



Fluid Management Technology Pty Ltd

SmartFill Gen 3 OPT

FCC 15.225:2025

13.56 MHz Radio

Report: FDMT0002.1 Rev. 1, Issue Date: May 6, 2025



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CERTIFICATE OF TEST

Last Date of Test: March 18, 2025
Fluid Management Technology Pty Ltd
EUT: SmartFill Gen 3 OPT

Radio Equipment Testing

Standards

Specification	Method
FCC 15.225:2025	ANSI C63.10:2013

Guidance

KDB 174176 v01r01

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:



Johnny Candelas, 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
01	Adjusted Mode Investigated, EUT Operating Modes, and Comments to represent what was used during the final testing	2025-05-06	15, 16, 18, 20, 22, 24, 25, 28, 29, 31, 34, 35, 39, 44
	X-axis updated to have 13.56 MHz as the center frequency with numbers adjusted to have 2 decimal places shown	2025-05-06	25
	Measurements adjusted according to standard - FCC 15.209(d)	2025-05-06	29, 30

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.

FDA - Recognized by the FDA as an Accreditation Scheme for Conformity Assessment (ASCA)-accredited testing laboratory for basic safety and essential performance.

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.

SCOPE

For details on the Scopes of our Accreditations, please visit:

[California](#)

[Minnesota](#)

[Oregon](#)

[Washington](#)

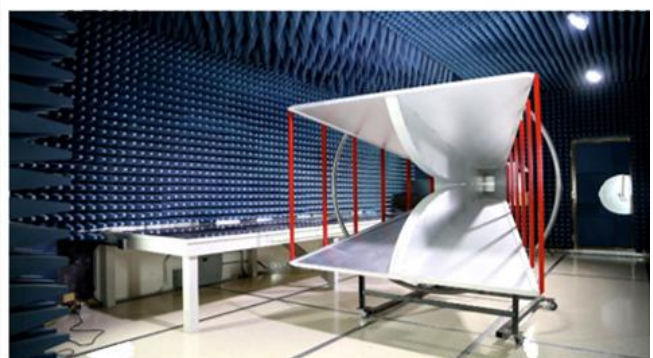
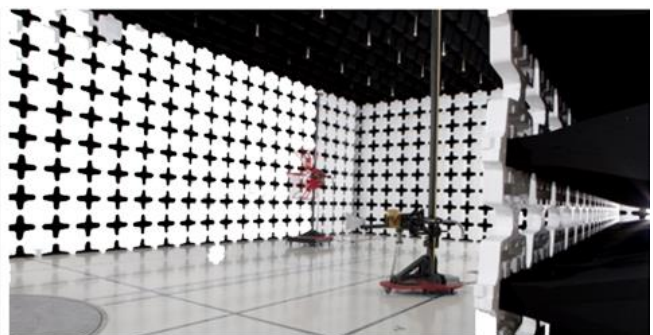
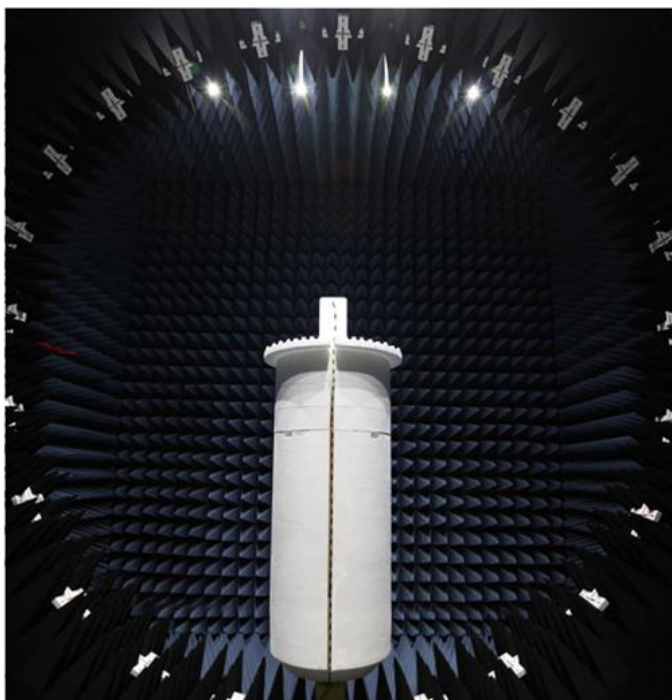
FACILITIES

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
☐	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, MOC, NCC, OFCA
- (7) FDA ASCA No.



MEASUREMENT UNCERTAINTY

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 reported is based on statistical analysis that was performed by the laboratory. 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
Near-field Measurement of E-Field (dB)	1.89
Near-field Measurement of H-Field (dB)	2.65

Field Strength Measurements (dB)

Range	OC07 (+/-)	OC08 (+/-)
10kHz-30MHz	1.8	1.8
30MHz-1GHz 3m	4.7	N/A
30MHz-1GHz 10m	N/A	3.4
1GHz-6GHz	5.1	N/A
6GHz-40GHz	5.1	N/A

AC Powerline Conducted Emissions Measurements (dB)

Range	OC06 (+/-)
9kHz-150kHz LISN	3.6
150kHz-30MHz LISN	3.2
150kHz-30MHz CVP	3
150kHz-30MHz Telecom-ISN	4.4

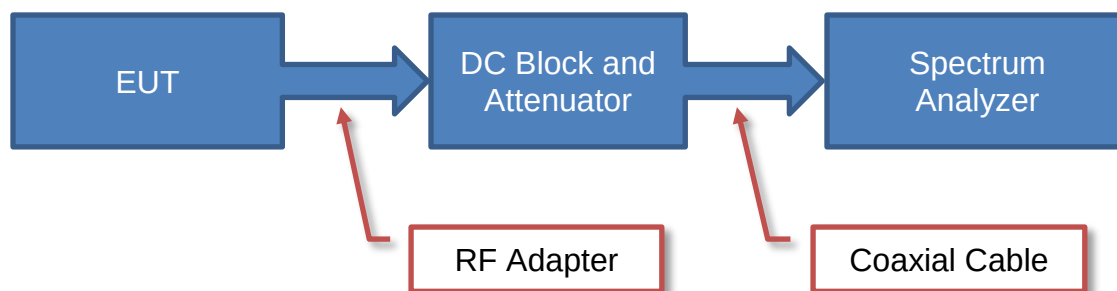
TEST SETUP BLOCK DIAGRAMS

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.

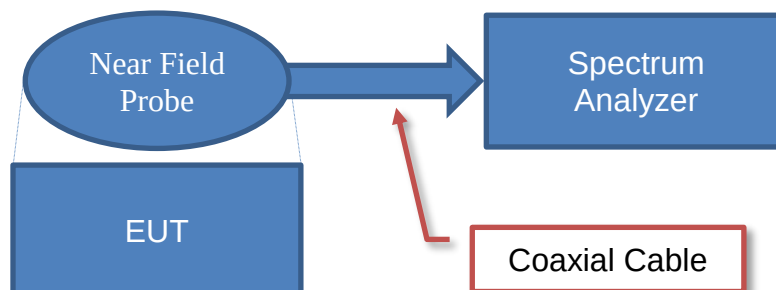
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

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

Near Field Test Fixture Measurements

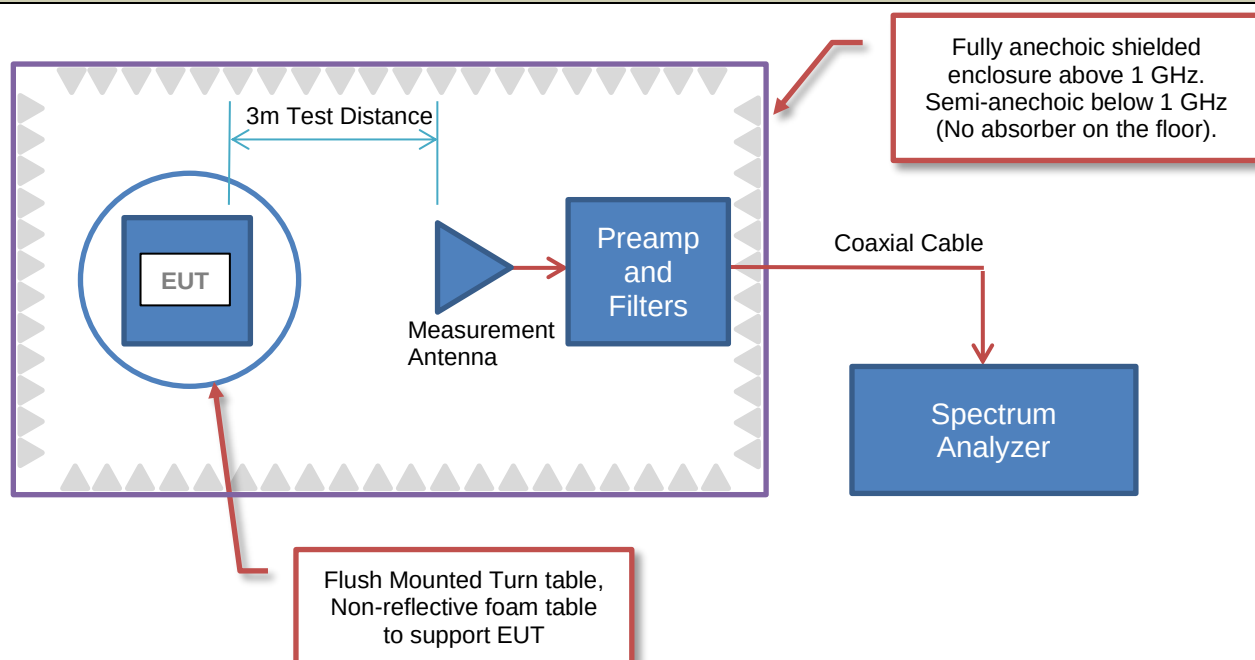


Sample Calculation (logarithmic units)

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			Distance Adjustment Factor	External Attenuation	Field Strength
	Antenna Factor	Cable Factor	Amplifier Gain			
42.6	28.6	3.1	40.8	0.0	0.0	33.5

Conducted Emissions:

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

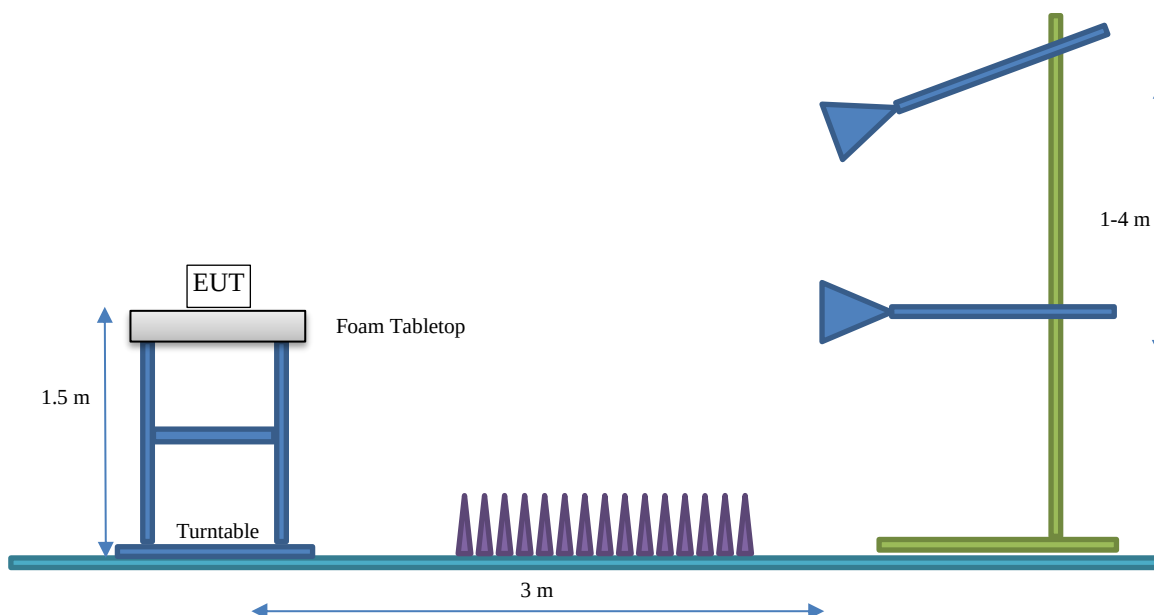
Radiated Power (ERP/EIRP) – Substitution Method:

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:	Fluid Management Technology Pty Ltd
Address:	147 William St
City, State, Zip:	Beverley SA 5009Australia
Test Requested By:	Bob Thomas
EUT:	SmartFill Gen 3 OPT
First Date of Test:	March 11, 2025
Last Date of Test:	March 18, 2025
Receipt Date of Samples:	March 11, 2025
Equipment Design Stage:	Prototype
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
System with NFC, Cellular (Model No: LE910C1-WW XD).
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

Type	Provided by:	Frequency Range (MHz)	Gain (dBi)	Dimensions	RFID Protocol
PCB loop antenna	Customer (Fluid Management Technology)	13.56Mhz	N/A	58 mm x 46 mm	ISO/IEC 14443 Type A

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

- ☐ Test software settings Software / firmware used for testing: See configurations
☒ Rated power settings

SETTINGS FOR ALL TESTS IN THIS REPORT

Modulation Types/ Operating Mode	Power Setting	Radio
Single Data Rate / Modulation	20 dBm	RFID

CONFIGURATIONS

Configuration FDMT0002-1

Software/Firmware Running During Test	
Description	Version
Gen 3 Firmware	3.1.7.2

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
GEN3 OPT	FMT	SF3-OPT-AC	7056

Peripherals in Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
3x Antennas	Signal Plus Technology Co., Ltd.	BI112NJXX085	None

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Cable	No	3 m	No	GEN3 OPT	AC Mains
3x Antenna Cables	Yes	5 m	No	GEN3 OPT	3x Antennas
RFID Module Cable	No	20 cm	Yes	Power Supply	RFID Module

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2025-03-11	Powerline Conducted Emissions	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	2025-03-13	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	2025-03-14	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.
4	2025-03-14	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.
5	2025-03-18	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	2025-03-18	Frequency Stability	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

AC POWERLINE CONDUCTED EMISSIONS

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.

In the event that the operating frequency of 13.56 MHz is causing the product to fail 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	ARO	2024-05-07	2025-05-07
Power Supply	Pacific Power	3120AFX-2L	SMT	NCR	NCR
LISN	Solar Electronics	9252-50-24-BNC	LIA	2024-09-12	2025-09-12
Cable - Conducted Cable Assembly	Northwest EMC	OCP, HFP, AWC	OCPA	2025-03-04	2026-03-04

CONFIGURATIONS INVESTIGATED

FDMT0002-1

MODES INVESTIGATED

Transmitting 13.56MHz, Modulated, Display shows "Press 1 to Purchase Fuel, 2 to Print Receipt"

AC POWERLINE CONDUCTED EMISSIONS



EUT:	SmartFill Gen 3 OPT	Work Order:	FDMT0002
Serial Number:	7056	Date:	2025-03-11
Customer:	Fluid Management Technology Pty Ltd	Temperature:	20.6°C
Attendees:	None	Relative Humidity:	48.6%
Customer Project:	None	Bar. Pressure (PMSL):	1009 mb
Tested By:	Matthew Ng	Job Site:	OC06
Power:	110VAC/60Hz	Configuration:	FDMT0002-1

TEST PARAMETERS

Run #:	46	Line:	High Line	Add. Ext. Attenuation (dB):	0
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COMMENTS

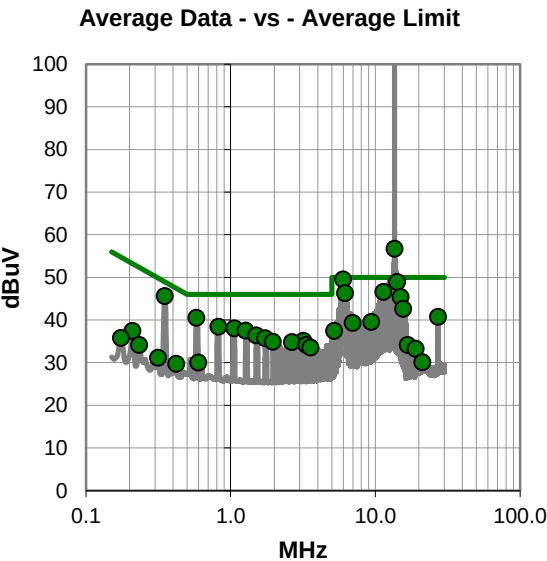
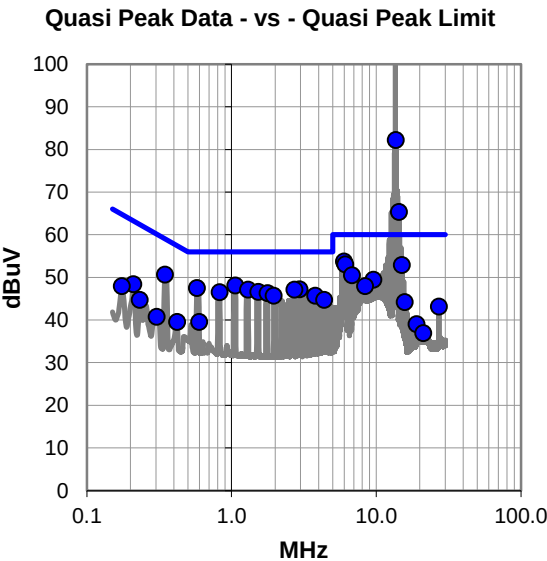
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EUT OPERATING MODES

Transmitting 13.56MHz, Modulated, Display shows "Press 1 to Purchase Fuel, 2 to Print Receipt"

DEVIATIONS FROM TEST STANDARD

None



AC POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #46

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	83.7	21.0	104.7	60.0	44.7
13.640	61.2	21.0	82.2	60.0	22.2
14.407	44.2	21.1	65.3	60.0	5.3
5.991	33.2	20.5	53.7	60.0	-6.3
6.107	32.5	20.5	53.0	60.0	-7.0
15.043	31.8	21.1	52.9	60.0	-7.1
1.064	27.9	20.2	48.1	56.0	-7.9
0.347	30.4	20.2	50.6	59.0	-8.4
0.577	27.4	20.1	47.5	56.0	-8.5
2.957	26.8	20.4	47.2	56.0	-8.8
1.300	26.9	20.2	47.1	56.0	-8.9
2.721	26.7	20.4	47.1	56.0	-8.9
1.537	26.4	20.2	46.6	56.0	-9.4
6.798	29.9	20.6	50.5	60.0	-9.5
0.827	26.3	20.2	46.5	56.0	-9.5
1.775	26.1	20.2	46.3	56.0	-9.7
3.800	25.2	20.5	45.7	56.0	-10.3
1.960	25.4	20.3	45.7	56.0	-10.3
9.584	28.6	20.8	49.4	60.0	-10.6
4.376	24.2	20.5	44.7	56.0	-11.3
8.395	27.2	20.7	47.9	60.0	-12.1
0.210	28.3	20.1	48.4	63.2	-14.8
15.788	23.0	21.2	44.2	60.0	-15.8
0.597	19.4	20.1	39.5	56.0	-16.5
0.174	27.7	20.2	47.9	64.7	-16.8

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	83.6	21.0	104.6	50.0	54.6
13.579	35.7	21.0	56.7	50.0	6.7
5.991	29.0	20.5	49.5	50.0	-0.5
14.190	27.9	21.0	48.9	50.0	-1.1
0.350	25.4	20.2	45.6	49.0	-3.4
11.394	25.6	21.0	46.6	50.0	-3.4
6.192	25.8	20.5	46.3	50.0	-3.7
14.976	24.3	21.1	45.4	50.0	-4.6
0.580	20.4	20.1	40.5	46.0	-5.5
15.591	21.4	21.2	42.6	50.0	-7.4
0.824	18.2	20.2	38.4	46.0	-7.6
1.061	17.8	20.2	38.0	46.0	-8.0
1.270	17.3	20.2	37.5	46.0	-8.5
27.120	18.3	22.4	40.7	50.0	-9.3
1.500	16.2	20.2	36.4	46.0	-9.6
1.731	15.5	20.2	35.7	46.0	-10.3
9.390	18.7	20.8	39.5	50.0	-10.5
6.989	18.7	20.6	39.3	50.0	-10.7
3.194	14.7	20.4	35.1	46.0	-10.9
1.961	14.6	20.3	34.9	46.0	-11.1
2.652	14.4	20.4	34.8	46.0	-11.2
3.344	13.7	20.4	34.1	46.0	-11.9
3.572	13.1	20.4	33.5	46.0	-12.5
5.194	16.9	20.5	37.4	50.0	-12.6
0.210	17.3	20.1	37.4	53.2	-15.8

CONCLUSION

Evaluation



Tested By

AC POWERLINE CONDUCTED EMISSIONS

EUT:	SmartFill Gen 3 OPT	Work Order:	FDMT0002
Serial Number:	7056	Date:	2025-03-11
Customer:	Fluid Management Technology Pty Ltd	Temperature:	20.6°C
Attendees:	None	Relative Humidity:	48.6%
Customer Project:	None	Bar. Pressure (PMSL):	1009 mb
Tested By:	Matthew Ng	Job Site:	OC06
Power:	110VAC/60Hz	Configuration:	FDMT0002-1

TEST PARAMETERS

Run #:	47	Line:	Neutral	Add. Ext. Attenuation (dB):	0
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COMMENTS

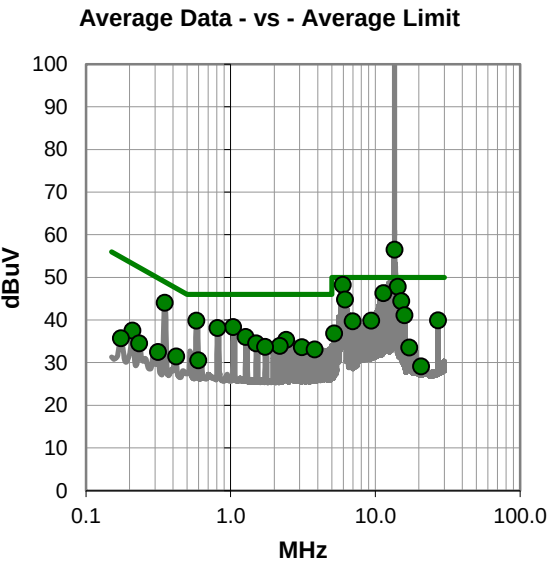
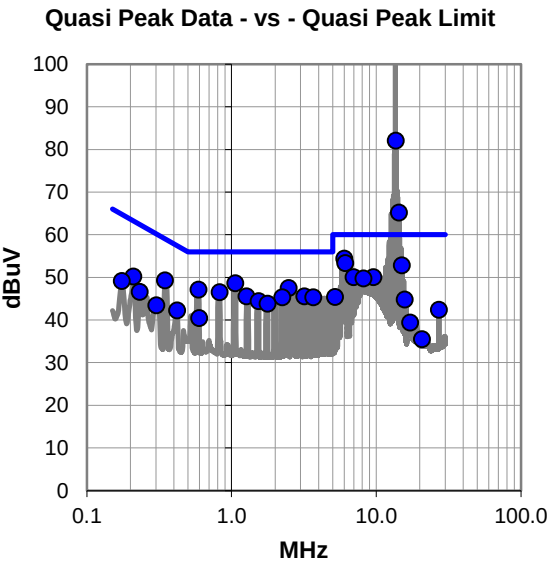
None

EUT OPERATING MODES

Transmitting 13.56MHz, Modulated, Display shows "Press 1 to Purchase Fuel, 2 to Print Receipt"

DEVIATIONS FROM TEST STANDARD

None



AC POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #47

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	83.5	21.0	104.5	60.0	44.5
13.638	61.0	21.0	82.0	60.0	22.0
14.409	44.1	21.1	65.2	60.0	5.2
6.038	33.9	20.5	54.4	60.0	-5.6
6.110	32.8	20.5	53.3	60.0	-6.7
15.043	31.7	21.1	52.8	60.0	-7.2
1.065	28.4	20.2	48.6	56.0	-7.4
2.486	27.1	20.4	47.5	56.0	-8.5
0.591	27.0	20.1	47.1	56.0	-8.9
0.829	26.3	20.2	46.5	56.0	-9.5
0.347	29.1	20.2	49.3	59.0	-9.7
6.981	29.4	20.6	50.0	60.0	-10.0
9.572	29.2	20.8	50.0	60.0	-10.0
8.170	29.0	20.7	49.7	60.0	-10.3
3.196	25.1	20.4	45.5	56.0	-10.5
1.268	25.3	20.2	45.5	56.0	-10.5
2.250	24.9	20.4	45.3	56.0	-10.7
3.670	24.8	20.5	45.3	56.0	-10.7
1.538	24.2	20.2	44.4	56.0	-11.6
1.775	23.6	20.2	43.8	56.0	-12.2
0.210	30.1	20.1	50.2	63.2	-13.0
5.187	24.9	20.5	45.4	60.0	-14.6
15.756	23.6	21.2	44.8	60.0	-15.2
0.420	22.1	20.1	42.2	57.4	-15.2
0.174	28.9	20.2	49.1	64.7	-15.6

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	83.4	21.0	104.4	50.0	54.4
13.579	35.5	21.0	56.5	50.0	6.5
5.980	27.7	20.5	48.2	50.0	-1.8
14.349	26.8	21.0	47.8	50.0	-2.2
11.363	25.3	21.0	46.3	50.0	-3.7
0.350	23.8	20.2	44.0	49.0	-5.0
6.178	24.3	20.5	44.8	50.0	-5.2
15.146	23.2	21.2	44.4	50.0	-5.6
0.580	19.7	20.1	39.8	46.0	-6.2
1.041	18.1	20.2	38.3	46.0	-7.7
0.811	17.9	20.2	38.1	46.0	-7.9
15.950	19.9	21.2	41.1	50.0	-8.9
1.271	15.8	20.2	36.0	46.0	-10.0
27.122	17.5	22.4	39.9	50.0	-10.1
9.364	19.1	20.7	39.8	50.0	-10.2
6.981	19.1	20.6	39.7	50.0	-10.3
2.422	14.9	20.4	35.3	46.0	-10.7
1.502	14.3	20.2	34.5	46.0	-11.5
2.193	13.6	20.3	33.9	46.0	-12.1
1.732	13.5	20.2	33.7	46.0	-12.3
3.116	13.2	20.4	33.6	46.0	-12.4
3.807	12.6	20.5	33.1	46.0	-12.9
5.187	16.3	20.5	36.8	50.0	-13.2
0.597	10.4	20.1	30.5	46.0	-15.5
0.210	17.4	20.1	37.5	53.2	-15.7

CONCLUSION

Evaluation



Tested By

AC POWERLINE CONDUCTED EMISSIONS

EUT:	SmartFill Gen 3 OPT	Work Order:	FDMT0002
Serial Number:	7056	Date:	2025-03-11
Customer:	Fluid Management Technology Pty Ltd	Temperature:	20.6°C
Attendees:	None	Relative Humidity:	48.6%
Customer Project:	None	Bar. Pressure (PMSL):	1009 mb
Tested By:	Matthew Ng	Job Site:	OC06
Power:	110VAC/60Hz	Configuration:	FDMT0002-1

TEST PARAMETERS

Run #:	42	Line:	High Line	Add. Ext. Attenuation (dB):	0
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COMMENTS

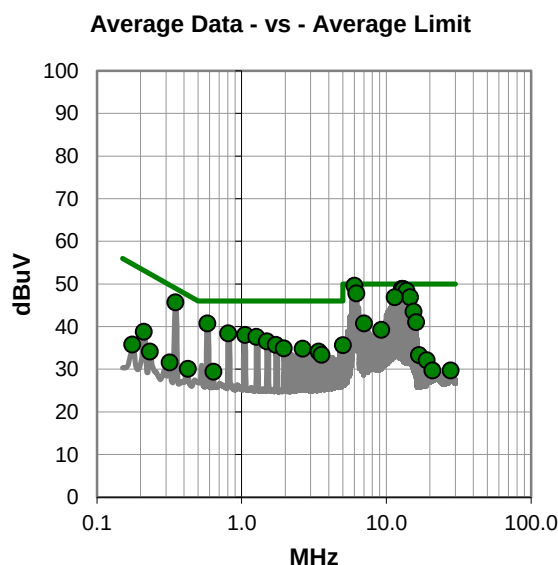
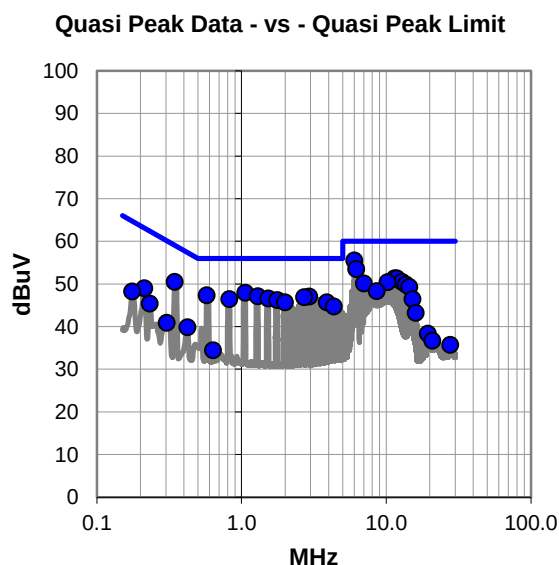
None

EUT OPERATING MODES

Transmitting 13.56MHz, Modulated, on radio board with 50 Ohm terminated antenna, Display shows "Press 1 to Purchase Fuel, 2 to Print Receipt"

DEVIATIONS FROM TEST STANDARD

None



AC POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #42

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
6.014	35.0	20.5	55.5	60.0	-4.5
6.221	33.0	20.5	53.5	60.0	-6.5
1.061	27.7	20.2	47.9	56.0	-8.1
0.345	30.3	20.2	50.5	59.1	-8.6
11.429	30.3	21.0	51.3	60.0	-8.7
11.835	30.3	21.0	51.3	60.0	-8.7
0.576	27.2	20.1	47.3	56.0	-8.7
1.296	26.9	20.2	47.1	56.0	-8.9
2.947	26.6	20.4	47.0	56.0	-9.0
2.710	26.5	20.4	46.9	56.0	-9.1
1.532	26.4	20.2	46.6	56.0	-9.4
12.840	29.5	21.0	50.5	60.0	-9.5
10.231	29.6	20.8	50.4	60.0	-9.6
0.824	26.2	20.2	46.4	56.0	-9.6
1.767	26.0	20.2	46.2	56.0	-9.8
7.016	29.5	20.6	50.1	60.0	-9.9
13.638	28.9	21.0	49.9	60.0	-10.1
3.890	25.2	20.5	45.7	56.0	-10.3
1.993	25.4	20.3	45.7	56.0	-10.3
14.444	28.2	21.1	49.3	60.0	-10.7
4.360	24.2	20.5	44.7	56.0	-11.3
8.623	27.6	20.7	48.3	60.0	-11.7
15.248	25.2	21.2	46.4	60.0	-13.6
0.213	28.9	20.1	49.0	63.1	-14.1
0.176	28.0	20.2	48.2	64.7	-16.5

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
6.014	29.1	20.5	49.6	50.0	-0.4
12.837	27.8	21.0	48.8	50.0	-1.2
12.840	27.8	21.0	48.8	50.0	-1.2
13.038	27.8	21.0	48.8	50.0	-1.2
13.042	27.7	21.0	48.7	50.0	-1.3
13.843	27.4	21.0	48.4	50.0	-1.6
6.218	27.3	20.5	47.8	50.0	-2.2
14.641	25.8	21.1	46.9	50.0	-3.1
11.429	25.9	21.0	46.9	50.0	-3.1
0.348	25.5	20.2	45.7	49.0	-3.3
0.579	20.6	20.1	40.7	46.0	-5.3
15.442	22.3	21.2	43.5	50.0	-6.5
0.808	18.2	20.2	38.4	46.0	-7.6
1.058	17.8	20.2	38.0	46.0	-8.0
1.267	17.4	20.2	37.6	46.0	-8.4
16.053	19.8	21.2	41.0	50.0	-9.0
7.019	20.1	20.6	40.7	50.0	-9.3
1.497	16.3	20.2	36.5	46.0	-9.5
1.726	15.5	20.2	35.7	46.0	-10.3
9.225	18.5	20.7	39.2	50.0	-10.8
1.957	14.6	20.3	34.9	46.0	-11.1
2.646	14.4	20.4	34.8	46.0	-11.2
3.415	13.7	20.4	34.1	46.0	-11.9
3.568	13.0	20.4	33.4	46.0	-12.6
0.211	18.7	20.1	38.8	53.2	-14.4

CONCLUSION

Pass



Tested By

AC POWERLINE CONDUCTED EMISSIONS

EUT:	SmartFill Gen 3 OPT	Work Order:	FDMT0002
Serial Number:	7056	Date:	2025-03-11
Customer:	Fluid Management Technology Pty Ltd	Temperature:	20.6°C
Attendees:	None	Relative Humidity:	48.6%
Customer Project:	None	Bar. Pressure (PMSL):	1009 mb
Tested By:	Matthew Ng	Job Site:	OC06
Power:	110VAC/60Hz	Configuration:	FDMT0002-1

TEST PARAMETERS

Run #:	43	Line:	Neutral	Add. Ext. Attenuation (dB):	0
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COMMENTS

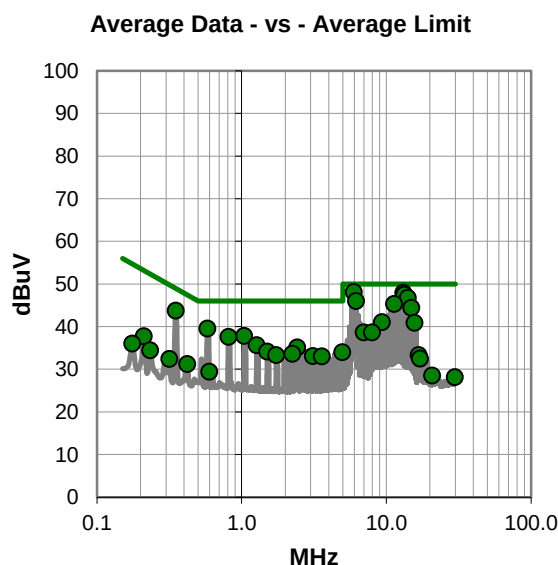
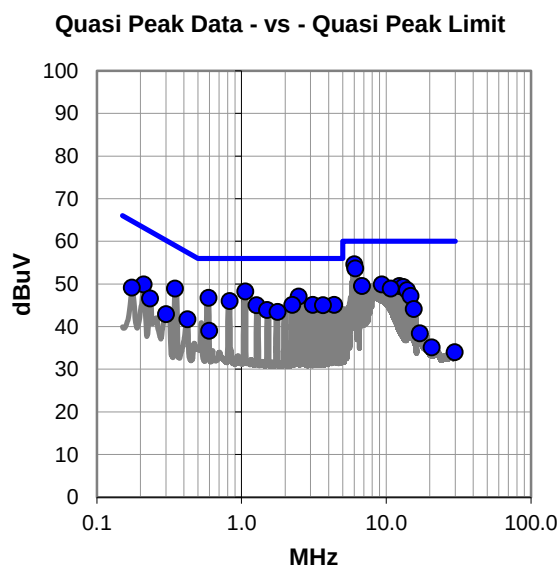
None

EUT OPERATING MODES

Transmitting 13.56MHz, Modulated, on radio board with 50 Ohm terminated antenna, Display shows "Press 1 to Purchase Fuel, 2 to Print Receipt"

DEVIATIONS FROM TEST STANDARD

None



AC POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #43

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
6.037	34.1	20.5	54.6	60.0	-5.4
6.114	33.1	20.5	53.6	60.0	-6.4
1.065	28.0	20.2	48.2	56.0	-7.8
2.484	26.6	20.4	47.0	56.0	-9.0
0.591	26.6	20.1	46.7	56.0	-9.3
0.827	25.8	20.2	46.0	56.0	-10.0
0.347	28.7	20.2	48.9	59.0	-10.1
9.351	29.2	20.7	49.9	60.0	-10.1
6.806	28.9	20.6	49.5	60.0	-10.5
12.341	28.5	21.0	49.5	60.0	-10.5
13.135	28.3	21.0	49.3	60.0	-10.7
3.115	24.7	20.4	45.1	56.0	-10.9
4.378	24.6	20.5	45.1	56.0	-10.9
2.248	24.7	20.4	45.1	56.0	-10.9
1.268	24.8	20.2	45.0	56.0	-11.0
3.667	24.5	20.5	45.0	56.0	-11.0
10.747	28.1	20.8	48.9	60.0	-11.1
13.934	27.5	21.0	48.5	60.0	-11.5
1.500	23.7	20.2	43.9	56.0	-12.1
1.773	23.2	20.2	43.4	56.0	-12.6
14.724	26.1	21.1	47.2	60.0	-12.8
0.211	29.8	20.1	49.9	63.2	-13.3
0.174	28.9	20.2	49.1	64.7	-15.6
0.234	26.5	20.1	46.6	62.3	-15.7
0.423	21.6	20.1	41.7	57.4	-15.7

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
5.971	27.6	20.5	48.1	50.0	-1.9
13.138	26.9	21.0	47.9	50.0	-2.1
13.333	26.5	21.0	47.5	50.0	-2.5
14.129	25.7	21.0	46.7	50.0	-3.3
6.169	25.5	20.5	46.0	50.0	-4.0
11.342	24.4	20.9	45.3	50.0	-4.7
0.350	23.5	20.2	43.7	49.0	-5.3
14.926	23.3	21.1	44.4	50.0	-5.6
0.580	19.4	20.1	39.5	46.0	-6.5
1.041	17.6	20.2	37.8	46.0	-8.2
0.811	17.4	20.2	37.6	46.0	-8.4
9.351	20.3	20.7	41.0	50.0	-9.0
15.721	19.7	21.2	40.9	50.0	-9.1
1.271	15.4	20.2	35.6	46.0	-10.4
2.425	14.7	20.4	35.1	46.0	-10.9
6.967	18.0	20.6	38.6	50.0	-11.4
7.962	17.9	20.7	38.6	50.0	-11.4
1.502	13.9	20.2	34.1	46.0	-11.9
4.975	13.5	20.5	34.0	46.0	-12.0
2.246	13.3	20.3	33.6	46.0	-12.4
1.734	13.1	20.2	33.3	46.0	-12.7
3.116	12.7	20.4	33.1	46.0	-12.9
3.578	12.6	20.4	33.0	46.0	-13.0
0.211	17.6	20.1	37.7	53.2	-15.5
0.422	11.1	20.1	31.2	47.4	-16.2

CONCLUSION

Pass



Tested By

FIELD STRENGTH OF FUNDAMENTAL



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
Antenna - Loop	EMCO	6502	AZB	2023-09-06	2025-09-06
Receiver	Rohde & Schwarz	ESCI	ARG	2024-09-19	2025-09-19
Cable	Northwest EMC	3kHz - 1GHz RE Cables	OCB	2024-05-15	2025-05-15

FREQUENCY RANGE INVESTIGATED

12.56 MHz TO 14.56 MHz

POWER INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

FDMT0002-1

MODES INVESTIGATED

Transmitting 13.56MHz, Modulated, Display shows "Press 1 to Purchase Fuel, 2 to Print Receipt"

FIELD STRENGTH OF FUNDAMENTAL



EUT:	SmartFill Gen 3 OPT	Work Order:	FDMT0002
Serial Number:	7056	Date:	2025-03-13
Customer:	Fluid Management Technology Pty Ltd	Temperature:	21.7°C
Attendees:	None	Relative Humidity:	47.6%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mb
Tested By:	Matthew Ng	Job Site:	OC08
Power:	110VAC/60Hz	Configuration:	FDMT0002-1

TEST PARAMETERS

Run #:	3	Test Distance (m):	10	Ant. Height(s) (m):	1(m)
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COMMENTS

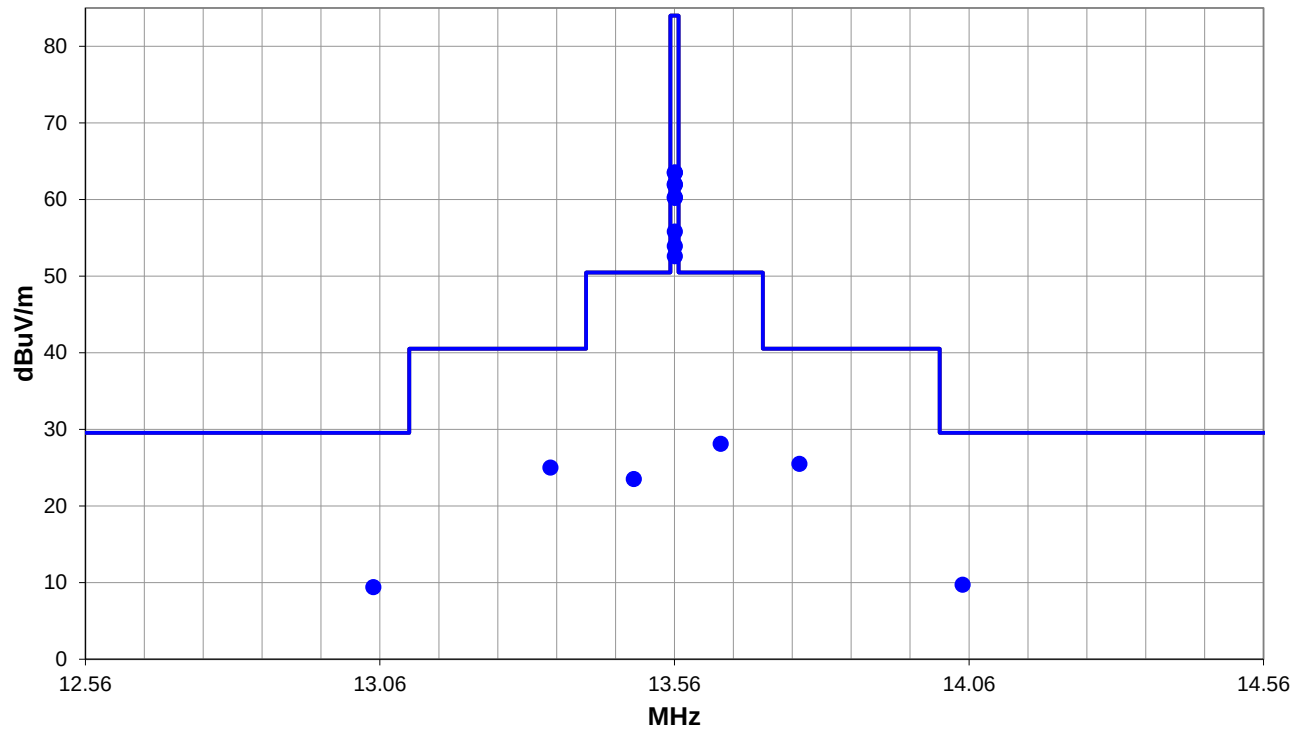
None

EUT OPERATING MODES

Transmitting 13.56MHz, Modulated, Display shows "Press 1 to Purchase Fuel, 2 to Print Receipt"
--

DEVIATIONS FROM TEST STANDARD

None



Run #: 3

PK AV QP

FIELD STRENGTH OF FUNDAMENTAL

RESULTS - Run #3

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
13.772	44.6	0.0	1.0	109.0	10.0	0.0	Perp to EUT	QP	-19.1	25.5	40.5	-15.0	Tx 13.56 Mhz, EUT Vert
13.350	44.1	0.0	1.0	109.0	10.0	0.0	Perp to EUT	QP	-19.1	25.0	40.5	-15.5	Tx 13.56 Mhz, EUT Vert
14.049	28.8	0.0	1.0	109.0	10.0	0.0	Perp to EUT	QP	-19.1	9.7	29.5	-19.8	Tx 13.56 Mhz, EUT Vert
13.049	28.5	0.0	1.0	109.0	10.0	0.0	Perp to EUT	QP	-19.1	9.4	29.5	-20.1	Tx 13.56 Mhz, EUT Vert
13.561	70.9	11.7	1.0	109.0	10.0	0.0	Perp to EUT	QP	-19.1	63.5	84.0	-20.5	Tx 13.56 Mhz, EUT Vert
13.561	70.9	11.7	1.0	109.0	10.0	0.0	Par to GND	QP	-19.1	63.5	84.0	-20.5	Tx 13.56 Mhz, EUT Vert
13.561	69.4	11.7	1.0	151.0	10.0	0.0	Par to GND	QP	-19.1	62.0	84.0	-22.0	Tx 13.56 Mhz, EUT Horz
13.561	69.3	11.7	1.0	159.0	10.0	0.0	Perp to EUT	QP	-19.1	61.9	84.0	-22.1	Tx 13.56 Mhz, EUT Horz
13.638	47.2	0.0	1.0	109.0	10.0	0.0	Perp to EUT	QP	-19.1	28.1	50.5	-22.4	Tx 13.56 Mhz, EUT Vert
13.561	67.7	11.7	1.0	109.0	10.0	0.0	Par to GND	QP	-19.1	60.3	84.0	-23.7	Tx 13.56 Mhz, EUT on Side
13.561	67.6	11.7	1.0	360.0	10.0	0.0	Perp to EUT	QP	-19.1	60.2	84.0	-23.8	Tx 13.56 Mhz, EUT on Side
13.491	42.6	0.0	1.0	109.0	10.0	0.0	Perp to EUT	QP	-19.1	23.5	50.5	-27.0	Tx 13.56 Mhz, EUT Vert
13.561	63.2	11.7	1.0	193.0	10.0	0.0	Par to EUT	QP	-19.1	55.8	84.0	-28.2	Tx 13.56 Mhz, EUT Vert
13.561	61.3	11.7	1.0	207.0	10.0	0.0	Par to EUT	QP	-19.1	53.9	84.0	-30.1	Tx 13.56 Mhz, EUT Horz
13.561	60.0	11.7	1.0	215.0	10.0	0.0	Par to EUT	QP	-19.1	52.6	84.0	-31.4	Tx 13.56 Mhz, EUT on Side

CONCLUSION

Pass

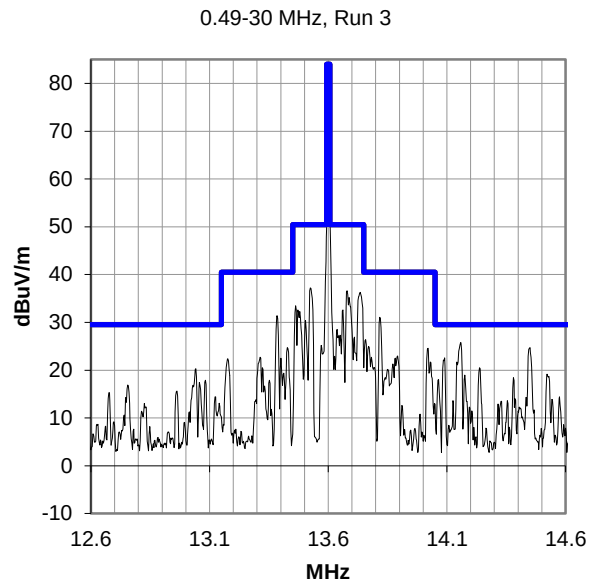


Tested By

FIELD STRENGTH OF FUNDAMENTAL

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 30 MHZ)

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
Receiver	Rohde & Schwarz	ESCI	ARG	2024-09-19	2025-09-19
Antenna - Loop	EMCO	6502	AZB	2023-09-06	2025-09-06
Cable	Northwest EMC	3kHz - 1GHz RE Cables	OCB	2024-05-15	2025-05-15

FREQUENCY RANGE INVESTIGATED

9 kHz TO 30 MHz

POWER INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

FDMT0002-1

MODES INVESTIGATED

Transmitting 13.56MHz, Modulated, Display shows "Press 1 to Purchase Fuel, 2 to Print Receipt"

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHz)



EUT:	SmartFill Gen 3 OPT	Work Order:	FDMT0002
Serial Number:	7056	Date:	2025-03-14
Customer:	Fluid Management Technology Pty Ltd	Temperature:	20.5°C
Attendees:	None	Relative Humidity:	42.4%
Customer Project:	None	Bar. Pressure (PMSL):	1018 mb
Tested By:	Matthew Ng	Job Site:	OC08
Power:	110VAC/60Hz	Configuration:	FDMT0002-1

TEST PARAMETERS

Run #:	6	Test Distance (m):	10	Ant. Height(s) (m):	1 to 4(m)
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COMMENTS

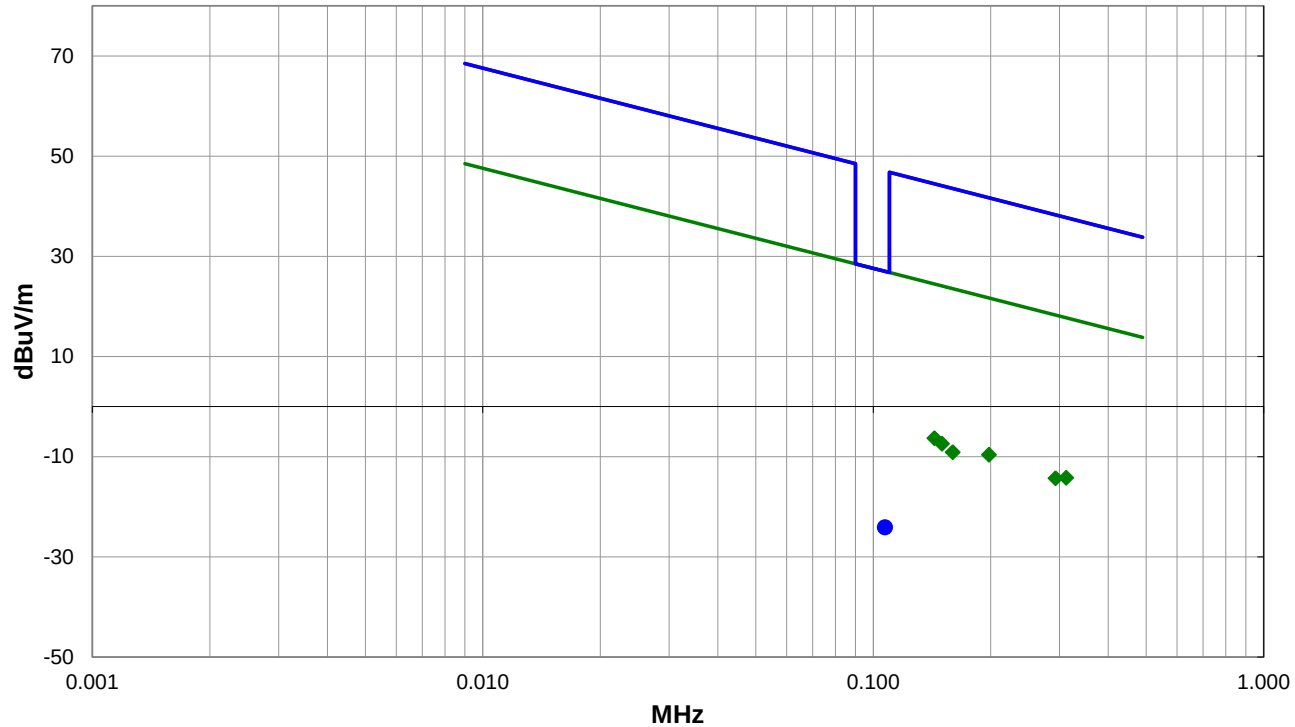
None

EUT OPERATING MODES

Transmitting 13.56MHz, Modulated, Display shows "Press 1 to Purchase Fuel, 2 to Print Receipt"
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DEVIATIONS FROM TEST STANDARD

None



Run #: 6

PK AV QP

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ)

RESULTS - Run #6

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
0.143	42.5	10.3	1.0	122.0	10.0	0.0	Perp to EUT	AV	-59.1	-6.3	24.5	-30.8	Tx 13.56, EUT Vert
0.198	39.1	10.4	2.55	232.0	10.0	0.0	Perp to EUT	AV	-59.1	-9.6	21.7	-31.3	Tx 13.56, EUT Vert
0.150	41.4	10.3	1.0	351.0	10.0	0.0	Perp to EUT	AV	-59.1	-7.4	24.1	-31.5	Tx 13.56, EUT Vert
0.312	34.6	10.3	3.6	50.0	10.0	0.0	Perp to EUT	AV	-59.1	-14.2	17.7	-31.9	Tx 13.56, EUT Vert
0.293	34.5	10.3	1.61	260.0	10.0	0.0	Perp to EUT	AV	-59.1	-14.3	18.3	-32.6	Tx 13.56, EUT Vert
0.160	39.6	10.4	1.0	229.0	10.0	0.0	Perp to EUT	AV	-59.1	-9.1	23.6	-32.7	Tx 13.56, EUT Vert
0.107	24.8	10.2	1.0	122.0	10.0	0.0	Perp to EUT	QP	-59.1	-24.1	27.0	-51.1	Tx 13.56, EUT Vert

CONCLUSION

Pass



Tested By

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHz)



EUT:	SmartFill Gen 3 OPT	Work Order:	FDMT0002
Serial Number:	7056	Date:	2025-03-14
Customer:	Fluid Management Technology Pty Ltd	Temperature:	20.5°C
Attendees:	None	Relative Humidity:	42.4%
Customer Project:	None	Bar. Pressure (PMSL):	1018 mb
Tested By:	Matthew Ng	Job Site:	OC08
Power:	110VAC/60Hz	Configuration:	FDMT0002-1

TEST PARAMETERS

Run #:	5	Test Distance (m):	10	Ant. Height(s) (m):	1(m)
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COMMENTS

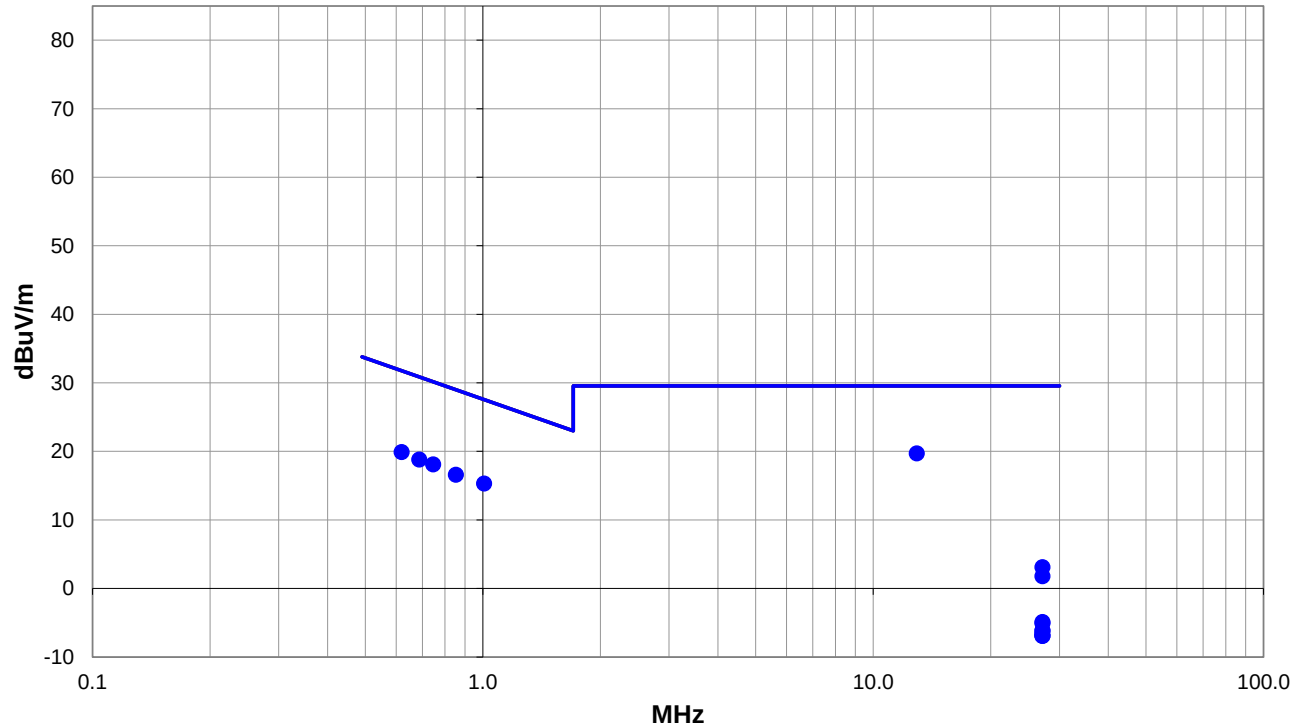
None

EUT OPERATING MODES

Transmitting 13.56MHz, Modulated, Display shows "Press 1 to Purchase Fuel, 2 to Print Receipt"
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DEVIATIONS FROM TEST STANDARD

None



Run #: 5

PK AV QP

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ)

RESULTS - Run #5

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
12.925	27.1	11.7	1.0	281.0	10.0	0.0	Perp to EUT	QP	-19.1	19.7	29.5	-9.8	Tx 13.56, EUT Vert
0.619	28.5	10.5	1.0	274.0	10.0	0.0	Perp to EUT	QP	-19.1	19.9	31.8	-11.9	Tx 13.56, EUT Vert
0.687	27.4	10.5	1.0	308.0	10.0	0.0	Perp to EUT	QP	-19.1	18.8	30.9	-12.1	Tx 13.56, EUT Vert
0.746	26.7	10.5	1.0	25.0	10.0	0.0	Perp to EUT	QP	-19.1	18.1	30.2	-12.1	Tx 13.56, EUT Vert
1.007	23.6	10.8	1.0	32.0	10.0	0.0	Perp to EUT	QP	-19.1	15.3	27.6	-12.3	Tx 13.56, EUT Vert
0.853	25.2	10.5	1.0	28.0	10.0	0.0	Perp to EUT	QP	-19.1	16.6	29.0	-12.4	Tx 13.56, EUT Vert
27.119	12.4	9.8	1.0	2.0	10.0	0.0	Perp to EUT	QP	-19.1	3.1	29.5	-26.4	Tx 13.56, EUT Vert
27.124	11.1	9.8	1.0	7.0	10.0	0.0	Perp to EUT	QP	-19.1	1.8	29.5	-27.7	Tx 13.56, EUT on Side
27.123	4.4	9.8	1.0	36.0	10.0	0.0	Par to GND	QP	-19.1	-4.9	29.5	-34.4	Tx 13.56, EUT on Side
27.122	4.2	9.8	1.0	57.0	10.0	0.0	Par to GND	QP	-19.1	-5.1	29.5	-34.6	Tx 13.56, EUT Vert
27.121	3.2	9.8	1.0	85.0	10.0	0.0	Perp to EUT	QP	-19.1	-6.1	29.5	-35.6	Tx 13.56, EUT Horz
27.122	3.1	9.8	1.0	90.0	10.0	0.0	Par to EUT	QP	-19.1	-6.2	29.5	-35.7	Tx 13.56, EUT on Side
27.115	2.6	9.8	1.0	20.0	10.0	0.0	Par to EUT	QP	-19.1	-6.7	29.5	-36.2	Tx 13.56, EUT Vert
27.122	2.4	9.8	1.0	230.0	10.0	0.0	Par to GND	QP	-19.1	-6.9	29.5	-36.4	Tx 13.56, EUT Horz
27.121	2.4	9.8	1.0	245.0	10.0	0.0	Par to EUT	QP	-19.1	-6.9	29.5	-36.4	Tx 13.56, EUT Horz

CONCLUSION

Pass

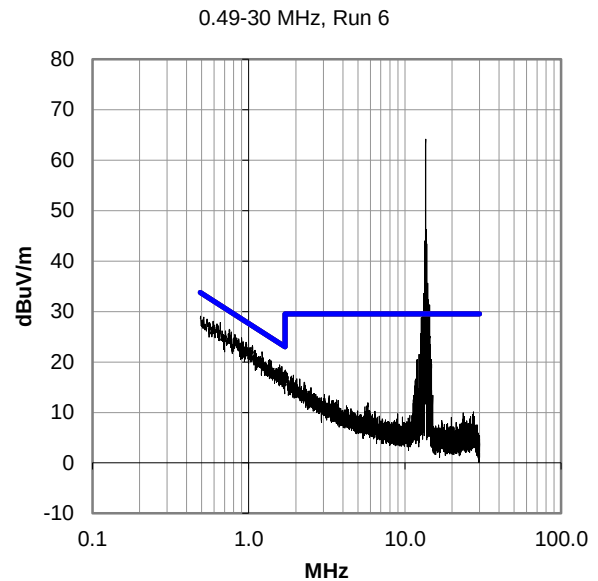
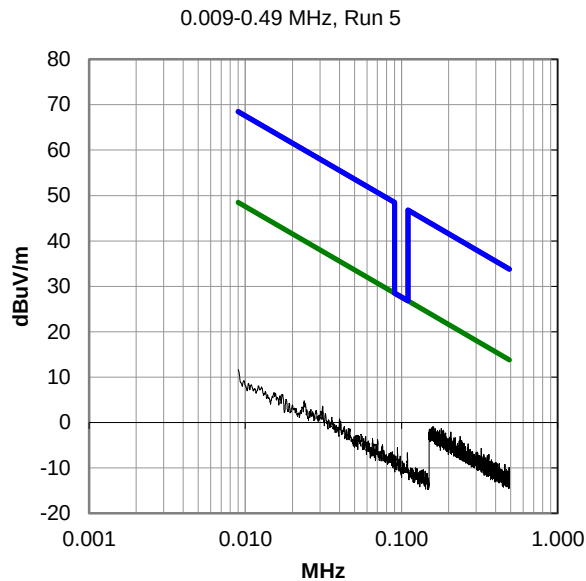


Tested By

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHz)

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 (GREATER THAN 30 MHZ)



TEST DESCRIPTION

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

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

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

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

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

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

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Biconilog	EMCO	3142	AXA	2024-01-05	2026-01-05
Cable	ESM Cable Corp.	30-1GHz Cables	OCW	2024-12-17	2025-12-17
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAD	2024-12-17	2025-12-17
Antenna - Double Ridge	EMCO	3115	AHB	2024-04-16	2026-04-16
Cable	ESM Cable Corp.	1-8GHz Cables	OCX	2025-02-17	2026-02-17
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVJ	2024-03-20	2025-03-20
Antenna - Standard Gain	ETS Lindgren	3160-07	AHX	2024-12-03	2025-12-03
Cable	ESM Cable Corp.	8-18GHz Cables	OCY	2025-02-17	2026-02-17
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVL	2024-03-20	2025-03-20
Antenna - Standard Gain	EMCO	3160-08	AHK	2024-12-03	2025-12-03
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVP	2024-03-20	2025-03-20
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFJ	2025-03-03	2026-03-03

FREQUENCY RANGE INVESTIGATED

30 MHz TO 18 GHz

POWER INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

FDMT0002-1

MODES INVESTIGATED

Transmitting 13.56MHz, Modulated, Display shows "Press 1 to Purchase Fuel, 2 to Print Receipt"

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHz)



EUT:	SmartFill Gen 3 OPT	Work Order:	FDMT0002
Serial Number:	7056	Date:	2025-03-14
Customer:	Fluid Management Technology Pty Ltd	Temperature:	20.2°C
Attendees:	None	Relative Humidity:	42.8%
Customer Project:	None	Bar. Pressure (PMSL):	1017 mb
Tested By:	Matthew Ng	Job Site:	OC07
Power:	110VAC/60Hz	Configuration:	FDMT0002-1

TEST PARAMETERS

Run #:	8	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)
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COMMENTS

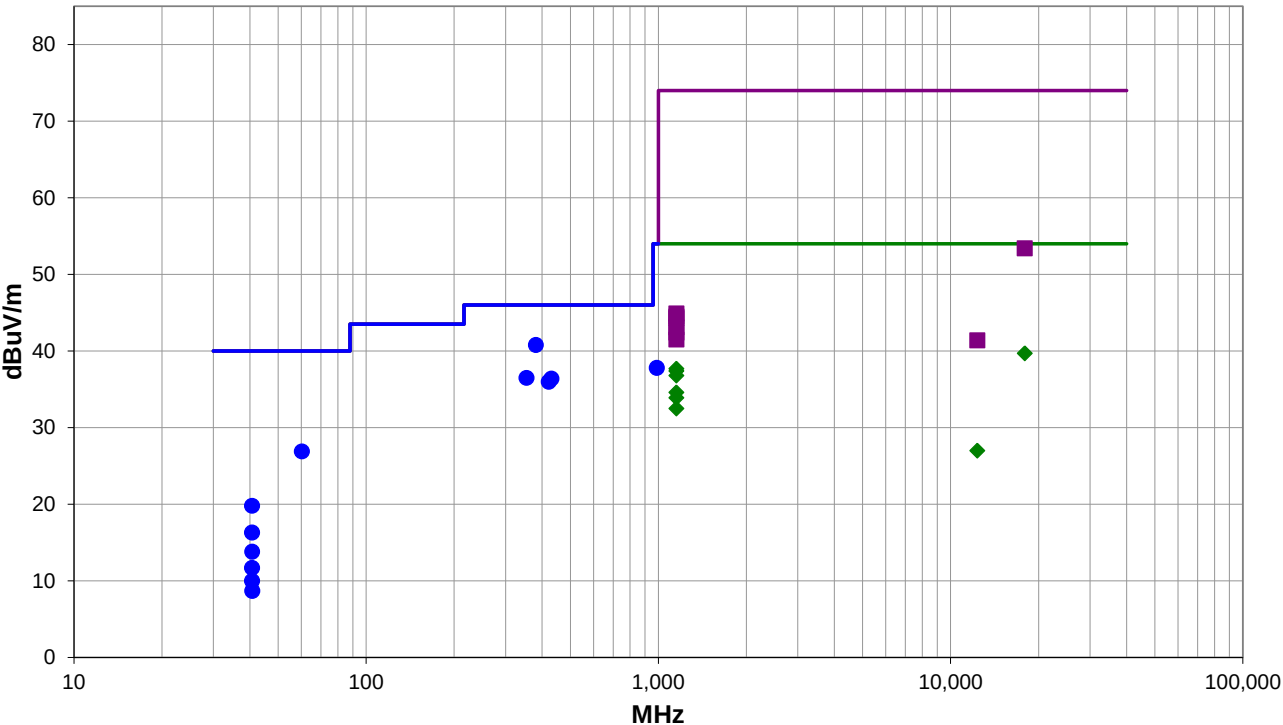
None

EUT OPERATING MODES

Transmitting 13.56MHz, Modulated, Display shows "Press 1 to Purchase Fuel, 2 to Print Receipt"

DEVIATIONS FROM TEST STANDARD

None



Run #: 8 PK AV QP

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHZ)

RESULTS - Run #8

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
380.792	54.8	-14.0	1.3	165.0	3.0	0.0	Horz	QP	0.0	40.8	46.0	-5.2	Tx 13.56, EUT Vert
353.608	52.0	-15.5	3.8	172.0	3.0	0.0	Vert	QP	0.0	36.5	46.0	-9.5	Tx 13.56, EUT Vert
430.510	50.5	-14.1	1.5	152.0	3.0	0.0	Horz	QP	0.0	36.4	46.0	-9.6	Tx 13.56, EUT Vert
421.713	50.1	-14.1	1.5	153.0	3.0	0.0	Horz	QP	0.0	36.0	46.0	-10.0	Tx 13.56, EUT Vert
60.229	53.7	-26.8	2.8	65.0	3.0	0.0	Vert	QP	0.0	26.9	40.0	-13.1	Tx 13.56, EUT Vert
17935.460	24.0	15.7	1.5	323.0	3.0	0.0	Vert	AV	0.0	39.7	54.0	-14.3	Tx 13.56 EUT on Side
987.425	41.1	-3.3	1.0	202.0	3.0	0.0	Vert	QP	0.0	37.8	54.0	-16.2	Tx 13.56, EUT Vert
1151.958	41.5	-3.8	1.1	143.0	3.0	0.0	Horz	AV	0.0	37.7	54.0	-16.3	Tx 13.56 EUT on Side
1151.983	41.2	-3.8	2.0	202.0	3.0	0.0	Horz	AV	0.0	37.4	54.0	-16.6	Tx 13.56, EUT Vert
1152.025	40.6	-3.8	3.2	23.0	3.0	0.0	Vert	AV	0.0	36.8	54.0	-17.2	Tx 13.56 , EUT Horz
1151.967	38.4	-3.8	1.4	244.0	3.0	0.0	Vert	AV	0.0	34.6	54.0	-19.4	Tx 13.56 EUT on Side
1151.992	37.7	-3.8	3.0	238.0	3.0	0.0	Vert	AV	0.0	33.9	54.0	-20.1	Tx 13.56, EUT Vert
40.674	42.1	-22.3	1.0	0.0	3.0	0.0	Vert	QP	0.0	19.8	40.0	-20.2	Tx 13.56, EUT Vert
17931.790	37.5	15.9	1.5	323.0	3.0	0.0	Vert	PK	0.0	53.4	74.0	-20.6	Tx 13.56 EUT on Side
1152.067	36.3	-3.8	2.6	55.0	3.0	0.0	Horz	AV	0.0	32.5	54.0	-21.5	Tx 13.56 , EUT Horz
40.685	38.6	-22.3	1.0	55.0	3.0	0.0	Vert	QP	0.0	16.3	40.0	-23.7	Tx 13.56, EUT Horz
40.715	36.1	-22.3	1.0	208.0	3.0	0.0	Vert	QP	0.0	13.8	40.0	-26.2	Tx 13.56 EUT on Side
12338.290	28.8	-1.8	1.5	94.0	3.0	0.0	Vert	AV	0.0	27.0	54.0	-27.0	Tx 13.56 EUT on Side
40.681	34.0	-22.3	2.8	255.0	3.0	0.0	Horz	QP	0.0	11.7	40.0	-28.3	Tx 13.56, EUT Vert
1151.917	48.7	-3.8	2.0	202.0	3.0	0.0	Horz	PK	0.0	44.9	74.0	-29.1	Tx 13.56, EUT Vert
1152.008	48.3	-3.8	1.1	143.0	3.0	0.0	Horz	PK	0.0	44.5	74.0	-29.5	Tx 13.56 EUT on Side
1152.017	48.1	-3.8	3.2	23.0	3.0	0.0	Vert	PK	0.0	44.3	74.0	-29.7	Tx 13.56 , EUT Horz
40.668	32.3	-22.3	1.3	291.0	3.0	0.0	Horz	QP	0.0	10.0	40.0	-30.0	Tx 13.56 EUT on Side
1151.758	46.9	-3.8	1.4	244.0	3.0	0.0	Vert	PK	0.0	43.1	74.0	-30.9	Tx 13.56 EUT on Side
40.753	31.1	-22.4	1.0	139.0	3.0	0.0	Horz	QP	0.0	8.7	40.0	-31.3	Tx 13.56, EUT Horz
1151.925	46.2	-3.8	3.0	238.0	3.0	0.0	Vert	PK	0.0	42.4	74.0	-31.6	Tx 13.56, EUT Vert
1151.758	45.3	-3.8	2.6	55.0	3.0	0.0	Horz	PK	0.0	41.5	74.0	-32.5	Tx 13.56 , EUT Horz
12342.830	43.2	-1.8	1.5	94.0	3.0	0.0	Vert	PK	0.0	41.4	74.0	-32.6	Tx 13.56 EUT on Side

CONCLUSION

Pass



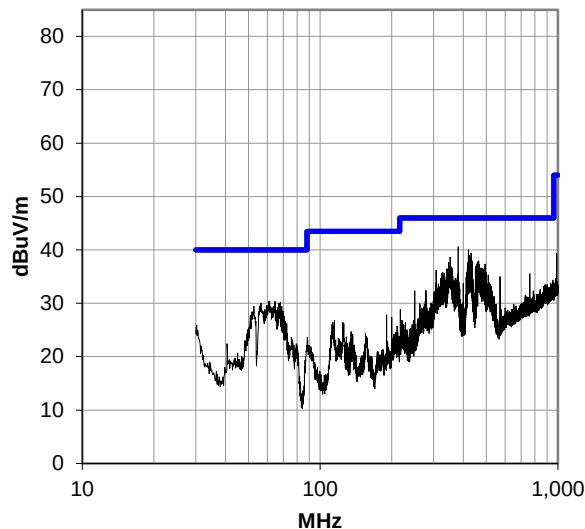
Tested By

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHz)

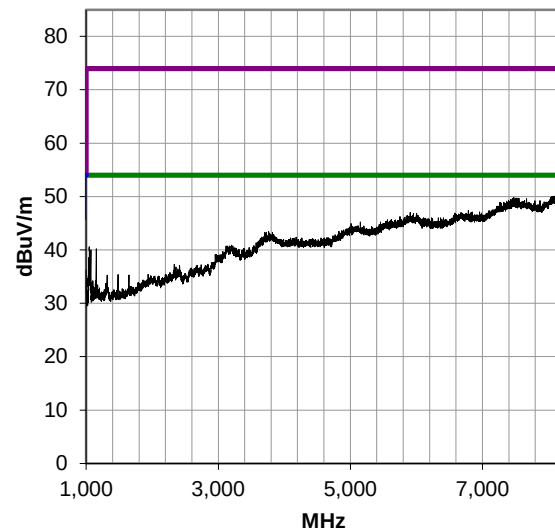
PRESCAN DATA

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.

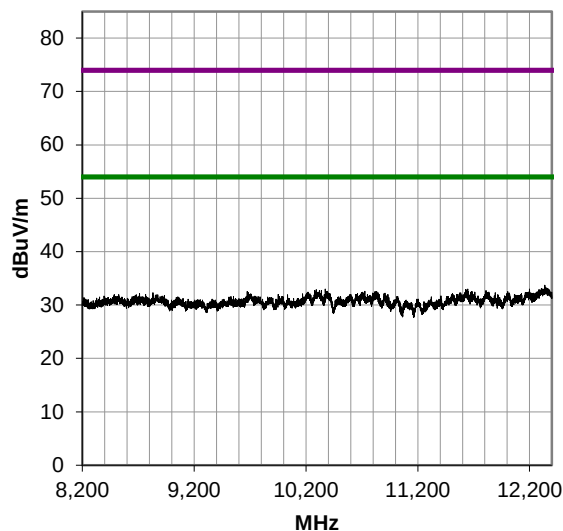
30-1000 MHz, Run 7



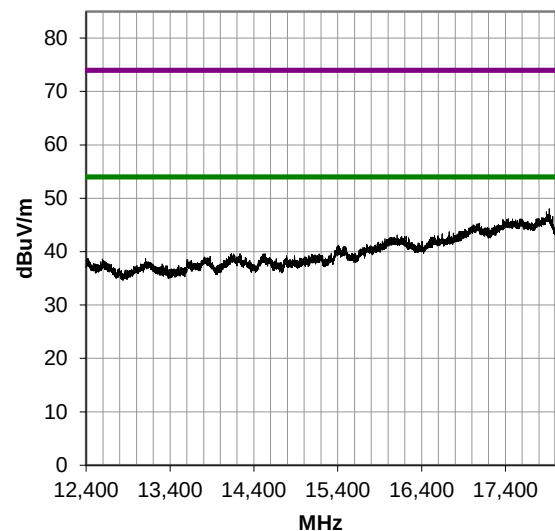
1000-8200 MHz, Run 2



8200-12400 MHz, Run 3



12400-18000 MHz, Run 5



FREQUENCY STABILITY

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 $\pm 0.01\%$ is equivalent to 100 ppm
The formula to check for compliance is:

$$\text{ppm} = (\text{Measured Frequency} / \text{Measured Nominal Frequency} - 1) * 1,000,000$$

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFJ	2025-03-03	2026-03-03
Cable	Element	None	OC5	2024-10-02	2025-10-02
Probe - Near Field Set	EMCO	7405	IPI	NCR	NCR
Block - DC	Fairview Microwave	SD3379	ANG	2024-10-03	2025-10-03
Chamber - Temperature/Humidity	Cincinnati Sub Zero	ZPHS-32-3.5-SCT/AC	TBE	NCR	NCR
Generator - Signal	Agilent	E8257D	TGU	2023-11-08	2026-11-08
Thermometer	Omega Engineering, Inc.	iTHx-SD-5	DVF	2024-11-11	2025-11-11
Probe - Temperature/Humidity	Omega Engineering, Inc.	iTHP-5-DB9	DVFA	2024-11-11	2025-11-11

FREQUENCY STABILITY

EUT:	SmartFill Gen 3 OPT	Work Order:	FDMT0002
Serial Number:	7056	Date:	2025-03-18
Customer:	Fluid Management Technology Pty Ltd	Temperature:	22.2°C
Attendees:	None	Relative Humidity:	45.2%
Customer Project:	None	Bar. Pressure (PMSL):	1024 mbar
Tested By:	Matthew Ng	Job Site:	OC13
Power:	110VAC/60Hz	Configuration:	FDMT0002-1

COMMENTS

Transmitting 13.56MHz, Unmodulated (CW)

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

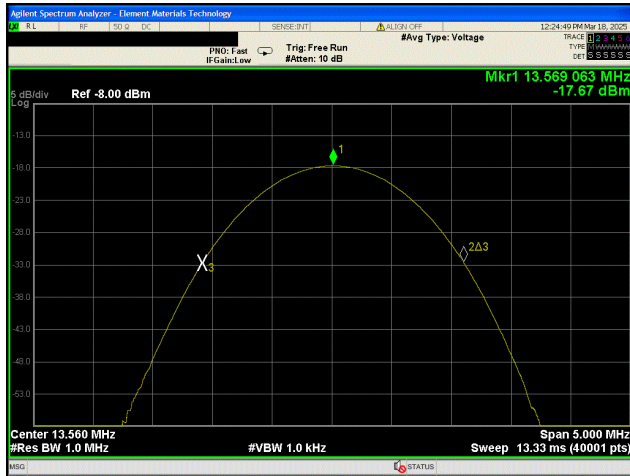


Tested By

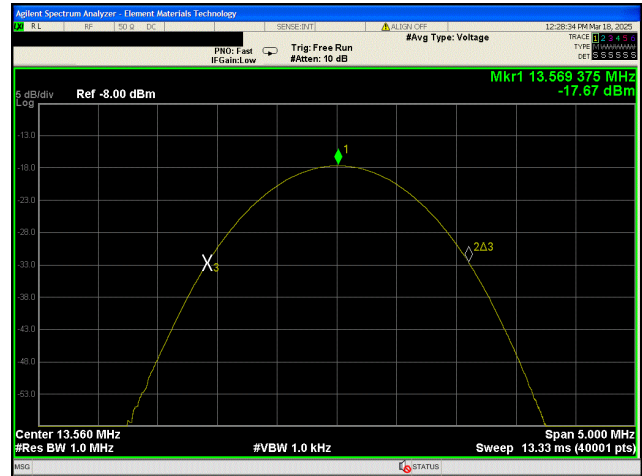
TEST RESULTS

	Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
13.56 MHz RFID, ISO/IEC 14443 Type A					
Normal Conditions (110VAC/60Hz)	13.5690625	13.5690625	0	100	Pass
Extreme Voltage 115% (126VAC/60Hz)	13.569375	13.5690625	23.03	100	Pass
Extreme Voltage 85% (93.5VAC/60Hz)	13.5701875	13.5690625	82.91	100	Pass
Extreme Temperature +50°C	13.5694375	13.5690625	27.64	100	Pass
Extreme Temperature +40°C	13.56975	13.5690625	50.67	100	Pass
Extreme Temperature +30°C	13.5694375	13.5690625	27.64	100	Pass
Extreme Temperature +20°C	13.569125	13.5690625	4.61	100	Pass
Extreme Temperature +10°C	13.5683125	13.5690625	55.27	100	Pass
Extreme Temperature +0°C	13.56875	13.5690625	23.03	100	Pass
Extreme Temperature -10°C	13.5696875	13.5690625	46.06	100	Pass
Extreme Temperature -20°C	13.5683125	13.5690625	55.27	100	Pass

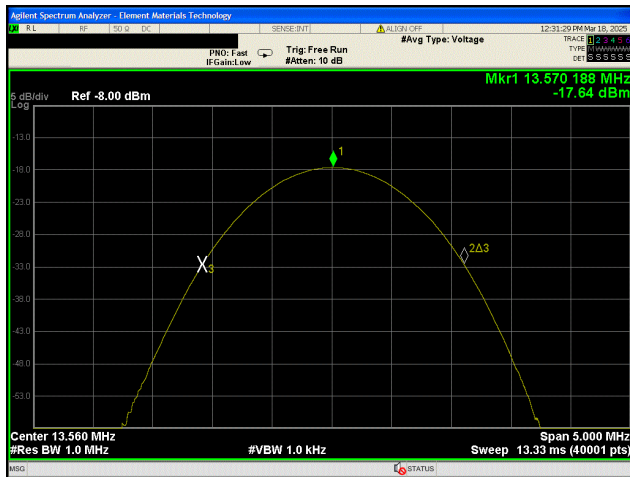
FREQUENCY STABILITY



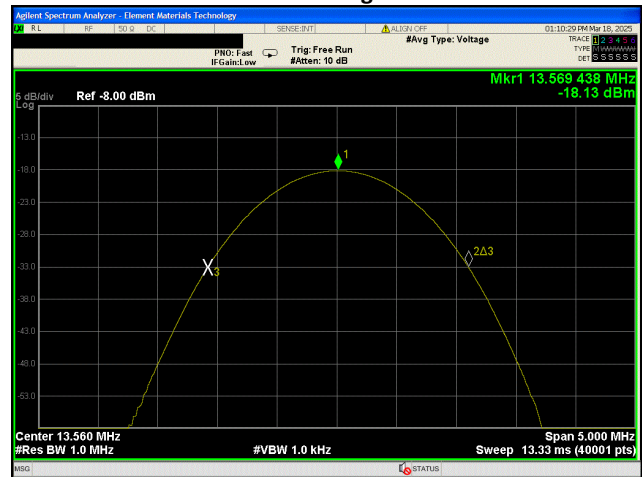
13.56 MHz RFID, ISO/IEC 14443 Type A
Normal Conditions



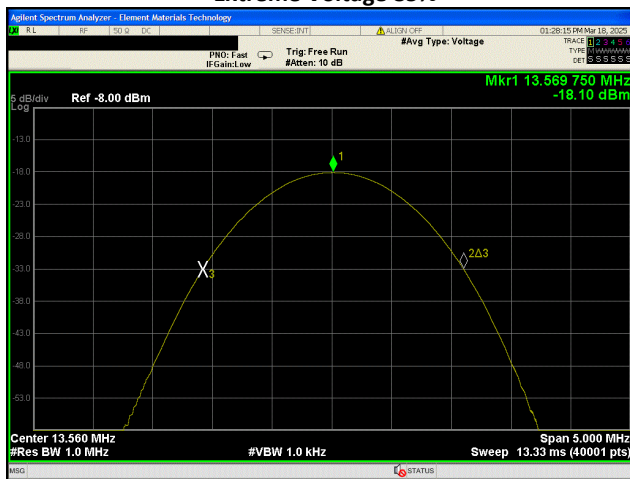
13.56 MHz RFID, ISO/IEC 14443 Type A
Extreme Voltage 115%



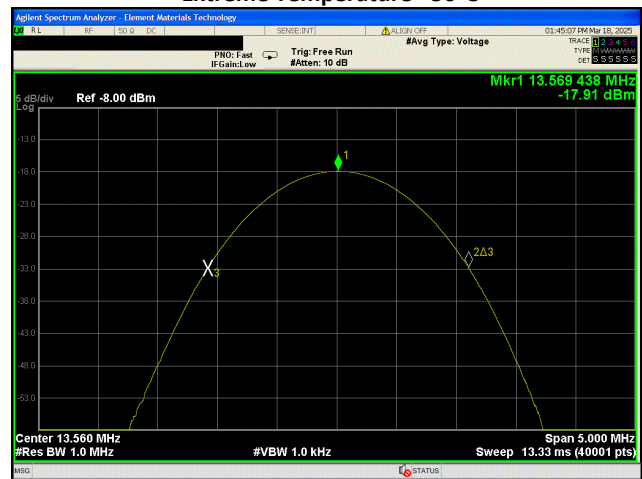
13.56 MHz RFID, ISO/IEC 14443 Type A
Extreme Voltage 85%



13.56 MHz RFID, ISO/IEC 14443 Type A
Extreme Temperature +50°C

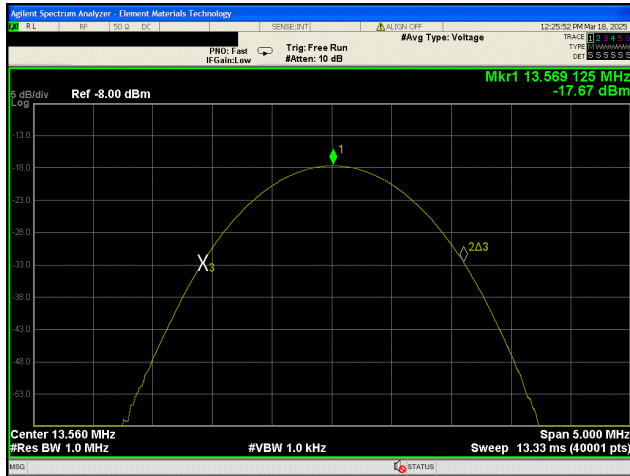


13.56 MHz RFID, ISO/IEC 14443 Type A
Extreme Temperature +40°C

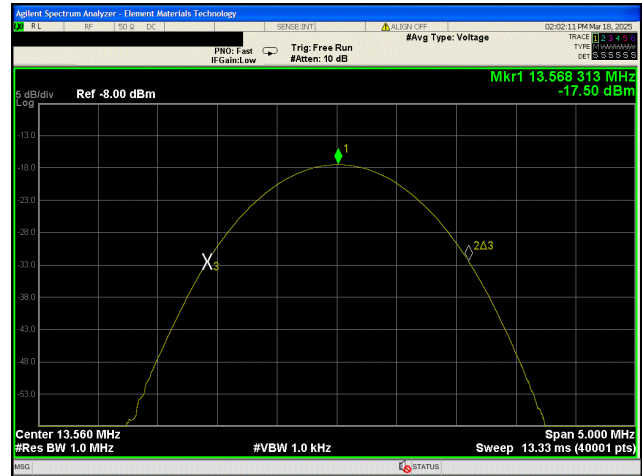


13.56 MHz RFID, ISO/IEC 14443 Type A
Extreme Temperature +30°C

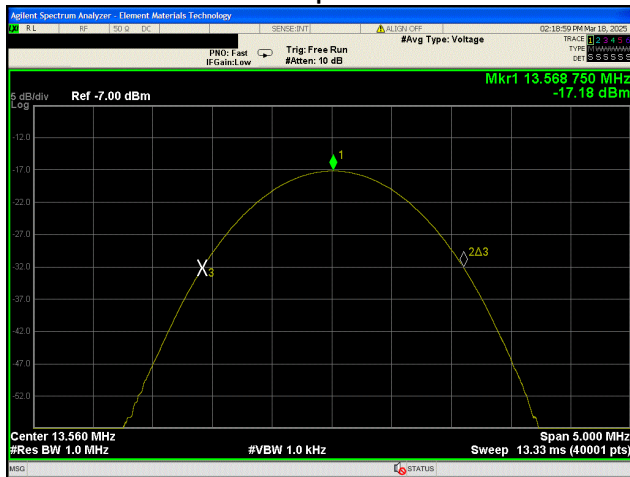
FREQUENCY STABILITY



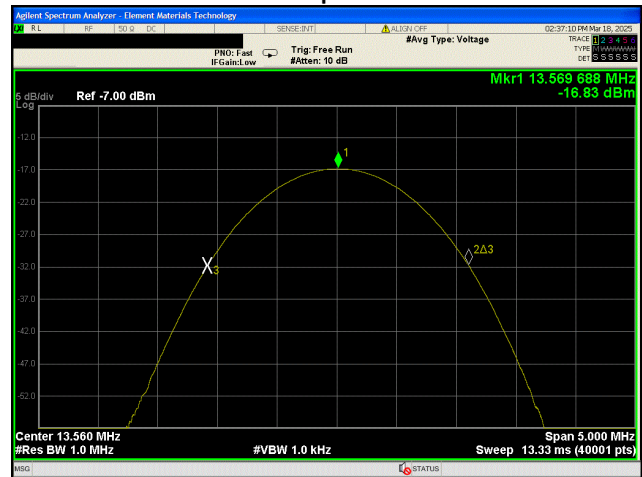
13.56 MHz RFID, ISO/IEC 14443 Type A
Extreme Temperature +20°C



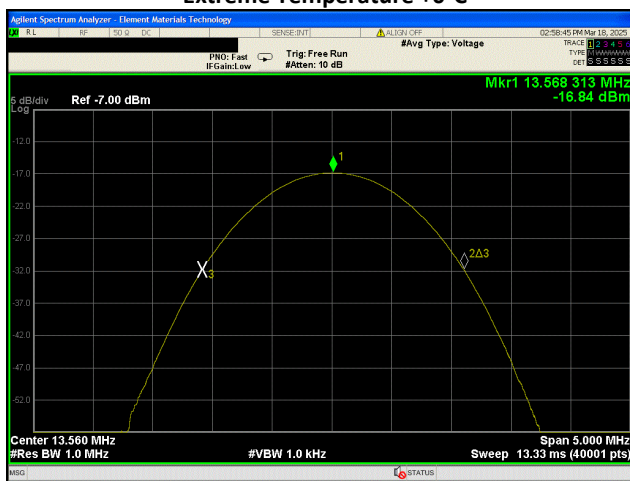
13.56 MHz RFID, ISO/IEC 14443 Type A
Extreme Temperature +10°C



13.56 MHz RFID, ISO/IEC 14443 Type A
Extreme Temperature 0°C



13.56 MHz RFID, ISO/IEC 14443 Type A
Extreme Temperature -10°C



13.56 MHz RFID, ISO/IEC 14443 Type A
Extreme Temperature -20°C

EMISSIONS BANDWIDTH (20 DB)

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 be 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	Agilent	N9010A	AFJ	2025-03-03	2026-03-03
Cable	Element	None	OC5	2024-10-02	2025-10-02
Probe - Near Field Set	EMCO	7405	IPI	NCR	NCR
Block - DC	Fairview Microwave	SD3379	ANG	2024-10-03	2025-10-03

EMISSIONS BANDWIDTH (20 DB)



EUT:	SmartFill Gen 3 OPT	Work Order:	FDMT0002
Serial Number:	7056	Date:	2025-03-18
Customer:	Fluid Management Technology Pty Ltd	Temperature:	22.2°C
Attendees:	None	Relative Humidity:	45.2%
Customer Project:	None	Bar. Pressure (PMSL):	1024 mbar
Tested By:	Matthew Ng	Job Site:	OC13
Power:	110VAC/60Hz	Configuration:	FDMT0002-1

COMMENTS

Transmitting 13.56MHz, Modulated, Display shows "Press 1 to Purchase Fuel, 2 to Print Receipt"

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

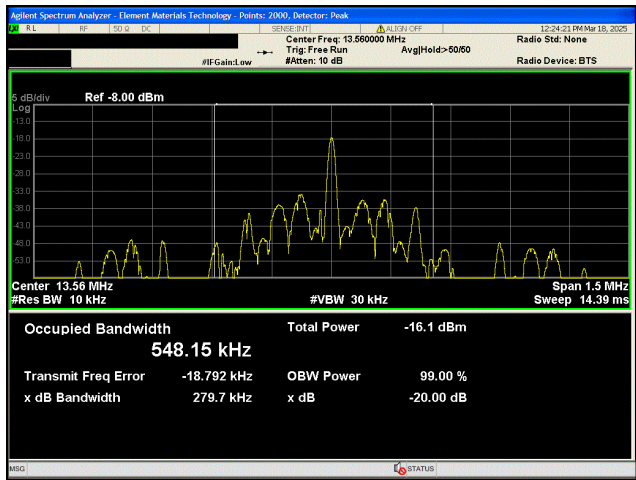
Pass

Tested By

TEST RESULTS

		Limit		
		Value	13.110 ≤ f ≤ 14.010	Result
13.56 MHz RFID, ISO/IEC 14443 Type A				
Normal Conditions (110VAC/60Hz)	279.692 kHz	Within		Pass

EMISSIONS BANDWIDTH (20 DB)



13.56 MHz RFID, ISO/IEC 14443 Type A
Normal Conditions

End of Test Report