	17.4	21.4	38.8	60.0	-21.2
0.902	13.7	20.0	33.7	56.0	-22.3
0.185	21.7	20.0	41.7	64.3	-22.6
19.705	16.3	21.1	37.4	60.0	-22.6
0.533	13.2	19.9	33.1	56.0	-22.9
0.597	12.6	20.0	32.6	56.0	-23.4
0.428	13.8	19.9	33.7	57.3	-23.6
1.804	11.8	20.1	31.9	56.0	-24.1
0.739	11.8	20.0	31.8	56.0	-24.2
0.223	18.5	20.0	38.5	62.7	-24.2
2.706	11.4	20.1	31.5	56.0	-24.5
1.400	11.2	20.1	31.3	56.0	-24.7
1.082	11.2	20.0	31.2	56.0	-24.8
2.007	10.9	20.1	31.0	56.0	-25.0
27.120	13.4	21.6	35.0	60.0	-25.0
3.098	10.8	20.1	30.9	56.0	-25.1
3.565	10.7	20.2	30.9	56.0	-25.1
4.276	10.6	20.2	30.8	56.0	-25.2
0.272	15.9	20.0	35.9	61.1	-25.2
0.330	14.2	19.9	34.1	59.5	-25.4
16.816	10.7	21.0	31.7	60.0	-28.3
11.180	10.2	20.7	30.9	60.0	-29.1

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	18.1	20.8	38.9	50.0	-11.1
0.902	8.3	20.0	28.3	46.0	-17.7
0.533	6.8	19.9	26.7	46.0	-19.3
17.517	9.4	21.0	30.4	50.0	-19.6
0.597	6.3	20.0	26.3	46.0	-19.7
24.062	8.7	21.4	30.1	50.0	-19.9
1.804	5.9	20.1	26.0	46.0	-20.0
0.429	7.2	19.9	27.1	47.3	-20.2
0.737	5.8	20.0	25.8	46.0	-20.2
2.706	5.5	20.1	25.6	46.0	-20.4
1.084	5.2	20.0	25.2	46.0	-20.8
1.317	5.0	20.1	25.1	46.0	-20.9
1.952	4.8	20.1	24.9	46.0	-21.1
27.120	7.3	21.6	28.9	50.0	-21.1
2.964	4.7	20.1	24.8	46.0	-21.2
3.524	4.5	20.2	24.7	46.0	-21.3
4.276	4.4	20.2	24.6	46.0	-21.4
0.359	7.2	19.9	27.1	48.8	-21.7
0.272	7.5	20.0	27.5	51.1	-23.6
16.809	4.5	21.0	25.5	50.0	-24.5
0.223	7.9	20.0	27.9	52.7	-24.8
11.198	4.1	20.7	24.8	50.0	-25.2
0.159	10.1	20.1	30.2	55.5	-25.3
5.409	4.4	20.3	24.7	50.0	-25.3
7.164	4.3	20.4	24.7	50.0	-25.3

CONCLUSION

Pass

Tested By

EMISSIONS BANDWIDTH (20 DB)

element
TbtTx 2023.08.15.2
WTD.2023.11.13.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

A near-field probe was placed near the transmitter. A low-loss coaxial cable was used to connect the near-field probe to the spectrum analyzer.

As defined in FCC 15.215 Part (c), intentional radiators must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise by specified in the specific rule section under which the equipment operates, is contained within the frequency band designed in the rule section under which the equipment is operated.

The 20 dB bandwidth must be contained within the band 13.110-14.010 MHz. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

F_Low = Center Frequency + Transmit Freq Error - (20 dB BW / 2)
F_High = Center Frequency + Transmit Freq Error + (20 dB BW / 2)

The resolution bandwidth (RBW) of the spectrum analyzer was set to the range of 1% to 5% of the emissions bandwidth (EBW) and video bandwidth (VBW) bandwidth was set to at least 3 times the resolution bandwidth. The analyzer sweep time was set to auto and a peak detector was used.

The spectrum analyzer bandwidth measurement function was used to measure the 20 dB bandwidth.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Probe - Near Field Set	EMCO	7405	IPD	NCR	NCR
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFD	2023-11-29	2024-11-29
Attenuator	Fairview Microwave	SA18N5WA-20	TYV	NCR	NCR
Power Supply - DC	Topward	TPS-2000	TPD	NCR	NCR
Thermometer	Omega Engineering, Inc.	iTHx-SD-5	DVG	2023-03-30	2024-03-30
Probe - Temperature/Humidity	Omega Engineering, Inc.	iTHP-5-DB9	DVGA	2023-03-30	2024-03-30
Meter - Multimeter	Tektronix	DMM912	MMH	2023-04-03	2024-04-03
Chamber - Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPH-8-1-1-H/AC	TBI	NCR	NCR

EMISSIONS BANDWIDTH (20 DB)

element
TbtTx 2023.08.15.2
WTD.2023.11.13.0

EUT:	SERENE WALL READER	Work Order:	ONIT0116
Serial Number:	70000036	Date:	2024-02-06
Customer:	Onity Inc.	Temperature:	21.8°C
Attendees:	Ali Elmi	Relative Humidity:	41%
Customer Project:	None	Bar. Pressure (PMSL):	1008 mbar
Tested By:	Christopher Ladwig and Jeff Alcoke	Job Site:	EV06
Power:	12 VDC	Configuration:	ONIT0116-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2024	ANSI C63.10:2013

COMMENTS

Due to the narrow band of the modulated signal, we are unable to meet the 1% - 5% RBW ratio with respect to the 20 dB BW. Measurements performed using 17% which is worse case.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

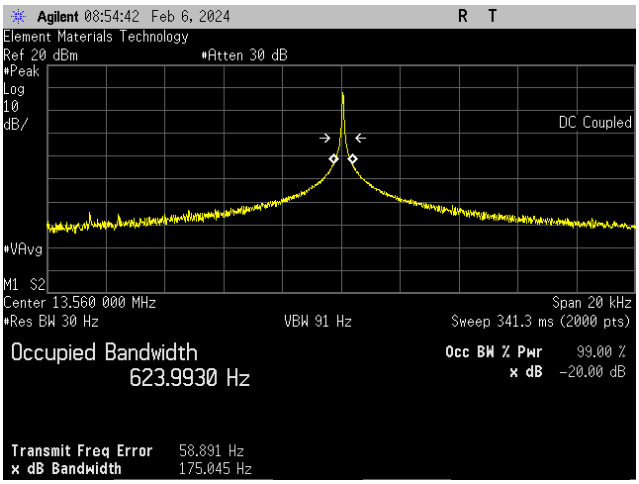
Tested By

TEST RESULTS

	20 dB BW (MHz)	F_Low (MHz)	F_High (MHz)	In Band (Y/N)	Limit (MHz)	Result
13.56 MHz RFID, ISO/IEC 14443a						
Normal Conditions	0.000175	13.55997	13.56015	Y	13.110 ≤ f ≤ 14.010	Pass

EMISSIONS BANDWIDTH (20 DB)

element
TbtTx 2023.08.15.2
WTD.2023.11.13.0



13.56 MHz RFID, ISO/IEC 14443a
Normal Conditions

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

TEST DESCRIPTION

The fundamental carrier of the EUT was maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A calibrated active loop antenna was used for this test in order to provide sufficient measurement sensitivity. The reference point of the loop antenna was maintained at 1m above the ground plane during the testing.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

As outlined in 15.209(e), 15.31(f)(2), and RSS-GEN, 6.5, measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Loop	EMCO	6502	AOA	2022-07-13	2024-07-13
Cable	None	10m Test Distance Cable	EVL	2024-01-17	2025-01-17
Receiver	Rohde & Schwarz	ESCI	ARF	2023-10-02	2024-10-02

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	1.7 dB	-1.7 dB

FREQUENCY RANGE INVESTIGATED

11.56 MHz TO 15.56 MHz

POWER INVESTIGATED

12 VDC

CONFIGURATIONS INVESTIGATED

ONIT0116-1

MODES INVESTIGATED

Transmitting 13.56 MHz RFID, ISO 14443a

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

EUT:	SERENE WALL READER	Work Order:	ONIT0116
Serial Number:	70000036	Date:	2024-02-05
Customer:	Onity Inc.	Temperature:	20.8°C
Attendees:	Ali Elmi	Relative Humidity:	38.7%
Customer Project:	None	Bar. Pressure (PMSL):	998 mb
Tested By:	Cole Ghizzone	Job Site:	EV11
Power:	12 VDC	Configuration:	ONIT0116-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2024	ANSI C63.10:2013
RSS-210 Issue 10:2019+A1:2020	ANSI C63.10:2013

TEST PARAMETERS

Run #:	9	Test Distance (m):	10	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

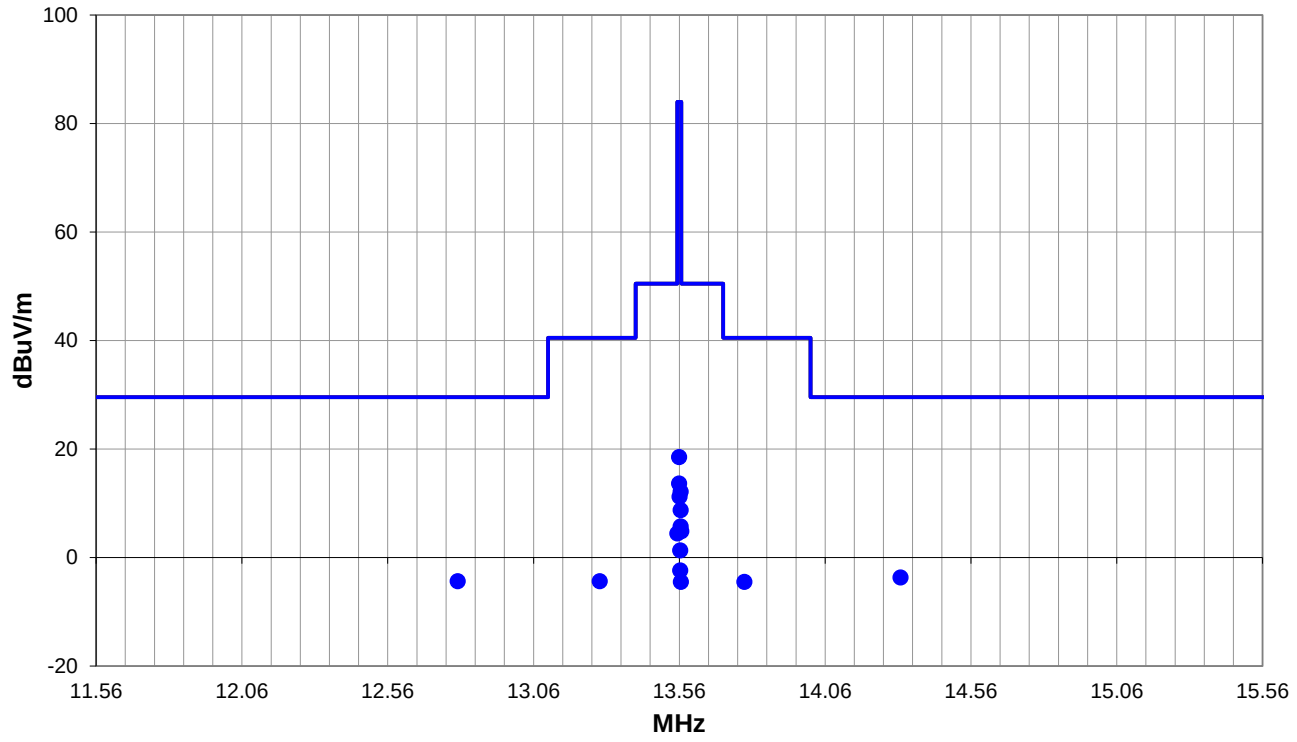
None

EUT OPERATING MODES

Transmitting 13.56 MHz RFID, ISO 14443a

DEVIATIONS FROM TEST STANDARD

None



Run #: 9 ■ PK ◆ AV ● QP

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #9

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)	Comments
14.318	4.4	11.0	1.0	279.0	10.0	0.0	Perp EUT	QP	-19.1	-3.7	29.5	-33.2	EUT Vertical
12.800	3.8	10.9	1.0	279.0	10.0	0.0	Perp EUT	QP	-19.1	-4.4	29.5	-33.9	EUT Vertical
13.287	3.8	10.9	1.0	279.0	10.0	0.0	Perp EUT	QP	-19.1	-4.4	40.5	-44.9	EUT Vertical
13.783	3.6	11.0	1.0	279.0	10.0	0.0	Perp EUT	QP	-19.1	-4.5	40.5	-45.0	EUT Vertical
13.567	12.9	11.0	1.0	279.0	10.0	0.0	Perp EUT	QP	-19.1	4.8	50.5	-45.7	EUT Vertical
13.553	12.5	11.0	1.0	279.0	10.0	0.0	Perp EUT	QP	-19.1	4.4	50.5	-46.1	EUT Vertical
13.559	26.6	11.0	1.0	274.0	10.0	0.0	Perp EUT	QP	-19.1	18.5	84.0	-65.5	EUT Vertical
13.559	21.7	11.0	1.0	274.0	10.0	0.0	Para Floor	QP	-19.1	13.6	84.0	-70.4	EUT Vertical
13.565	20.2	11.0	1.0	284.0	10.0	0.0	Perp EUT	QP	-19.1	12.1	84.0	-71.9	EUT On Side
13.561	19.3	11.0	1.0	65.0	10.0	0.0	Para EUT	QP	-19.1	11.2	84.0	-72.8	EUT On Side
13.564	16.8	11.0	1.0	93.0	10.0	0.0	Para Floor	QP	-19.1	8.7	84.0	-75.3	EUT On Side
13.565	13.8	11.0	1.0	32.0	10.0	0.0	Para EUT	QP	-19.1	5.7	84.0	-78.3	EUT Vertical
13.563	9.4	11.0	1.0	315.0	10.0	0.0	Perp EUT	QP	-19.1	1.3	84.0	-82.7	EUT Horizontal
13.563	5.7	11.0	1.0	152.0	10.0	0.0	Para EUT	QP	-19.1	-2.4	84.0	-86.4	EUT Horizontal
13.566	3.6	11.0	1.0	66.0	10.0	0.0	Para Floor	QP	-19.1	-4.5	84.0	-88.5	EUT Horizontal

CONCLUSION

Pass

Tested By

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHz)

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was continuously transmitting while set to the channel specified.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. A reference preview scan (pre-scan) is included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). An active loop antenna was used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

As outlined in 15.209(e), 15.31(f)(2), and RSS-GEN, 6.5, measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.

The limits in CFR 47, Part 15C 15.209(a) are identical to those is RSS-Gen section 8.9 Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ohms. For example, an E-Field measurement in dBuV/m can be converted to dBuA/m via the following formula: dBuV/m - 51.5 dB = dBuA/m. E-Field measurements have the same margin in dB to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limits.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Rohde & Schwarz	ESCI	ARF	2023-10-02	2024-10-02
Cable	None	10m Test Distance Cable	EVL	2024-01-17	2025-01-17
Antenna - Loop	EMCO	6502	AOA	2022-07-13	2024-07-13
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2023-10-04	2024-10-04
Cable	N/A	Bilog Cables	EVA	2023-11-05	2024-11-05

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	1.7 dB	-1.7 dB

FREQUENCY RANGE INVESTIGATED

9 kHz TO 30 MHz

POWER INVESTIGATED

12 VDC

CONFIGURATIONS INVESTIGATED

ONIT0116-1

MODES INVESTIGATED

Transmitting 13.56 MHz RFID, ISO 14443a

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHz)

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

EUT:	SERENE WALL READER	Work Order:	ONIT0116
Serial Number:	70000036	Date:	2024-02-05
Customer:	Onity Inc.	Temperature:	20.8°C
Attendees:	Ali Elmi	Relative Humidity:	38.7%
Customer Project:	None	Bar. Pressure (PMSL):	998 mb
Tested By:	Cole Ghizzone	Job Site:	EV11
Power:	12 VDC	Configuration:	ONIT0116-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2024	ANSI C63.10:2013
RSS-210 Issue 10:2019+A1:2020	ANSI C63.10:2013

TEST PARAMETERS

Run #:	8	Test Distance (m):	10	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

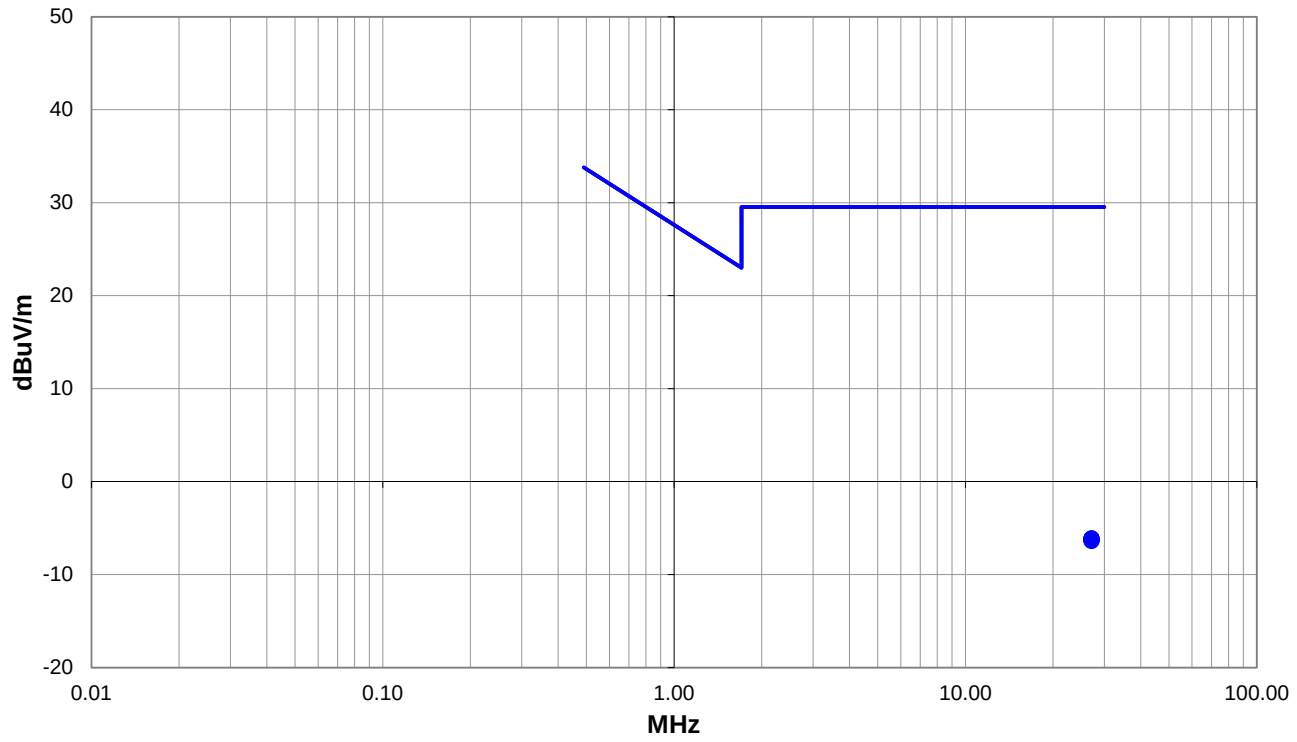
None

EUT OPERATING MODES

Transmitting 13.56 MHz RFID, ISO 14443a

DEVIATIONS FROM TEST STANDARD

None



Run #: 8 ■ PK ◆ AV ● QP

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHz)

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #8

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)	Comments
27.099	3.8	9.2	1.0	27.0	10.0	0.0	Perp EUT	QP	-19.1	-6.1	29.5	-35.6	EUT Horizontal
27.099	3.8	9.2	1.0	122.0	10.0	0.0	Perp EUT	QP	-19.1	-6.1	29.5	-35.6	EUT Vertical
27.102	3.7	9.2	1.0	302.0	10.0	0.0	Para EUT	QP	-19.1	-6.2	29.5	-35.7	EUT On Side
27.092	3.8	9.1	1.0	255.0	10.0	0.0	Perp EUT	QP	-19.1	-6.2	29.5	-35.7	EUT On Side
27.096	3.8	9.1	1.0	3.0	10.0	0.0	Para Floor	QP	-19.1	-6.2	29.5	-35.7	EUT On Side
27.108	3.7	9.2	1.0	97.0	10.0	0.0	Para Floor	QP	-19.1	-6.2	29.5	-35.7	EUT Vertical
27.105	3.6	9.2	1.0	228.0	10.0	0.0	Para Floor	QP	-19.1	-6.3	29.5	-35.8	EUT Horizontal
27.106	3.6	9.2	1.0	274.0	10.0	0.0	Para EUT	QP	-19.1	-6.3	29.5	-35.8	EUT Vertical
27.096	3.6	9.1	1.0	309.0	10.0	0.0	Para EUT	QP	-19.1	-6.4	29.5	-35.9	EUT Horizontal

CONCLUSION

Pass

Tested By

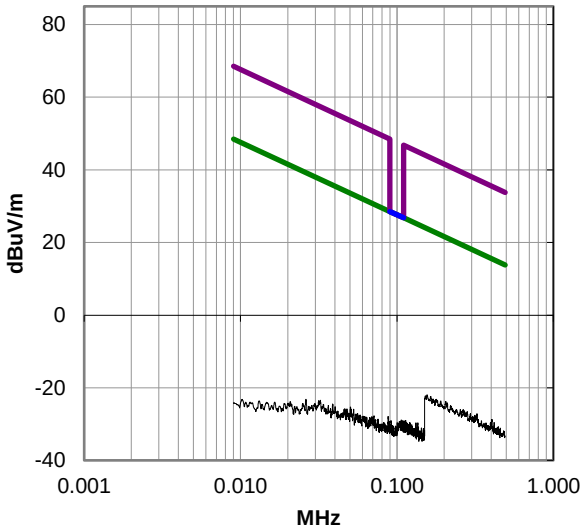
FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHz)

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

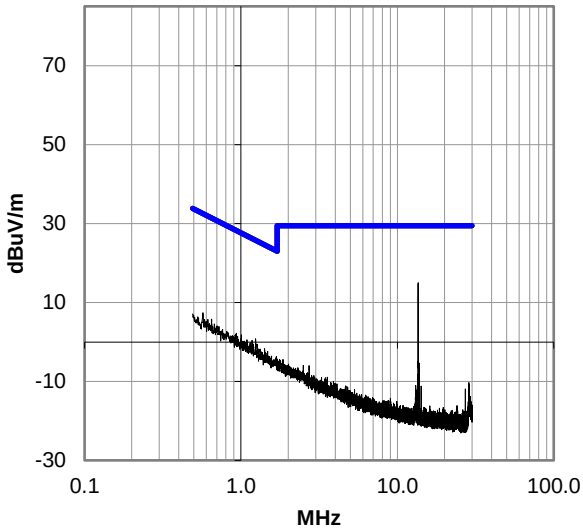
PRESCAN DATA

Radiated spurious emissions from the EUT are initially reviewed with Pre-scans (Preview scans). Pre-scans are performed, with the EUT transmitting on the lowest applicable data rate, for both vertical and horizontal polarizations. The Pre-scan plots below are shown with a peak detector and RBW for the following frequency ranges: 9 kHz RBW (< 30 MHz); 120 kHz RBW (30 - 1000 MHz); 1 MHz RBW (> 1 GHz). In the case where unintentional emissions are observed, an ambient or idle pre-scan with the radio off, will be shown for comparison.

0.009-0.49 MHz, Run 49



0.49-30 MHz, Run 50



FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHz)

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was transmitting while set at the operating channel.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Loop	EMCO	6502	AOA	2022-07-13	2024-07-13
Cable	None	10m Test Distance Cable	EVL	2024-01-17	2025-01-17
Receiver	Rohde & Schwarz	ESCI	ARF	2023-10-02	2024-10-02
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2023-10-04	2024-10-04
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	2022-03-02	2024-03-02
Antenna - Standard Gain	ETS Lindgren	3160-07	AHU	NCR	NCR
Cable	N/A	Double Ridge Horn Cables	EVB	2023-03-26	2024-03-26
Cable	None	Standard Gain Horn Cables	EVF	2023-10-31	2024-10-31
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAG	2023-03-26	2024-03-26
Amplifier - Pre-Amplifier	L-3 Narda-MITEQ	AMF-6F-08001200-30-10P	PAO	2023-10-31	2024-10-31
Filter - High Pass	Micro-Tronics	HPM50111	HFO	2023-11-06	2024-11-06
Attenuator	Coaxicom	3910-10	AWX	2023-02-10	2024-02-10

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	5.2 dB	-5.2 dB

FREQUENCY RANGE INVESTIGATED

30 MHz TO 12.4 GHz

POWER INVESTIGATED

12 VDC

CONFIGURATIONS INVESTIGATED

ONIT0116-1

MODES INVESTIGATED

Transmitting 13.56 MHz RFID, ISO 14443a

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHz)

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

EUT:	SERENE WALL READER	Work Order:	ONIT0116
Serial Number:	70000036	Date:	2024-02-05
Customer:	Onity Inc.	Temperature:	22.6°C
Attendees:	Ali Elmi	Relative Humidity:	38.9%
Customer Project:	None	Bar. Pressure (PMSL):	1001 mb
Tested By:	Cole Ghizzone	Job Site:	EV11
Power:	12 VDC	Configuration:	ONIT0116-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2024	ANSI C63.10:2013
RSS-210 Issue 10:2019+A1:2020	ANSI C63.10:2013

TEST PARAMETERS

Run #:	15	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

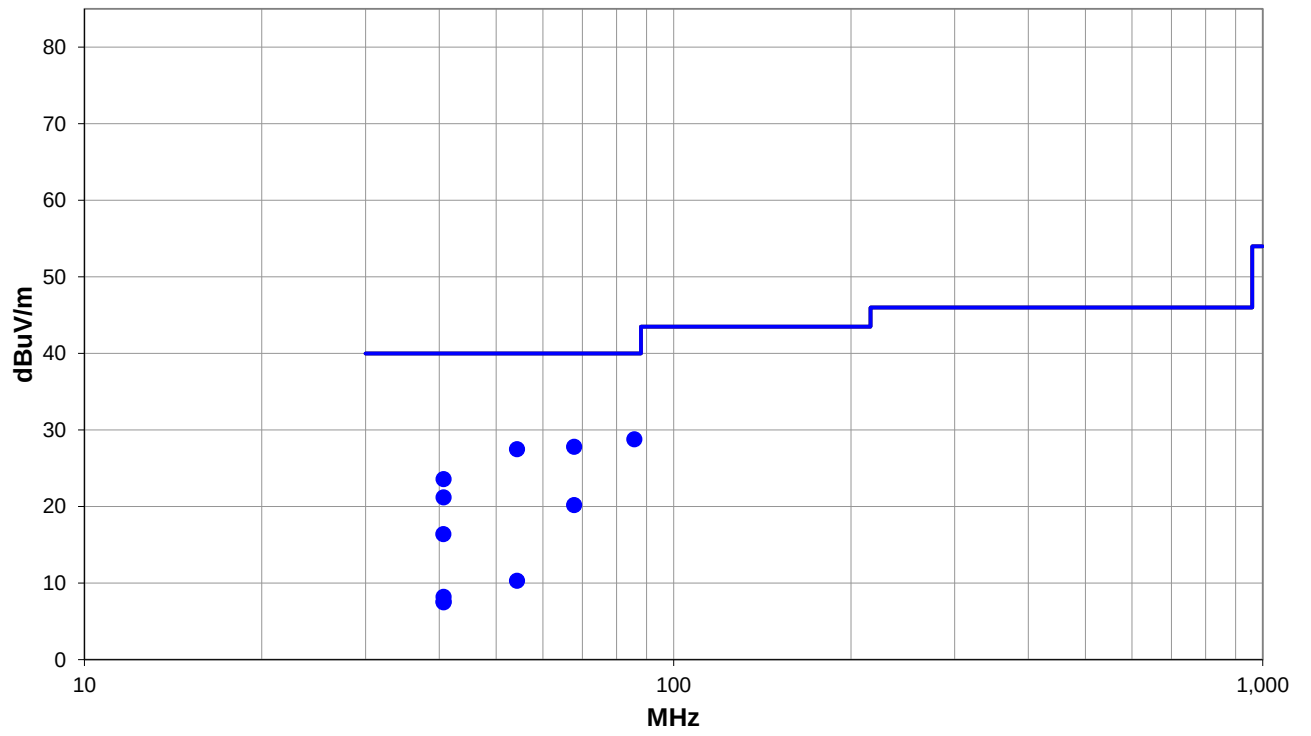
None

EUT OPERATING MODES

Transmitting 13.56 MHz RFID, ISO 14443a

DEVIATIONS FROM TEST STANDARD

None



Run #: 15 ■ PK ◆ AV ● QP

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHz)

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #15

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)	Comments
85.752	57.4	-28.6	1.5	158.0	3.0	0.0	Vert	QP	0.0	28.8	40.0	-11.2	EUT On Side
67.807	56.5	-28.7	1.0	145.0	3.0	0.0	Vert	QP	0.0	27.8	40.0	-12.2	EUT On Side
54.244	55.2	-27.7	1.0	55.0	3.0	0.0	Vert	QP	0.0	27.5	40.0	-12.5	EUT On Side
40.680	47.6	-24.0	1.17	301.0	3.0	0.0	Vert	QP	0.0	23.6	40.0	-16.4	EUT On Side
40.682	45.2	-24.0	1.05	280.0	3.0	0.0	Vert	QP	0.0	21.2	40.0	-18.8	EUT Vert
67.796	48.9	-28.7	2.61	109.0	3.0	0.0	Horz	QP	0.0	20.2	40.0	-19.8	EUT Vert
40.671	40.4	-24.0	1.0	332.0	3.0	0.0	Vert	QP	0.0	16.4	40.0	-23.6	EUT Horz
54.243	38.0	-27.7	1.02	286.0	3.0	0.0	Horz	QP	0.0	10.3	40.0	-29.7	EUT Vert
40.699	32.2	-24.0	2.21	266.0	3.0	0.0	Horz	QP	0.0	8.2	40.0	-31.8	EUT Vert
40.693	31.6	-24.0	2.48	301.0	3.0	0.0	Horz	QP	0.0	7.6	40.0	-32.4	EUT Horz
40.699	31.5	-24.0	1.0	250.0	3.0	0.0	Horz	QP	0.0	7.5	40.0	-32.5	EUT On Side

CONCLUSION

Pass

Tested By

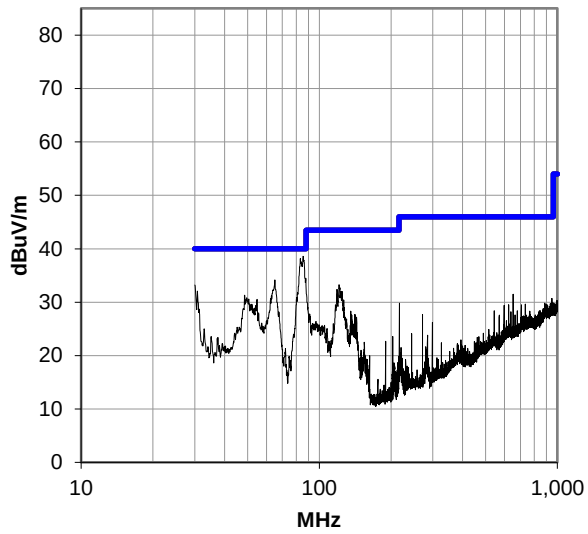
FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHz)

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

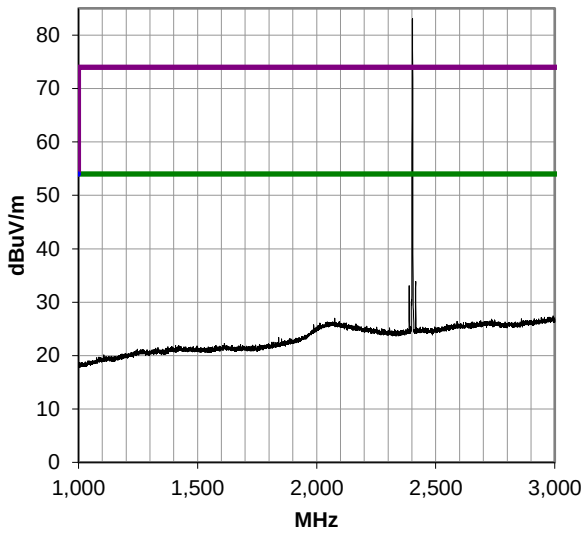
PRESCAN DATA

Radiated spurious emissions from the EUT are initially reviewed with Pre-scans (Preview scans). Pre-scans are performed, with the EUT transmitting on the lowest applicable data rate, for both vertical and horizontal polarizations. The Pre-scan plots below are shown with a peak detector and RBW for the following frequency ranges: 9 kHz RBW (< 30 MHz); 120 kHz RBW (30 - 1000 MHz); 1 MHz RBW (> 1 GHz). In the case where unintentional emissions are observed, an ambient or idle pre-scan with the radio off, will be shown for comparison.

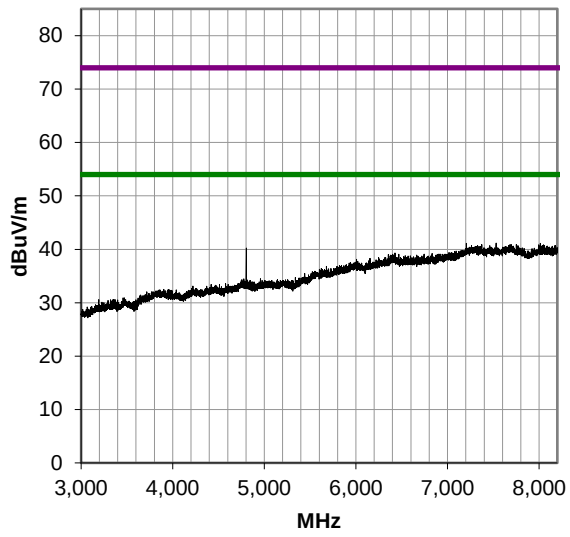
30-1000 MHz, Run 15



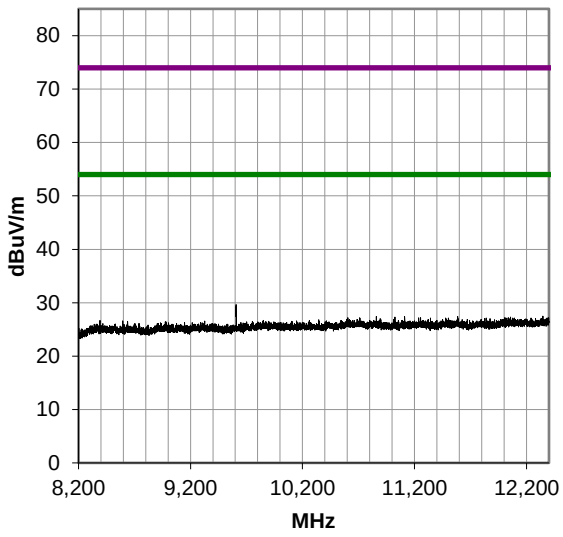
1000-3000 MHz, Run 32*



3000-8200 MHz, Run 33



8200-12400 MHz, Run 34



*Emissions noted in the above pre-scan are from the fundamental transmit frequency of the co-located BLE radio and do not fall under the scope of FCC 15.225 or RSS-210.

FREQUENCY STABILITY

element
TbtTx 2023.08.15.2
WTD.2023.11.13.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

A near-field probe was placed near the transmitter. A low-loss coaxial cable was used to connect the near-field probe to the spectrum analyzer.

The spectrum analyzer is equipped with a precision frequency reference that exceeds the stability requirement of the EUT.

Measurements were made on the single transmit frequency as called out on the data sheets. Testing was done while the EUT was continuously polling.

The primary supply voltage was varied from 85 % to 115% of the nominal voltage while at ambient temperature. Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range of -20 ° to +50° C and at 10°C intervals.

The requirement of a frequency tolerance of ±0.01% is equivalent to 100 ppm
The formula to check for compliance is:

ppm = (Measured Frequency / Measured Nominal Frequency - 1) * 1,000,000

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Probe - Near Field Set	EMCO	7405	IPD	NCR	NCR
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFD	2023-11-29	2024-11-29
Attenuator	Fairview Microwave	SA18N5WA-20	TYV	NCR	NCR
Power Supply - DC	Topward	TPS-2000	TPD	NCR	NCR
Thermometer	Omega Engineering, Inc.	iTHx-SD-5	DVG	2023-03-30	2024-03-30
Probe - Temperature/Humidity	Omega Engineering, Inc.	iTHP-5-DB9	DVGA	2023-03-30	2024-03-30
Meter - Multimeter	Tektronix	DMM912	MMH	2023-04-03	2024-04-03
Chamber - Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPH-8-1-1-H/AC	TBI	NCR	NCR

FREQUENCY STABILITY

element
TbtTx 2023.08.15.2
WTD.2023.11.13.0

EUT:	SERENE WALL READER	Work Order:	ONIT0116
Serial Number:	70000036	Date:	2024-02-07
Customer:	Onity Inc.	Temperature:	21.4°C
Attendees:	Ali Elmi	Relative Humidity:	40.6%
Customer Project:	None	Bar. Pressure (PMSL):	1006 mbar
Tested By:	Christopher Ladwig and Jeff Alcoke	Job Site:	EV06
Power:	12 VDC	Configuration:	ONIT0116-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2024	ANSI C63.10:2013
RSS-210 Issue 10:2019+A1:2020	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

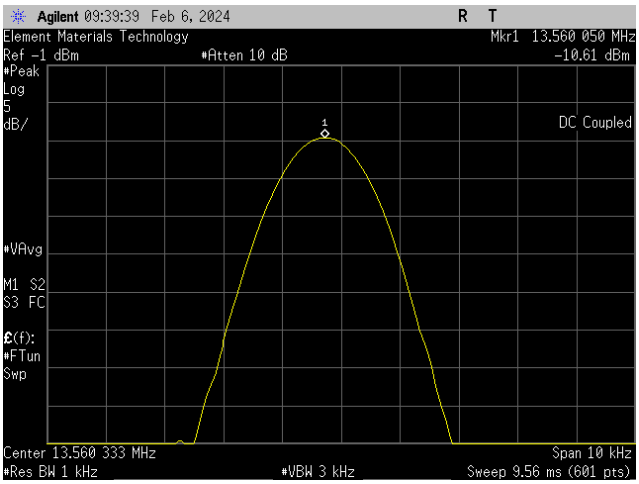
Tested By

TEST RESULTS

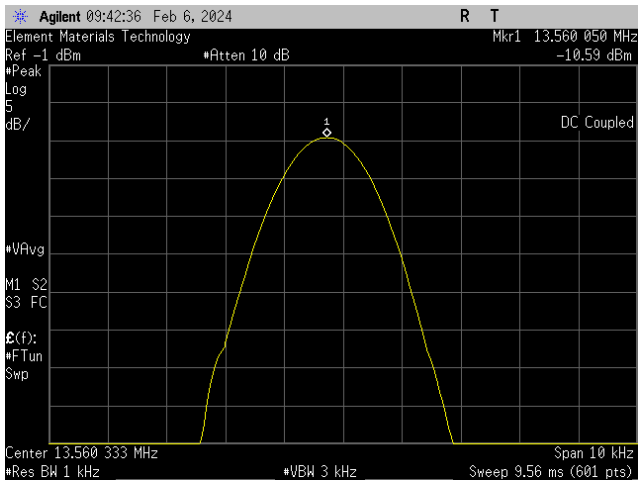
	Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
CW, 13.56 MHz					
Normal Conditions	13.560050	13.560050	0	100	Pass
Extreme Voltage 115%	13.560050	13.560050	0	100	Pass
Extreme Voltage 85%	13.560050	13.560050	0	100	Pass
Extreme Temperature +50°C	13.560016	13.560050	2.51	100	Pass
Extreme Temperature +40°C	13.559999	13.560050	3.76	100	Pass
Extreme Temperature +30°C	13.560017	13.560050	2.43	100	Pass
Extreme Temperature +20°C	13.560033	13.560050	1.25	100	Pass
Extreme Temperature +10°C	13.560083	13.560050	2.43	100	Pass
Extreme Temperature +0°C	13.560100	13.560050	3.69	100	Pass
Extreme Temperature -10°C	13.560117	13.560050	4.94	100	Pass
Extreme Temperature -20°C	13.560117	13.560050	4.94	100	Pass

FREQUENCY STABILITY

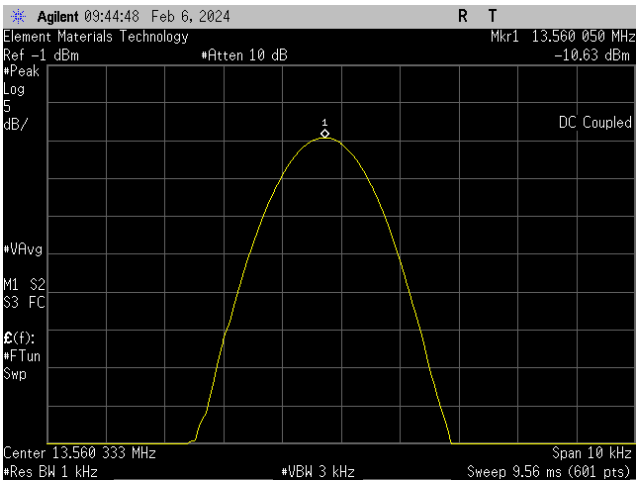
element
TbtTx 2023.08.15.2
WTD.2023.11.13.0



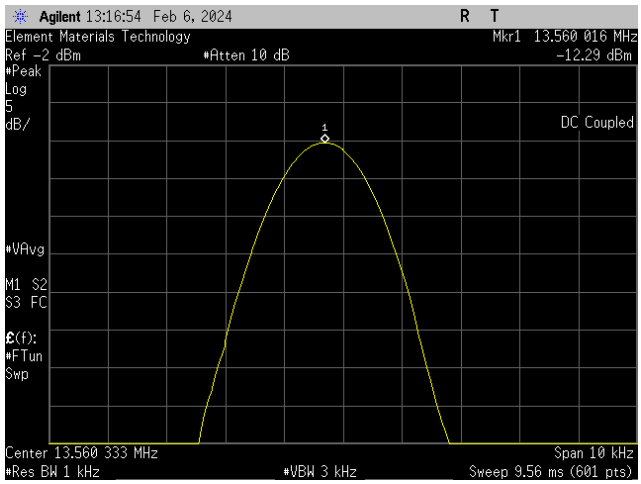
CW, 13.56 MHz
Normal Conditions



CW, 13.56 MHz
Extreme Voltage 115%



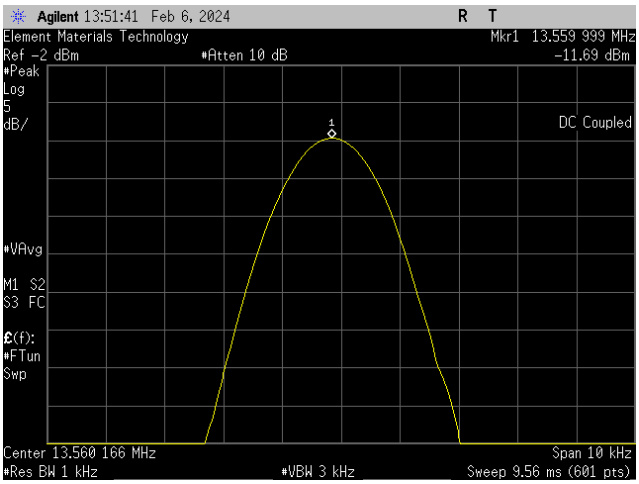
CW, 13.56 MHz
Extreme Voltage 85%



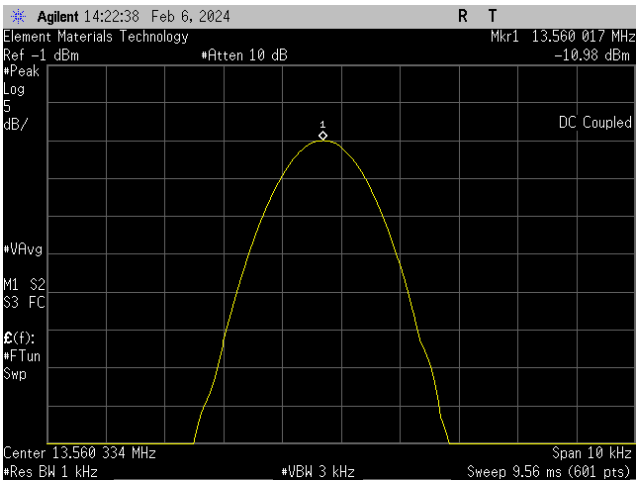
CW, 13.56 MHz
Extreme Temperature +50°C

FREQUENCY STABILITY

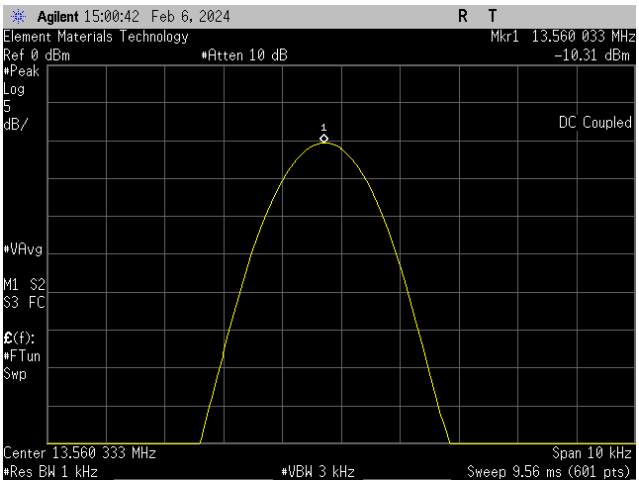
element
TbtTx 2023.08.15.2
WTD.2023.11.13.0



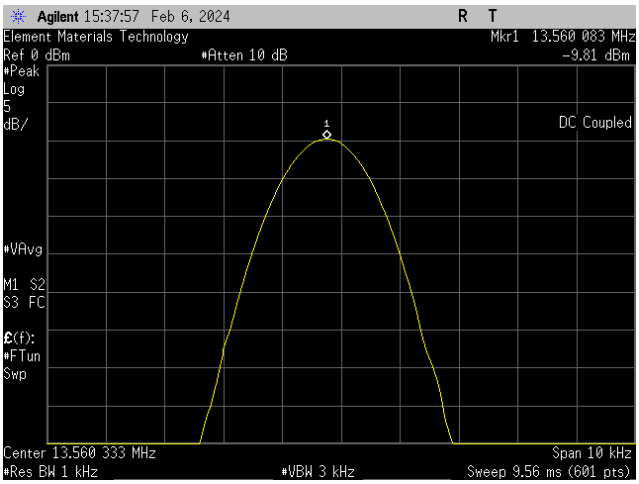
CW, 13.56 MHz
Extreme Temperature +40°C



CW, 13.56 MHz
Extreme Temperature +30°C



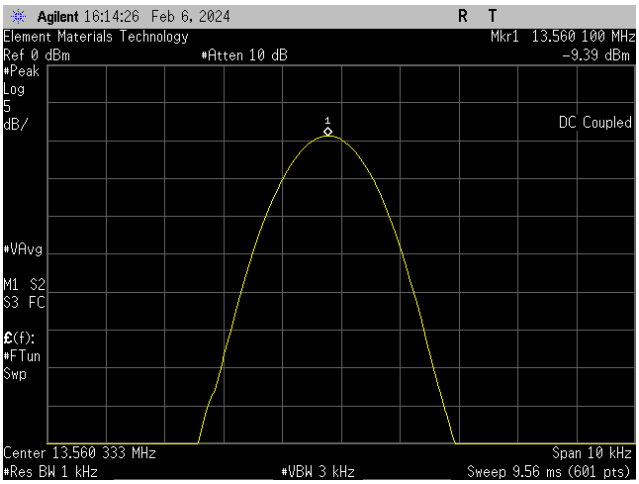
CW, 13.56 MHz
Extreme Temperature +20°C



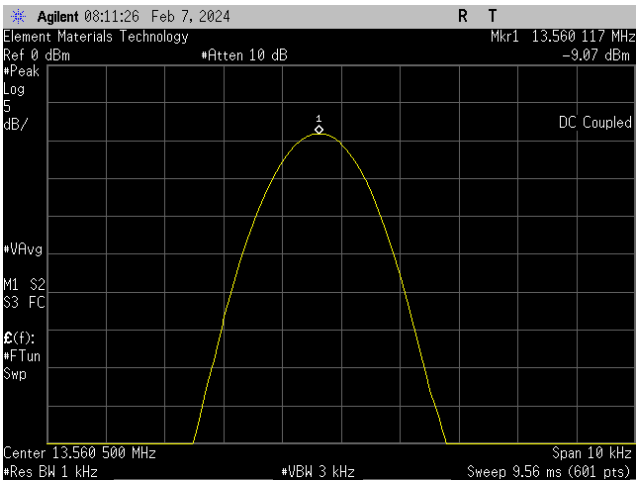
CW, 13.56 MHz
Extreme Temperature +10°C

FREQUENCY STABILITY

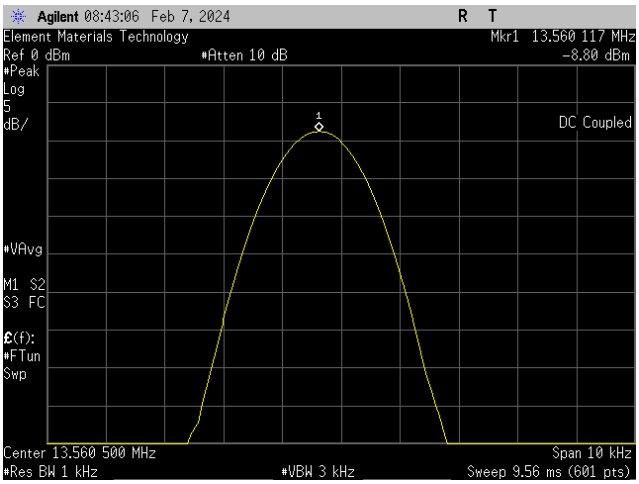
element
TbtTx 2023.08.15.2
WTD.2023.11.13.0



CW, 13.56 MHz
Extreme Temperature +0°C



CW, 13.56 MHz
Extreme Temperature -10°C



CW, 13.56 MHz
Extreme Temperature -20°C

OCCUPIED BANDWIDTH (99%)

element
TbtTx 2023.08.15.2
WTD.2023.11.13.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

A near-field probe was placed near the transmitter. A low-loss coaxial cable was used to connect the near-field probe to the spectrum analyzer.

When the occupied bandwidth limit is not stated in the applicable RSS or reference measurement method, the transmitted signal bandwidth shall be reported as the 99% emission bandwidth as defined in RSS-Gen.

The 99% occupied bandwidth was measured with the EUT configured for continuous modulated operation.

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

The resolution bandwidth (RBW) of the spectrum analyzer was set to the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) bandwidth was set to at least 3 times the resolution bandwidth. The analyzer sweep time was set to auto to prevent video filtering or averaging. A sample detector was used unless the device was not able to be operated in a continuous transmit mode, in which case a peak detector was used.

The spectrum analyzer occupied bandwidth measurement function was used to sum the power of the transmission in linear terms to obtain the 99% bandwidth.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Probe - Near Field Set	EMCO	7405	IPD	NCR	NCR
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFD	2023-11-29	2024-11-29
Attenuator	Fairview Microwave	SA18N5WA-20	TYV	NCR	NCR
Power Supply - DC	Topward	TPS-2000	TPD	NCR	NCR
Thermometer	Omega Engineering, Inc.	iTHx-SD-5	DVG	2023-03-30	2024-03-30
Probe - Temperature/Humidity	Omega Engineering, Inc.	iTHP-5-DB9	DVGA	2023-03-30	2024-03-30
Meter - Multimeter	Tektronix	DMM912	MMH	2023-04-03	2024-04-03
Chamber - Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPH-8-1-1-H/AC	TBI	NCR	NCR

OCCUPIED BANDWIDTH (99%)

element
TbtTx 2023.08.15.2
WTD.2023.11.13.0

EUT:	SERENE WALL READER	Work Order:	ONIT0116
Serial Number:	70000036	Date:	2024-02-06
Customer:	Onity Inc.	Temperature:	21.9°C
Attendees:	Ali Elmi	Relative Humidity:	40.6%
Customer Project:	None	Bar. Pressure (PMSL):	1008 mbar
Tested By:	Christopher Ladwig and Jeff Alcoke	Job Site:	EV06
Power:	12 VDC	Configuration:	ONIT0116-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2024	ANSI C63.10:2013
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

N/A

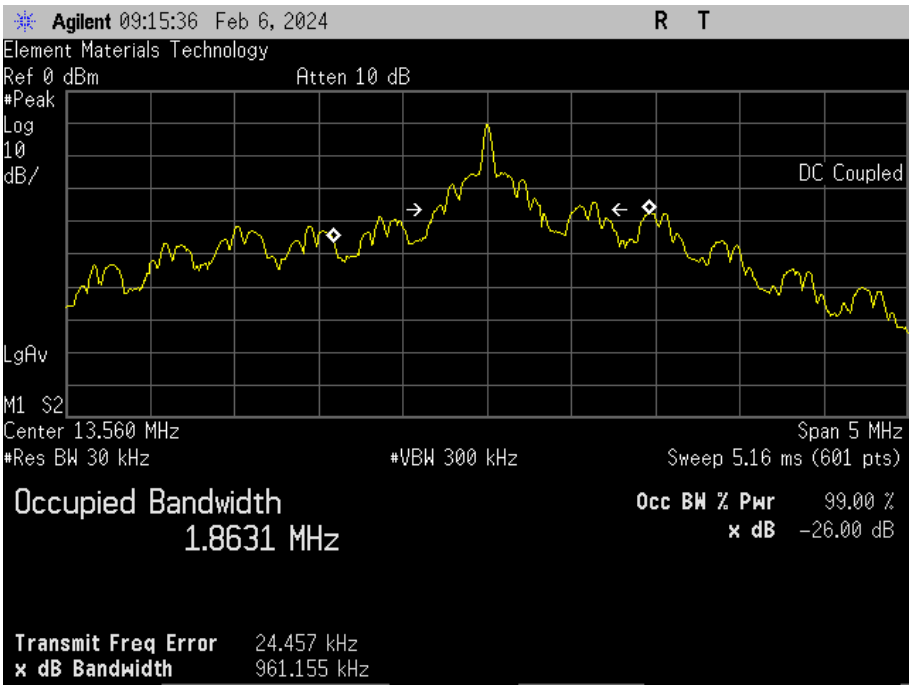
Tested By

TEST RESULTS

	Value	Limit	Result
13.56 MHz RFID, ISO/IEC 14443a			
Normal Conditions	1.863 MHz	N/A	N/A

OCCUPIED BANDWIDTH (99%)

element
TbtTx 2023.08.15.2
WTD.2023.11.13.0



13.56 MHz RFID, ISO/IEC 14443a
Normal Conditions

End of Test Report