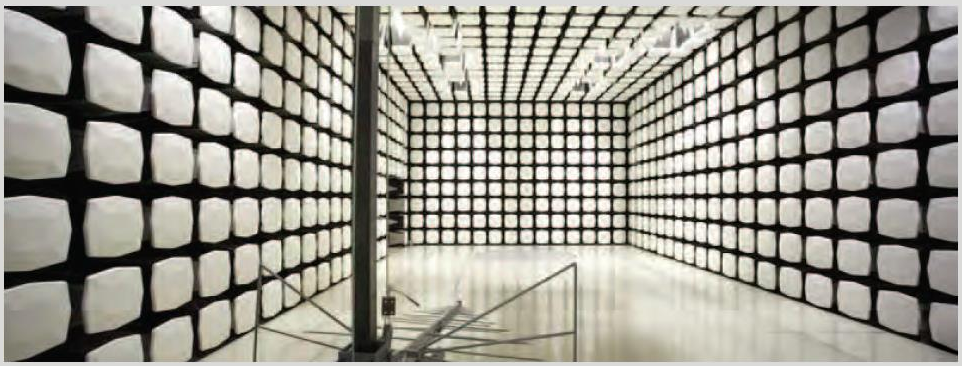
Seitz and Associates, Inc.

Gen4 RFID

FCC 15.225:2024

13.56 MHz Radio

Report: SEIT0121.0 Rev. 1, Issue Date: March 3, 2025



CERT #3310.02

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CERTIFICATE OF TEST

Last Date of Test: October 9, 2024
Seitz and Associates, Inc.
EUT: Gen4 RFID

Radio Equipment Testing

Standards

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

Guidance

KDB 174176

Results

Test Description	Result	Specification Section(s)	Method Section(s)	Comments
Powerline Conducted Emissions	Pass	15.207	6.2	
Field Strength of Fundamental	Pass	15.225(a)-(c)	6.4	
Field Strength of Spurious Emissions (Less Than 30 MHz)	Pass	15.225(d), 15.209	6.4	
Field Strength of Spurious Emissions (Greater Than 30 MHz)	Pass	15.225(d), 15.209	6.5	
Frequency Stability	Pass	15.225(e), 15.31(e), 15.215(c), 2.1055	6.8	
Emissions Bandwidth (20 dB)	Pass	15.215(c)	6.9.2	

Deviations From Test Standards

None

Approved By:

Chuck Heller, Operations 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
00	None		
01	Corrected test results for Powerline Conducted emissions on the Certificate of Test from Fail to Pass.	2025-03-03	3
	Updated the test description, changed the word “fail” to “exceed”.		16
	Corrected the test results for Powerline Conducted Emissions from Fail to Evaluated.		18, 20, 22, 24, 26, 28

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:

California Minnesota Oregon Texas Washington

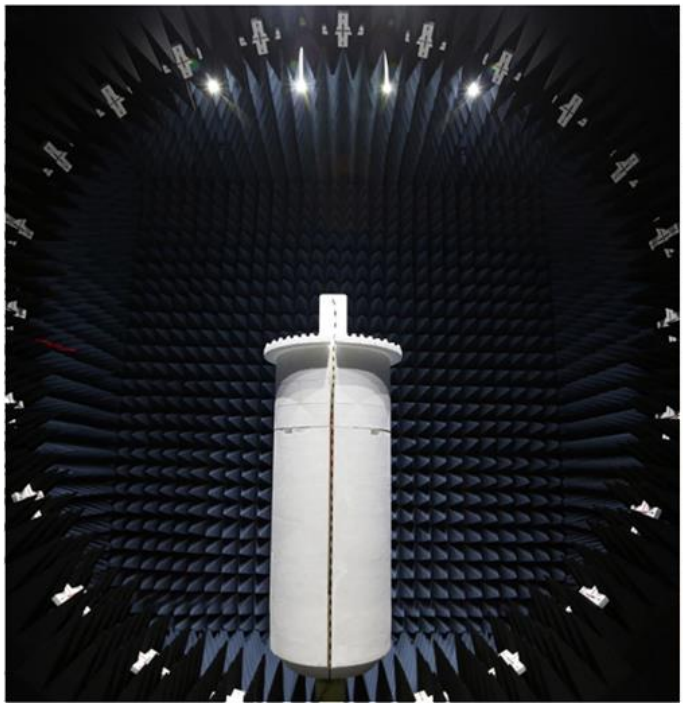
FACILITIES

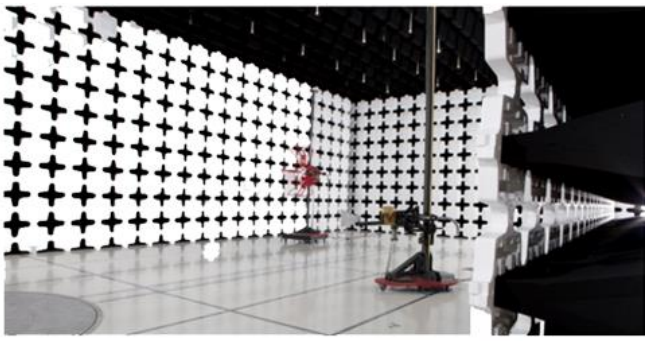
Testing was performed at the following location(s)

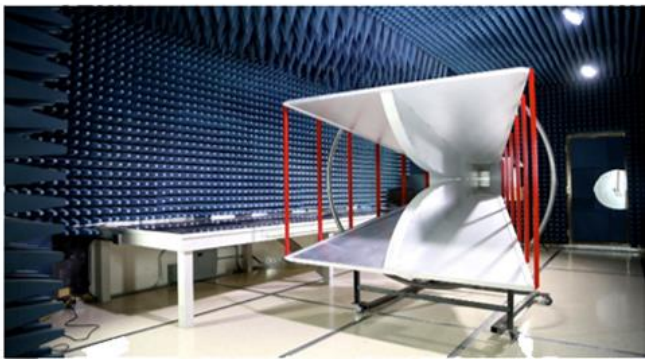
	Location	Labs (1)	Address	A2LA (2)	ISED (3)	BSMI (4)	VCCI (5)	CAB (6)	FDA (7)
☐	California	OC01-17	41 Tesla Irvine, CA 92618 (949) 861-8918	3310.04	2834B	SL2-IN-E-1154R	A-0029	US0158	TL-55
☐	Minnesota	MN01-11	9349 W Broadway Ave. Brooklyn Park, MN 55445 (612) 638-5136	3310.05	2834E	SL2-IN-E-1152R	A-0109	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
☐	Plano Texas	PT01-15	1701 E Plano Pkwy, Ste 150 Plano, TX 75074 (972) 509-2566	214.19	32637	SL2-IN-E-057R	A-0426	US0054	N/A
☐	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
MU 2023-09-21

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.

Various Measurements

Test	All Labs (+/-)
Frequency Accuracy (%)	0.0007
Amplitude Accuracy (dB)	1.2
Conducted Power (dB)	1.2
Radiated Power via Substitution (dB)	0.7
Temperature (degrees C)	0.7
Humidity (% RH)	2.5
Voltage (AC) (%)	1
Voltage (DC) (%)	0.7
Field Strength	5.2

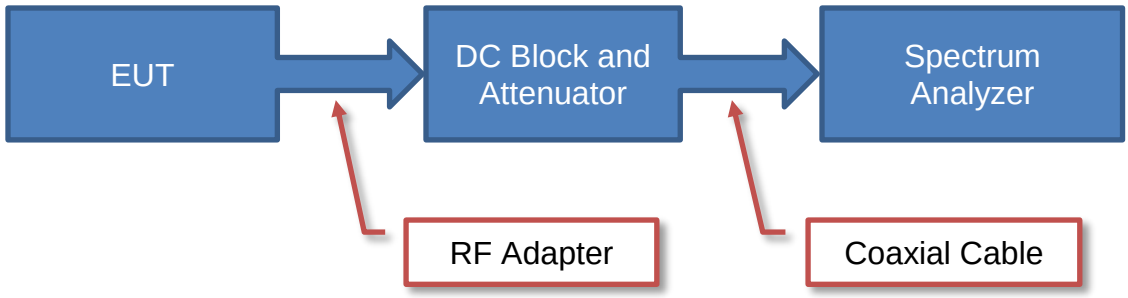
TEST SETUP BLOCK DIAGRAMS

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.

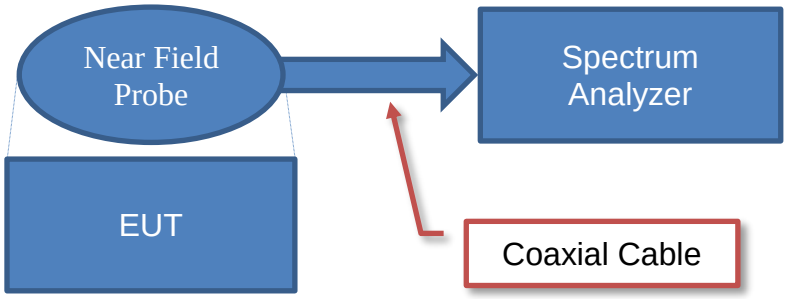
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

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

Near Field Test Fixture Measurements

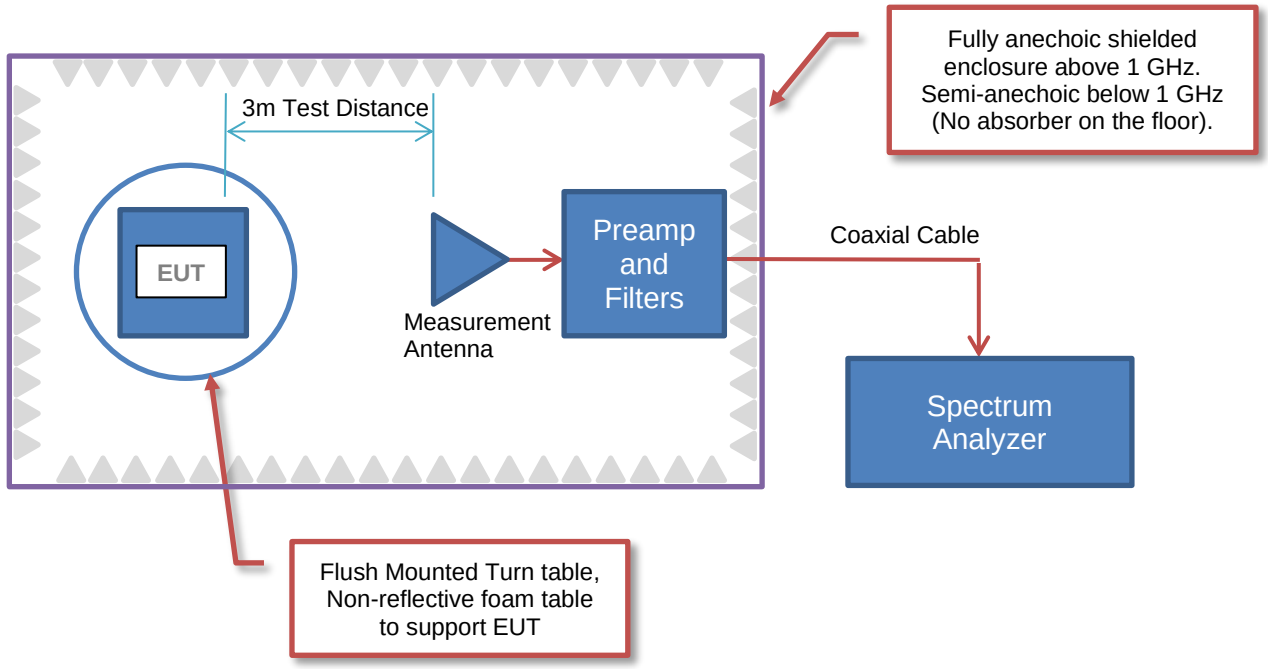


Sample Calculation (logarithmic units)

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**

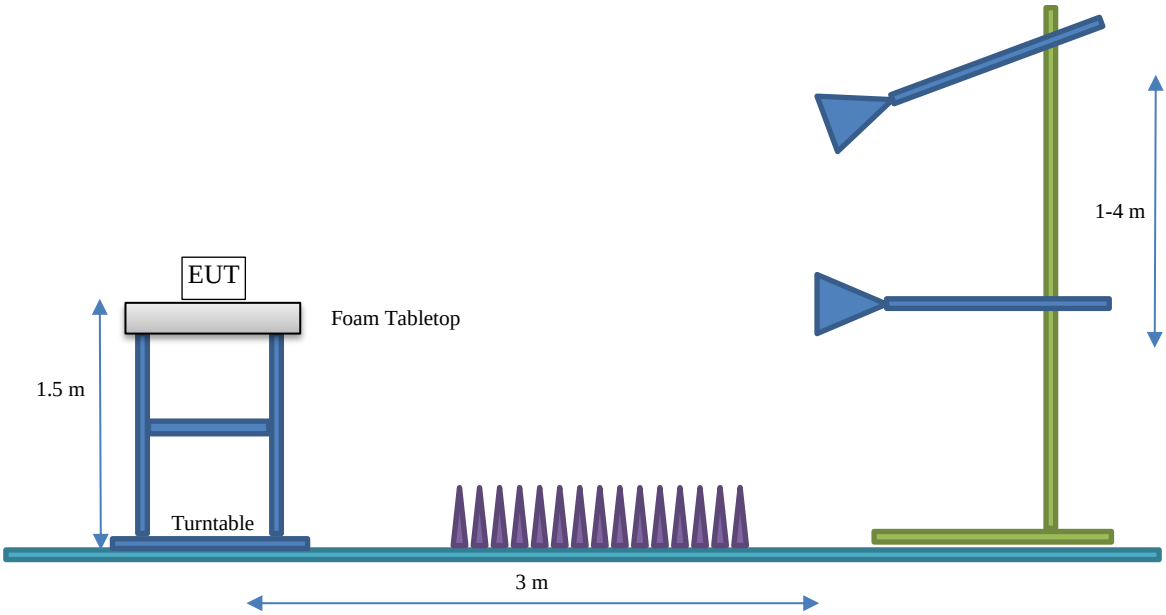
Radiated Power (ERP/EIRP) – Substitution Method:

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:	Seitz and Associates, Inc.
Address:	16700 NW Mission Oaks Dr
City, State, Zip:	Beaverton, OR 97006
Test Requested By:	Tyler Seitz
EUT:	Gen4 RFID
First Date of Test:	September 17, 2024
Last Date of Test:	October 9, 2024
Receipt Date of Samples:	September 17, 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:
The Gen4 RFID device is a 13.56 MHz RFID transceiver with single PCB antenna that contains Qty. 7 x 1.2" diameter microstrip antenna and Qty. 2x 2.5in diameter mictostrip antenna.

Testing Objective:
To demonstrate compliance of the 13.56 MHz radio to FCC 15.225 requirements.

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

Antenna Location	Type	Dimensions	Provided by:
A0, A1, A2, A3, A4, A5, A6	Microstrip Loop	1.2” diameter, 5 Turns	Seitz and Associates, Inc.
A26, A27	Microstrip Loop	2.5” diameter, 3.5 Turns	Seitz and Associates, Inc.

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

☐ Test software settings Test software/firmware installed on EUT: 2.65

X Rated power settings

SETTINGS FOR ALL TESTS IN THIS REPORT

Radio	Modulation	Protocol	Data Rate (kbps)	Frequency (MHz)	Power Setting (W)
RFID	ASK	ISO 18000-3M3	53	13.56	1.25

CONFIGURATIONS

Configuration SEIT0121-1

Software/Firmware Running During Test	
Description	**Version**
Firmware	2.65
Software	IntegratedReaderStreamTest0051

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RFID Radio	Seitz and Associates, Inc.	Gen4 RFID RevD2	00002147
Antenna PCB	Seitz and Associates, Inc.	BJ/Carn RevC0	00000001

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Power Supply	Seitz and Associates, Inc.	SDM-120-65	N/A
Laptop	HP	EliteBook 8570p	5CB309LP0360T5

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Ethernet	Yes	9.0	No	RFID Radio	Laptop
AC Power	No	1.3	No	Power Supply	AC Power
DC Power	No	1.8	No	Power Supply	RFID Radio

CONFIGURATIONS

Configuration SEIT0121-2

Software/Firmware Running During Test	
Description	**Version**
Firmware	2.65
Software	IntegratedReaderStreamTest0051

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RFID Radio	Seitz and Associates, Inc.	Gen4 RFID RevD2	00002147
Antenna PCB	Seitz and Associates, Inc.	BJ/Carn RevC0	00000001

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	HP	EliteBook 8570p	5CB309LP0360T5

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Ethernet	Yes	9.0	No	RFID Radio	Laptop
DC Power	No	1.8	No	Lab DC Power Supply	RFID Radio

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2024-09-17	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.
2	2024-09-23	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.
3	2024-09-23	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	2024-09-24	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.
5	2024-09-25	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.
6	2024-10-09	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.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

TEST DESCRIPTION

The EUT will be powered either directly or indirectly from the AC power line. Therefore, conducted emissions measurements were made on the AC input of the EUT, or on the AC input of the device used to power the EUT.

The EUT was transmitting at its maximum data rate. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.10.

If the operating frequency of 13.56 MHz is causing the product to exceed the FCC 15.207 limits, the following guidance can be used:

FCC KDB 174176 D01 AC Conducted FAQ v01r01, June 3, 2015 Section Q5:

For a device with a permanent or detachable antenna operating at or below 30 MHz, the FCC will accept measurements performed with a suitable dummy load in lieu of the antenna under the following conditions:

(1) perform the AC power-line conducted tests with the antenna connected to determine compliance with Section 15.207 limits outside the transmitter's fundamental emission band;

(2) retest with a dummy load in lieu of the antenna to determine compliance with Section 15.207 limits within the transmitter's fundamental emission band. For a detachable antenna, remove the antenna and connect a suitable dummy load to the antenna connector. For a permanent antenna, remove the antenna and terminate the RF output with a dummy load or network which simulates the antenna in the fundamental frequency band.

All measurements must be performed as specified in clause 6.2 of ANSI C63.10-2013.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Gauss Instruments	TDEMI 30M	ARN	2024-05-22	2025-05-22
Cable - Conducted Cable Assembly	Northwest EMC	EVG, HHD, RKT, VAB	EVGA	2024-04-19	2025-04-19
Power Supply - DC	Topward	TPS-2000	TPD	NCR	NCR
LISN	Solar Electronics	9252-50-R-24-BNC	LIR	2024-09-13	2025-09-13
LISN	Solar Electronics	9252-50-R-24-BNC	LIN	2024-09-13	2025-09-13

CONFIGURATIONS INVESTIGATED

SEIT0121-2

MODES INVESTIGATED

Transmitting on antenna A27, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-10-09
Customer:	Seitz and Associates, Inc.	Temperature:	23°C
Attendees:	None	Relative Humidity:	50%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	5VDC, 12VDC, 24VDC via 120VAC/60Hz	Configuration:	SEIT0121-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2024	ANSI C63.10:2013

TEST PARAMETERS

Run #:	26	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

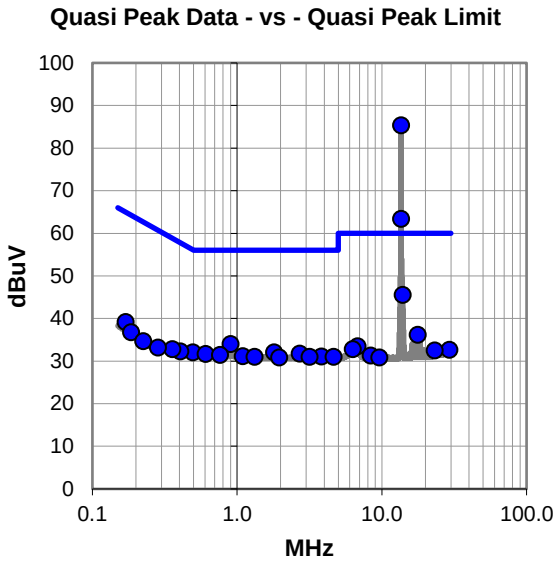
Measuring 24 VDC regulator.

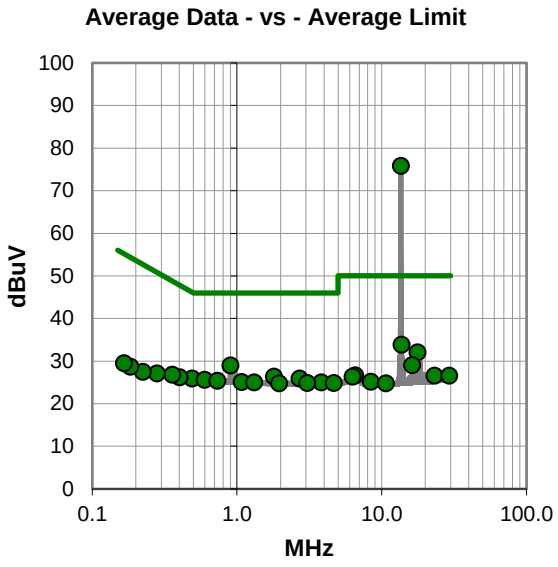
EUT OPERATING MODES

Transmitting on antenna A27, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None





POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #26

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	64.5	20.9	85.4	60.0	25.4
13.612	42.5	20.9	63.4	60.0	3.4
13.931	24.7	20.9	45.6	60.0	-14.4
0.902	14.0	20.0	34.0	56.0	-22.0
17.694	15.0	21.2	36.2	60.0	-23.8
1.802	12.1	20.0	32.1	56.0	-23.9
0.495	12.2	19.9	32.1	56.1	-24.0
2.704	11.7	20.1	31.8	56.0	-24.2
0.606	11.8	19.9	31.7	56.0	-24.3
0.762	11.6	19.9	31.5	56.0	-24.5
1.093	11.2	20.0	31.2	56.0	-24.8
3.818	10.9	20.2	31.1	56.0	-24.9
1.319	11.0	20.0	31.0	56.0	-25.0
3.177	10.9	20.1	31.0	56.0	-25.0
4.654	10.7	20.3	31.0	56.0	-25.0
1.957	10.9	20.0	30.9	56.0	-25.1
0.405	12.4	19.9	32.3	57.8	-25.5
0.170	19.1	20.1	39.2	65.0	-25.8
0.358	12.9	19.9	32.8	58.8	-26.0
6.803	13.2	20.3	33.5	60.0	-26.5
6.313	12.5	20.3	32.8	60.0	-27.2
29.235	10.4	22.3	32.7	60.0	-27.3
0.185	16.8	20.0	36.8	64.3	-27.5
0.284	13.3	19.9	33.2	60.7	-27.5
23.127	10.9	21.6	32.5	60.0	-27.5

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	55.0	20.9	75.9	50.0	25.9
13.717	13.0	20.9	33.9	50.0	-16.1
0.902	9.0	20.0	29.0	46.0	-17.0
17.694	10.9	21.2	32.1	50.0	-17.9
1.802	6.4	20.0	26.4	46.0	-19.6
2.704	5.8	20.1	25.9	46.0	-20.1
0.490	6.0	19.9	25.9	46.2	-20.3
0.597	5.7	19.9	25.6	46.0	-20.4
0.730	5.5	19.9	25.4	46.0	-20.6
1.076	5.1	20.0	25.1	46.0	-20.9
16.227	7.9	21.2	29.1	50.0	-20.9
1.311	5.0	20.0	25.0	46.0	-21.0
3.813	4.8	20.2	25.0	46.0	-21.0
3.054	4.8	20.1	24.9	46.0	-21.1
4.654	4.6	20.3	24.9	46.0	-21.1
1.955	4.8	20.0	24.8	46.0	-21.2
0.402	6.3	19.9	26.2	47.8	-21.6
0.358	6.9	19.9	26.8	48.8	-22.0
6.564	6.4	20.3	26.7	50.0	-23.3
23.129	5.0	21.6	26.6	50.0	-23.4
29.233	4.3	22.3	26.6	50.0	-23.4
6.299	6.1	20.3	26.4	50.0	-23.6
0.280	7.2	19.9	27.1	50.8	-23.7
8.394	4.7	20.5	25.2	50.0	-24.8
10.686	4.1	20.7	24.8	50.0	-25.2

CONCLUSION

Evaluated

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-10-09
Customer:	Seitz and Associates, Inc.	Temperature:	23°C
Attendees:	None	Relative Humidity:	50%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	5VDC, 12VDC, 24VDC via 120VAC/60Hz	Configuration:	SEIT0121-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2024	ANSI C63.10:2013

TEST PARAMETERS

Run #:	27	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

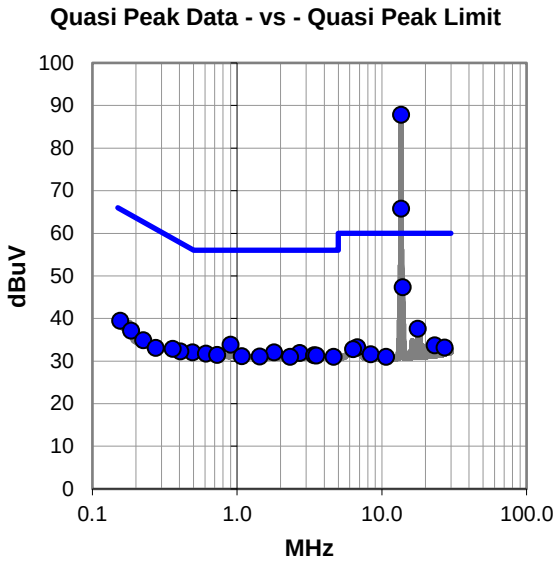
Measuring 24 VDC regulator.

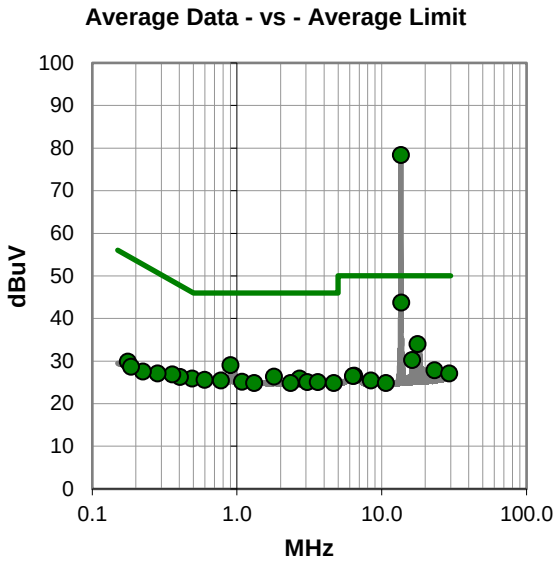
EUT OPERATING MODES

Transmitting on antenna A27, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None





POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #27

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	67.0	20.9	87.9	60.0	27.9
13.612	44.9	20.9	65.8	60.0	5.8
13.931	26.5	20.9	47.4	60.0	-12.6
0.901	14.0	19.9	33.9	56.0	-22.1
17.694	16.4	21.2	37.6	60.0	-22.4
1.802	12.1	20.0	32.1	56.0	-23.9
0.492	12.2	19.9	32.1	56.1	-24.0
2.704	11.8	20.1	31.9	56.0	-24.1
0.611	11.9	19.9	31.8	56.0	-24.2
0.730	11.6	19.9	31.5	56.0	-24.5
3.405	11.3	20.1	31.4	56.0	-24.6
3.519	11.2	20.1	31.3	56.0	-24.7
1.076	11.2	20.0	31.2	56.0	-24.8
1.435	11.1	20.0	31.1	56.0	-24.9
2.329	10.9	20.1	31.0	56.0	-25.0
4.654	10.7	20.3	31.0	56.0	-25.0
0.405	12.4	19.9	32.3	57.8	-25.5
0.359	13.0	19.9	32.9	58.8	-25.9
0.156	19.4	20.1	39.5	65.7	-26.2
23.129	12.1	21.6	33.7	60.0	-26.3
6.763	13.0	20.3	33.3	60.0	-26.7
27.120	11.2	22.0	33.2	60.0	-26.8
0.185	17.2	20.0	37.2	64.3	-27.1
6.328	12.5	20.3	32.8	60.0	-27.2
0.225	14.9	20.0	34.9	62.6	-27.7

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	57.5	20.9	78.4	50.0	28.4
13.611	22.9	20.9	43.8	50.0	-6.2
17.694	12.8	21.2	34.0	50.0	-16.0
0.902	9.1	20.0	29.1	46.0	-16.9
1.802	6.4	20.0	26.4	46.0	-19.6
16.227	9.1	21.2	30.3	50.0	-19.7
2.704	5.8	20.1	25.9	46.0	-20.1
0.490	6.0	19.9	25.9	46.2	-20.3
0.597	5.7	19.9	25.6	46.0	-20.4
0.773	5.6	19.9	25.5	46.0	-20.5
1.081	5.2	20.0	25.2	46.0	-20.8
3.052	5.0	20.1	25.1	46.0	-20.9
3.623	5.0	20.1	25.1	46.0	-20.9
1.311	4.9	20.0	24.9	46.0	-21.1
2.343	4.8	20.1	24.9	46.0	-21.1
4.654	4.6	20.3	24.9	46.0	-21.1
0.403	6.4	19.9	26.3	47.8	-21.5
0.358	7.0	19.9	26.9	48.8	-21.9
23.129	6.3	21.6	27.9	50.0	-22.1
29.235	4.8	22.3	27.1	50.0	-22.9
6.447	6.3	20.3	26.6	50.0	-23.4
6.311	6.2	20.3	26.5	50.0	-23.5
0.283	7.2	19.9	27.1	50.7	-23.6
8.395	5.0	20.5	25.5	50.0	-24.5
0.176	9.8	20.1	29.9	54.7	-24.8

CONCLUSION

Evaluated

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-10-09
Customer:	Seitz and Associates, Inc.	Temperature:	23°C
Attendees:	None	Relative Humidity:	50%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	5VDC, 12VDC, 24VDC via 120VAC/60Hz	Configuration:	SEIT0121-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2024	ANSI C63.10:2013

TEST PARAMETERS

Run #:	28	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

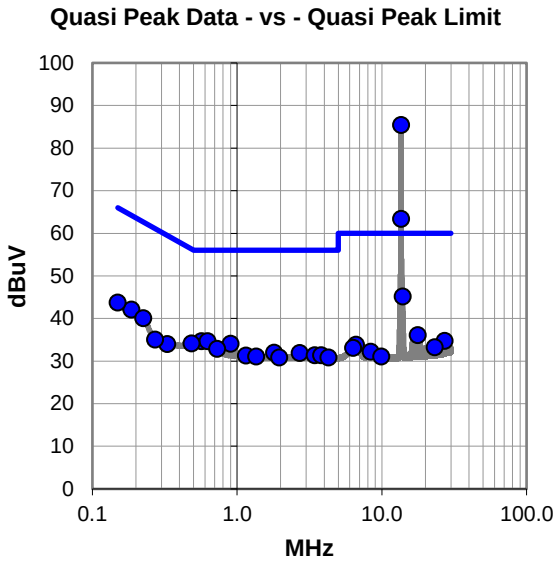
Measuring 5 VDC regulator.

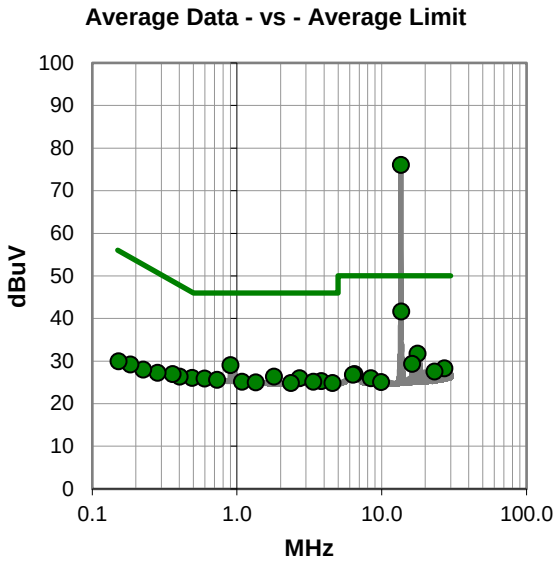
EUT OPERATING MODES

Transmitting on antenna A27, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None





POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #28

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	64.6	20.9	85.5	60.0	25.5
13.612	42.5	20.9	63.4	60.0	3.4
13.931	24.3	20.9	45.2	60.0	-14.8
0.568	14.8	19.9	34.7	56.0	-21.3
0.625	14.8	19.9	34.7	56.0	-21.3
0.902	14.1	20.0	34.1	56.0	-21.9
0.486	14.3	19.9	34.2	56.2	-22.0
0.187	22.1	20.0	42.1	64.2	-22.1
0.150	23.6	20.2	43.8	66.0	-22.2
0.225	20.1	20.0	40.1	62.6	-22.5
0.728	13.0	19.9	32.9	56.0	-23.1
17.694	14.9	21.2	36.1	60.0	-23.9
1.802	12.0	20.0	32.0	56.0	-24.0
2.704	11.8	20.1	31.9	56.0	-24.1
3.446	11.3	20.1	31.4	56.0	-24.6
3.817	11.2	20.2	31.4	56.0	-24.6
1.151	11.3	20.0	31.3	56.0	-24.7
1.358	11.1	20.0	31.1	56.0	-24.9
1.954	10.9	20.0	30.9	56.0	-25.1
4.276	10.6	20.3	30.9	56.0	-25.1
27.120	12.8	22.0	34.8	60.0	-25.2
0.330	14.1	19.9	34.0	59.5	-25.5
0.272	15.2	19.9	35.1	61.1	-26.0
6.627	13.6	20.3	33.9	60.0	-26.1
23.129	11.7	21.6	33.3	60.0	-26.7

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	55.2	20.9	76.1	50.0	26.1
13.609	20.8	20.9	41.7	50.0	-8.3
0.902	9.1	20.0	29.1	46.0	-16.9
17.694	10.6	21.2	31.8	50.0	-18.2
1.804	6.4	20.0	26.4	46.0	-19.6
2.704	5.9	20.1	26.0	46.0	-20.0
0.490	6.2	19.9	26.1	46.2	-20.1
0.597	6.0	19.9	25.9	46.0	-20.1
0.728	5.7	19.9	25.6	46.0	-20.4
16.227	8.2	21.2	29.4	50.0	-20.6
3.815	5.1	20.2	25.3	46.0	-20.7
1.084	5.2	20.0	25.2	46.0	-20.8
3.363	5.1	20.1	25.2	46.0	-20.8
1.345	5.0	20.0	25.0	46.0	-21.0
2.356	4.8	20.1	24.9	46.0	-21.1
4.578	4.6	20.3	24.9	46.0	-21.1
0.402	6.5	19.9	26.4	47.8	-21.4
27.120	6.3	22.0	28.3	50.0	-21.7
0.359	7.1	19.9	27.0	48.8	-21.8
23.129	6.0	21.6	27.6	50.0	-22.4
6.499	6.7	20.3	27.0	50.0	-23.0
6.311	6.5	20.3	26.8	50.0	-23.2
0.283	7.4	19.9	27.3	50.7	-23.4
8.391	5.5	20.5	26.0	50.0	-24.0
0.225	8.0	20.0	28.0	52.6	-24.6

CONCLUSION

Evaluated

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-10-09
Customer:	Seitz and Associates, Inc.	Temperature:	23°C
Attendees:	None	Relative Humidity:	50%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	5VDC, 12VDC, 24VDC via 120VAC/60Hz	Configuration:	SEIT0121-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2024	ANSI C63.10:2013

TEST PARAMETERS

Run #:	29	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

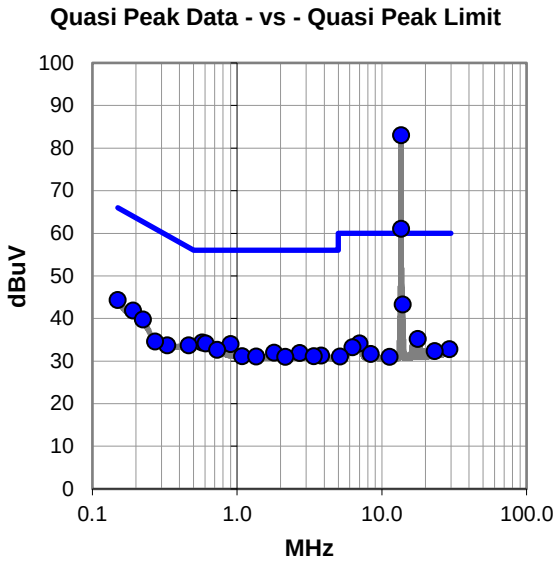
Measuring 5 VDC regulator.

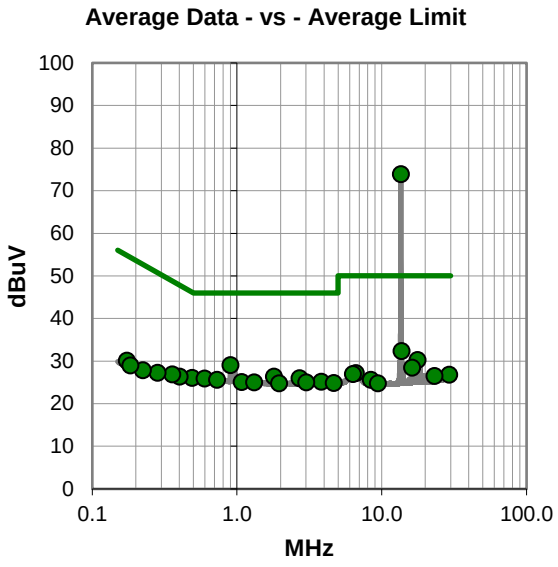
EUT OPERATING MODES

Transmitting on antenna A27, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None





POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #29

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	62.2	20.9	83.1	60.0	23.1
13.612	40.2	20.9	61.1	60.0	1.1
13.931	22.4	20.9	43.3	60.0	-16.7
0.150	24.2	20.2	44.4	66.0	-21.6
0.573	14.5	19.9	34.4	56.0	-21.6
0.608	14.3	19.9	34.2	56.0	-21.8
0.902	14.0	20.0	34.0	56.0	-22.0
0.191	21.9	20.0	41.9	64.0	-22.1
0.463	13.8	19.9	33.7	56.6	-22.9
0.223	19.8	20.0	39.8	62.7	-22.9
0.727	12.8	19.9	32.7	56.0	-23.3
1.802	12.0	20.0	32.0	56.0	-24.0
2.706	11.8	20.1	31.9	56.0	-24.1
3.815	11.1	20.2	31.3	56.0	-24.7
17.694	14.0	21.2	35.2	60.0	-24.8
1.081	11.2	20.0	31.2	56.0	-24.8
3.388	11.1	20.1	31.2	56.0	-24.8
1.358	11.1	20.0	31.1	56.0	-24.9
2.158	10.9	20.1	31.0	56.0	-25.0
0.330	13.8	19.9	33.7	59.5	-25.8
7.007	13.8	20.4	34.2	60.0	-25.8
0.272	14.7	19.9	34.6	61.1	-26.5
6.265	13.0	20.3	33.3	60.0	-26.7
29.235	10.5	22.3	32.8	60.0	-27.2
23.129	10.8	21.6	32.4	60.0	-27.6

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	53.0	20.9	73.9	50.0	23.9
0.902	9.1	20.0	29.1	46.0	-16.9
13.716	11.5	20.9	32.4	50.0	-17.6
1.804	6.4	20.0	26.4	46.0	-19.6
17.694	9.1	21.2	30.3	50.0	-19.7
2.704	5.9	20.1	26.0	46.0	-20.0
0.490	6.2	19.9	26.1	46.2	-20.1
0.597	6.0	19.9	25.9	46.0	-20.1
0.727	5.7	19.9	25.6	46.0	-20.4
3.813	5.0	20.2	25.2	46.0	-20.8
1.076	5.1	20.0	25.1	46.0	-20.9
1.313	5.0	20.0	25.0	46.0	-21.0
3.006	4.9	20.1	25.0	46.0	-21.0
4.653	4.6	20.3	24.9	46.0	-21.1
1.957	4.8	20.0	24.8	46.0	-21.2
0.402	6.5	19.9	26.4	47.8	-21.4
16.227	7.3	21.2	28.5	50.0	-21.5
0.358	7.0	19.9	26.9	48.8	-21.9
6.622	6.9	20.3	27.2	50.0	-22.8
6.311	6.7	20.3	27.0	50.0	-23.0
29.235	4.5	22.3	26.8	50.0	-23.2
0.283	7.4	19.9	27.3	50.7	-23.4
23.127	4.9	21.6	26.5	50.0	-23.5
8.392	5.1	20.5	25.6	50.0	-24.4
0.173	10.0	20.1	30.1	54.8	-24.7

CONCLUSION

Evaluated

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-10-09
Customer:	Seitz and Associates, Inc.	Temperature:	23°C
Attendees:	None	Relative Humidity:	50%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	5VDC, 12VDC, 24VDC via 120VAC/60Hz	Configuration:	SEIT0121-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2024	ANSI C63.10:2013

TEST PARAMETERS

Run #:	30	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

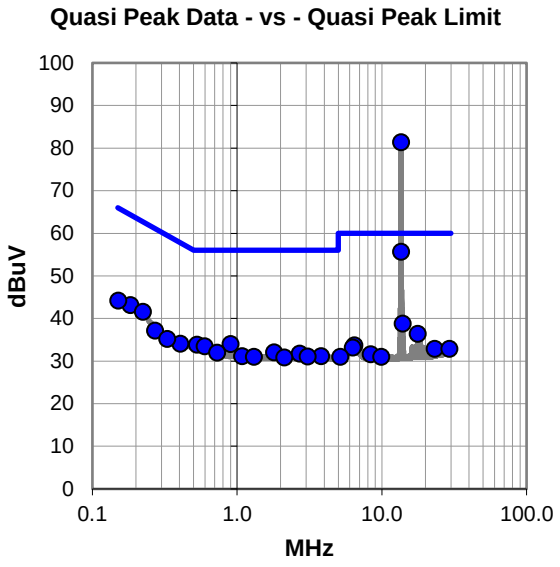
Measuring 12 VDC regulator.

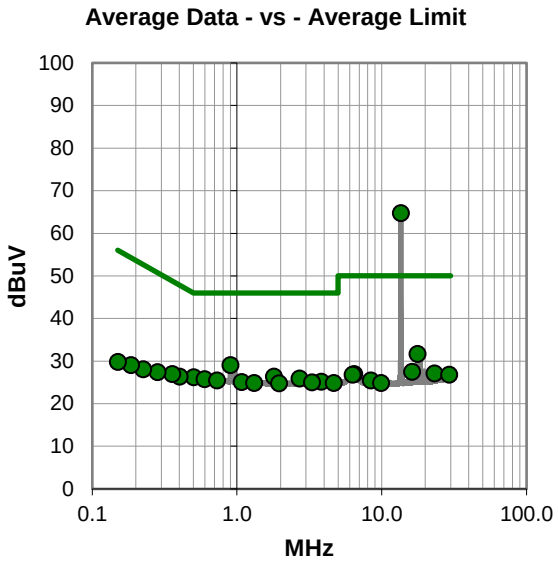
EUT OPERATING MODES

Transmitting on antenna A27, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None





POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #30

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	60.5	20.9	81.4	60.0	21.4
13.612	34.8	20.9	55.7	60.0	-4.3
0.184	23.2	20.0	43.2	64.3	-21.1
0.223	21.6	20.0	41.6	62.7	-21.1
13.931	17.9	20.9	38.8	60.0	-21.2
0.152	24.0	20.2	44.2	65.9	-21.7
0.902	14.0	20.0	34.0	56.0	-22.0
0.528	14.0	19.9	33.9	56.0	-22.1
0.597	13.6	19.9	33.5	56.0	-22.5
17.694	15.2	21.2	36.4	60.0	-23.6
0.405	14.2	19.9	34.1	57.8	-23.7
0.272	17.3	19.9	37.2	61.1	-23.9
1.802	12.1	20.0	32.1	56.0	-23.9
0.728	12.1	19.9	32.0	56.0	-24.0
2.704	11.7	20.1	31.8	56.0	-24.2
0.330	15.3	19.9	35.2	59.5	-24.3
1.084	11.2	20.0	31.2	56.0	-24.8
3.817	11.0	20.2	31.2	56.0	-24.8
3.067	11.0	20.1	31.1	56.0	-24.9
1.311	11.0	20.0	31.0	56.0	-25.0
2.121	10.8	20.1	30.9	56.0	-25.1
6.468	13.4	20.3	33.7	60.0	-26.3
6.288	12.9	20.3	33.2	60.0	-26.8
23.129	11.3	21.6	32.9	60.0	-27.1
29.235	10.6	22.3	32.9	60.0	-27.1

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	43.9	20.9	64.8	50.0	14.8
0.902	9.1	20.0	29.1	46.0	-16.9
17.694	10.5	21.2	31.7	50.0	-18.3
1.802	6.4	20.0	26.4	46.0	-19.6
0.501	6.3	19.9	26.2	46.0	-19.8
2.704	5.8	20.1	25.9	46.0	-20.1
0.597	5.9	19.9	25.8	46.0	-20.2
0.727	5.6	19.9	25.5	46.0	-20.5
3.817	5.0	20.2	25.2	46.0	-20.8
1.078	5.1	20.0	25.1	46.0	-20.9
3.305	4.9	20.1	25.0	46.0	-21.0
1.311	4.9	20.0	24.9	46.0	-21.1
4.656	4.6	20.3	24.9	46.0	-21.1
1.957	4.8	20.0	24.8	46.0	-21.2
0.402	6.5	19.9	26.4	47.8	-21.4
0.358	7.1	19.9	27.0	48.8	-21.8
16.227	6.3	21.2	27.5	50.0	-22.5
23.129	5.5	21.6	27.1	50.0	-22.9
6.468	6.7	20.3	27.0	50.0	-23.0
6.308	6.5	20.3	26.8	50.0	-23.2
29.235	4.5	22.3	26.8	50.0	-23.2
0.283	7.5	19.9	27.4	50.7	-23.3
0.225	8.1	20.0	28.1	52.6	-24.5
8.392	5.0	20.5	25.5	50.0	-24.5
9.918	4.3	20.6	24.9	50.0	-25.1

CONCLUSION

Evaluated

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-10-09
Customer:	Seitz and Associates, Inc.	Temperature:	23°C
Attendees:	None	Relative Humidity:	50%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	5VDC, 12VDC, 24VDC via 120VAC/60Hz	Configuration:	SEIT0121-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2024	ANSI C63.10:2013

TEST PARAMETERS

Run #:	31	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

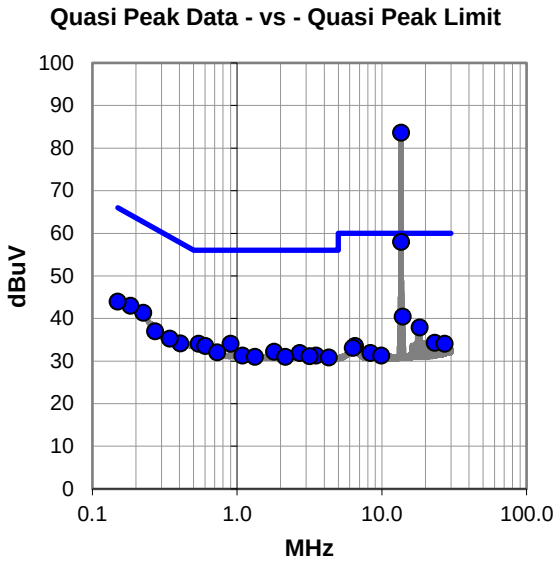
Measuring 12 VDC regulator.

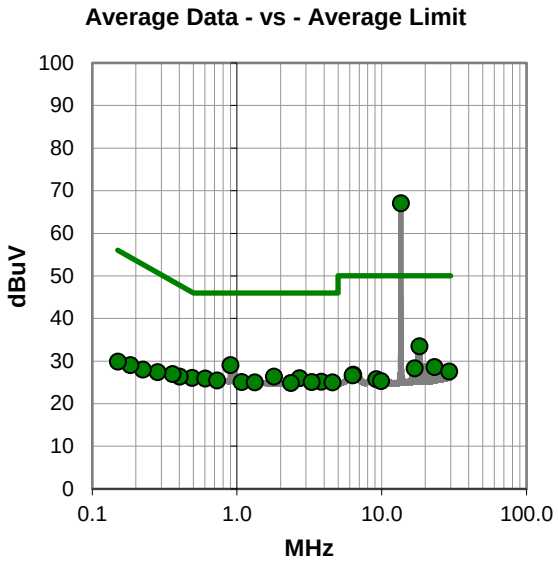
EUT OPERATING MODES

Transmitting on antenna A27, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None





POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #31

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	62.8	20.9	83.7	60.0	23.7
13.612	37.1	20.9	58.0	60.0	-2.0
13.931	19.6	20.9	40.5	60.0	-19.5
0.225	21.4	20.0	41.4	62.6	-21.2
0.184	23.0	20.0	43.0	64.3	-21.3
0.542	14.2	19.9	34.1	56.0	-21.9
0.902	14.1	20.0	34.1	56.0	-21.9
0.150	23.8	20.2	44.0	66.0	-22.0
18.243	16.6	21.3	37.9	60.0	-22.1
0.605	13.7	19.9	33.6	56.0	-22.4
0.405	14.3	19.9	34.2	57.8	-23.6
1.802	12.2	20.0	32.2	56.0	-23.8
0.344	15.4	19.9	35.3	59.1	-23.8
0.727	12.2	19.9	32.1	56.0	-23.9
0.272	17.1	19.9	37.0	61.1	-24.1
2.704	11.8	20.1	31.9	56.0	-24.1
1.090	11.3	20.0	31.3	56.0	-24.7
3.516	11.2	20.1	31.3	56.0	-24.7
3.177	11.1	20.1	31.2	56.0	-24.8
1.325	11.0	20.0	31.0	56.0	-25.0
2.152	10.9	20.1	31.0	56.0	-25.0
4.293	10.6	20.3	30.9	56.0	-25.1
23.129	12.7	21.6	34.3	60.0	-25.7
27.120	12.1	22.0	34.1	60.0	-25.9
6.523	13.3	20.3	33.6	60.0	-26.4

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	46.2	20.9	67.1	50.0	17.1
18.243	12.2	21.3	33.5	50.0	-16.5
0.902	9.1	20.0	29.1	46.0	-16.9
1.804	6.4	20.0	26.4	46.0	-19.6
2.704	5.9	20.1	26.0	46.0	-20.0
0.490	6.2	19.9	26.1	46.2	-20.1
0.603	6.0	19.9	25.9	46.0	-20.1
0.728	5.6	19.9	25.5	46.0	-20.5
3.815	5.0	20.2	25.2	46.0	-20.8
1.076	5.1	20.0	25.1	46.0	-20.9
3.287	5.0	20.1	25.1	46.0	-20.9
1.325	5.0	20.0	25.0	46.0	-21.0
4.578	4.7	20.3	25.0	46.0	-21.0
2.355	4.8	20.1	24.9	46.0	-21.1
0.402	6.5	19.9	26.4	47.8	-21.4
23.129	7.0	21.6	28.6	50.0	-21.4
16.900	7.1	21.2	28.3	50.0	-21.7
0.359	7.1	19.9	27.0	48.8	-21.8
29.235	5.3	22.3	27.6	50.0	-22.4
6.359	6.5	20.3	26.8	50.0	-23.2
6.308	6.4	20.3	26.7	50.0	-23.3
0.283	7.5	19.9	27.4	50.7	-23.3
9.157	5.3	20.5	25.8	50.0	-24.2
9.920	4.7	20.6	25.3	50.0	-24.7
0.223	8.0	20.0	28.0	52.7	-24.7

CONCLUSION

Evaluated

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-10-09
Customer:	Seitz and Associates, Inc.	Temperature:	23°C
Attendees:	None	Relative Humidity:	50%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	5VDC, 12VDC, 24VDC via 120VAC/60Hz	Configuration:	SEIT0121-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2024	ANSI C63.10:2013

TEST PARAMETERS

Run #:	20	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

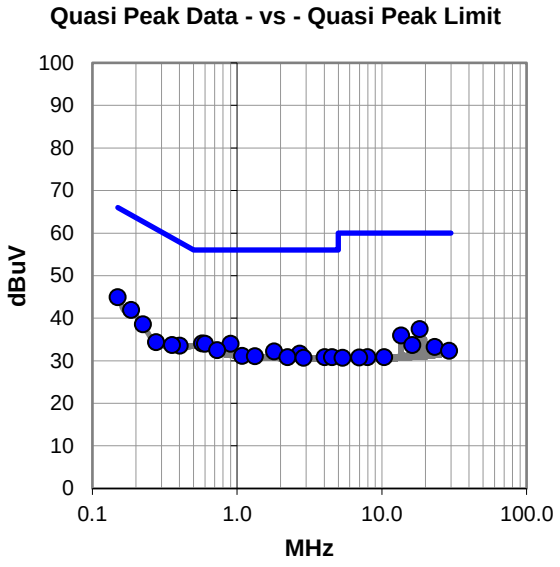
Measuring 5 VDC regulator. The antenna was terminated with representative load.

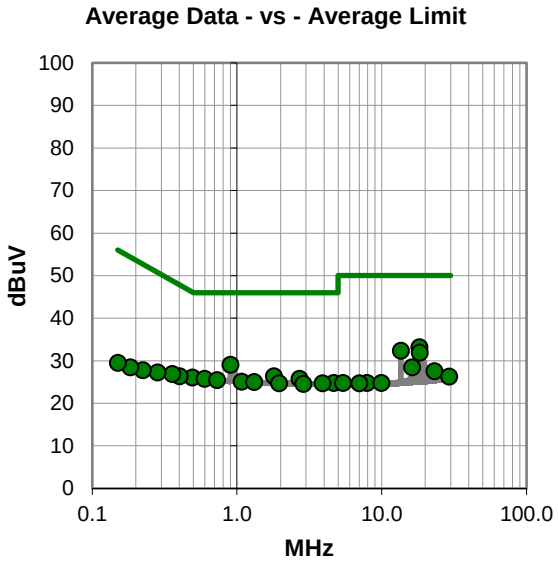
EUT OPERATING MODES

Transmitting on antenna A27, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None





POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #20

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.150	24.8	20.2	45.0	66.0	-21.0
0.574	14.2	19.9	34.1	56.0	-21.9
0.600	14.1	19.9	34.0	56.0	-22.0
0.902	14.0	20.0	34.0	56.0	-22.0
0.185	22.0	20.0	42.0	64.3	-22.3
18.243	16.2	21.3	37.5	60.0	-22.5
0.727	12.6	19.9	32.5	56.0	-23.5
1.804	12.2	20.0	32.2	56.0	-23.8
13.560	15.1	20.9	36.0	60.0	-24.0
0.223	18.6	20.0	38.6	62.7	-24.1
0.402	13.7	19.9	33.6	57.8	-24.2
2.706	11.6	20.1	31.7	56.0	-24.3
1.081	11.2	20.0	31.2	56.0	-24.8
1.329	11.1	20.0	31.1	56.0	-24.9
0.356	13.8	19.9	33.7	58.8	-25.1
2.236	10.8	20.1	30.9	56.0	-25.1
4.016	10.6	20.3	30.9	56.0	-25.1
4.523	10.6	20.3	30.9	56.0	-25.1
2.883	10.6	20.1	30.7	56.0	-25.3
16.227	12.5	21.2	33.7	60.0	-26.3
0.275	14.5	19.9	34.4	61.0	-26.6
23.129	11.7	21.6	33.3	60.0	-26.7
29.165	10.1	22.3	32.4	60.0	-27.6
7.951	10.4	20.5	30.9	60.0	-29.1
10.382	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)
18.243	11.9	21.3	33.2	50.0	-16.8
0.902	9.1	20.0	29.1	46.0	-16.9
13.560	11.5	20.9	32.4	50.0	-17.6
18.304	10.6	21.3	31.9	50.0	-18.1
1.804	6.4	20.0	26.4	46.0	-19.6
0.492	6.2	19.9	26.1	46.1	-20.0
0.597	5.9	19.9	25.8	46.0	-20.2
2.704	5.7	20.1	25.8	46.0	-20.2
0.727	5.6	19.9	25.5	46.0	-20.5
1.078	5.1	20.0	25.1	46.0	-20.9
1.313	5.0	20.0	25.0	46.0	-21.0
4.654	4.5	20.3	24.8	46.0	-21.2
1.952	4.7	20.0	24.7	46.0	-21.3
3.905	4.4	20.3	24.7	46.0	-21.3
0.402	6.5	19.9	26.4	47.8	-21.4
2.881	4.5	20.1	24.6	46.0	-21.4
16.227	7.3	21.2	28.5	50.0	-21.5
0.358	7.0	19.9	26.9	48.8	-21.9
23.129	6.0	21.6	27.6	50.0	-22.4
0.283	7.4	19.9	27.3	50.7	-23.4
29.235	4.0	22.3	26.3	50.0	-23.7
0.223	7.8	20.0	27.8	52.7	-24.9
5.409	4.5	20.3	24.8	50.0	-25.2
7.924	4.3	20.5	24.8	50.0	-25.2
9.938	4.2	20.6	24.8	50.0	-25.2

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-10-09
Customer:	Seitz and Associates, Inc.	Temperature:	23°C
Attendees:	None	Relative Humidity:	50%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	5VDC, 12VDC, 24VDC via 120VAC/60Hz	Configuration:	SEIT0121-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2024	ANSI C63.10:2013

TEST PARAMETERS

Run #:	21	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

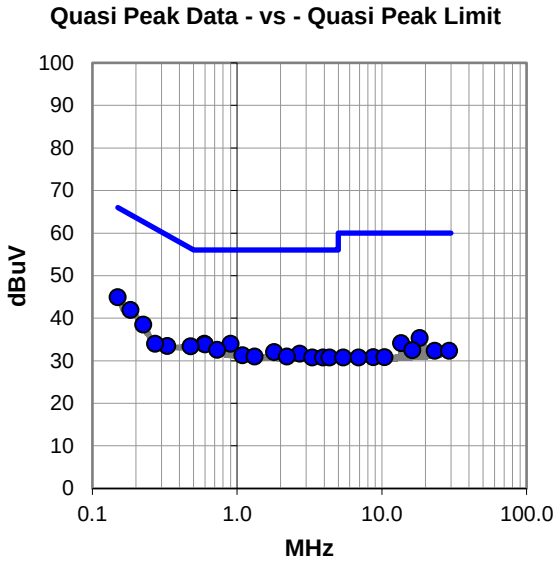
Measuring 5 VDC regulator. The antenna was terminated with representative load.

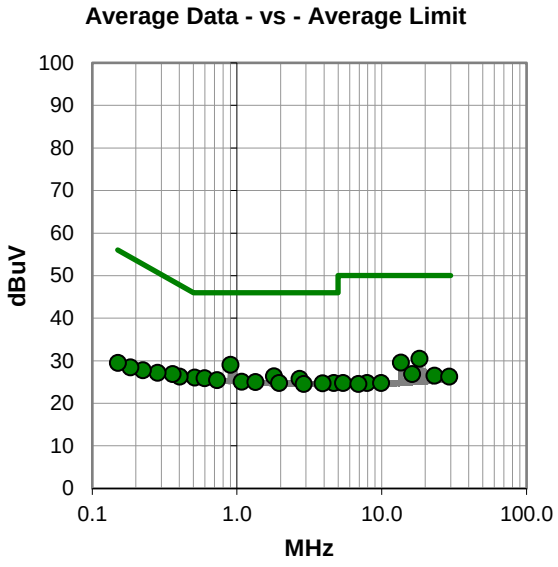
EUT OPERATING MODES

Transmitting on antenna A27, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None





POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #21

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.150	24.8	20.2	45.0	66.0	-21.0
0.596	14.1	19.9	34.0	56.0	-22.0
0.902	14.0	20.0	34.0	56.0	-22.0
0.600	14.0	19.9	33.9	56.0	-22.1
0.184	22.0	20.0	42.0	64.3	-22.3
0.477	13.5	19.9	33.4	56.4	-23.0
0.727	12.7	19.9	32.6	56.0	-23.4
1.804	12.1	20.0	32.1	56.0	-23.9
0.225	18.5	20.0	38.5	62.6	-24.1
2.706	11.6	20.1	31.7	56.0	-24.3
18.243	14.1	21.3	35.4	60.0	-24.6
1.090	11.3	20.0	31.3	56.0	-24.7
1.320	11.0	20.0	31.0	56.0	-25.0
2.207	10.9	20.1	31.0	56.0	-25.0
3.296	10.7	20.1	30.8	56.0	-25.2
3.917	10.5	20.3	30.8	56.0	-25.2
4.347	10.5	20.3	30.8	56.0	-25.2
13.560	13.3	20.9	34.2	60.0	-25.8
0.330	13.6	19.9	33.5	59.5	-26.0
0.272	14.1	19.9	34.0	61.1	-27.1
16.229	11.3	21.2	32.5	60.0	-27.5
23.127	10.8	21.6	32.4	60.0	-27.6
29.117	10.1	22.3	32.4	60.0	-27.6
8.717	10.4	20.5	30.9	60.0	-29.1
10.434	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)
0.902	9.1	20.0	29.1	46.0	-16.9
18.243	9.2	21.3	30.5	50.0	-19.5
1.804	6.4	20.0	26.4	46.0	-19.6
0.509	6.2	19.9	26.1	46.0	-19.9
0.597	6.0	19.9	25.9	46.0	-20.1
2.704	5.7	20.1	25.8	46.0	-20.2
13.560	8.7	20.9	29.6	50.0	-20.4
0.727	5.6	19.9	25.5	46.0	-20.5
1.078	5.1	20.0	25.1	46.0	-20.9
1.340	5.0	20.0	25.0	46.0	-21.0
1.955	4.8	20.0	24.8	46.0	-21.2
4.654	4.5	20.3	24.8	46.0	-21.2
3.903	4.4	20.3	24.7	46.0	-21.3
2.883	4.5	20.1	24.6	46.0	-21.4
0.402	6.4	19.9	26.3	47.8	-21.5
0.359	7.0	19.9	26.9	48.8	-21.9
16.227	5.7	21.2	26.9	50.0	-23.1
23.129	4.9	21.6	26.5	50.0	-23.5
0.283	7.3	19.9	27.2	50.7	-23.5
29.235	4.0	22.3	26.3	50.0	-23.7
0.223	7.8	20.0	27.8	52.7	-24.9
5.411	4.5	20.3	24.8	50.0	-25.2
7.922	4.3	20.5	24.8	50.0	-25.2
9.918	4.2	20.6	24.8	50.0	-25.2
6.891	4.2	20.4	24.6	50.0	-25.4

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-10-09
Customer:	Seitz and Associates, Inc.	Temperature:	23°C
Attendees:	None	Relative Humidity:	50%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	5VDC, 12VDC, 24VDC via 120VAC/60Hz	Configuration:	SEIT0121-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2024	ANSI C63.10:2013

TEST PARAMETERS

Run #:	22	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

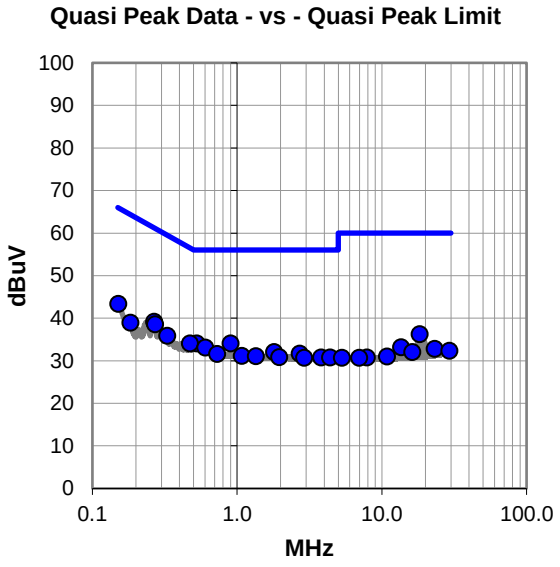
Measuring 12 VDC regulator. The antenna was terminated with representative load.

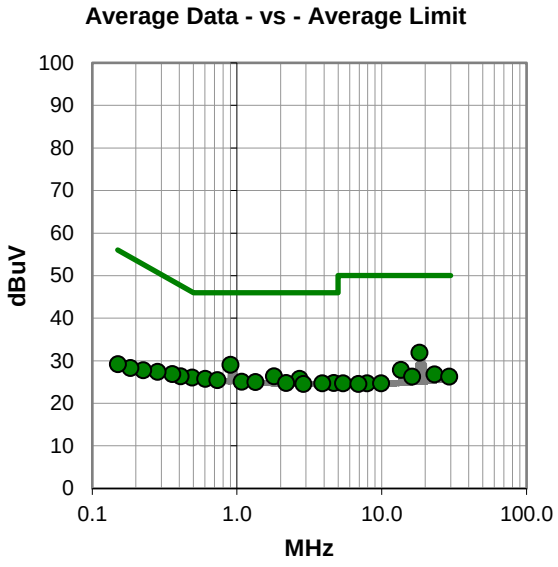
EUT OPERATING MODES

Transmitting on antenna A27, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None





POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #22

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.527	14.2	19.9	34.1	56.0	-21.9
0.902	14.1	20.0	34.1	56.0	-21.9
0.267	19.3	19.9	39.2	61.2	-22.0
0.472	14.2	19.9	34.1	56.5	-22.4
0.272	18.7	19.9	38.6	61.1	-22.5
0.152	23.2	20.2	43.4	65.9	-22.5
0.605	13.2	19.9	33.1	56.0	-22.9
0.330	16.0	19.9	35.9	59.5	-23.6
18.243	15.0	21.3	36.3	60.0	-23.7
1.804	12.1	20.0	32.1	56.0	-23.9
2.706	11.6	20.1	31.7	56.0	-24.3
0.728	11.7	19.9	31.6	56.0	-24.4
1.076	11.2	20.0	31.2	56.0	-24.8
1.348	11.1	20.0	31.1	56.0	-24.9
1.960	10.9	20.0	30.9	56.0	-25.1
3.804	10.6	20.2	30.8	56.0	-25.2
4.386	10.5	20.3	30.8	56.0	-25.2
0.184	19.0	20.0	39.0	64.3	-25.3
2.912	10.6	20.1	30.7	56.0	-25.3
13.559	12.3	20.9	33.2	60.0	-26.8
23.129	11.2	21.6	32.8	60.0	-27.2
29.236	10.1	22.3	32.4	60.0	-27.6
16.227	10.9	21.2	32.1	60.0	-27.9
10.847	10.3	20.7	31.0	60.0	-29.0
7.866	10.3	20.5	30.8	60.0	-29.2

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.902	9.1	20.0	29.1	46.0	-16.9
18.243	10.6	21.3	31.9	50.0	-18.1
1.804	6.4	20.0	26.4	46.0	-19.6
0.490	6.2	19.9	26.1	46.2	-20.1
0.602	5.9	19.9	25.8	46.0	-20.2
2.704	5.7	20.1	25.8	46.0	-20.2
0.731	5.6	19.9	25.5	46.0	-20.5
1.079	5.1	20.0	25.1	46.0	-20.9
1.339	5.0	20.0	25.0	46.0	-21.0
2.185	4.7	20.1	24.8	46.0	-21.2
4.654	4.5	20.3	24.8	46.0	-21.2
3.890	4.5	20.2	24.7	46.0	-21.3
0.406	6.5	19.9	26.4	47.7	-21.3
2.881	4.5	20.1	24.6	46.0	-21.4
0.356	7.0	19.9	26.9	48.8	-21.9
13.560	7.0	20.9	27.9	50.0	-22.1
23.129	5.2	21.6	26.8	50.0	-23.2
0.283	7.5	19.9	27.4	50.7	-23.3
16.227	5.1	21.2	26.3	50.0	-23.7
29.233	4.0	22.3	26.3	50.0	-23.7
0.225	7.8	20.0	27.8	52.6	-24.8
5.408	4.4	20.3	24.7	50.0	-25.3
7.921	4.2	20.5	24.7	50.0	-25.3
9.915	4.1	20.6	24.7	50.0	-25.3
6.893	4.2	20.4	24.6	50.0	-25.4

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-10-09
Customer:	Seitz and Associates, Inc.	Temperature:	23°C
Attendees:	None	Relative Humidity:	50%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	5VDC, 12VDC, 24VDC via 120VAC/60Hz	Configuration:	SEIT0121-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2024	ANSI C63.10:2013

TEST PARAMETERS

Run #:	23	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

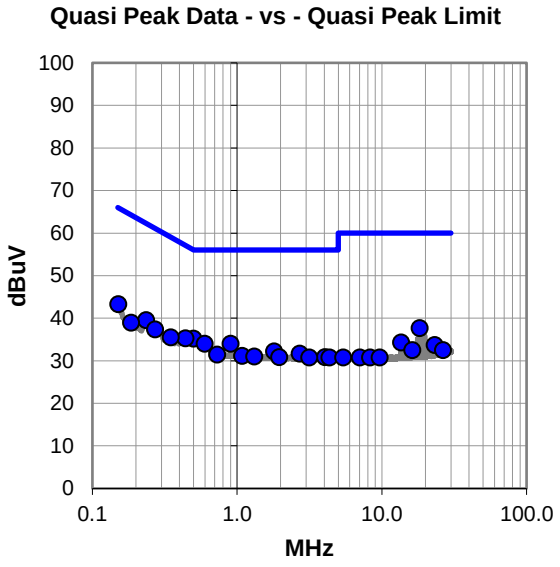
Measuring 12 VDC regulator. The antenna was terminated with representative load.

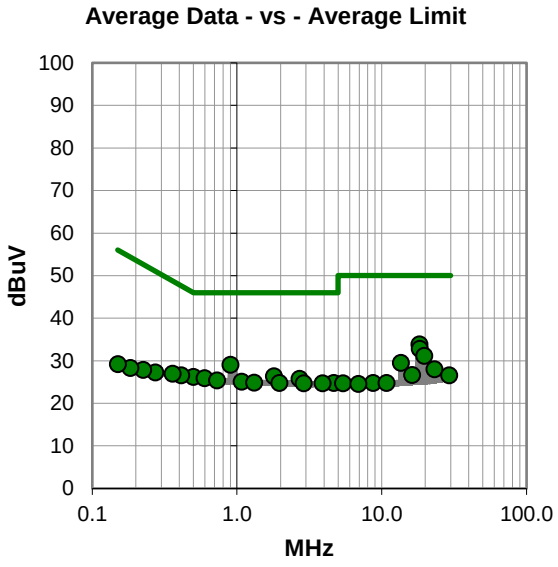
EUT OPERATING MODES

Transmitting on antenna A27, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None





POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #23

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.499	15.3	19.9	35.2	56.0	-20.8
0.440	15.4	19.9	35.3	57.1	-21.8
0.599	14.1	19.9	34.0	56.0	-22.0
0.902	14.0	20.0	34.0	56.0	-22.0
18.243	16.4	21.3	37.7	60.0	-22.3
0.152	23.1	20.2	43.3	65.9	-22.6
0.235	19.6	20.0	39.6	62.3	-22.7
0.348	15.6	19.9	35.5	59.0	-23.5
0.272	17.5	19.9	37.4	61.1	-23.7
1.804	12.2	20.0	32.2	56.0	-23.8
2.706	11.6	20.1	31.7	56.0	-24.3
0.727	11.6	19.9	31.5	56.0	-24.5
1.081	11.2	20.0	31.2	56.0	-24.8
1.317	11.0	20.0	31.0	56.0	-25.0
1.960	10.9	20.0	30.9	56.0	-25.1
4.042	10.6	20.3	30.9	56.0	-25.1
3.162	10.7	20.1	30.8	56.0	-25.2
4.343	10.5	20.3	30.8	56.0	-25.2
0.185	19.0	20.0	39.0	64.3	-25.3
13.560	13.4	20.9	34.3	60.0	-25.7
23.129	12.1	21.6	33.7	60.0	-26.3
16.227	11.3	21.2	32.5	60.0	-27.5
26.487	10.5	22.0	32.5	60.0	-27.5
5.409	10.5	20.3	30.8	60.0	-29.2
7.048	10.4	20.4	30.8	60.0	-29.2

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
18.243	12.6	21.3	33.9	50.0	-16.1
0.902	9.1	20.0	29.1	46.0	-16.9
18.304	11.5	21.3	32.8	50.0	-17.2
19.709	9.9	21.3	31.2	50.0	-18.8
1.802	6.4	20.0	26.4	46.0	-19.6
0.499	6.3	19.9	26.2	46.0	-19.8
0.597	6.0	19.9	25.9	46.0	-20.1
2.704	5.7	20.1	25.8	46.0	-20.2
13.560	8.6	20.9	29.5	50.0	-20.5
0.727	5.5	19.9	25.4	46.0	-20.6
1.079	5.1	20.0	25.1	46.0	-20.9
0.412	6.7	19.9	26.6	47.6	-21.0
1.311	4.9	20.0	24.9	46.0	-21.1
1.958	4.8	20.0	24.8	46.0	-21.2
4.654	4.5	20.3	24.8	46.0	-21.2
2.883	4.6	20.1	24.7	46.0	-21.3
3.905	4.4	20.3	24.7	46.0	-21.3
0.359	7.1	19.9	27.0	48.8	-21.8
23.129	6.4	21.6	28.0	50.0	-22.0
16.227	5.5	21.2	26.7	50.0	-23.3
29.235	4.3	22.3	26.6	50.0	-23.4
0.272	7.4	19.9	27.3	51.1	-23.8
0.225	7.9	20.0	27.9	52.6	-24.7
8.716	4.3	20.5	24.8	50.0	-25.2
10.796	4.1	20.7	24.8	50.0	-25.2

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-10-09
Customer:	Seitz and Associates, Inc.	Temperature:	23°C
Attendees:	None	Relative Humidity:	50%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	5VDC, 12VDC, 24VDC via 120VAC/60Hz	Configuration:	SEIT0121-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2024	ANSI C63.10:2013

TEST PARAMETERS

Run #:	24	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

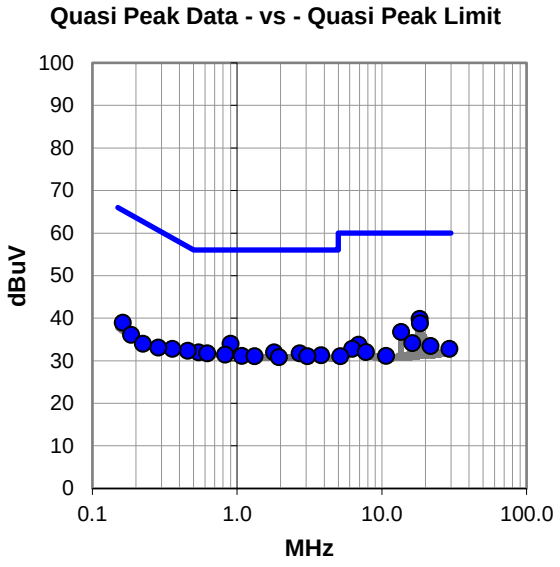
Measuring 24 VDC regulator. The antenna was terminated with representative load.

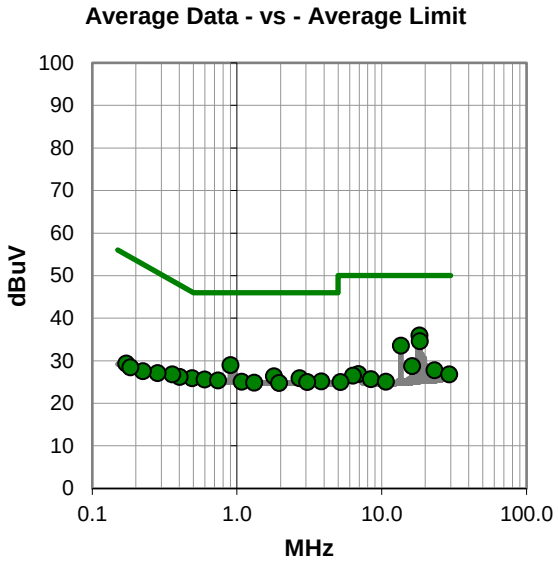
EUT OPERATING MODES

Transmitting on antenna A27, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None





POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #24

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
18.243	18.6	21.3	39.9	60.0	-20.1
18.304	17.5	21.3	38.8	60.0	-21.2
0.902	14.0	20.0	34.0	56.0	-22.0
13.560	15.9	20.9	36.8	60.0	-23.2
0.542	12.1	19.9	32.0	56.0	-24.0
1.802	12.0	20.0	32.0	56.0	-24.0
0.621	11.9	19.9	31.8	56.0	-24.2
2.704	11.7	20.1	31.8	56.0	-24.2
0.457	12.5	19.9	32.4	56.8	-24.4
0.829	11.6	19.9	31.5	56.0	-24.5
3.815	11.1	20.2	31.3	56.0	-24.7
1.078	11.2	20.0	31.2	56.0	-24.8
1.319	11.1	20.0	31.1	56.0	-24.9
3.058	11.0	20.1	31.1	56.0	-24.9
1.943	10.9	20.0	30.9	56.0	-25.1
16.227	13.0	21.2	34.2	60.0	-25.8
0.358	12.9	19.9	32.8	58.8	-26.0
6.896	13.4	20.4	33.8	60.0	-26.2
0.162	18.9	20.1	39.0	65.4	-26.4
21.662	12.1	21.4	33.5	60.0	-26.5
29.235	10.5	22.3	32.8	60.0	-27.2
6.232	12.5	20.3	32.8	60.0	-27.2
0.286	13.2	19.9	33.1	60.6	-27.5
7.756	11.6	20.5	32.1	60.0	-27.9
0.185	16.1	20.0	36.1	64.3	-28.2

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
18.243	14.7	21.3	36.0	50.0	-14.0
18.304	13.3	21.3	34.6	50.0	-15.4
13.560	12.7	20.9	33.6	50.0	-16.4
0.902	9.0	20.0	29.0	46.0	-17.0
1.804	6.4	20.0	26.4	46.0	-19.6
2.704	5.8	20.1	25.9	46.0	-20.1
0.490	6.0	19.9	25.9	46.2	-20.3
0.597	5.7	19.9	25.6	46.0	-20.4
0.737	5.5	19.9	25.4	46.0	-20.6
3.815	5.0	20.2	25.2	46.0	-20.8
1.079	5.1	20.0	25.1	46.0	-20.9
3.054	4.9	20.1	25.0	46.0	-21.0
1.311	4.9	20.0	24.9	46.0	-21.1
1.957	4.8	20.0	24.8	46.0	-21.2
16.227	7.6	21.2	28.8	50.0	-21.2
0.402	6.3	19.9	26.2	47.8	-21.6
0.358	6.9	19.9	26.8	48.8	-22.0
23.129	6.2	21.6	27.8	50.0	-22.2
6.900	6.5	20.4	26.9	50.0	-23.1
29.235	4.5	22.3	26.8	50.0	-23.2
6.310	6.2	20.3	26.5	50.0	-23.5
0.283	7.2	19.9	27.1	50.7	-23.6
8.399	5.2	20.5	25.7	50.0	-24.3
10.687	4.4	20.7	25.1	50.0	-24.9
5.184	4.7	20.3	25.0	50.0	-25.0

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-10-09
Customer:	Seitz and Associates, Inc.	Temperature:	23°C
Attendees:	None	Relative Humidity:	50%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	5VDC, 12VDC, 24VDC via 120VAC/60Hz	Configuration:	SEIT0121-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2024	ANSI C63.10:2013

TEST PARAMETERS

Run #:	25	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

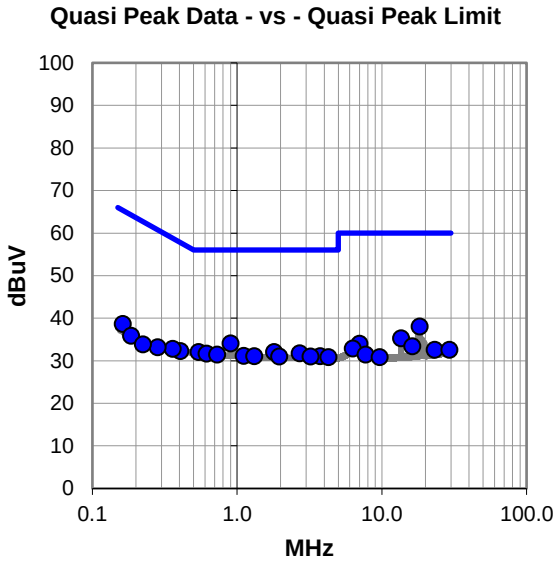
Measuring 24 VDC regulator. The antenna was terminated with representative load.

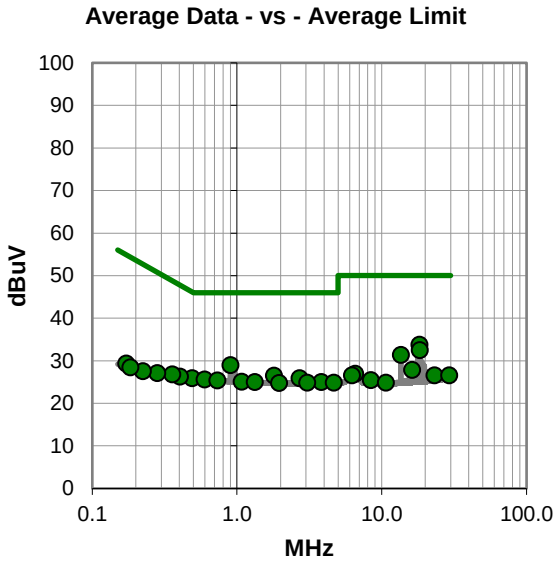
EUT OPERATING MODES

Transmitting on antenna A27, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None





POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #25

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
18.243	16.8	21.3	38.1	60.0	-21.9
0.902	14.1	20.0	34.1	56.0	-21.9
0.542	12.2	19.9	32.1	56.0	-23.9
1.804	12.1	20.0	32.1	56.0	-23.9
2.704	11.7	20.1	31.8	56.0	-24.2
0.615	11.8	19.9	31.7	56.0	-24.3
0.727	11.6	19.9	31.5	56.0	-24.5
13.560	14.4	20.9	35.3	60.0	-24.7
1.111	11.2	20.0	31.2	56.0	-24.8
1.314	11.1	20.0	31.1	56.0	-24.9
3.746	10.9	20.2	31.1	56.0	-24.9
1.957	11.0	20.0	31.0	56.0	-25.0
3.220	10.9	20.1	31.0	56.0	-25.0
4.277	10.6	20.3	30.9	56.0	-25.1
0.405	12.4	19.9	32.3	57.8	-25.5
0.359	12.9	19.9	32.8	58.8	-26.0
6.996	13.6	20.4	34.0	60.0	-26.0
16.227	12.2	21.2	33.4	60.0	-26.6
0.162	18.6	20.1	38.7	65.4	-26.7
6.293	12.6	20.3	32.9	60.0	-27.1
23.129	11.0	21.6	32.6	60.0	-27.4
29.235	10.3	22.3	32.6	60.0	-27.4
0.283	13.3	19.9	33.2	60.7	-27.5
0.185	15.9	20.0	35.9	64.3	-28.4
7.720	11.1	20.4	31.5	60.0	-28.5

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
18.243	12.5	21.3	33.8	50.0	-16.2
0.902	9.0	20.0	29.0	46.0	-17.0
18.304	11.2	21.3	32.5	50.0	-17.5
13.560	10.5	20.9	31.4	50.0	-18.6
1.804	6.5	20.0	26.5	46.0	-19.5
2.704	5.8	20.1	25.9	46.0	-20.1
0.490	6.0	19.9	25.9	46.2	-20.3
0.597	5.7	19.9	25.6	46.0	-20.4
0.730	5.5	19.9	25.4	46.0	-20.6
1.079	5.1	20.0	25.1	46.0	-20.9
1.328	5.0	20.0	25.0	46.0	-21.0
3.815	4.8	20.2	25.0	46.0	-21.0
3.054	4.8	20.1	24.9	46.0	-21.1
4.656	4.6	20.3	24.9	46.0	-21.1
1.957	4.8	20.0	24.8	46.0	-21.2
0.403	6.4	19.9	26.3	47.8	-21.5
0.358	6.9	19.9	26.8	48.8	-22.0
16.227	6.7	21.2	27.9	50.0	-22.1
6.566	6.7	20.3	27.0	50.0	-23.0
6.232	6.3	20.3	26.6	50.0	-23.4
23.129	5.0	21.6	26.6	50.0	-23.4
29.235	4.3	22.3	26.6	50.0	-23.4
0.281	7.2	19.9	27.1	50.8	-23.7
8.395	5.0	20.5	25.5	50.0	-24.5
0.223	7.6	20.0	27.6	52.7	-25.1

CONCLUSION

Pass

Tested By

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

TEST DESCRIPTION

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

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
Cable	None	10m Test Distance Cable	EVL	2024-01-17	2025-01-17
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFD	2024-06-17	2025-06-17
Antenna, Active Loop	EMCO	6502	AZC	2023-09-05	2025-09-05

FREQUENCY RANGE INVESTIGATED

12.92 MHz TO 14.2 MHz

POWER INVESTIGATED

5VDC, 12VDC, 24VDC via 110VAC/60Hz

CONFIGURATIONS INVESTIGATED

SEIT0121-1

MODES INVESTIGATED

Transmitting on antenna A0, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.
Transmitting on antenna A1, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.
Transmitting on antenna A2, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.
Transmitting on antenna A26, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.
Transmitting on antenna A27, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.
Transmitting on antenna A3, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.
Transmitting on antenna A4, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.
Transmitting on antenna A5, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.
Transmitting on antenna A6, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-09-23
Customer:	Seitz and Associates, Inc.	Temperature:	22.2°C
Attendees:	Tyler Seitz	Relative Humidity:	52.2%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mb
Tested By:	Cole Ghizzone	Job Site:	EV11
Power:	5VDC, 12VDC, 24VDC via 110VAC/60Hz	Configuration:	SEIT0121-1

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	30	Test Distance (m):	10	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

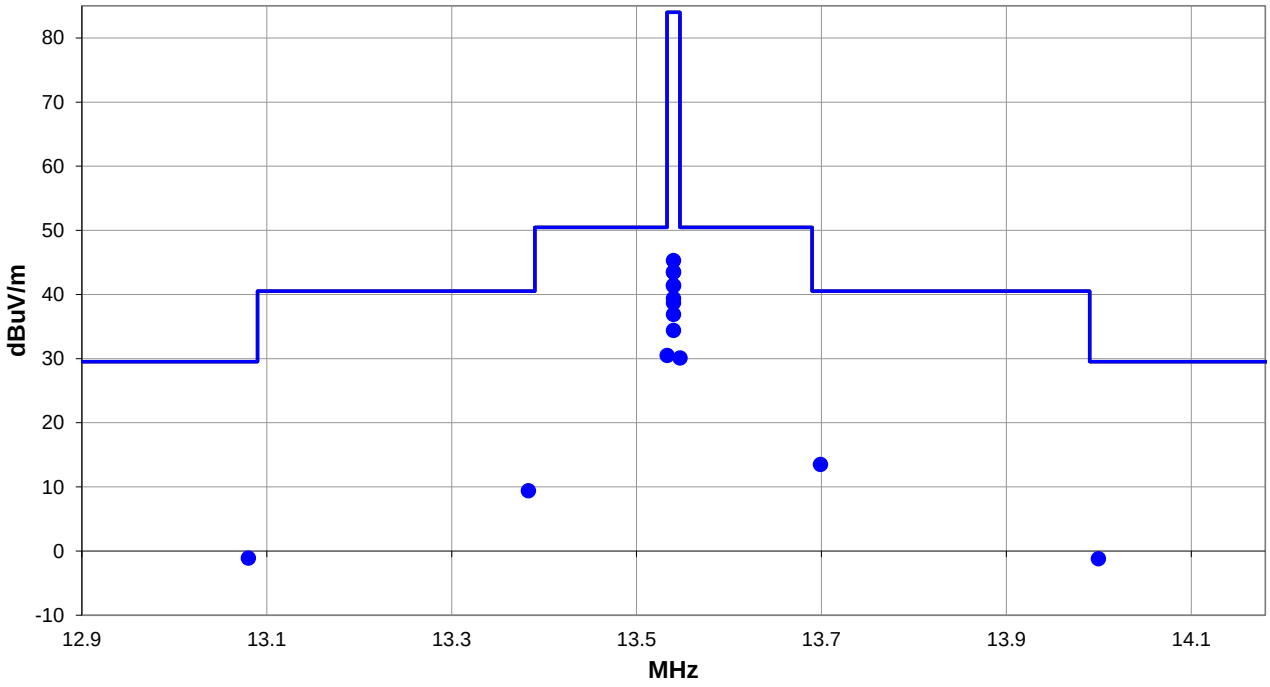
None

EUT OPERATING MODES

Transmitting on antenna A27, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None



Run #: 30 ■ PK ◆ AV ● QP

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #30

10 (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
13.553	38.6	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	30.5	50.5	-20.0	EUT Vert
13.567	38.2	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	30.1	50.5	-20.4	EUT Vert
13.719	21.6	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	13.5	40.5	-27.0	EUT Vert
13.100	7.0	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	-1.1	29.5	-30.6	EUT Vert
14.020	6.9	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	-1.2	29.5	-30.7	EUT Vert
13.403	17.5	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	9.4	40.5	-31.1	EUT Vert
13.560	53.4	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	45.3	84.0	-38.7	EUT Vert
13.560	51.6	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	43.5	84.0	-40.5	EUT On Side
13.560	51.6	11.0	1.0	95.0	10.0	0.0	Par GND	QP	-19.1	43.5	84.0	-40.5	EUT Vert
13.560	49.5	11.0	1.0	95.0	10.0	0.0	Par GND	QP	-19.1	41.4	84.0	-42.6	EUT On Side
13.560	49.5	11.0	1.0	165.0	10.0	0.0	Perp EUT	QP	-19.1	41.4	84.0	-42.6	EUT Horz
13.560	47.5	11.0	1.0	195.0	10.0	0.0	Par GND	QP	-19.1	39.4	84.0	-44.6	EUT Horz
13.560	46.8	11.0	1.0	95.0	10.0	0.0	Par EUT	QP	-19.1	38.7	84.0	-45.3	EUT Vert
13.560	45.0	11.0	1.0	95.0	10.0	0.0	Par EUT	QP	-19.1	36.9	84.0	-47.1	EUT On Side
13.560	42.5	11.0	1.0	243.0	10.0	0.0	Par GND	QP	-19.1	34.4	84.0	-49.6	EUT Horz

CONCLUSION

Pass

Tested By

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-09-23
Customer:	Seitz and Associates, Inc.	Temperature:	22.2°C
Attendees:	Tyler Seitz	Relative Humidity:	52.2%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mb
Tested By:	Cole Ghizzone	Job Site:	EV11
Power:	5VDC, 12VDC, 24VDC via 110VAC/60Hz	Configuration:	SEIT0121-1

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	31	Test Distance (m):	10	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

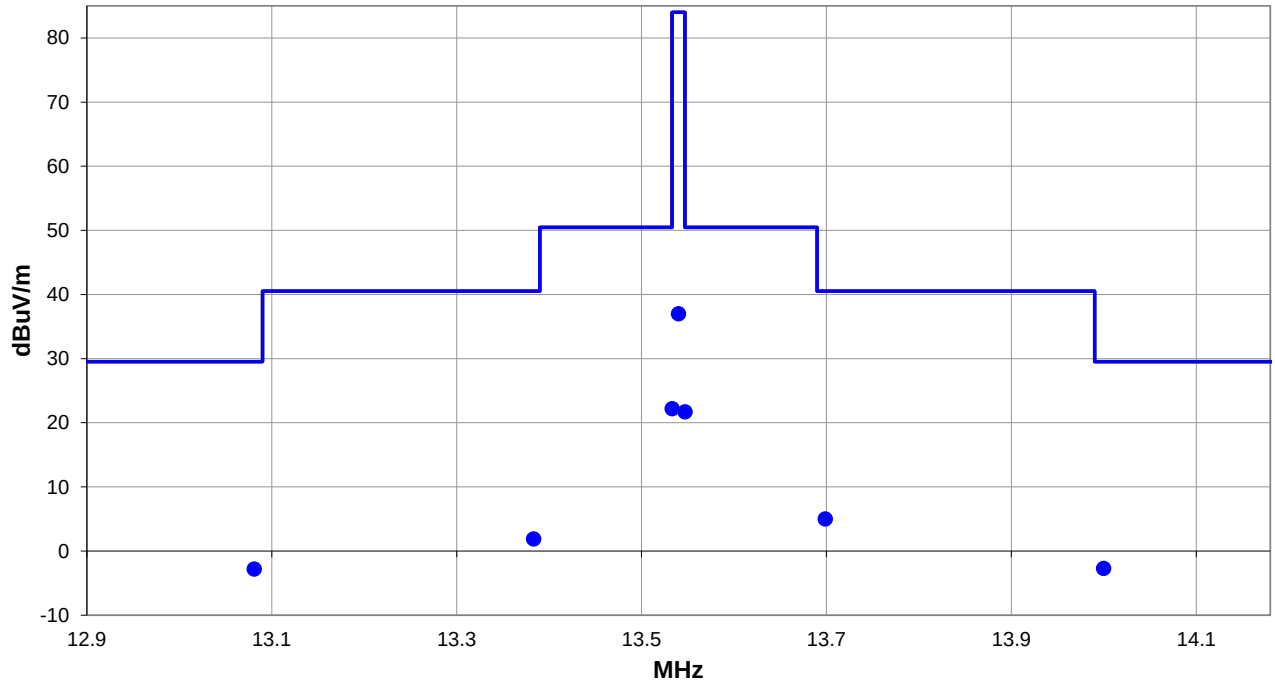
EUT on side, antenna perp EUR

EUT OPERATING MODES

Transmitting on antenna A26, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None



Run #: 31 ■ PK ◆ AV ● QP

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

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)	Comments
13.553	30.3	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	22.2	50.5	-28.3	EUT Vert
13.567	29.8	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	21.7	50.5	-28.8	EUT Vert
14.020	5.4	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	-2.7	29.5	-32.2	EUT Vert
13.101	5.3	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	-2.8	29.5	-32.3	EUT Vert
13.719	13.1	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	5.0	40.5	-35.5	EUT Vert
13.403	10.0	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	1.9	40.5	-38.6	EUT Vert
13.560	45.1	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	37.0	84.0	-47.0	EUT Vert

CONCLUSION

Pass

Tested By

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-09-23
Customer:	Seitz and Associates, Inc.	Temperature:	22.2°C
Attendees:	Tyler Seitz	Relative Humidity:	52.2%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mb
Tested By:	Cole Ghizzone	Job Site:	EV11
Power:	5VDC, 12VDC, 24VDC via 110VAC/60Hz	Configuration:	SEIT0121-1

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	32	Test Distance (m):	10	Ant. Height(s) (m):	1(m)

COMMENTS

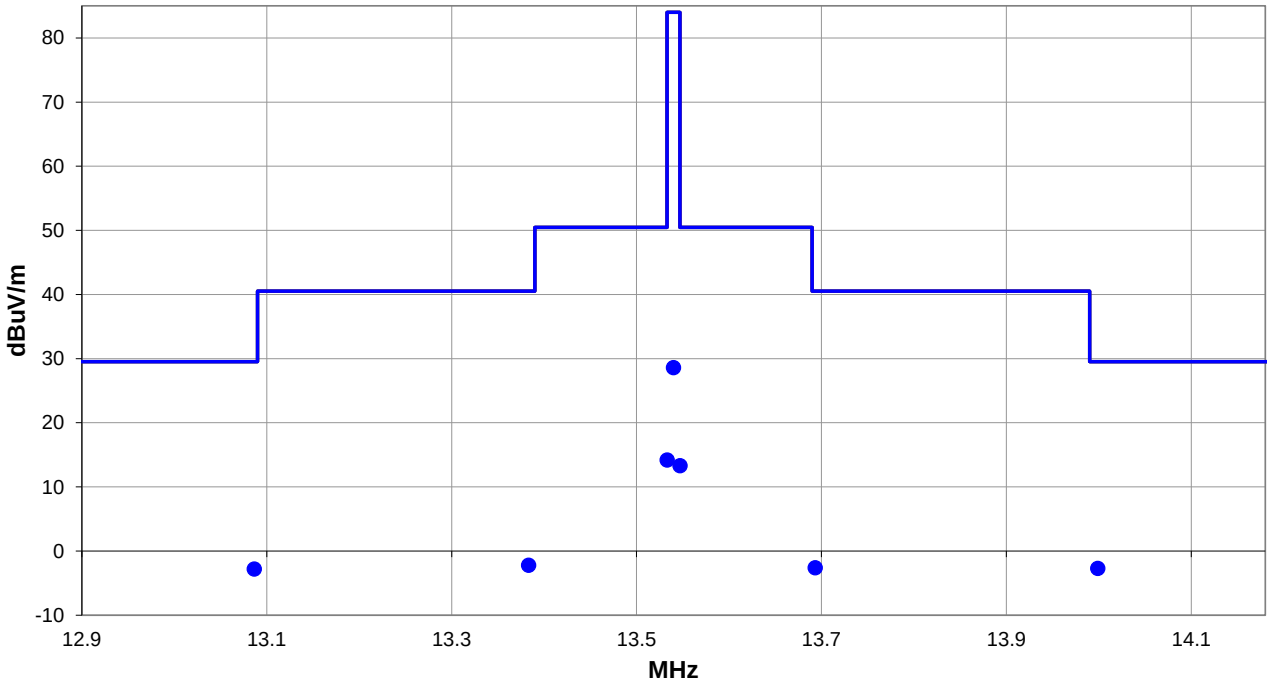
EUT on side, antenna perp EUR

EUT OPERATING MODES

Transmitting on antenna A6, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None



Run #: 32 ■ PK ◆ AV ● QP

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #32

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
14.019	5.4	11.0	1.0	94.0	10.0	0.0	Perp EUT	QP	-19.1	-2.7	29.5	-32.2	EUT Vert
13.107	5.3	11.0	1.0	94.0	10.0	0.0	Perp EUT	QP	-19.1	-2.8	29.5	-32.3	EUT Vert
13.553	22.3	11.0	1.0	94.0	10.0	0.0	Perp EUT	QP	-19.1	14.2	50.5	-36.3	EUT Vert
13.567	21.4	11.0	1.0	94.0	10.0	0.0	Perp EUT	QP	-19.1	13.3	50.5	-37.2	EUT Vert
13.403	5.9	11.0	1.0	94.0	10.0	0.0	Perp EUT	QP	-19.1	-2.2	40.5	-42.7	EUT Vert
13.713	5.5	11.0	1.0	94.0	10.0	0.0	Perp EUT	QP	-19.1	-2.6	40.5	-43.1	EUT Vert
13.560	36.7	11.0	1.0	94.0	10.0	0.0	Perp EUT	QP	-19.1	28.6	84.0	-55.4	EUT Vert

CONCLUSION

Pass

Tested By

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-09-23
Customer:	Seitz and Associates, Inc.	Temperature:	22.2°C
Attendees:	Tyler Seitz	Relative Humidity:	52.2%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mb
Tested By:	Cole Ghizzone	Job Site:	EV11
Power:	5VDC, 12VDC, 24VDC via 110VAC/60Hz	Configuration:	SEIT0121-1

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	33	Test Distance (m):	10	Ant. Height(s) (m):	1(m)

COMMENTS

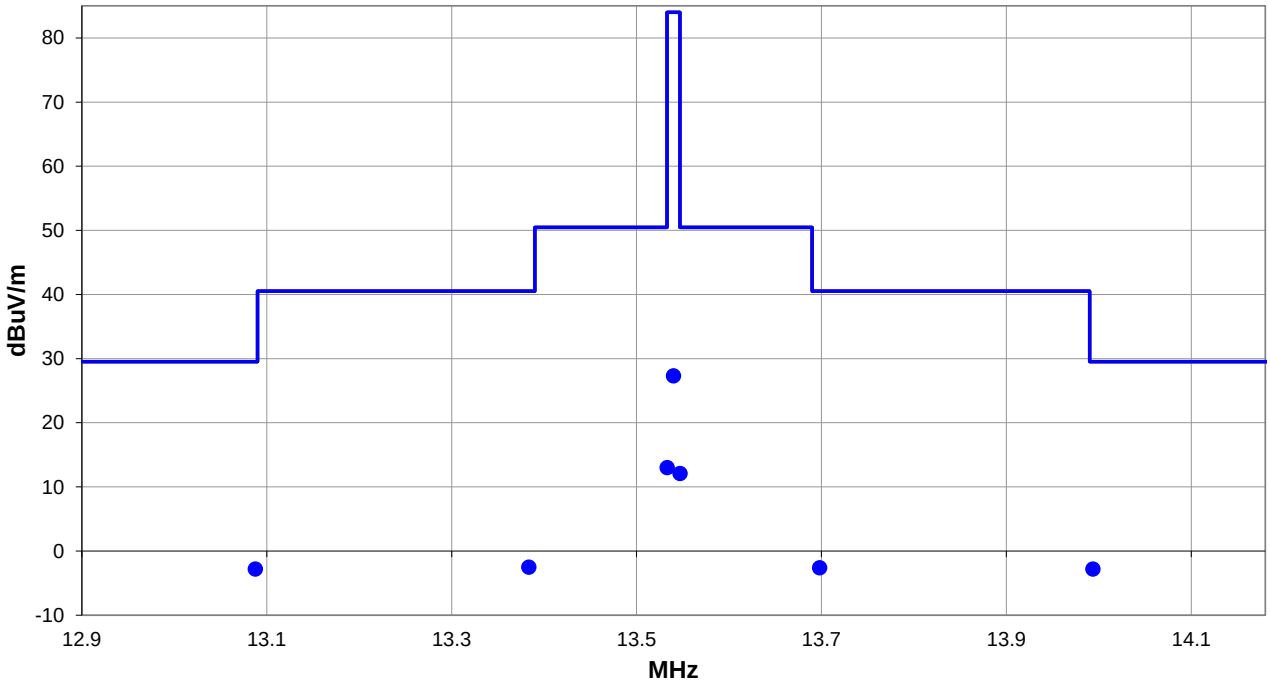
None

EUT OPERATING MODES

Transmitting on antenna A5, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None



Run #: 33 ■ PK ◆ AV ● QP

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #33

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
13.108	5.3	11.0	1.0	94.0	10.0	0.0	Perp EUT	QP	-19.1	-2.8	29.5	-32.3	EUT Vert
14.014	5.3	11.0	1.0	94.0	10.0	0.0	Perp EUT	QP	-19.1	-2.8	29.5	-32.3	EUT Vert
13.553	21.1	11.0	1.0	94.0	10.0	0.0	Perp EUT	QP	-19.1	13.0	50.5	-37.5	EUT Vert
13.567	20.2	11.0	1.0	94.0	10.0	0.0	Perp EUT	QP	-19.1	12.1	50.5	-38.4	EUT Vert
13.403	5.6	11.0	1.0	94.0	10.0	0.0	Perp EUT	QP	-19.1	-2.5	40.5	-43.0	EUT Vert
13.718	5.5	11.0	1.0	94.0	10.0	0.0	Perp EUT	QP	-19.1	-2.6	40.5	-43.1	EUT Vert
13.560	35.4	11.0	1.0	94.0	10.0	0.0	Perp EUT	QP	-19.1	27.3	84.0	-56.7	EUT Vert

CONCLUSION

Pass

Tested By

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-09-23
Customer:	Seitz and Associates, Inc.	Temperature:	22.2°C
Attendees:	Tyler Seitz	Relative Humidity:	52.2%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mb
Tested By:	Cole Ghizzone	Job Site:	EV11
Power:	5VDC, 12VDC, 24VDC via 110VAC/60Hz	Configuration:	SEIT0121-1

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	34	Test Distance (m):	10	Ant. Height(s) (m):	1(m)

COMMENTS

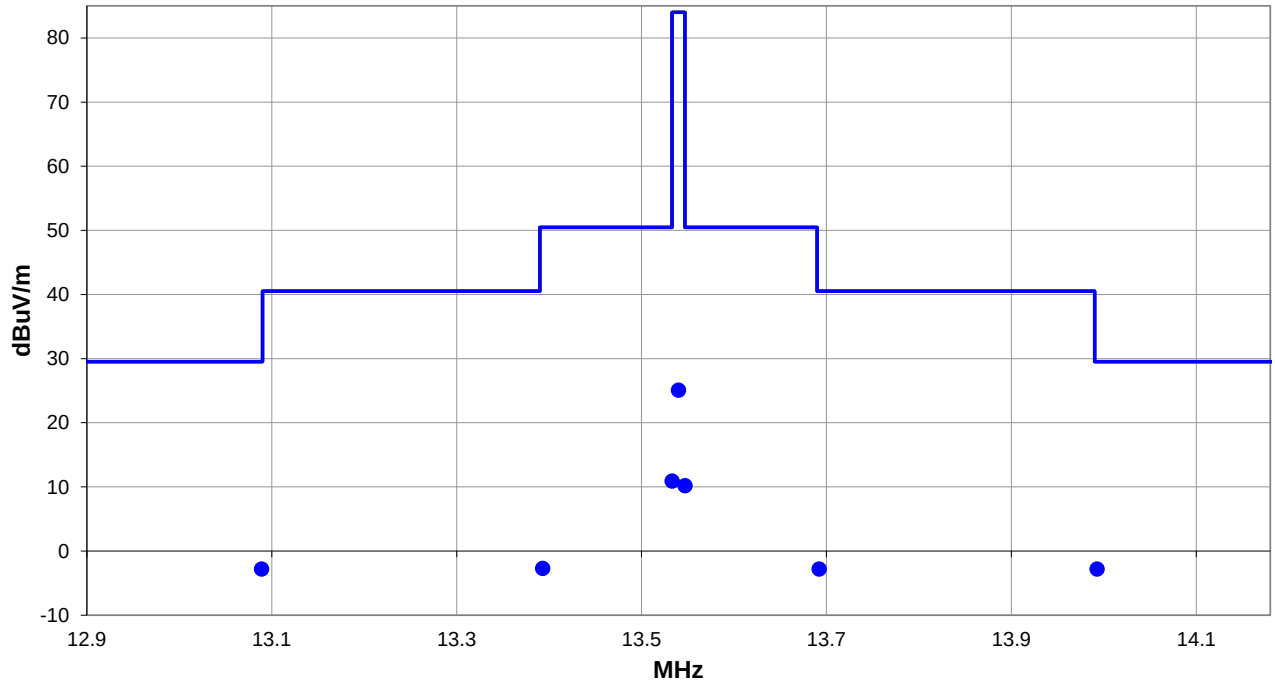
None

EUT OPERATING MODES

Transmitting on antenna A4, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None



Run #: 34 ■ PK ◆ AV ● QP

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #34

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
13.109	5.3	11.0	1.0	93.0	10.0	0.0	Perp EUT	QP	-19.1	-2.8	29.5	-32.3	EUT Vert
14.013	5.3	11.0	1.0	93.0	10.0	0.0	Perp EUT	QP	-19.1	-2.8	29.5	-32.3	EUT Vert
13.553	19.0	11.0	1.0	93.0	10.0	0.0	Perp EUT	QP	-19.1	10.9	50.5	-39.6	EUT Vert
13.567	18.3	11.0	1.0	93.0	10.0	0.0	Perp EUT	QP	-19.1	10.2	50.5	-40.3	EUT Vert
13.712	5.3	11.0	1.0	93.0	10.0	0.0	Perp EUT	QP	-19.1	-2.8	40.5	-43.3	EUT Vert
13.413	5.4	11.0	1.0	93.0	10.0	0.0	Perp EUT	QP	-19.1	-2.7	50.5	-53.2	EUT Vert
13.560	33.2	11.0	1.0	93.0	10.0	0.0	Perp EUT	QP	-19.1	25.1	84.0	-58.9	EUT Vert

CONCLUSION

Pass

Tested By

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-09-23
Customer:	Seitz and Associates, Inc.	Temperature:	22.2°C
Attendees:	Tyler Seitz	Relative Humidity:	52.2%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mb
Tested By:	Cole Ghizzone	Job Site:	EV11
Power:	5VDC, 12VDC, 24VDC via 110VAC/60Hz	Configuration:	SEIT0121-1

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	35	Test Distance (m):	10	Ant. Height(s) (m):	1(m)

COMMENTS

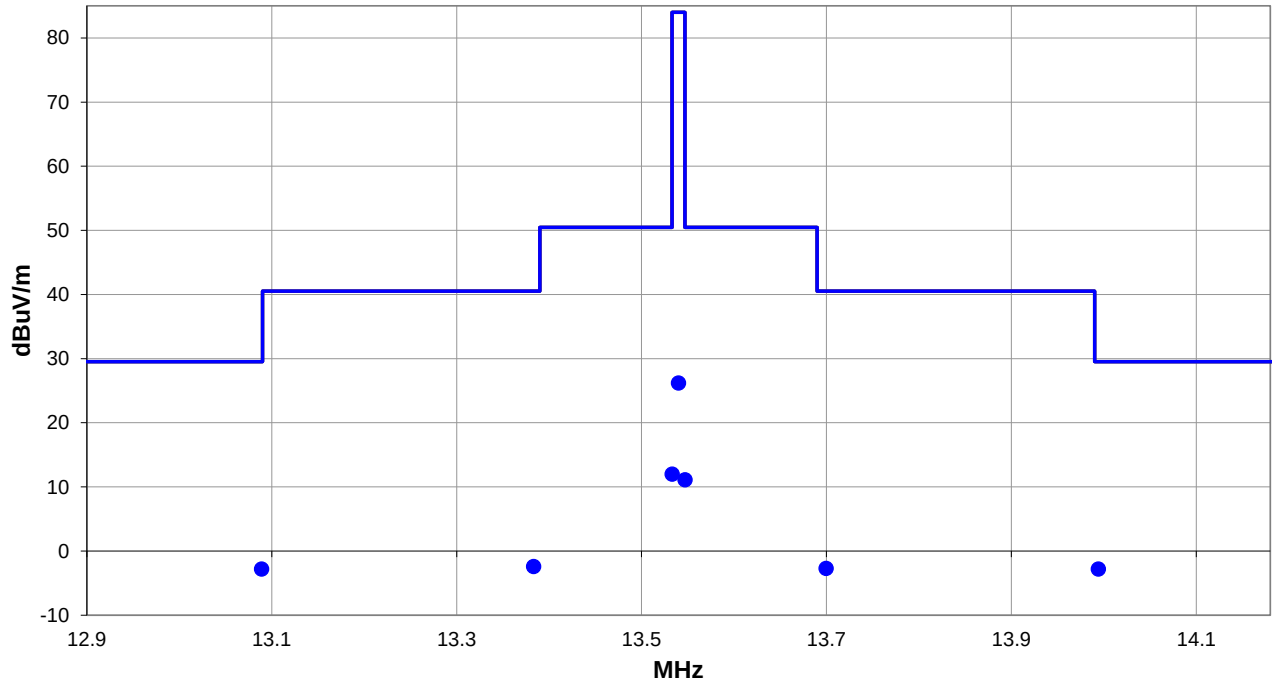
None

EUT OPERATING MODES

Transmitting on antenna A3, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None



Run #: 35 ■ PK ◆ AV ● QP

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

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 (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
13.109	5.3	11.0	1.0	70.0	10.0	0.0	Perp EUT	QP	-19.1	-2.8	29.5	-32.3	EUT Vert
14.014	5.3	11.0	1.0	70.0	10.0	0.0	Perp EUT	QP	-19.1	-2.8	29.5	-32.3	EUT Vert
13.553	20.1	11.0	1.0	70.0	10.0	0.0	Perp EUT	QP	-19.1	12.0	50.5	-38.5	EUT Vert
13.567	19.2	11.0	1.0	70.0	10.0	0.0	Perp EUT	QP	-19.1	11.1	50.5	-39.4	EUT Vert
13.403	5.7	11.0	1.0	70.0	10.0	0.0	Perp EUT	QP	-19.1	-2.4	40.5	-42.9	EUT Vert
13.720	5.4	11.0	1.0	70.0	10.0	0.0	Perp EUT	QP	-19.1	-2.7	40.5	-43.2	EUT Vert
13.560	34.3	11.0	1.0	70.0	10.0	0.0	Perp EUT	QP	-19.1	26.2	84.0	-57.8	EUT Vert

CONCLUSION

Pass

Tested By

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-09-23
Customer:	Seitz and Associates, Inc.	Temperature:	22.2°C
Attendees:	Tyler Seitz	Relative Humidity:	52.2%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mb
Tested By:	Cole Ghizzone	Job Site:	EV11
Power:	5VDC, 12VDC, 24VDC via 110VAC/60Hz	Configuration:	SEIT0121-1

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	36	Test Distance (m):	10	Ant. Height(s) (m):	1(m)

COMMENTS

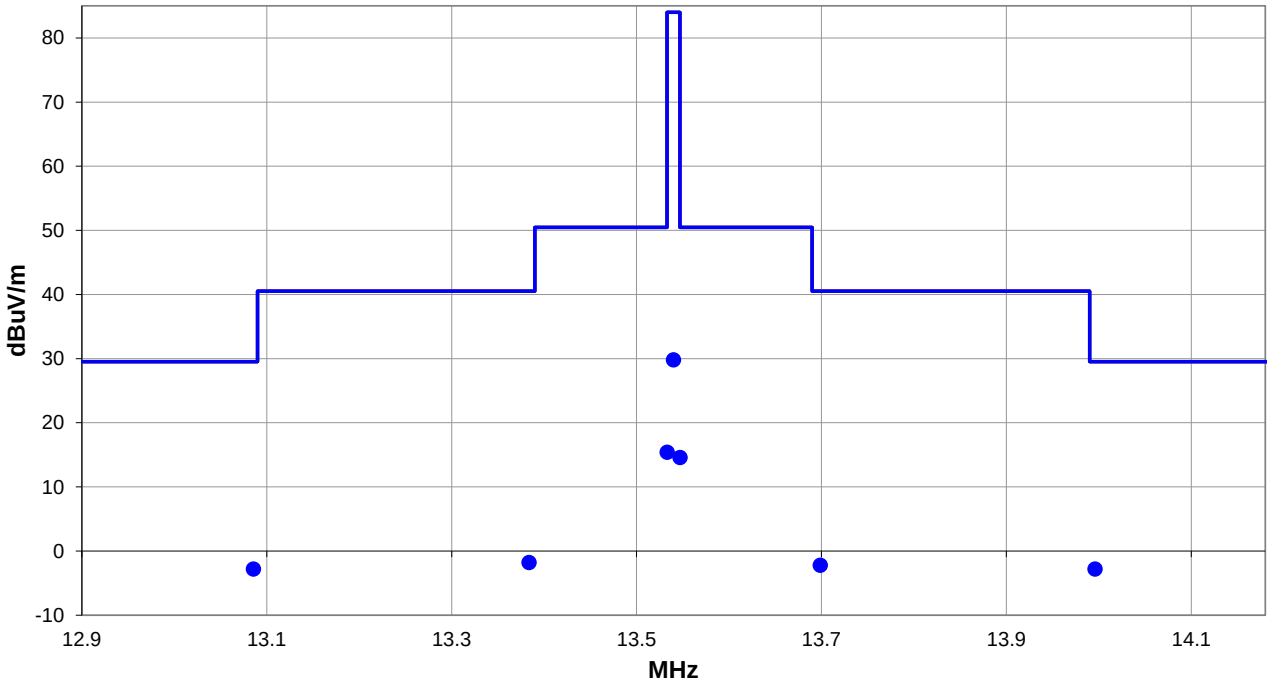
None

EUT OPERATING MODES

Transmitting on antenna A2, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None



Run #: 36 ■ PK ◆ AV ● QP

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #36

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
13.106	5.3	11.0	1.0	68.0	10.0	0.0	Perp EUT	QP	-19.1	-2.8	29.5	-32.3	EUT Vert
14.016	5.3	11.0	1.0	68.0	10.0	0.0	Perp EUT	QP	-19.1	-2.8	29.5	-32.3	EUT Vert
13.553	23.5	11.0	1.0	68.0	10.0	0.0	Perp EUT	QP	-19.1	15.4	50.5	-35.1	EUT Vert
13.567	22.7	11.0	1.0	68.0	10.0	0.0	Perp EUT	QP	-19.1	14.6	50.5	-35.9	EUT Vert
13.404	6.3	11.0	1.0	68.0	10.0	0.0	Perp EUT	QP	-19.1	-1.8	40.5	-42.3	EUT Vert
13.719	5.9	11.0	1.0	68.0	10.0	0.0	Perp EUT	QP	-19.1	-2.2	40.5	-42.7	EUT Vert
13.560	37.9	11.0	1.0	68.0	10.0	0.0	Perp EUT	QP	-19.1	29.8	84.0	-54.2	EUT Vert

CONCLUSION

Pass

Tested By

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-09-23
Customer:	Seitz and Associates, Inc.	Temperature:	22.2°C
Attendees:	Tyler Seitz	Relative Humidity:	52.2%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mb
Tested By:	Cole Ghizzone	Job Site:	EV11
Power:	5VDC, 12VDC, 24VDC via 110VAC/60Hz	Configuration:	SEIT0121-1

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	37	Test Distance (m):	10	Ant. Height(s) (m):	1(m)

COMMENTS

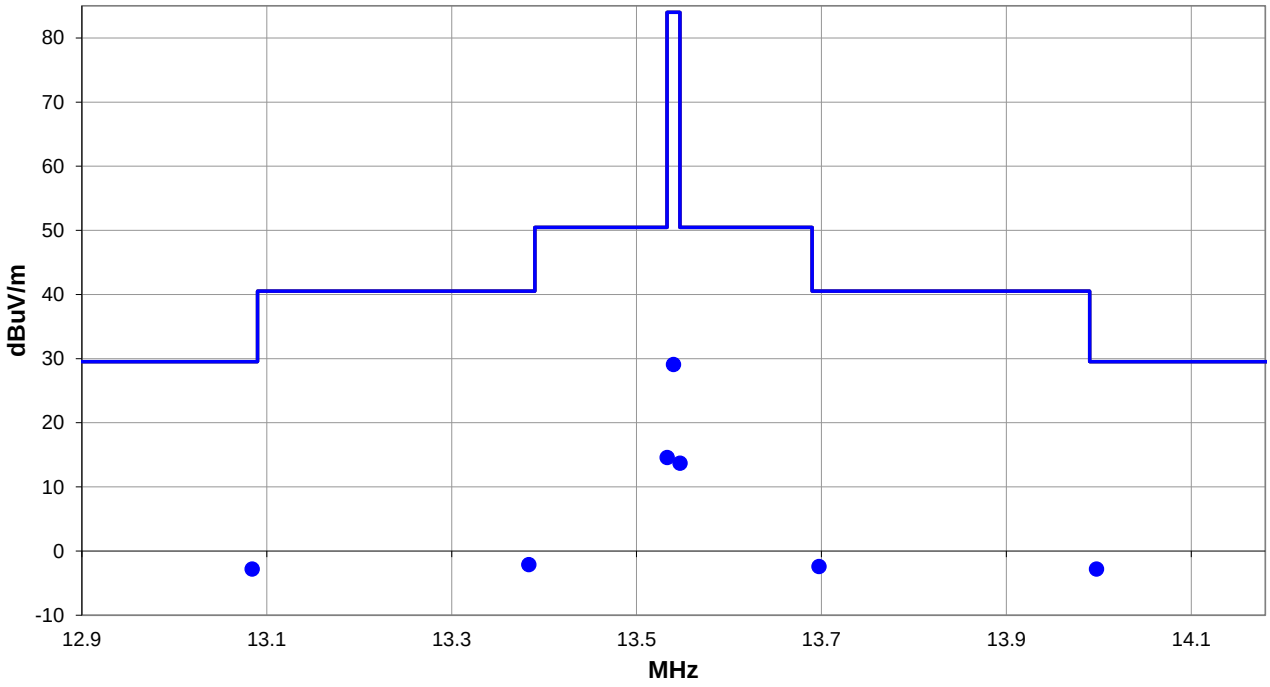
None

EUT OPERATING MODES

Transmitting on antenna A1, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None



Run #: 37 ■ PK ◆ AV ● QP

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #37

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
13.104	5.3	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	-2.8	29.5	-32.3	EUT Vert
14.018	5.3	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	-2.8	29.5	-32.3	EUT Vert
13.553	22.7	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	14.6	50.5	-35.9	EUT Vert
13.567	21.8	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	13.7	50.5	-36.8	EUT Vert
13.404	6.0	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	-2.1	40.5	-42.6	EUT Vert
13.717	5.7	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	-2.4	40.5	-42.9	EUT Vert
13.560	37.2	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	29.1	84.0	-54.9	EUT Vert

CONCLUSION

Pass

Tested By

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-09-23
Customer:	Seitz and Associates, Inc.	Temperature:	22.2°C
Attendees:	Tyler Seitz	Relative Humidity:	52.2%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mb
Tested By:	Cole Ghizzone	Job Site:	EV11
Power:	5VDC, 12VDC, 24VDC via 110VAC/60Hz	Configuration:	SEIT0121-1

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	38	Test Distance (m):	10	Ant. Height(s) (m):	1(m)

COMMENTS

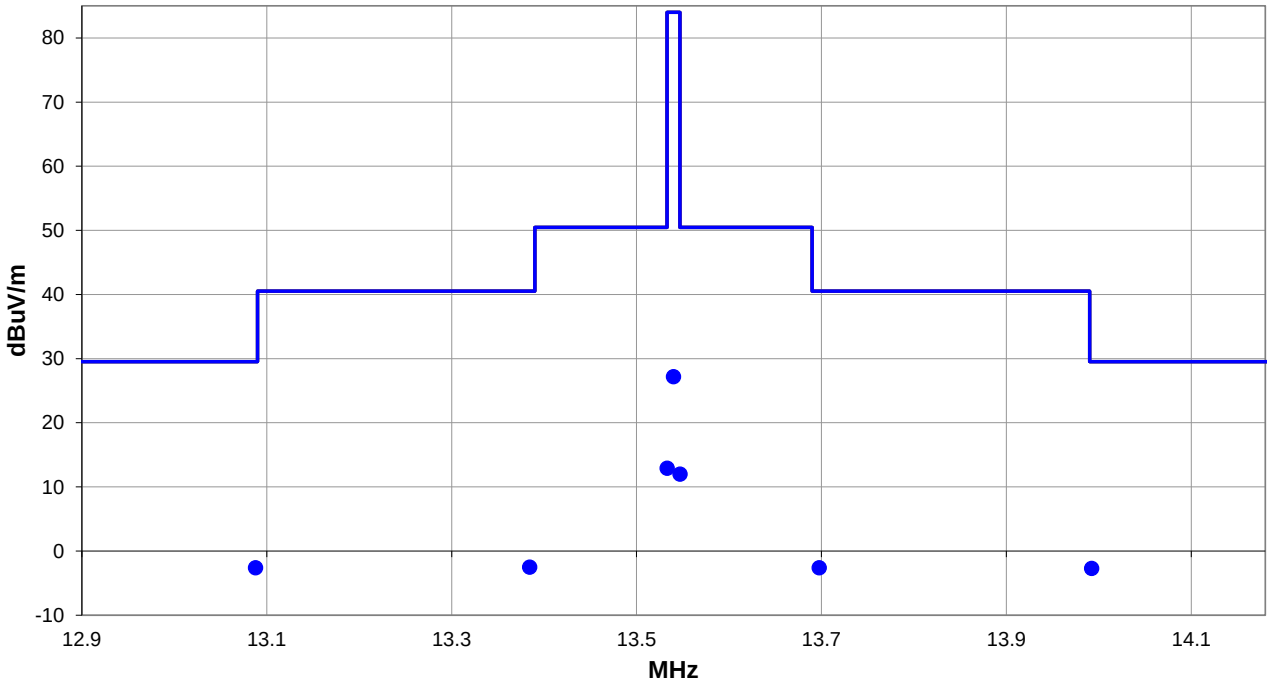
None

EUT OPERATING MODES

Transmitting on antenna A0, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None



Run #: 38 ■ PK ◆ AV ● QP

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #38

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
13.108	5.5	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	-2.6	29.5	-32.1	EUT Vert
14.012	5.4	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	-2.7	29.5	-32.2	EUT Vert
13.553	21.0	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	12.9	50.5	-37.6	EUT Vert
13.567	20.1	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	12.0	50.5	-38.5	EUT Vert
13.404	5.6	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	-2.5	40.5	-43.0	EUT Vert
13.718	5.5	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	-2.6	40.5	-43.1	EUT Vert
13.560	35.3	11.0	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	27.2	84.0	-56.8	EUT Vert

CONCLUSION

Pass

Tested By

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30MHz)

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Cable	None	10m Test Distance Cable	EVL	2024-01-17	2025-01-17
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFD	2024-06-17	2025-06-17
Antenna, Active Loop	EMCO	6502	AZC	2023-09-05	2025-09-05

FREQUENCY RANGE INVESTIGATED

9 kHz TO 30 MHz

POWER INVESTIGATED

5VDC, 12VDC, 24VDC via 110VAC/60Hz

CONFIGURATIONS INVESTIGATED

SEIT0121-1

MODES INVESTIGATED

Transmitting on all antennas sequentially, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30MHz)

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-09-23
Customer:	Seitz and Associates, Inc.	Temperature:	22.2°C
Attendees:	Tyler Seitz	Relative Humidity:	52.2%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mb
Tested By:	Cole Ghizzone	Job Site:	EV11
Power:	5VDC, 12VDC, 24VDC via 110VAC/60Hz	Configuration:	SEIT0121-1

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	29	Test Distance (m):	10	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

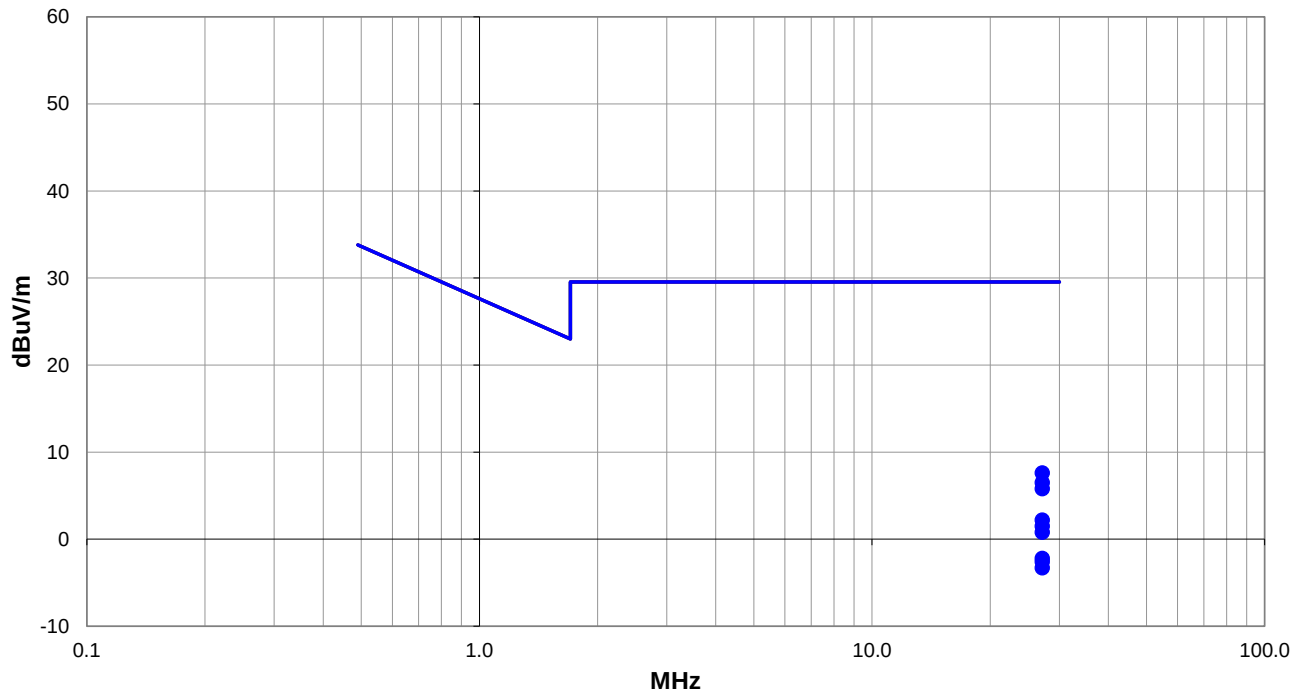
None

EUT OPERATING MODES

Transmitting on all antennas sequentially, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None



Run #: 29 ■ PK ◆ AV ● QP

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30MHz)

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #29

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
27.120	16.9	9.8	1.0	295.0	10.0	0.0	Perp EUT	QP	-19.1	7.6	29.5	-21.9	EUT Vert
27.120	15.8	9.8	1.0	95.0	10.0	0.0	Perp EUT	QP	-19.1	6.5	29.5	-23.0	EUT Horz
27.120	15.1	9.8	1.0	265.0	10.0	0.0	Perp EUT	QP	-19.1	5.8	29.5	-23.7	EUT On Side
27.120	11.5	9.8	1.0	15.0	10.0	0.0	Par GND	QP	-19.1	2.2	29.5	-27.3	EUT Vert
27.120	10.8	9.8	1.0	45.0	10.0	0.0	Par GND	QP	-19.1	1.5	29.5	-28.0	EUT Horz
27.120	10.1	9.8	1.0	295.0	10.0	0.0	Par GND	QP	-19.1	0.8	29.5	-28.7	EUT On Side
27.120	7.1	9.8	1.0	45.0	10.0	0.0	Par EUT	QP	-19.1	-2.2	29.5	-31.7	EUT Vert
27.120	6.7	9.8	1.0	95.0	10.0	0.0	Par EUT	QP	-19.1	-2.6	29.5	-32.1	EUT Horz
27.120	6.0	9.8	1.0	65.0	10.0	0.0	Par EUT	QP	-19.1	-3.3	29.5	-32.8	EUT On Side

CONCLUSION

Pass

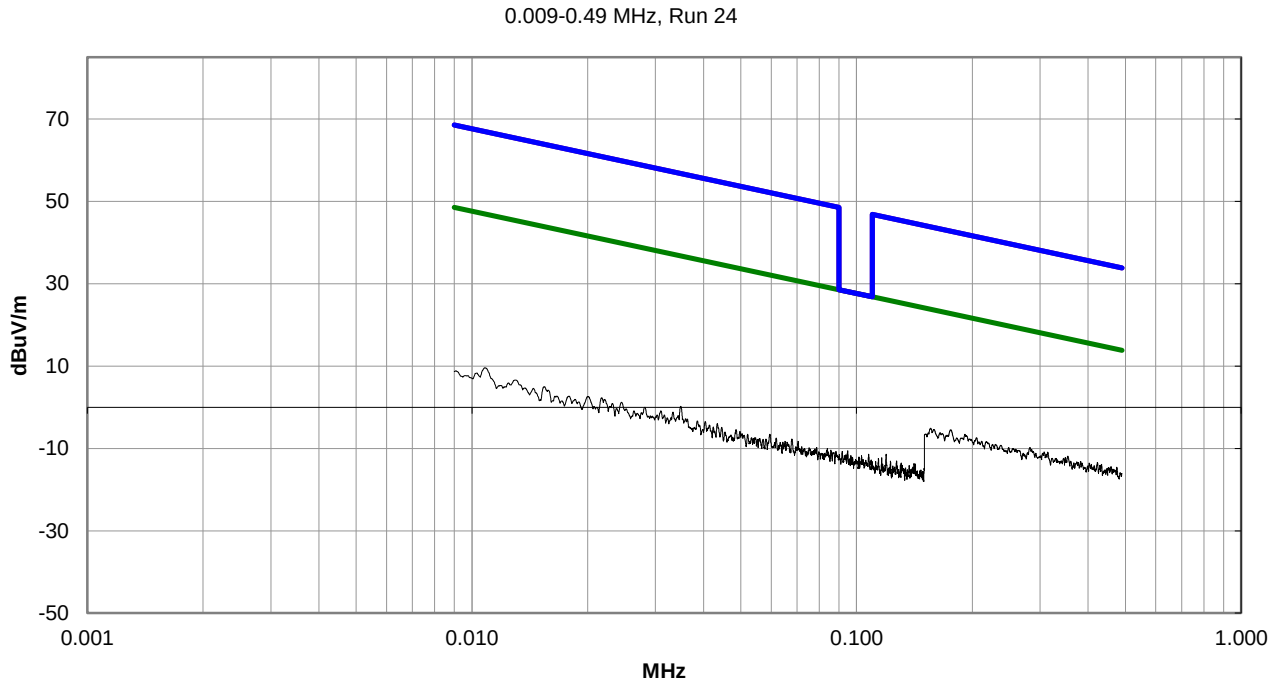
Tested By

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30MHz)

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

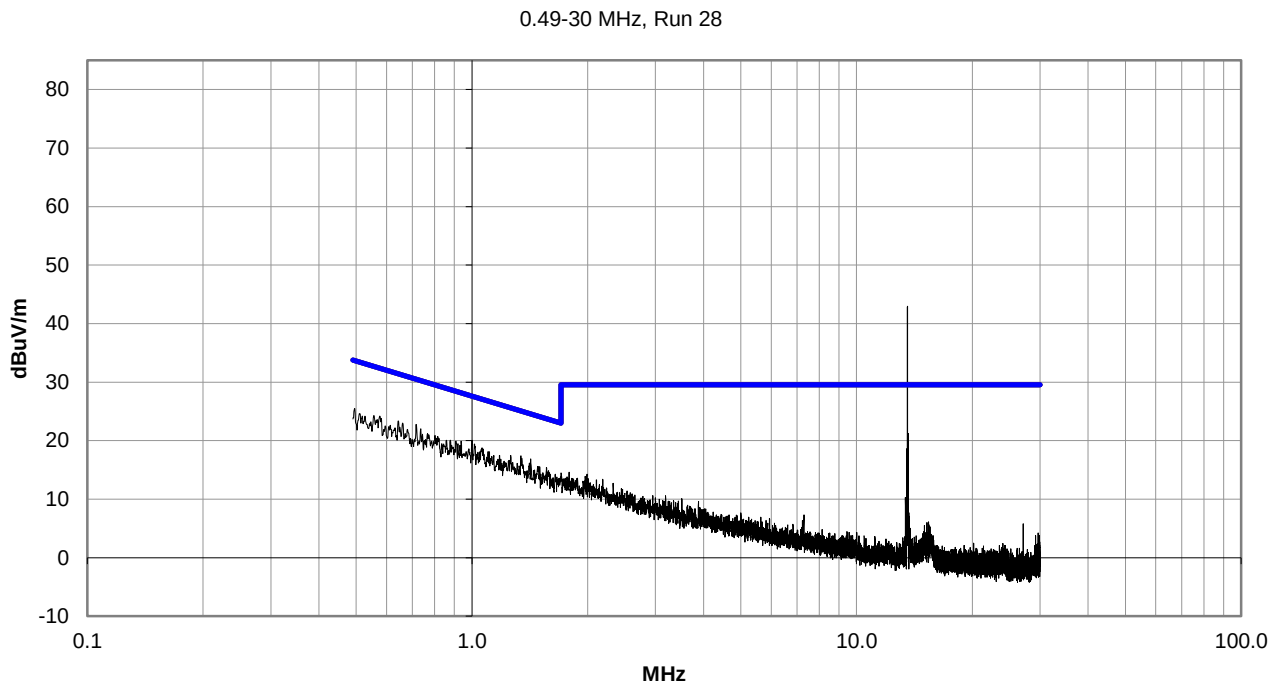
PRESCAN DATA

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.



FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30MHz)

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0



FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHz)

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

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 (30MHz – 1GHz data from EV11)

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Biconilog	EMCO	3141	AXG	2023-09-14	2025-09-14
Cable	None	10m Test Distance Cable	EVL	2024-01-17	2025-01-17
Amplifier - Pre-Amplifier	Fairview Microwave	FMAM63001	PAY	2024-01-17	2025-01-17
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFD	2024-06-17	2025-06-17

TEST EQUIPMENT (1GHz – 2GHz scan performed in EV01)

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	2024-03-08	2026-03-08
Cable	N/A	Double Ridge Horn Cables	EVB	2024-03-14	2025-03-14
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAG	2024-03-14	2025-03-14
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2023-10-04	2024-10-04

FREQUENCY RANGE INVESTIGATED

30 MHz TO 2000 MHz

POWER INVESTIGATED

5VDC, 12VDC, 24VDC via 110VAC/60Hz

CONFIGURATIONS INVESTIGATED

SEIT0121-1

MODES INVESTIGATED

Transmitting on all antennas sequentially, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHz)

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-09-17
Customer:	Seitz and Associates, Inc.	Temperature:	21.8°C
Attendees:	Tyler Seitz	Relative Humidity:	0.464%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mb
Tested By:	Cole Ghizzone	Job Site:	EV11
Power:	5VDC, 12VDC, 24VDC via 110VAC/60Hz	Configuration:	SEIT0121-1

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	20	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

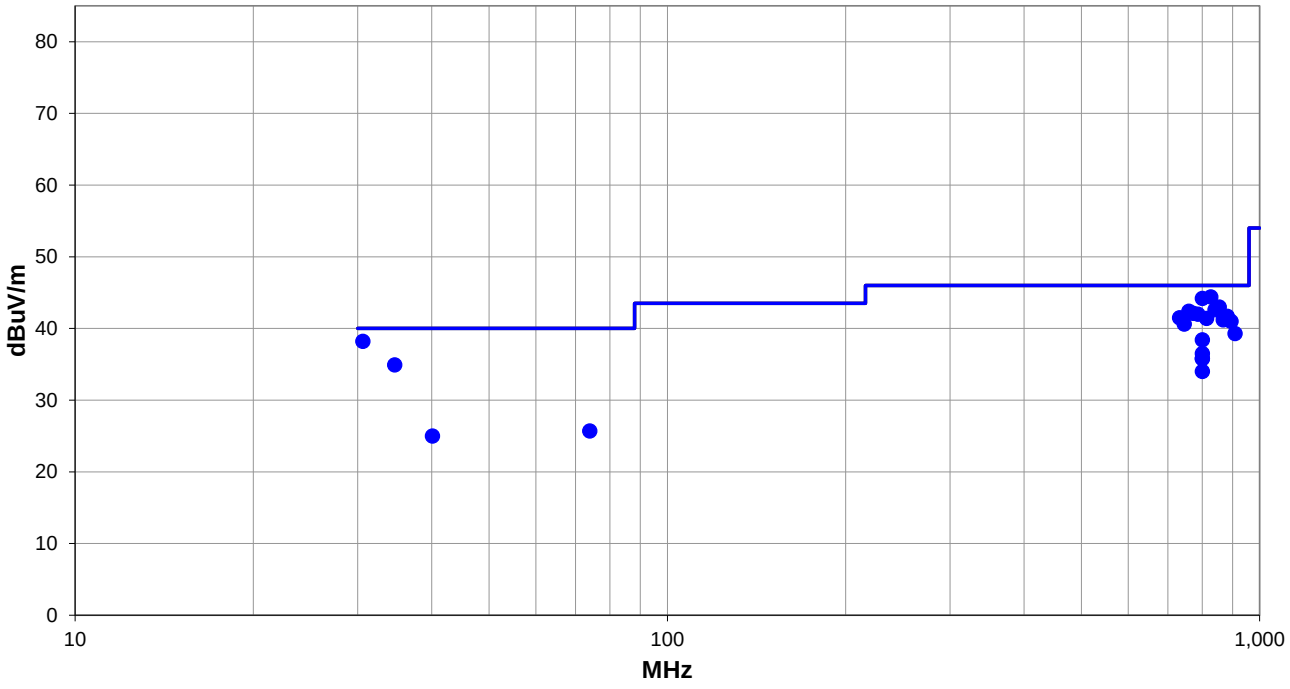
None

EUT OPERATING MODES

Transmitting on all antennas sequentially, ISO 1800-3M3, 13.56 MHz RFID, ASK, 53 kbps.

DEVIATIONS FROM TEST STANDARD

None



Run #: 20 ■ PK ◆ AV ● QP

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHz)

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #20

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
827.153	53.6	-9.2	1.02	142.0	3.0	0.0	Horz	QP	0.0	44.4	46.0	-1.6	EUT On Side
30.608	56.8	-18.6	1.0	209.0	3.0	0.0	Vert	QP	0.0	38.2	40.0	-1.8	EUT On Side
800.031	53.9	-9.7	1.0	148.0	3.0	0.0	Horz	QP	0.0	44.2	46.0	-1.8	EUT On Side
854.271	51.4	-8.4	1.0	145.0	3.0	0.0	Horz	QP	0.0	43.0	46.0	-3.0	EUT On Side
840.710	51.5	-8.9	1.0	143.0	3.0	0.0	Horz	QP	0.0	42.6	46.0	-3.4	EUT On Side
759.351	52.0	-9.6	1.0	133.0	3.0	0.0	Horz	QP	0.0	42.4	46.0	-3.6	EUT On Side
772.915	51.5	-9.4	1.0	133.0	3.0	0.0	Horz	QP	0.0	42.1	46.0	-3.9	EUT On Side
786.472	51.5	-9.5	1.0	144.0	3.0	0.0	Horz	QP	0.0	42.0	46.0	-4.0	EUT On Side
881.389	48.9	-7.2	1.0	140.0	3.0	0.0	Horz	QP	0.0	41.7	46.0	-4.3	EUT On Side
732.233	51.5	-10.0	1.0	120.0	3.0	0.0	Horz	QP	0.0	41.5	46.0	-4.5	EUT On Side
813.592	50.9	-9.5	1.0	127.0	3.0	0.0	Horz	QP	0.0	41.4	46.0	-4.6	EUT On Side
867.829	49.2	-8.0	1.0	147.0	3.0	0.0	Horz	QP	0.0	41.2	46.0	-4.8	EUT On Side
894.952	47.9	-6.9	1.0	142.0	3.0	0.0	Horz	QP	0.0	41.0	46.0	-5.0	EUT On Side
34.634	55.8	-20.9	1.0	282.0	3.0	0.0	Vert	QP	0.0	34.9	40.0	-5.1	EUT On Side
745.791	50.6	-10.0	1.16	125.0	3.0	0.0	Horz	QP	0.0	40.6	46.0	-5.4	EUT On Side
908.511	46.3	-7.0	1.0	118.0	3.0	0.0	Horz	QP	0.0	39.3	46.0	-6.7	EUT On Side
800.027	48.1	-9.7	1.16	185.0	3.0	0.0	Vert	QP	0.0	38.4	46.0	-7.6	EUT Horz
800.026	46.2	-9.7	1.16	188.0	3.0	0.0	Vert	QP	0.0	36.5	46.0	-9.5	EUT Vert
800.026	45.5	-9.7	1.0	299.0	3.0	0.0	Horz	QP	0.0	35.8	46.0	-10.2	EUT Horz
800.031	45.5	-9.7	1.0	153.0	3.0	0.0	Vert	QP	0.0	35.8	46.0	-10.2	EUT On Side
800.027	43.7	-9.7	1.0	164.0	3.0	0.0	Horz	QP	0.0	34.0	46.0	-12.0	EUT Vert
73.957	54.8	-29.1	1.0	163.0	3.0	0.0	Vert	QP	0.0	25.7	40.0	-14.3	EUT On Side
40.110	48.7	-23.7	1.0	210.0	3.0	0.0	Vert	QP	0.0	25.0	40.0	-15.0	EUT On Side

CONCLUSION

Pass

Tested By

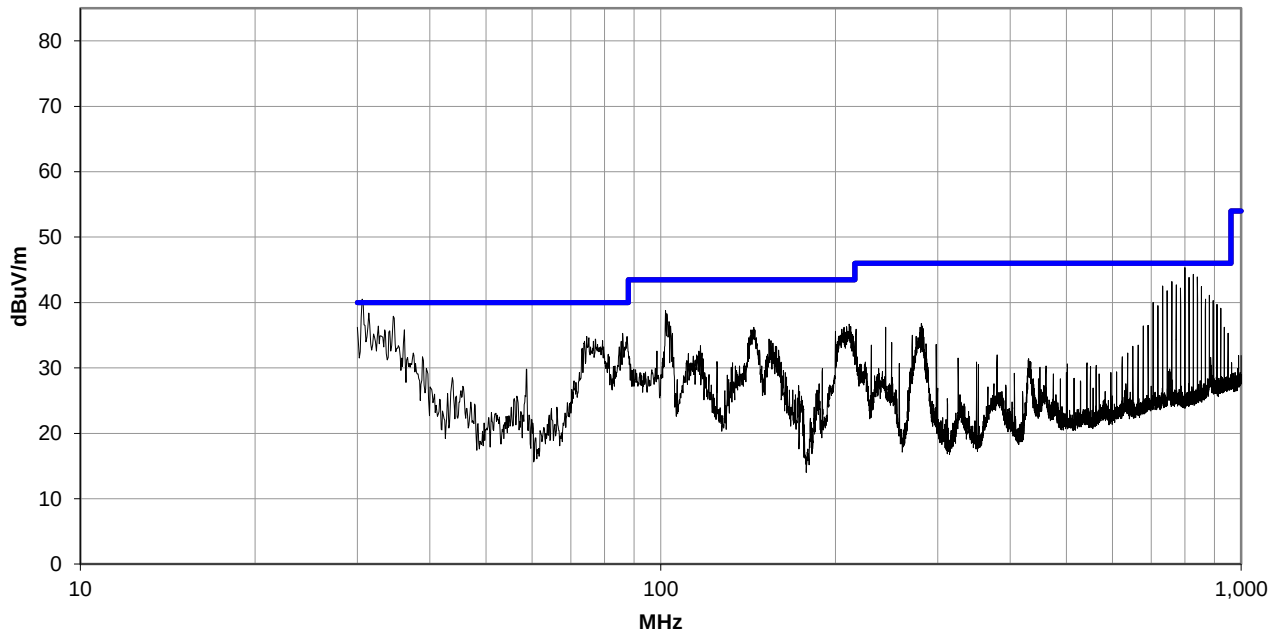
FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHz)

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

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.

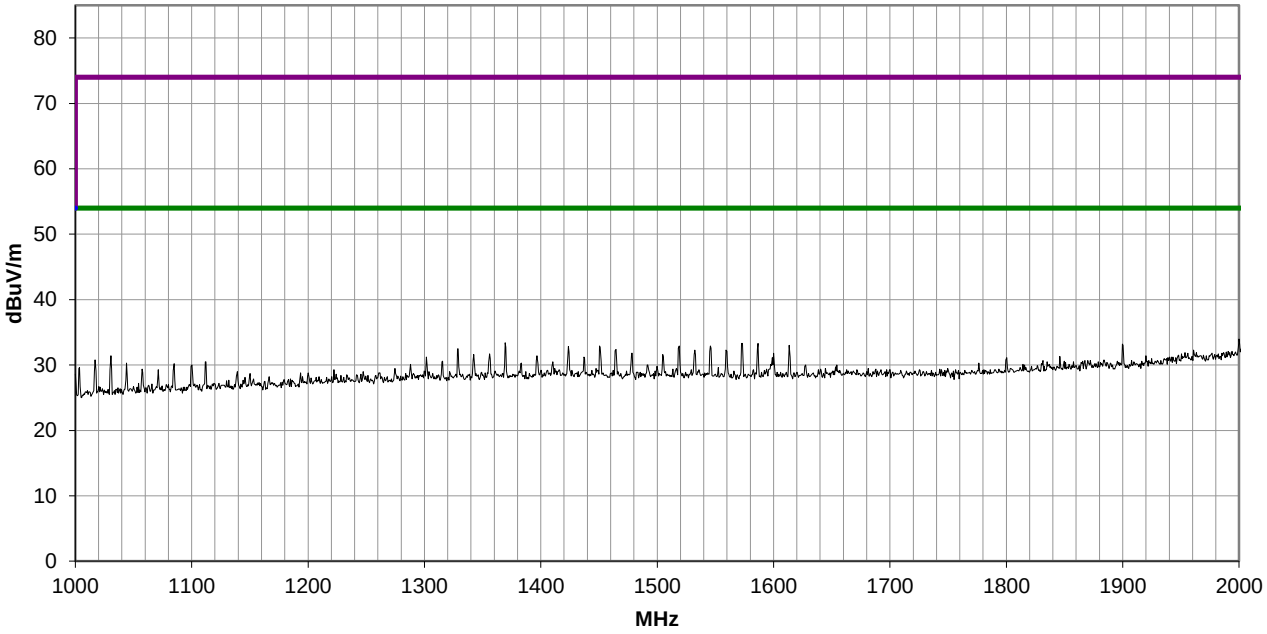
30-1000 MHz, Run 20



FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHz)

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

1000-6000 MHz, Run 3



FREQUENCY STABILITY

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

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
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2023-10-04	2024-10-04
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2023-11-22	2024-11-22
Probe - Near Field Set	EMCO	7405	IPD	NCR	NCR
Thermometer	Omegaette	HH311	DTY	2024-04-09	2025-04-09
Chamber - Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPH-8-1-1-H/AC	TBI	NCR	NCR

FREQUENCY STABILITY

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-09-24
Customer:	Seitz and Associates, Inc.	Temperature:	23°C
Attendees:	None	Relative Humidity:	47.3%
Customer Project:	None	Bar. Pressure (PMSL):	1010 mbar
Tested By:	Jeff Alcoke	Job Site:	EV06
Power:	5VDC, 12VDC, 24VDC	Configuration:	SEIT0121-2

TEST SPECIFICATIONS

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

COMMENTS

The EUT would cease to transmit when the 5 VDC regulator was reduced below 4.6 VDC, therefor the 5VDC regulator was varied between the range of 4.6 - 5.75 VDC. The other voltage regulators were varied the full range of +/- 15% of nominal voltage.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

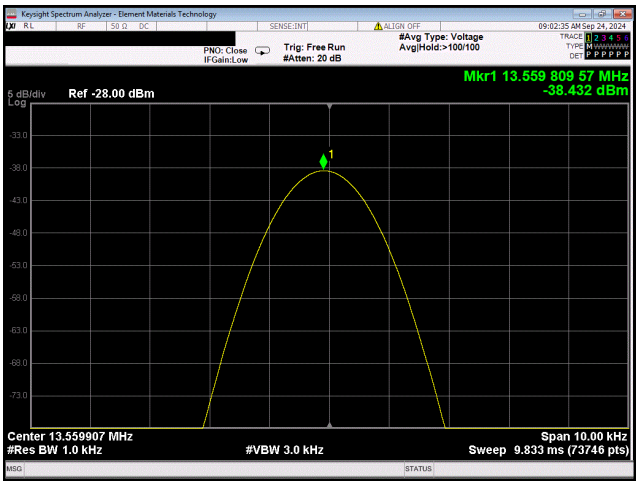
Tested By

TEST RESULTS

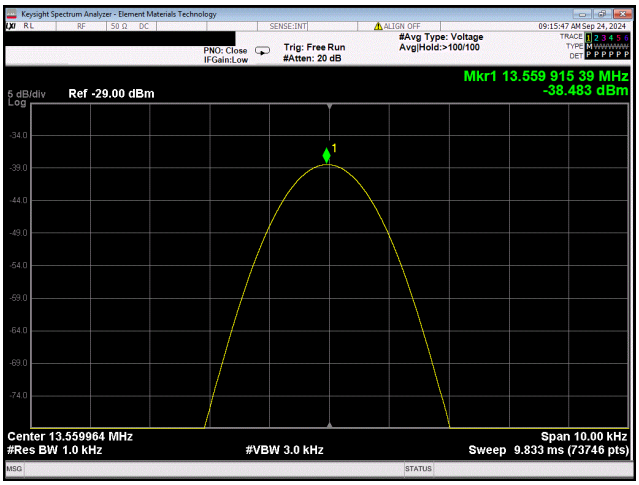
	Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
CW 13.56 MHz					
Normal Conditions	13.55980957	13.55980957	0	100	Pass
Extreme Voltage 115%	13.55991539	13.55980957	7.8	100	Pass
Extreme Voltage 85%	13.55983033	13.55980957	1.53	100	Pass
Extreme Temperature +50°C	13.55980408	13.55980957	0.4	100	Pass
Extreme Temperature +40°C	13.55984872	13.55980957	2.89	100	Pass
Extreme Temperature +30°C	13.55990706	13.55980957	7.19	100	Pass
Extreme Temperature +20°C	13.55995414	13.55980957	10.66	100	Pass
Extreme Temperature +10°C	13.55997851	13.55980957	12.46	100	Pass
Extreme Temperature +0°C	13.56000605	13.55980957	14.49	100	Pass
Extreme Temperature -10°C	13.560005	13.55980957	14.41	100	Pass
Extreme Temperature -20°C	13.55999052	13.55980957	13.34	100	Pass

FREQUENCY STABILITY

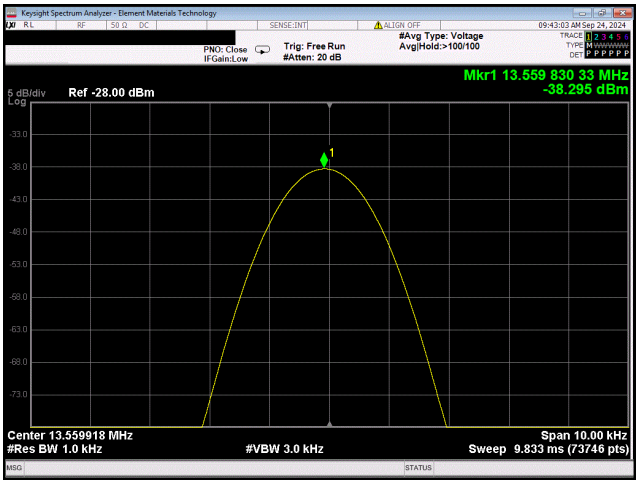
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



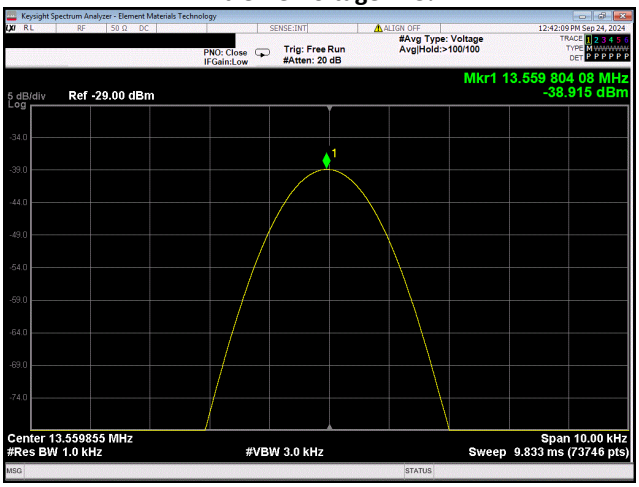
CW 13.56 MHz
Normal Conditions



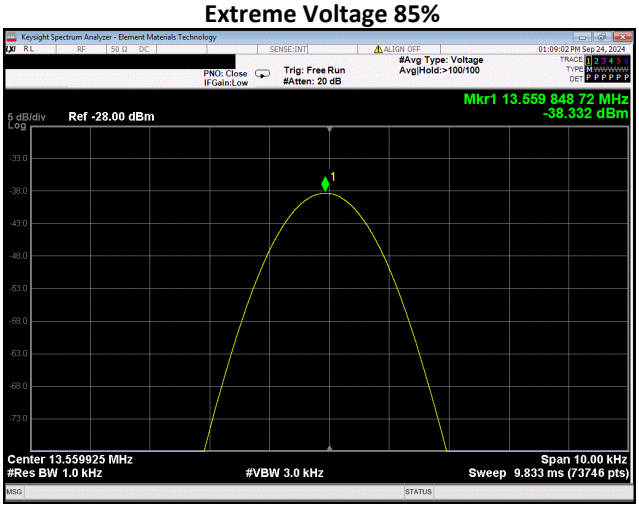
CW 13.56 MHz
Extreme Voltage 115%



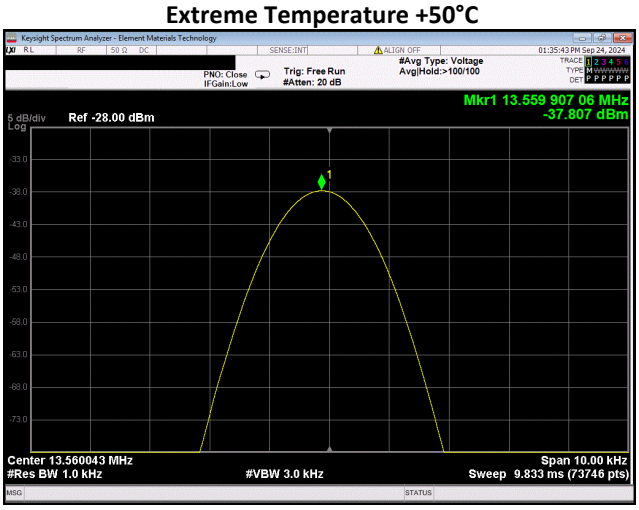
CW 13.56 MHz
Extreme Voltage 85%



CW 13.56 MHz
Extreme Temperature +50°C



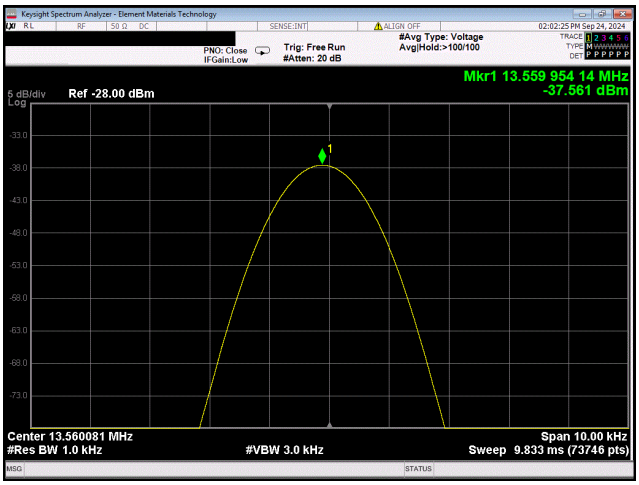
CW 13.56 MHz
Extreme Temperature +40°C



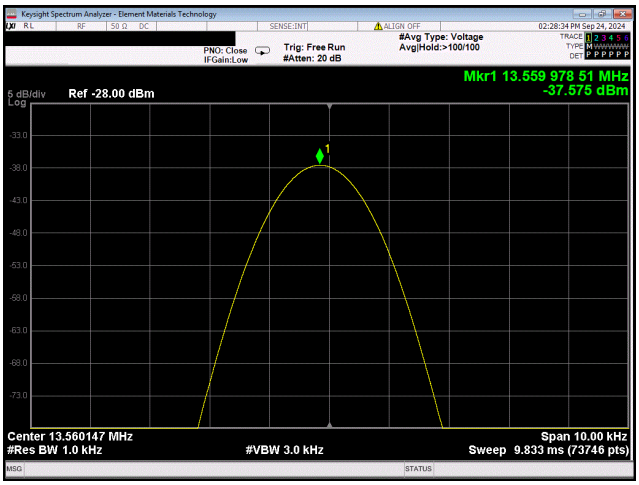
CW 13.56 MHz
Extreme Temperature +30°C

FREQUENCY STABILITY

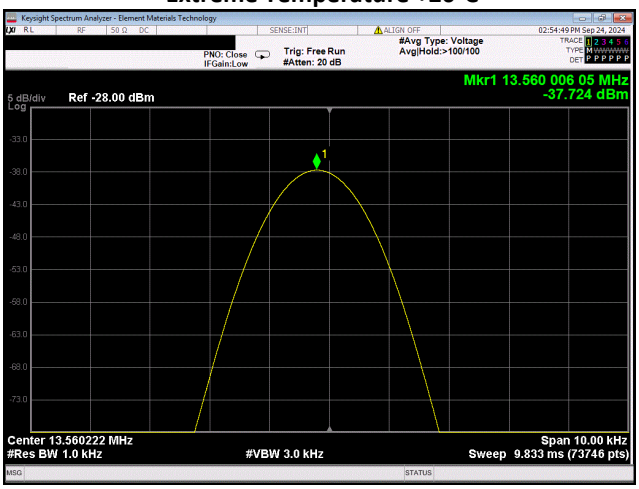
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



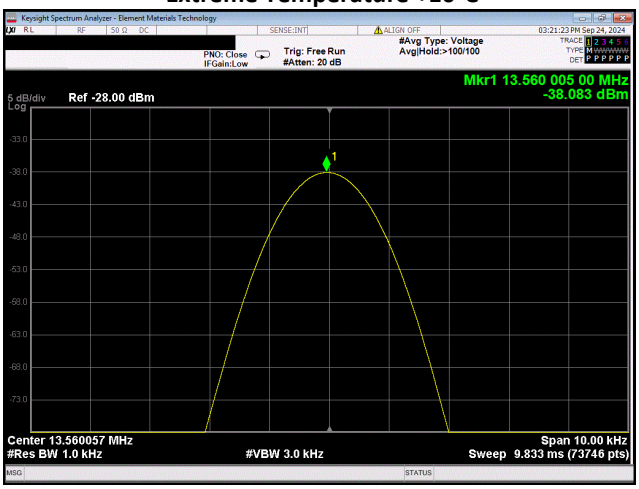
CW 13.56 MHz
Extreme Temperature +20°C



CW 13.56 MHz
Extreme Temperature +10°C



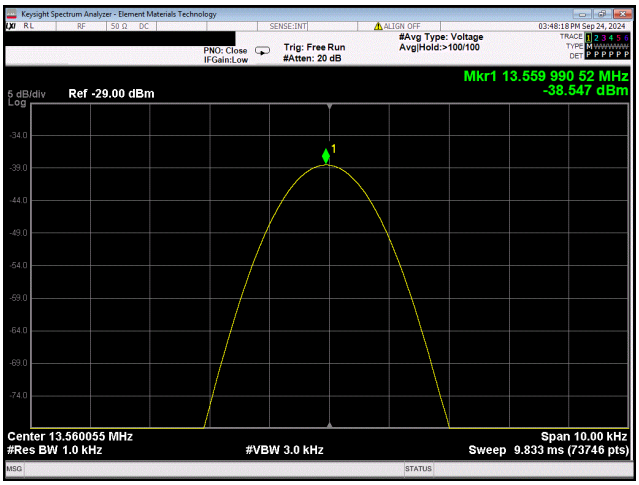
CW 13.56 MHz
Extreme Temperature +0°C



CW 13.56 MHz
Extreme Temperature -10°C

FREQUENCY STABILITY

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



CW 13.56 MHz
Extreme Temperature -20°C

EMISSIONS BANDWIDTH (20 DB)

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

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.

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.

Per ANSI C63.10a:2024, Clause 6.9.2 b) The nominal IF filter bandwidth shall be within 1-5% of the OBW without going below the values in Clause 6.9.1. In this frequency range (9 kHz – 30 MHz) the minimum RBW is 0.1 kHz.

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2023-10-04	2024-10-04
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2023-11-22	2024-11-22
Probe - Near Field Set	EMCO	7405	IPD	NCR	NCR

EMISSIONS BANDWIDTH (20 DB)

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Gen4 RFID	Work Order:	SEIT0121
Serial Number:	00002147	Date:	2024-09-25
Customer:	Seitz and Associates, Inc.	Temperature:	23°C
Attendees:	None	Relative Humidity:	46.7%
Customer Project:	None	Bar. Pressure (PMSL):	1006 mbar
Tested By:	Jeff Alcoke	Job Site:	EV06
Power:	5VDC, 12VDC, 24VDC	Configuration:	SEIT0121-2

TEST SPECIFICATIONS

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

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

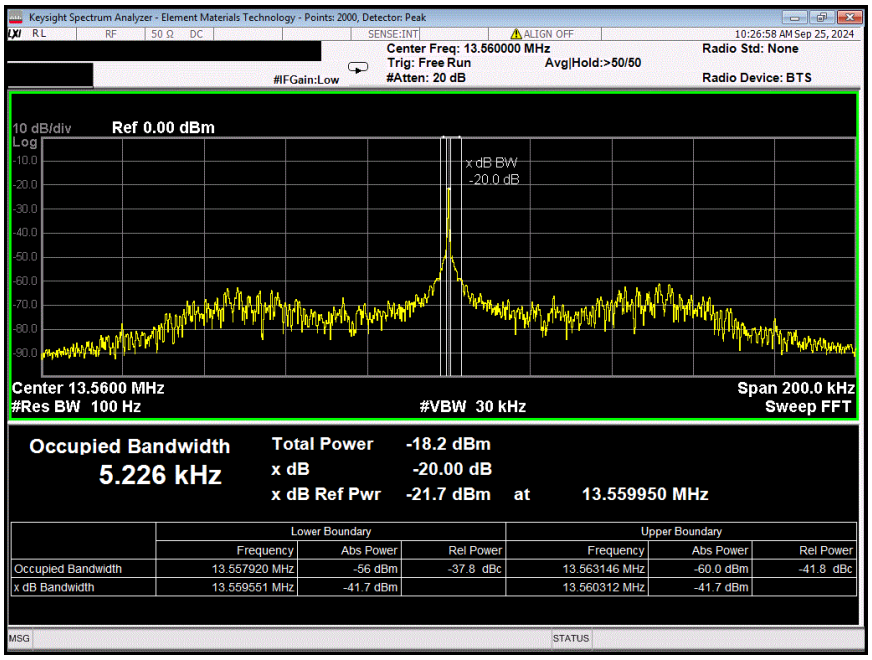
Tested By

TEST RESULTS

	20 dB BW (Hz)	F_low (MHz)	F_high (MHz)	20 dB BW Contained in band (Y/N)	Result
13.56 MHz RFID, ISO 18000-3M3, A27					
Normal Conditions	760.603	13.559551	13.560312	Y	Pass

EMISSIONS BANDWIDTH (20 DB)

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



	Lower Boundary			Upper Boundary		
	Frequency	Abs Power	Rel Power	Frequency	Abs Power	Rel Power
Occupied Bandwidth	13.557920 MHz	-56 dBm	-37.8 dBc	13.563146 MHz	-60.0 dBm	-41.8 dBc
x dB Bandwidth	13.559551 MHz	-41.7 dBm		13.560312 MHz	-41.7 dBm	

13.56 MHz RFID, ISO 18000-3M3, A27
Normal Conditions

End of Test Report