Schweitzer Engineering Laboratories, Inc.

SEL-FT50

FCC 15.207:2017

FCC 15.247:2017

902 - 928 MHz DTS Transceiver

Report # SCHW0215

NVLAP Lab Code: 200629-0

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CERTIFICATE OF TEST

Last Date of Test: March 7, 2017
Schweitzer Engineering Laboratories, Inc.
Model: SEL-FT50

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2017	ANSI C63.10:2013
FCC 15.247:2017	

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
6.5, 6.6, 11.12.1, 11.13.2	Spurious Radiated Emissions	Yes	Pass	
7.8.2	Carrier Frequency Separation	No	N/A	Not required for DTS devices.
7.8.3	Number of Hopping Frequencies	No	N/A	Not required for DTS devices.
7.8.4	Dwell Time	No	N/A	Not required for DTS devices.
7.8.6	Band Edge Compliance - Hopping Mode	No	N/A	Not required for DTS devices.
11.6	Duty Cycle	Yes	Pass	
11.8.2	Occupied Bandwidth	Yes	Pass	
11.9.2.2.4	Output Power	Yes	Pass	
11.10.3	Power Spectral Density	Yes	Pass	
11.11	Spurious Conducted Emissions	Yes	Pass	
11.11	Band Edge Compliance	Yes	Pass	

Deviations From Test Standards

None

Approved By:

Rod Munro, Operations Manager

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information.

REVISION HISTORY

Revision Number	Description	Date	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

2017.1.25

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 - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This allows Element to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with ISED.

European Union

European Commission – Validated by the European Commission as a Notified Body under the R&TTE Directive.

Australia/New Zealand

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

Korea

MSIP / 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.

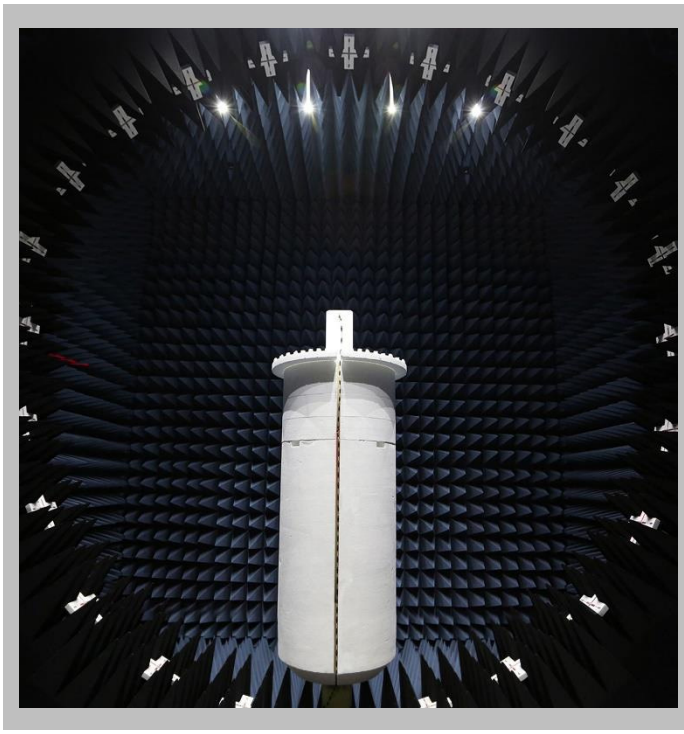
SCOPE

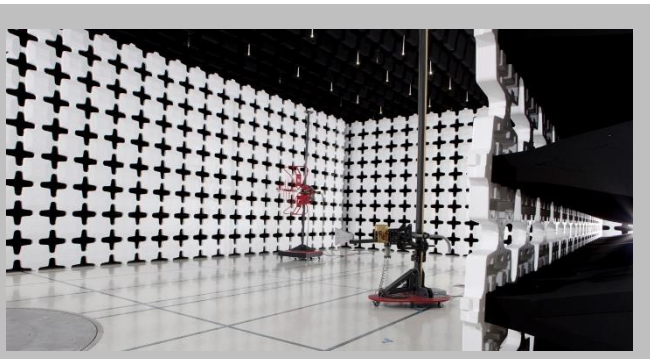
For details on the Scopes of our Accreditations, please visit:
http://portlandcustomer.element.com/ts/scope/scope.htm
http://gsi.nist.gov/global/docs/cabs/designations.html

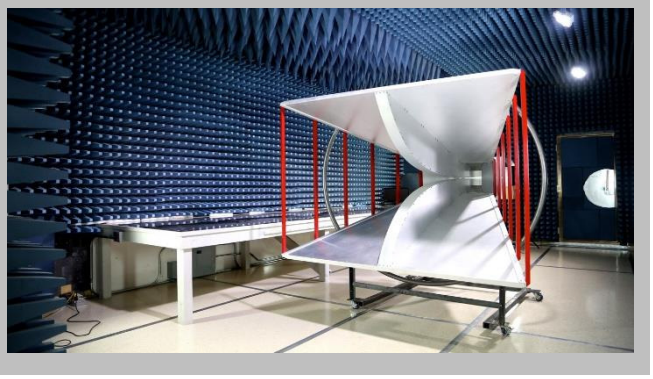
FACILITIES

2017.3.2

California	Minnesota	New York	Oregon	Texas	Washington
Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Labs NC01-05 19201 120th Ave NE Bothell, WA 98011 (425)984-6600
NVLAP					
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
Innovation, Science and Economic Development Canada					
2834B-1, 2834B-3	2834E-1	N/A	2834D-1, 2834D-*2*	2834G-1	2834F-1
BSMI					
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110
Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA					
US0158	US0175	N/A	US0017	US0191	US0157







MEASUREMENT UNCERTAINTY

TMU.2015.07.10

Measurement Uncertainty

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

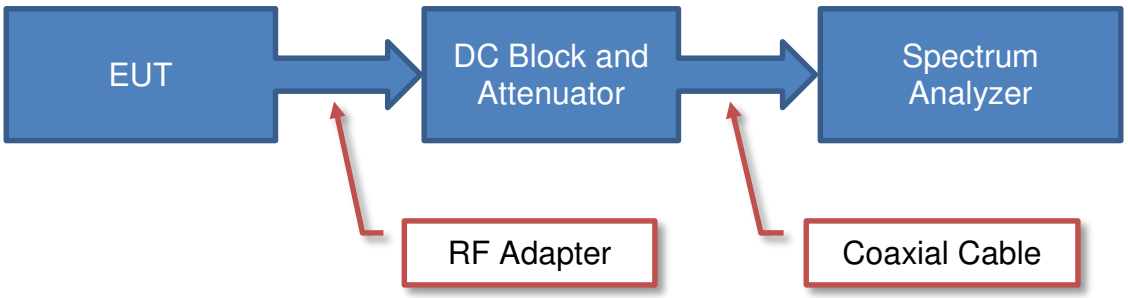
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable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

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

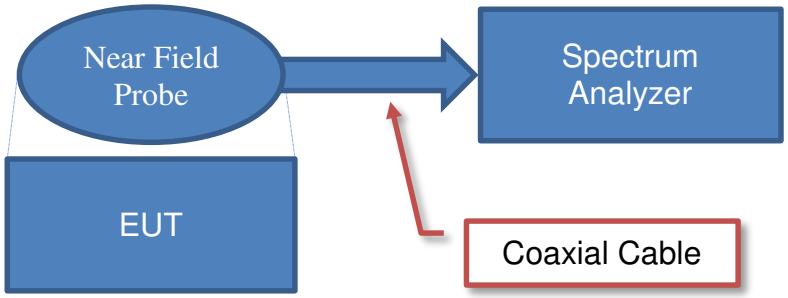
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	0	0
AC Powerline Conducted Emissions (dB)	0	0

Test Setup Block Diagrams

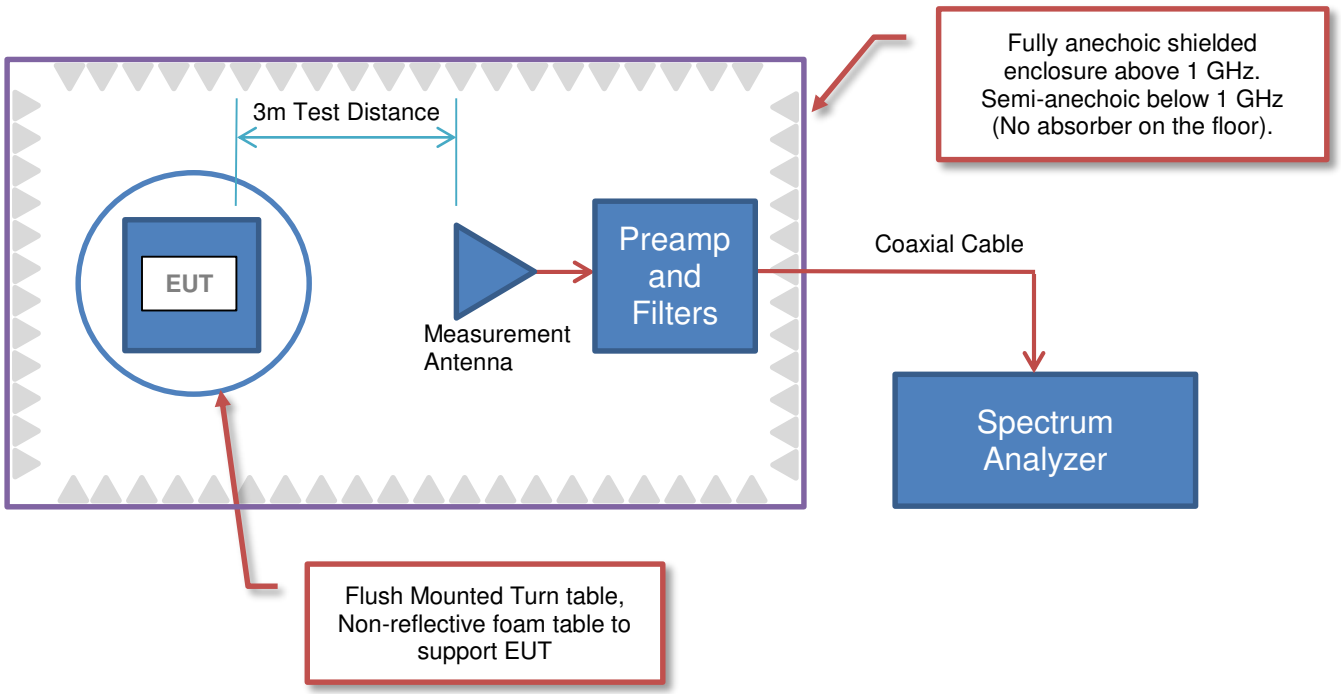
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Schweitzer Engineering Laboratories, Inc.
Address:	2350 NE Hopkins Court
City, State, Zip:	Pullman, WA 99163
Test Requested By:	Miralem Cosic
Model:	SEL-FT50
First Date of Test:	March 6, 2017
Last Date of Test:	March 7, 2017
Receipt Date of Samples:	March 6, 2017
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
The FT50 Power Line Overhead Fault Detection sensor with a DTS radio operating in the 902 - 928 MHz band. If there is a fault on the power line the transmitter will send a message to an FR12 receiver. One FR12 receiver can listen to 12 FR50 units at a time. Each FT50 unit has its center frequency at a different frequency in the band. The center frequency is determined by the Unit ID and Network ID of the unit. FT50 also sends out a heartbeat message every 15-30 seconds.

Testing Objective:
Seeking to demonstrate compliance of the DTS radio under FCC 15.247:2017 for operation in the 902 - 928 MHz Band.

CONFIGURATIONS

Configuration SCHW0215- 1

Software/Firmware Running during test	
Description	**Version**
Energia MT	1.6.10E18

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Overhead Current Fault Indicator	Schweitzer Engineering Laboratories, Inc.	SEL-FT50	A01951775

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
DC Power Supply	Schweitzer Engineering Laboratories, Inc.	SEL-9322	1130930786

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Dell	Latitude E6540	None
Development Board	Texas Instruments	None	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power	No	1.0m	No	DC Power Supply	Overhead Current Fault Indicator
AC Power	No	1.6m	No	AC Mains	DC Power Supply
USB Cable	No	0.6m	No	Laptop	Development Board

MODIFICATIONS

2017-1-25

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	3/6/2017	Output Power	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	3/6/2017	Band Edge Compliance	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	3/6/2017	Occupied Bandwidth	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	3/6/2017	Spurious 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.
5	3/6/2017	Power Spectral Density	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	3/6/2017	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
7	3/7/2017	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

WTD.2016.12.19

TEST DESCRIPTION

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
LISN	Solar Electronics	9252-50-R-24-BNC	LIM	9/23/2016	9/23/2017
Cable - Conducted Cable Assembly	Element	NC4, HHF, TYL	NC4A	5/6/2016	5/6/2017
Receiver	Rohde & Schwarz	ESCI	ARE	8/8/2016	8/8/2017

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

SCHW0215-1

MODES INVESTIGATED

Transmitting 100% Duty Cycle, FSK Modulation, Mid Channel 4, 917 MHz

POWERLINE CONDUCTED EMISSIONS

EUT:	SEL-FT50	Work Order:	SCHW0215
Serial Number:	A01951775	Date:	03/07/2017
Customer:	Schweitzer Engineering Laboratories, Inc.	Temperature:	25.8°C
Attendees:	Miralem Cosic	Relative Humidity:	24.1%
Customer Project:	None	Bar. Pressure:	1018 mb
Tested By:	Richard Mellroth	Job Site:	NC05
Power:	15VDC via 110VAC/60Hz	Configuration:	SCHW0215-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2017	ANSI C63.10:2013

TEST PARAMETERS

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

COMMENTS

None

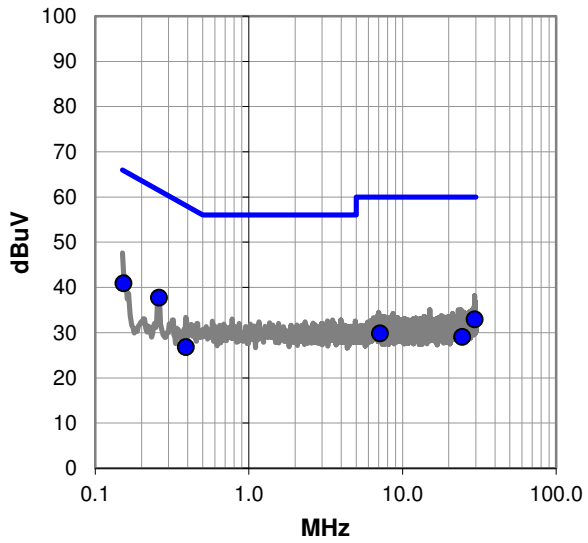
EUT OPERATING MODES

Transmitting 100% Duty Cycle, FSK Modulation, Mid Channel 4, 917 MHz

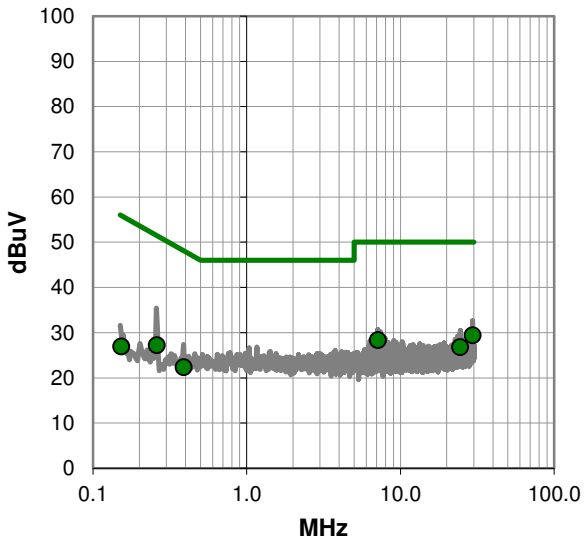
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

WTD.2016.12.19

RESULTS - Run #8

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.260	17.1	20.6	37.7	61.4	-23.7
0.153	20.1	20.8	40.9	65.8	-24.9
29.529	10.0	22.9	32.9	60.0	-27.1
7.131	8.8	21.0	29.8	60.0	-30.2
24.501	6.6	22.4	29.0	60.0	-31.0
0.389	6.2	20.6	26.8	58.1	-31.3

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
29.529	6.5	22.9	29.4	50.0	-20.6
7.131	7.3	21.0	28.3	50.0	-21.7
24.501	4.4	22.4	26.8	50.0	-23.2
0.260	6.6	20.6	27.2	51.4	-24.2
0.389	1.7	20.6	22.3	48.1	-25.8
0.153	6.1	20.8	26.9	55.8	-28.9

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

EUT:	SEL-FT50	Work Order:	SCHW0215
Serial Number:	A01951775	Date:	03/07/2017
Customer:	Schweitzer Engineering Laboratories, Inc.	Temperature:	25.8°C
Attendees:	Miralem Cosic	Relative Humidity:	24.1%
Customer Project:	None	Bar. Pressure:	1018 mb
Tested By:	Richard Mellroth	Job Site:	NC05
Power:	15VDC via 110VAC/60Hz	Configuration:	SCHW0215-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2017	ANSI C63.10:2013

TEST PARAMETERS

Run #:	9	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

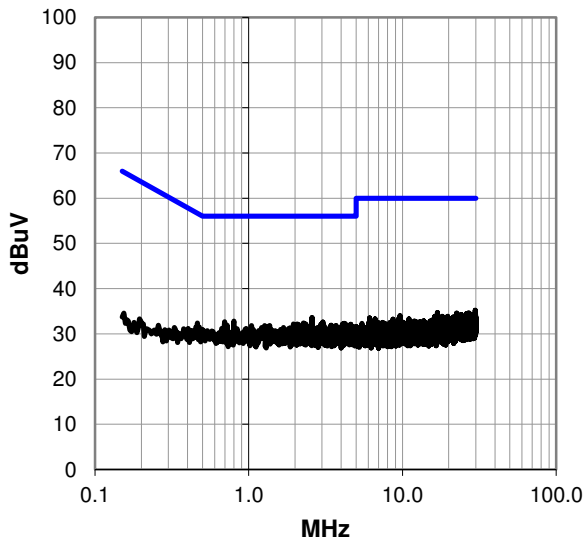
EUT OPERATING MODES

Transmitting 100% Duty Cycle, FSK Modulation, Mid Channel 4, 917 MHz

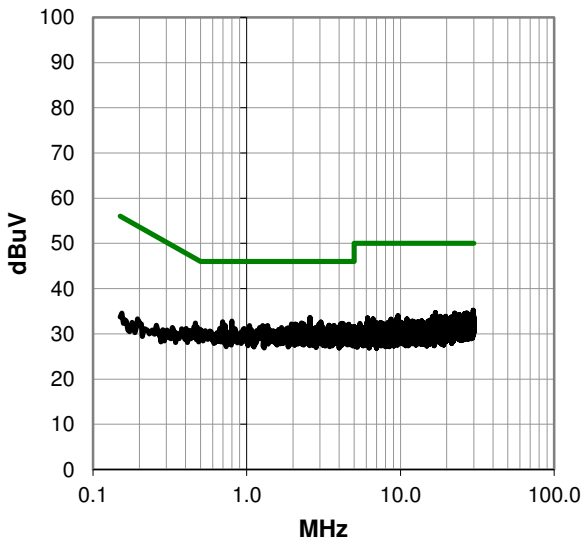
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

WTD.2016.12.19

RESULTS - Run #9

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.582	12.9	20.7	33.6	56.0	-22.4
0.799	12.1	20.7	32.8	56.0	-23.2
0.698	12.0	20.7	32.7	56.0	-23.3
3.034	11.8	20.8	32.6	56.0	-23.4
2.269	11.7	20.7	32.4	56.0	-23.6
4.183	11.5	20.8	32.3	56.0	-23.7
1.956	11.5	20.7	32.2	56.0	-23.8
2.068	11.5	20.7	32.2	56.0	-23.8
2.351	11.5	20.7	32.2	56.0	-23.8
4.082	11.4	20.8	32.2	56.0	-23.8
4.250	11.4	20.8	32.2	56.0	-23.8
2.948	11.3	20.8	32.1	56.0	-23.9
4.605	11.3	20.8	32.1	56.0	-23.9
2.112	11.3	20.7	32.0	56.0	-24.0
0.725	11.2	20.7	31.9	56.0	-24.1
3.086	11.1	20.8	31.9	56.0	-24.1
3.437	11.2	20.7	31.9	56.0	-24.1
1.042	11.2	20.6	31.8	56.0	-24.2
1.269	11.1	20.7	31.8	56.0	-24.2
1.366	11.1	20.7	31.8	56.0	-24.2
3.702	11.0	20.8	31.8	56.0	-24.2
0.463	11.8	20.6	32.4	56.6	-24.2
3.403	11.0	20.7	31.7	56.0	-24.3
1.307	10.9	20.7	31.6	56.0	-24.4
2.407	10.9	20.7	31.6	56.0	-24.4
2.441	10.9	20.7	31.6	56.0	-24.4

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.582	12.9	20.7	33.6	46.0	-12.4
0.799	12.1	20.7	32.8	46.0	-13.2
0.698	12.0	20.7	32.7	46.0	-13.3
3.034	11.8	20.8	32.6	46.0	-13.4
2.269	11.7	20.7	32.4	46.0	-13.6
4.183	11.5	20.8	32.3	46.0	-13.7
1.956	11.5	20.7	32.2	46.0	-13.8
2.068	11.5	20.7	32.2	46.0	-13.8
2.351	11.5	20.7	32.2	46.0	-13.8
4.082	11.4	20.8	32.2	46.0	-13.8
4.250	11.4	20.8	32.2	46.0	-13.8
2.948	11.3	20.8	32.1	46.0	-13.9
4.605	11.3	20.8	32.1	46.0	-13.9
2.112	11.3	20.7	32.0	46.0	-14.0
0.725	11.2	20.7	31.9	46.0	-14.1
3.086	11.1	20.8	31.9	46.0	-14.1
3.437	11.2	20.7	31.9	46.0	-14.1
1.042	11.2	20.6	31.8	46.0	-14.2
1.269	11.1	20.7	31.8	46.0	-14.2
1.366	11.1	20.7	31.8	46.0	-14.2
3.702	11.0	20.8	31.8	46.0	-14.2
0.463	11.8	20.6	32.4	46.6	-14.2
3.403	11.0	20.7	31.7	46.0	-14.3
1.307	10.9	20.7	31.6	46.0	-14.4
2.407	10.9	20.7	31.6	46.0	-14.4
2.441	10.9	20.7	31.6	46.0	-14.4

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2017.01.26

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

MODES OF OPERATION

Transmitting at 100% Duty Cycle, FSK Modulation

CHANNELS TESTED

Low Channel 1, 904 MHz
Mid Channel 4, 917 MHz
High Channel 12, 926 MHz

POWER SETTINGS INVESTIGATED

15 VDC

CONFIGURATIONS INVESTIGATED

SCHW0215 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	12500 MHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	6/23/2016	12 mo
Filter - Low Pass	Micro-Tronics	LPM50003	LFE	10/27/2016	12 mo
Filter - Band Pass/Notch	K&L Microwave	3TNF-500/1000-N/N	HHO	5/6/2016	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	LFF	12/27/2016	12 mo
Filter - High Pass	Micro-Tronics	HPM50114	HFN	12/27/2016	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYL	7/30/2015	24 mo
Antenna - Double Ridge	EMCO	3115	AHM	6/10/2016	24 mo
Antenna - Standard Gain	EMCO	3160-07	AHP	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAB	7/15/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVZ	6/6/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOK	9/20/2016	12 mo
Cable	Element	Bilog Cables	NC1	8/3/2016	12 mo
Cable	Element	3115 Horn Cable	NC2	5/23/2016	12 mo
Cable	Element	Standard Gain Horn Cable	NC3	5/23/2016	12 mo

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

TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.

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 if required, 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.

Measurements at the edges of the allowable band may be presented in an alternative method as provided for in the ANSI C63.10 Marker-Delta method. This method involves performing an in-band fundamental measurement followed by a screen capture of the fundamental and out-of-band emission using reduced measurement instrumentation bandwidths. The amplitude delta measured on this screen capture is applied to the fundamental emission value to show the out-of-band emission level as applied to the limit.

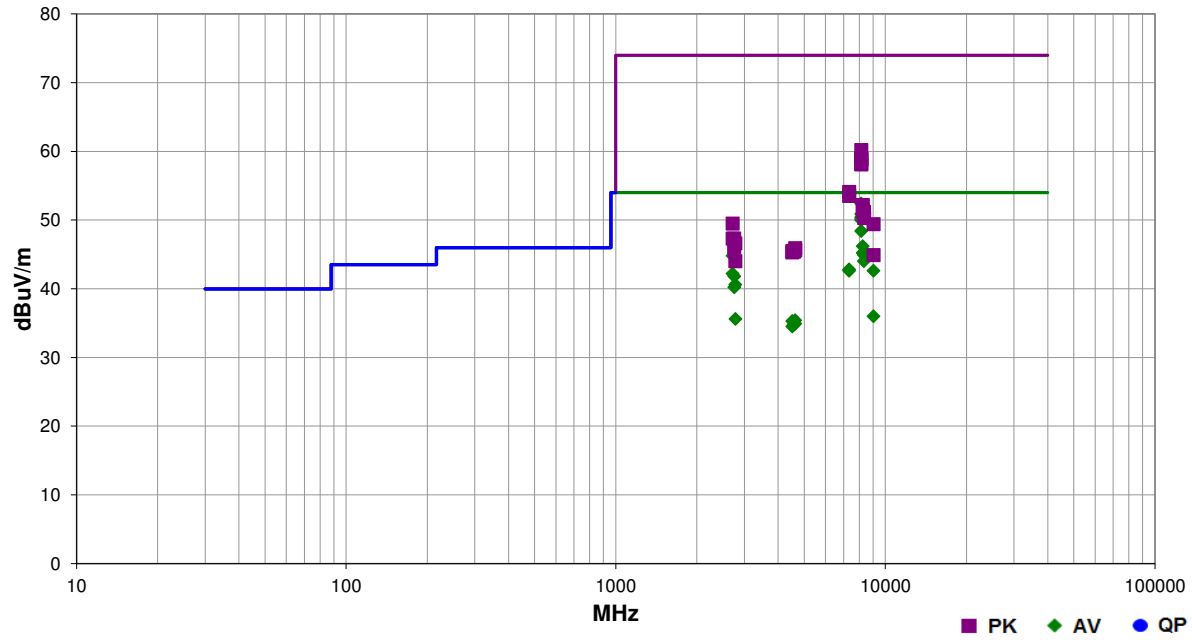
SPURIOUS RADIATED EMISSIONS

EmiR5 2017.01.25 PSA-ESCI 2017.01.26

Work Order:	SCHW0215	**Date:**	03/06/17		
Project:	None	**Temperature:**	22.1 °C		
Job Site:	NC01	**Humidity:**	28.5% RH		
Serial Number:	A01951775	**Barometric Pres.:**	1012 mbar	**Tested by:**	Richard Mellroth
EUT:	SEL-FT50				
Configuration:	1				
Customer:	Schweitzer Engineering Laboratories, Inc.				
Attendees:	Miralem Cosic				
EUT Power:	15 VDC				
Operating Mode:	Transmitting at 100% Duty Cycle, FSK Modulation. See comments next to data points for EUT channel and orientation.				
Deviations:	None				
Comments:	None				

Test Specifications	**Test Method**
FCC 15.247:2017	ANSI C63.10:2013

Run #	15-18	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
8138.117	37.2	15.2	1.0	168.0	3.0	0.0	Vert	AV	0.0	52.4	54.0	-1.6	Low Ch 1, EUT Flat
8138.233	35.7	15.2	2.5	166.0	3.0	0.0	Vert	AV	0.0	50.9	54.0	-3.1	Low Ch 1, EUT Horz
8134.175	35.2	15.2	2.4	138.0	3.0	0.0	Vert	AV	0.0	50.4	54.0	-3.6	Low Ch 1, EUT Vertical
8138.175	35.0	15.2	2.4	184.0	3.0	0.0	Horz	AV	0.0	50.2	54.0	-3.8	Low Ch 1, EUT Vertical
8138.150	34.8	15.2	1.6	203.0	3.0	0.0	Horz	AV	0.0	50.0	54.0	-4.0	Low Ch 1, EUT Horz
8134.175	33.2	15.2	3.0	278.0	3.0	0.0	Horz	AV	0.0	48.4	54.0	-5.6	Low Ch 1, EUT Flat
8251.467	51.6	-5.4	2.0	171.0	3.0	0.0	Horz	AV	0.0	46.2	54.0	-7.8	Mid Ch 4, EUT Flat
8251.125	50.6	-5.4	1.6	268.0	3.0	0.0	Vert	AV	0.0	45.2	54.0	-8.8	Mid Ch 4, EUT Vertical
8332.292	50.2	-5.3	1.6	277.0	3.0	0.0	Vert	AV	0.0	44.9	54.0	-9.1	High Ch 12, EUT Flat
2712.050	45.3	-0.5	1.0	323.0	3.0	0.0	Vert	AV	0.0	44.8	54.0	-9.2	Low Ch 1, EUT Flat
8332.200	49.3	-5.3	1.9	176.0	3.0	0.0	Horz	AV	0.0	44.0	54.0	-10.0	High Ch 12, EUT Vertical
7337.908	29.3	13.5	1.6	27.0	3.0	0.0	Vert	AV	0.0	42.8	54.0	-11.2	Mid Ch 4, EUT Flat
9042.300	47.0	-4.4	2.4	303.0	3.0	0.0	Horz	AV	0.0	42.6	54.0	-11.4	Low Ch 1, EUT Vertical
7337.867	29.1	13.5	1.7	167.0	3.0	0.0	Horz	AV	0.0	42.6	54.0	-11.4	Mid Ch 4, EUT Vertical
2711.958	42.7	-0.5	2.8	128.0	3.0	0.0	Horz	AV	0.0	42.2	54.0	-11.8	Low Ch 1, EUT Vertical
2751.008	42.3	-0.5	1.0	337.0	3.0	0.0	Vert	AV	0.0	41.8	54.0	-12.2	Mid Ch 4, EUT Flat
2777.400	40.9	-0.3	1.2	341.0	3.0	0.0	Vert	AV	0.0	40.6	54.0	-13.4	High Ch 12, EUT Flat
8134.217	45.0	15.2	1.0	168.0	3.0	0.0	Vert	PK	0.0	60.2	74.0	-13.8	Low Ch 1, EUT Flat

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
2751.125	40.7	-0.5	2.2	246.0	3.0	0.0	Horz	AV	0.0	40.2	54.0	-13.8	Mid Ch 4, EUT Vertical
8138.200	43.8	15.2	2.4	138.0	3.0	0.0	Vert	PK	0.0	59.0	74.0	-15.0	Low Ch 1, EUT Vertical
8138.075	43.7	15.2	2.5	166.0	3.0	0.0	Vert	PK	0.0	58.9	74.0	-15.1	Low Ch 1, EUT Horz
8134.267	43.5	15.2	2.4	184.0	3.0	0.0	Horz	PK	0.0	58.7	74.0	-15.3	Low Ch 1, EUT Vertical
8136.675	43.0	15.2	1.6	203.0	3.0	0.0	Horz	PK	0.0	58.2	74.0	-15.8	Low Ch 1, EUT Horz
8136.083	42.9	15.2	3.0	278.0	3.0	0.0	Horz	PK	0.0	58.1	74.0	-15.9	Low Ch 1, EUT Flat
9042.300	40.4	-4.4	1.5	97.0	3.0	0.0	Vert	AV	0.0	36.0	54.0	-18.0	Low Ch 1, EUT Flat
2777.958	35.9	-0.3	1.6	342.0	3.0	0.0	Horz	AV	0.0	35.6	54.0	-18.4	High Ch 12, EUT Vertical
4631.200	27.7	7.7	3.1	183.0	3.0	0.0	Vert	AV	0.0	35.4	54.0	-18.6	High Ch 12, EUT Flat
4520.383	28.2	7.1	1.6	193.0	3.0	0.0	Horz	AV	0.0	35.3	54.0	-18.7	Low Ch 1, EUT Vertical
4585.308	27.7	7.4	1.6	182.0	3.0	0.0	Horz	AV	0.0	35.1	54.0	-18.9	Mid Ch 4, EUT Vertical
4631.417	27.2	7.7	1.6	5.0	3.0	0.0	Horz	AV	0.0	34.9	54.0	-19.1	High Ch 12, EUT Vertical
4585.975	27.4	7.4	1.6	134.0	3.0	0.0	Vert	AV	0.0	34.8	54.0	-19.2	Mid Ch 4, EUT Flat
4519.058	27.4	7.1	1.6	258.0	3.0	0.0	Vert	AV	0.0	34.5	54.0	-19.5	Low Ch 1, EUT Flat
7337.842	40.6	13.5	1.6	27.0	3.0	0.0	Vert	PK	0.0	54.1	74.0	-19.9	Mid Ch 4, EUT Flat
7336.733	40.0	13.5	1.7	167.0	3.0	0.0	Horz	PK	0.0	53.5	74.0	-20.5	Mid Ch 4, EUT Vertical
8251.342	57.6	-5.4	2.0	171.0	3.0	0.0	Horz	PK	0.0	52.2	74.0	-21.8	Mid Ch 4, EUT Flat
8251.133	56.8	-5.4	1.6	268.0	3.0	0.0	Vert	PK	0.0	51.4	74.0	-22.6	Mid Ch 4, EUT Vertical
8331.800	56.5	-5.3	1.6	277.0	3.0	0.0	Vert	PK	0.0	51.2	74.0	-22.8	High Ch 12, EUT Flat
8335.933	55.7	-5.4	1.9	176.0	3.0	0.0	Horz	PK	0.0	50.3	74.0	-23.7	High Ch 12, EUT Vertical
2711.550	50.0	-0.5	1.0	323.0	3.0	0.0	Vert	PK	0.0	49.5	74.0	-24.5	Low Ch 1, EUT Flat
9042.258	53.8	-4.4	2.4	303.0	3.0	0.0	Horz	PK	0.0	49.4	74.0	-24.6	Low Ch 1, EUT Vertical
2711.617	47.8	-0.5	2.8	128.0	3.0	0.0	Horz	PK	0.0	47.3	74.0	-26.7	Low Ch 1, EUT Vertical
2750.400	47.8	-0.5	1.0	337.0	3.0	0.0	Vert	PK	0.0	47.3	74.0	-26.7	Mid Ch 4, EUT Flat
2777.250	46.9	-0.3	1.2	341.0	3.0	0.0	Vert	PK	0.0	46.6	74.0	-27.4	High Ch 12, EUT Flat
2750.508	46.5	-0.5	2.2	246.0	3.0	0.0	Horz	PK	0.0	46.0	74.0	-28.0	Mid Ch 4, EUT Vertical
4631.433	38.2	7.7	1.6	5.0	3.0	0.0	Horz	PK	0.0	45.9	74.0	-28.1	High Ch 12, EUT Vertical
4627.917	38.0	7.6	3.1	183.0	3.0	0.0	Vert	PK	0.0	45.6	74.0	-28.4	High Ch 12, EUT Flat
4517.125	38.4	7.1	1.6	258.0	3.0	0.0	Vert	PK	0.0	45.5	74.0	-28.5	Low Ch 1, EUT Flat
4584.742	38.1	7.4	1.6	134.0	3.0	0.0	Vert	PK	0.0	45.5	74.0	-28.5	Mid Ch 4, EUT Flat
4585.033	38.0	7.4	1.6	182.0	3.0	0.0	Horz	PK	0.0	45.4	74.0	-28.6	Mid Ch 4, EUT Vertical
4520.192	38.2	7.1	1.6	193.0	3.0	0.0	Horz	PK	0.0	45.3	74.0	-28.7	Low Ch 1, EUT Vertical
9038.058	49.3	-4.4	1.5	97.0	3.0	0.0	Vert	PK	0.0	44.9	74.0	-29.1	Low Ch 1, EUT Flat
2777.183	44.3	-0.3	1.6	342.0	3.0	0.0	Horz	PK	0.0	44.0	74.0	-30.0	High Ch 12, EUT Vertical

DUTY CYCLE

TEST DESCRIPTION

The Duty Cycle (x) were measured for each of the EUT operating modes. The measurements were made using a zero span on the spectrum analyzer to see the pulses in the time domain. The transmit power was set to its default maximum.

The duty cycle was calculated by dividing the transmission pulse duration (T) by the total period of a single on and total off time.

The EUT operates at 100% Duty Cycle.

OCCUPIED BANDWIDTH

XMit 2017.01.26

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	6/23/2016	6/23/2017
Attenuator	Weinschel	54A-20	TYR	11/18/2016	11/18/2017
Block - DC	Weinschel Corp.	7006	AMS	11/18/2016	11/18/2017
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	6/7/2016	6/7/2017
Generator - Signal	Agilent	N5183A	TIA	4/6/2016	4/6/2018

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was set to the channels and modes listed in the datasheet.

The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.0% occupied bandwidth was also measured at the same time which can be needed during Output Power depending on the applicable method.

OCCUPIED BANDWIDTH

NweTx 2016.09.14.2 XMit 2017.01.26

EUT:	**SEL-FT50**			**Work Order:**	**SCHW0215**
Serial Number:	**A01951775**			**Date:**	**03/06/17**
Customer:	**Schweitzer Engineering Laboratories, Inc.**			**Temperature:**	**22.2 °C**
Attendees:	**Miralem Cosic**			**Humidity:**	**28% RH**
Project:	**None**			**Barometric Pres.:**	**1011 mbar**
Tested by:	**Richard Mellroth**	**Power:**	**15 VDC**	**Job Site:**	**NC01**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2017	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

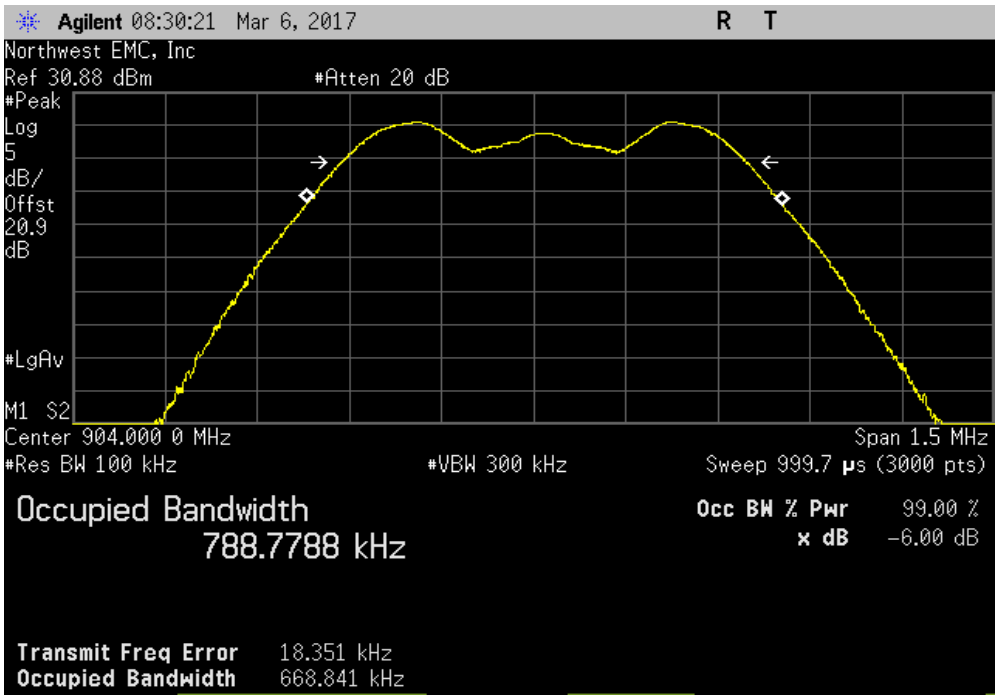
Configuration #	**1**	*Signature*

		Value	**Limit (≥)**	**Result**
FSK Modulation				
	Low Channel 1, 904 MHz	668.842 kHz	500 kHz	Pass
	Mid Channel 3, 917 MHz	667.712 kHz	500 kHz	Pass
	High Channel 12, 926 MHz	666.339 kHz	500 kHz	Pass

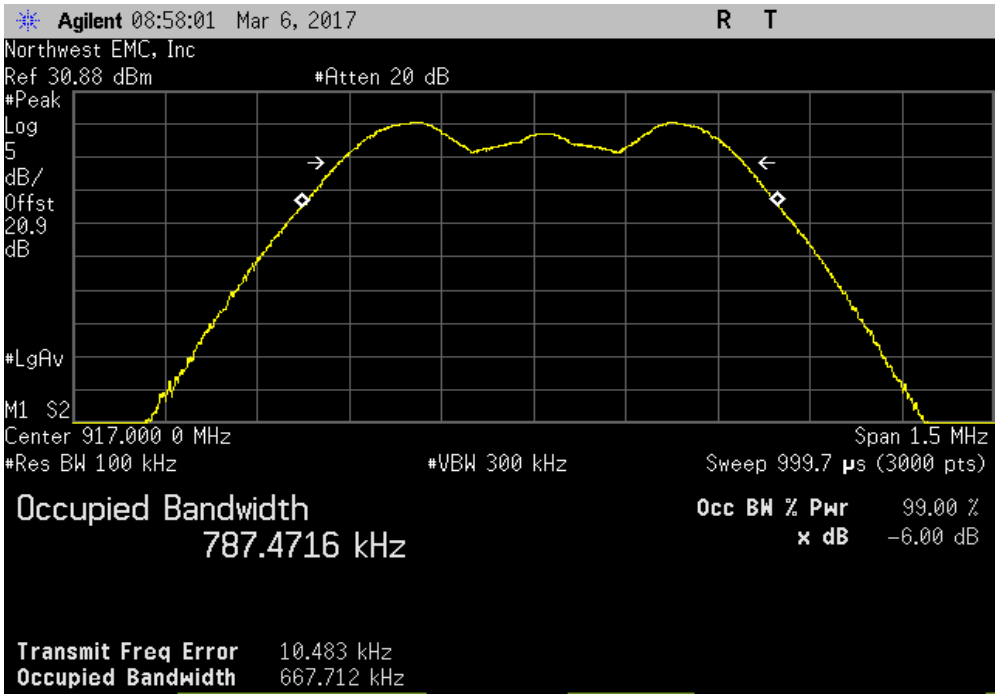
OCCUPIED BANDWIDTH

NweTx 2016.09.14.2 XMit 2017.01.26

FSK Modulation, Low Channel 1, 904 MHz						
				Value	Limit (≥)	Result
				668.842 kHz	500 kHz	Pass



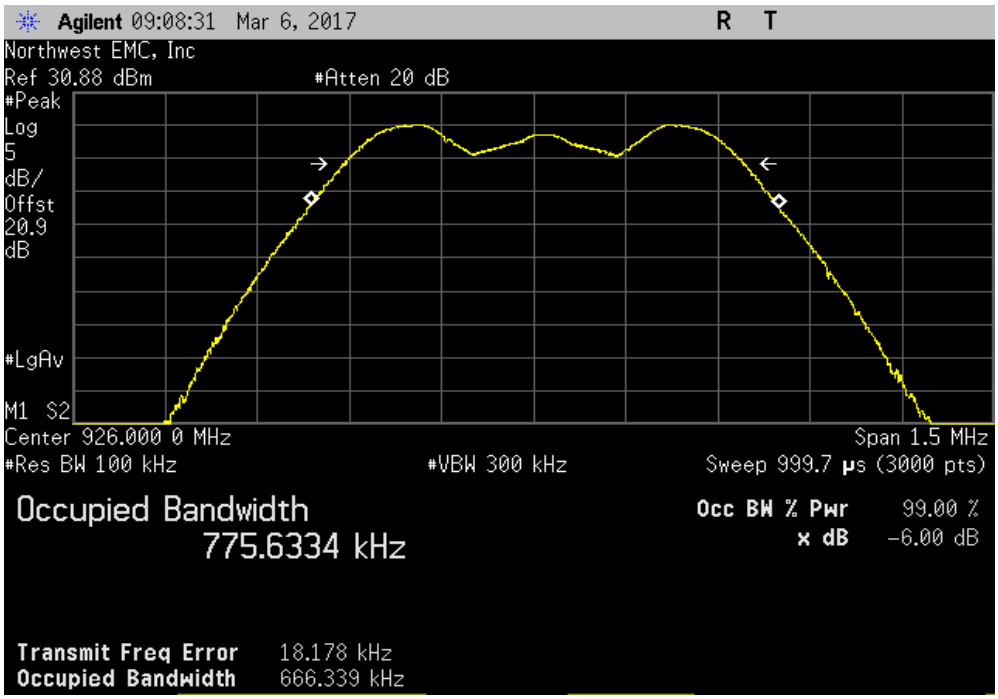
FSK Modulation, Mid Channel 3, 917 MHz						
				Value	Limit (≥)	Result
				667.712 kHz	500 kHz	Pass



OCCUPIED BANDWIDTH

NweTx 2016.09.14.2 XMit 2017.01.26

FSK Modulation, High Channel 12, 926 MHz							
					Value	Limit (≥)	Result
					666.339 kHz	500 kHz	Pass



OUTPUT POWER

XMit 2017.01.26

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	6/23/2016	6/23/2017
Attenuator	Weinschel	54A-20	TYR	11/18/2016	11/18/2017
Block - DC	Weinschel Corp.	7006	AMS	11/18/2016	11/18/2017
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	6/7/2016	6/7/2017
Generator - Signal	Agilent	N5183A	TIA	4/6/2016	4/6/2018

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The fundamental emission output power (maximum average conducted output power) was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

Prior to measuring output power; the emission bandwidth (B) and the transmission pulse duration (T) were measured. Both are required to determine the method of measuring Maximum Conducted Output Power. The transmission pulse duration (T) was measured using a zero span on the spectrum analyzer to see the pulses in the time domain.

The method AVGSA-2 in section 11.9.2.2.4 of ANSI C63.10:2013 was used to make the measurement. This method uses trace averaging across ON and OFF times of the EUT transmissions in the spectrum analyzer channel power function using an RMS detector. Following the measurement a duty cycle correction was applied by adding [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times.

De Facto EIRP Limit: The EUT meets the de facto EIRP limit of +36 dBm.

OUTPUT POWER

NweTx 2016.09.14.2 XMit 2017.01.26

EUT:	**SEL-FT50**			**Work Order:**	**SCHW0215**
Serial Number:	**A01951775**			**Date:**	**03/06/17**
Customer:	**Schweitzer Engineering Laboratories, Inc.**			**Temperature:**	**22.2 °C**
Attendees:	**Miralem Cosic**			**Humidity:**	**28.1% RH**
Project:	**None**			**Barometric Pres.:**	**1012 mbar**
Tested by:	**Richard Mellroth**	**Power:**	**15 VDC**	**Job Site:**	**NC01**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2017	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

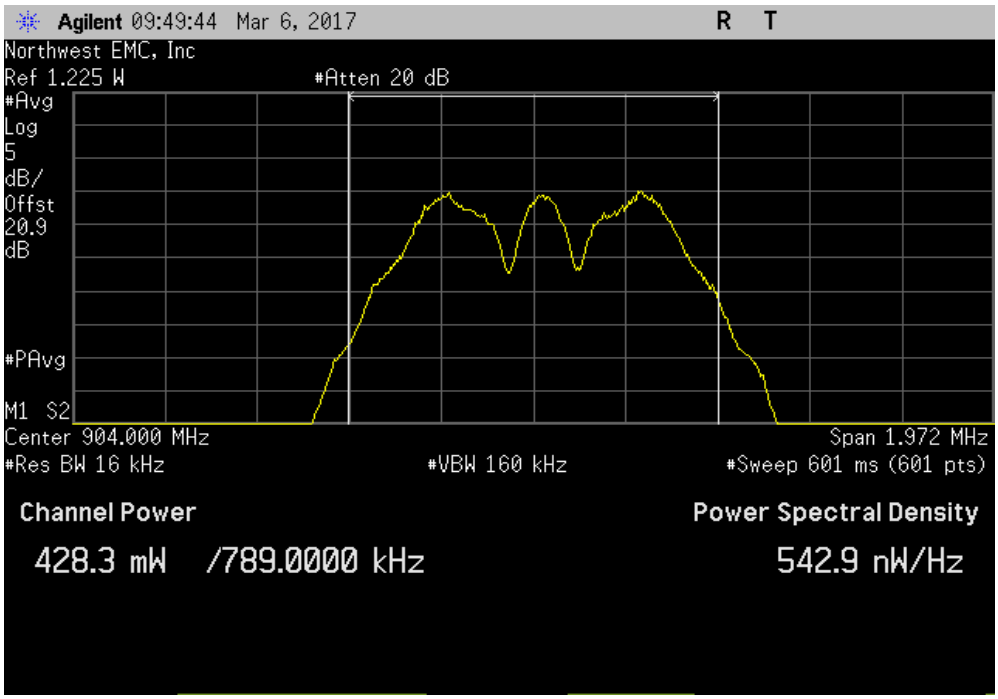
Configuration #	**1**	*Signature*

	Avg Cond Pwr (mW)	Duty Cycle Factor (dB)	Value (mW)	Limit (W)	Results
FSK Modulation					
Low Channel 1, 904 MHz	428.3	0	428.3	1	Pass
Mid Channel 3, 917 MHz	409.7	0	409.7	1	Pass
High Channel 12, 926 MHz	394.1	0	394.1	1	Pass

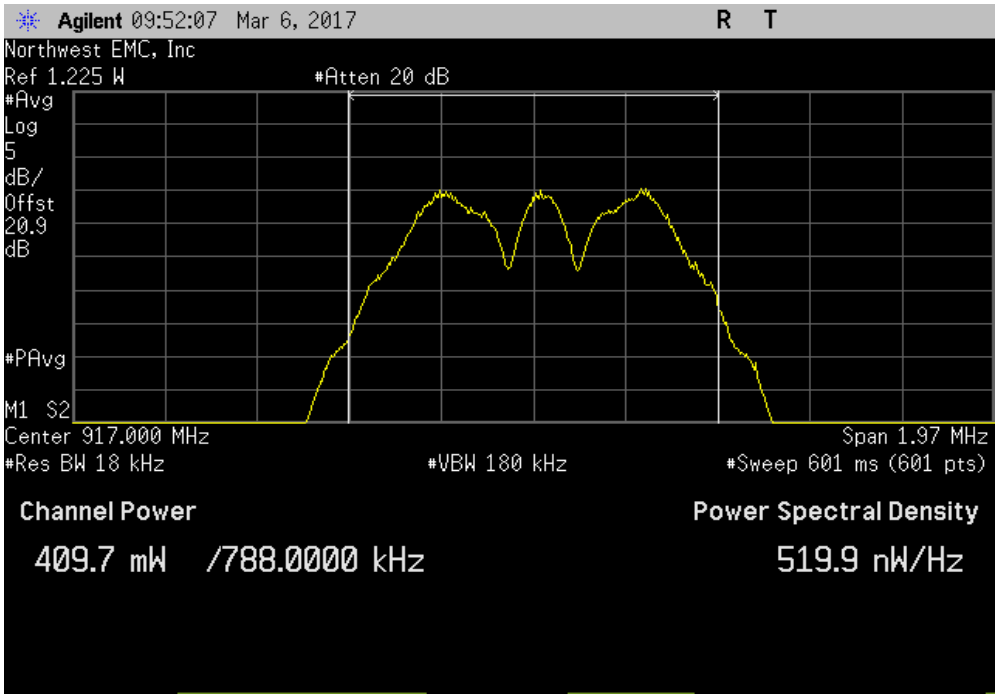
OUTPUT POWER

NweTx 2016.09.14.2 XMit 2017.01.26

FSK Modulation, Low Channel 1, 904 MHz						
	Avg Cond Pwr (mW)	Duty Cycle Factor (dB)		Value (mW)	Limit (W)	Results
	428.3	0		428.3	1	Pass



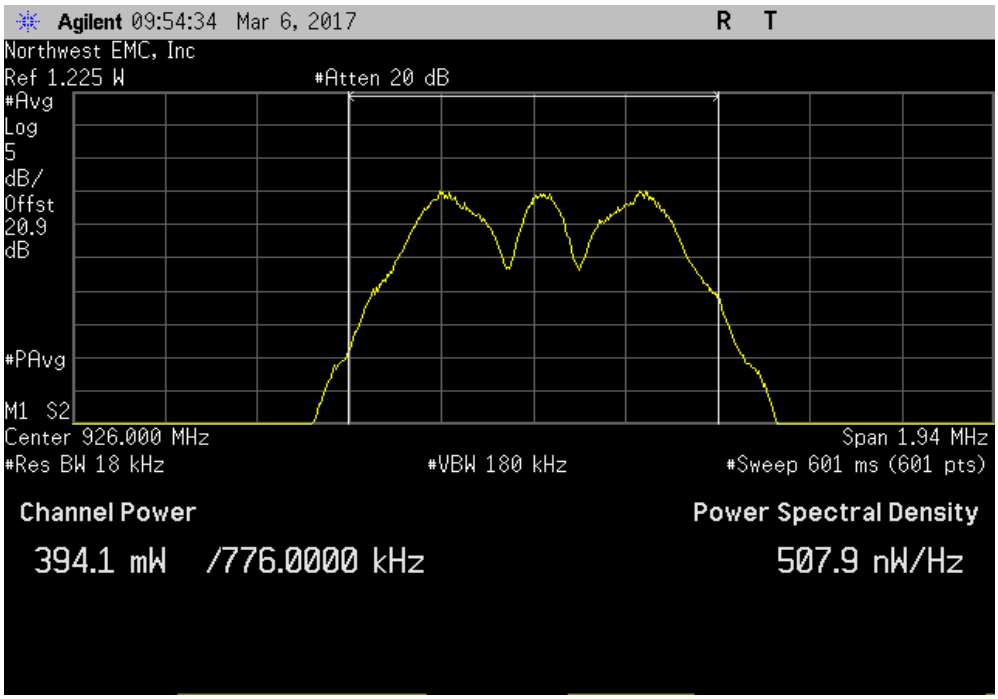
FSK Modulation, Mid Channel 3, 917 MHz						
	Avg Cond Pwr (mW)	Duty Cycle Factor (dB)		Value (mW)	Limit (W)	Results
	409.7	0		409.7	1	Pass



OUTPUT POWER

NweTx 2016.09.14.2 XMit 2017.01.26

FSK Modulation, High Channel 12, 926 MHz						
	Avg Cond Pwr (mW)	Duty Cycle Factor (dB)		Value (mW)	Limit (W)	Results
	394.1	0		394.1	1	Pass



POWER SPECTRAL DENSITY

XMit 2017.01.26

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	6/23/2016	6/23/2017
Attenuator	Weinschel	54A-20	TYR	11/18/2016	11/18/2017
Block - DC	Weinschel Corp.	7006	AMS	11/18/2016	11/18/2017
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	6/7/2016	6/7/2017
Generator - Signal	Agilent	N5183A	TIA	4/6/2016	4/6/2018

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The maximum power spectral density measurements was measured using the channels and modes as called out on the following data sheets.

Per the procedure outlined in ANSI C63.10 the power spectral density was measured in a 3 kHz RBW. Method AVGPSD-1 of FCC KDB 558074 v03r05, section 10.3 was used to determine the maximum power spectral density.

POWER SPECTRAL DENSITY

NweTx 2016.09.14.2 XMit 2017.01.26

EUT:	**SEL-FT50**			**Work Order:**	**SCHW0215**
Serial Number:	**A01951775**			**Date:**	**03/06/17**
Customer:	**Schweitzer Engineering Laboratories, Inc.**			**Temperature:**	**22.2 °C**
Attendees:	**Miralem Cosic**			**Humidity:**	**28.1% RH**
Project:	**None**			**Barometric Pres.:**	**1012 mbar**
Tested by:	**Richard Mellroth**	**Power:**	**15 VDC**	**Job Site:**	**NC01**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2017	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

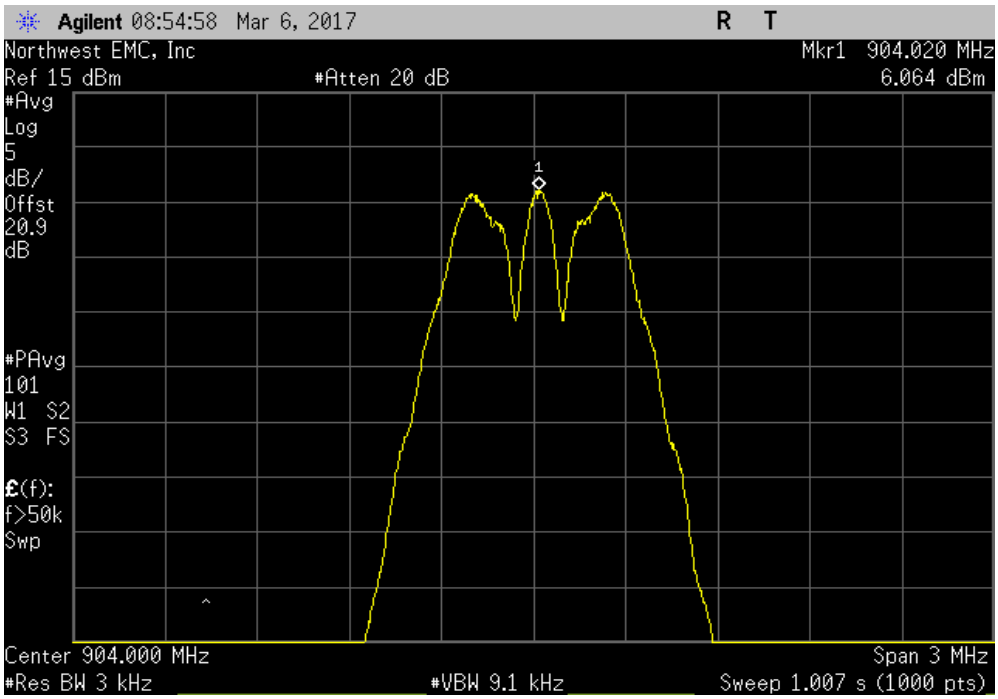
Configuration #	**1**	*Signature*

	Value dBm/3kHz	**Limit < dBm/3kHz**	**Results**
FSK Modulation			
Low Channel 1, 904 MHz	6.064	8	Pass
Mid Channel 3, 917 MHz	6.102	8	Pass
High Channel 12, 926 MHz	5.908	8	Pass

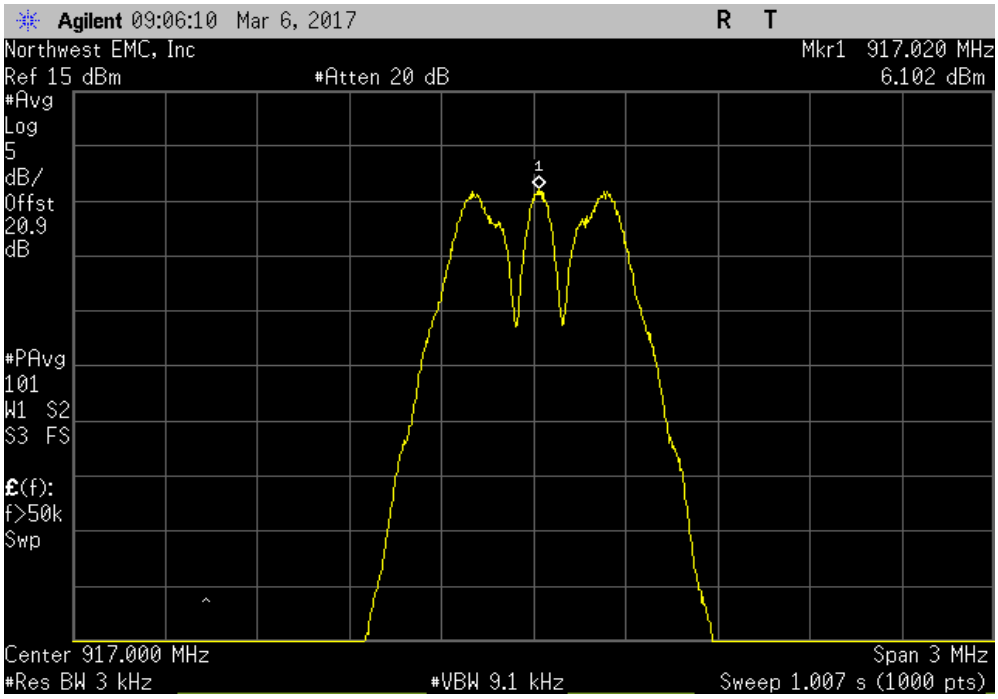
POWER SPECTRAL DENSITY

NweTx 2016.09.14.2 XMit 2017.01.26

FSK Modulation, Low Channel 1, 904 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				6.064	8	Pass



FSK Modulation, Mid Channel 3, 917 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				6.102	8	Pass



POWER SPECTRAL DENSITY

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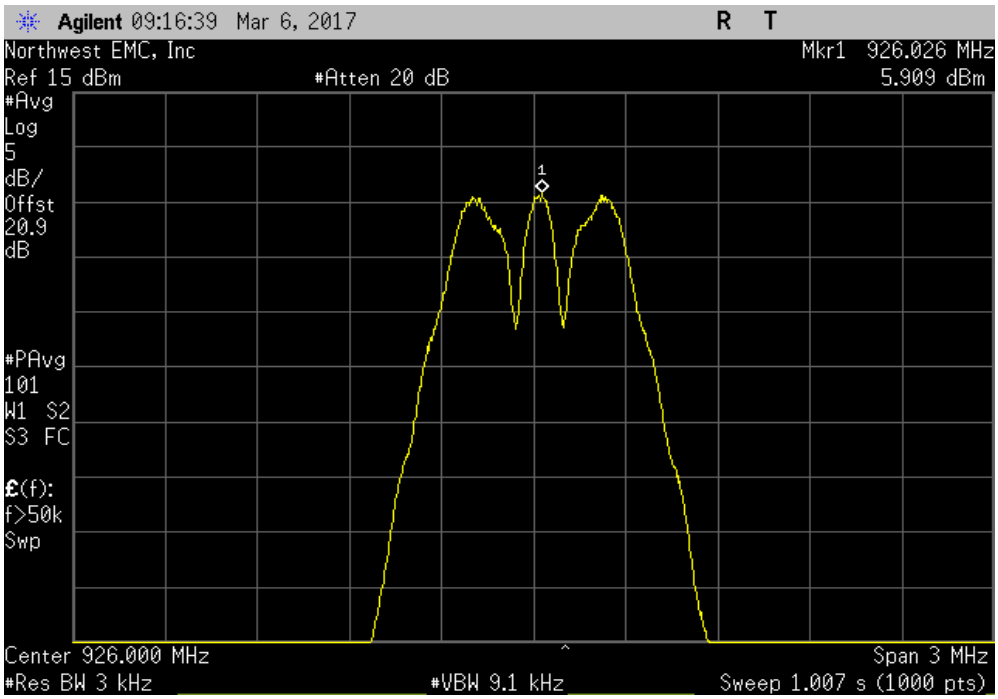
FSK Modulation, High Channel 12, 926 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				5.908	8	Pass



SPURIOUS CONDUCTED EMISSIONS

XMit 2017.01.26

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	6/23/2016	6/23/2017
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	6/7/2016	6/7/2017
Attenuator	Weinschel	54A-20	TYR	11/18/2016	11/18/2017
Block - DC	Weinschel Corp.	7006	AMS	11/18/2016	11/18/2017
Generator - Signal	Agilent	N5183A	TIA	4/6/2016	4/6/2018

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

SPURIOUS CONDUCTED EMISSIONS

NweTx 2016.09.14.2 XMit 2017.01.26

EUT:	**SEL-FT50**			**Work Order:**	**SCHW0215**
Serial Number:	**A01951775**			**Date:**	**03/06/17**
Customer:	**Schweitzer Engineering Laboratories, Inc.**			**Temperature:**	**22.3 °C**
Attendees:	**Miralem Cosic**			**Humidity:**	**28.1% RH**
Project:	**None**			**Barometric Pres.:**	**1011 mbar**
Tested by:	**Richard Mellroth**	**Power:**	**15 VDC**	**Job Site:**	**NC01**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2017	ANSI C63.10:2013

COMMENTS

None

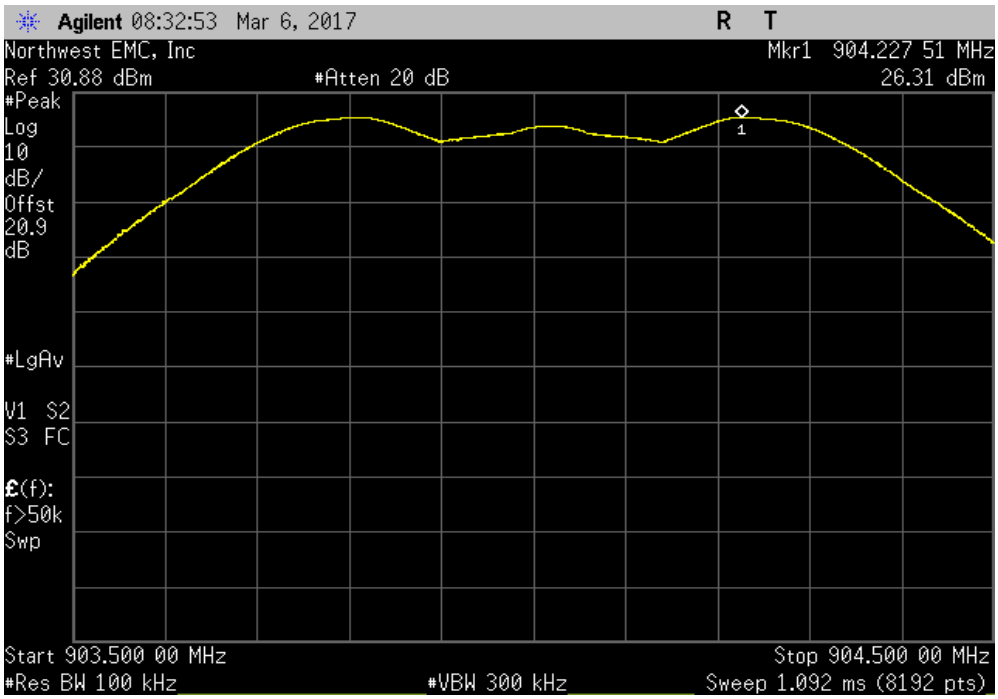
DEVIATIONS FROM TEST STANDARD

None

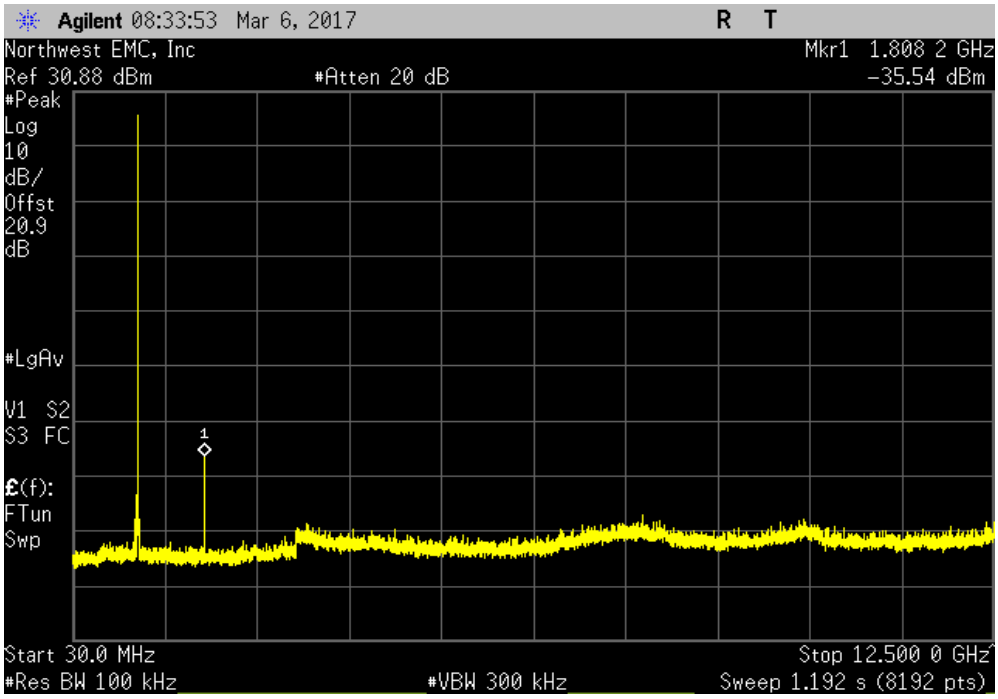
Configuration #	**1**	*Signature*

		Frequency Range	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
FSK Modulation					
	Low Channel 1, 904 MHz	Fundamental	N/A	N/A	N/A
	Low Channel 1, 904 MHz	30 MHz - 12.5 GHz	-61.85	-30	Pass
	Low Channel 1, 904 MHz	12.5 GHz - 25 GHz	-69.51	-30	Pass
	Mid Channel 3, 917 MHz	Fundamental	N/A	N/A	N/A
	Mid Channel 3, 917 MHz	30 MHz - 12.5 GHz	-65.97	-30	Pass
	Mid Channel 3, 917 MHz	12.5 GHz - 25 GHz	-69.66	-30	Pass
	High Channel 12, 926 MHz	Fundamental	N/A	N/A	N/A
	High Channel 12, 926 MHz	30 MHz - 12.5 GHz	-68.27	-30	Pass
	High Channel 12, 926 MHz	12.5 GHz - 25 GHz	-69.35	-30	Pass

FSK Modulation, Low Channel 1, 904 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



FSK Modulation, Low Channel 1, 904 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	30 MHz - 12.5 GHz			-61.85	-30	Pass



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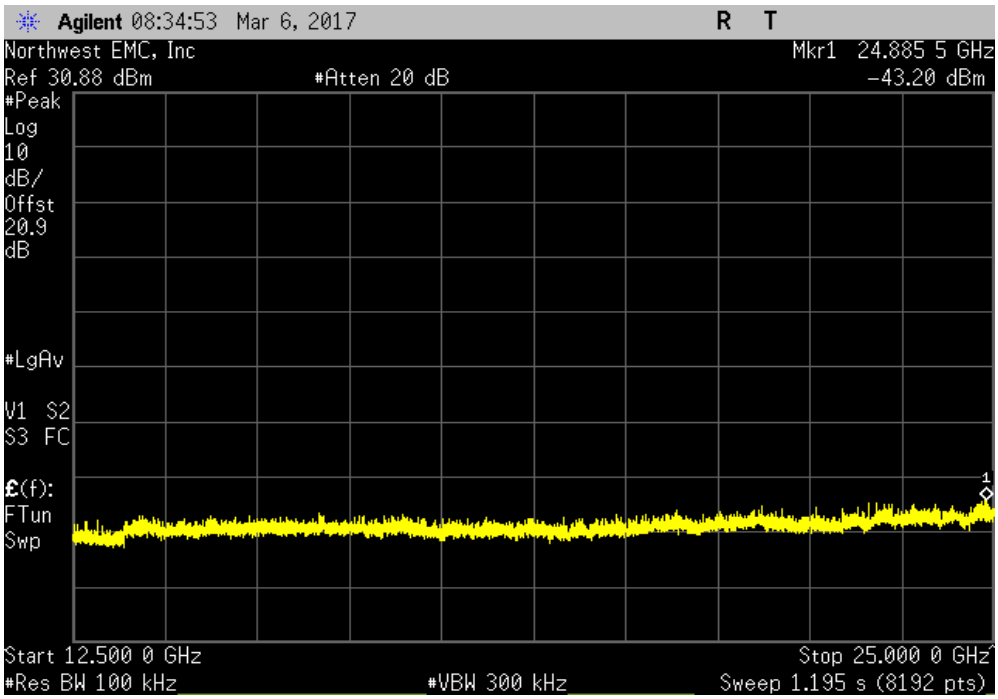
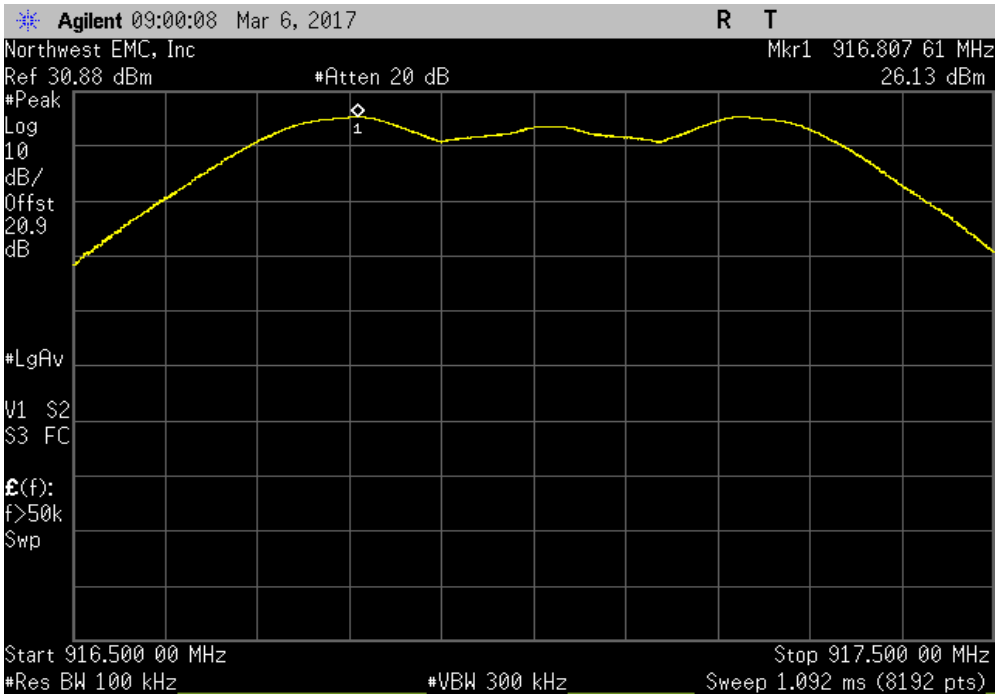
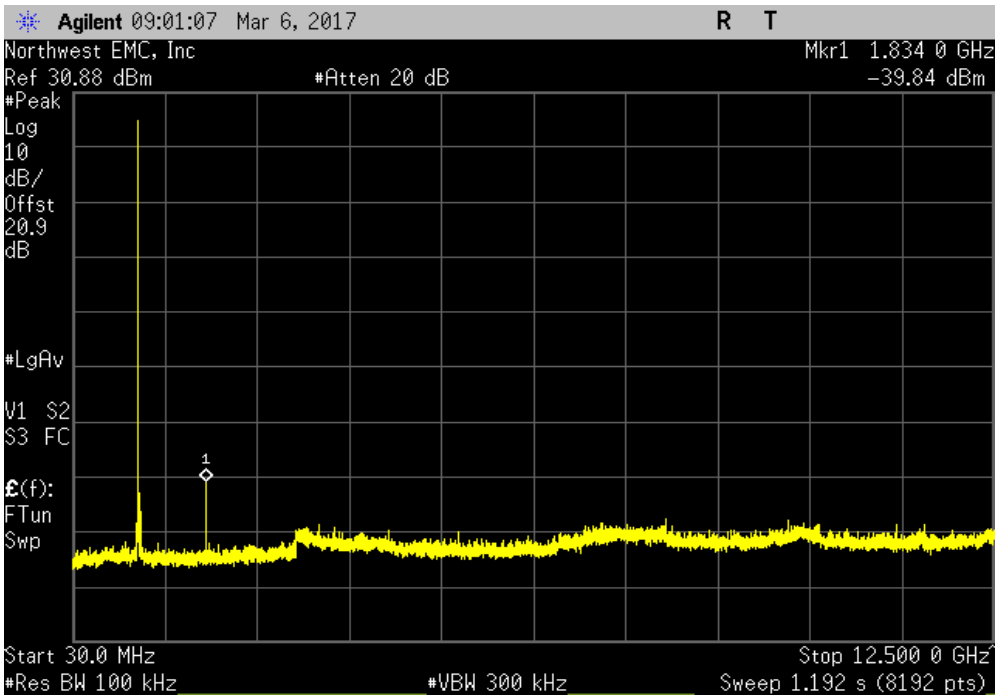
FSK Modulation, Low Channel 1, 904 MHz				
Frequency Range		Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz		-69.51	-30	Pass



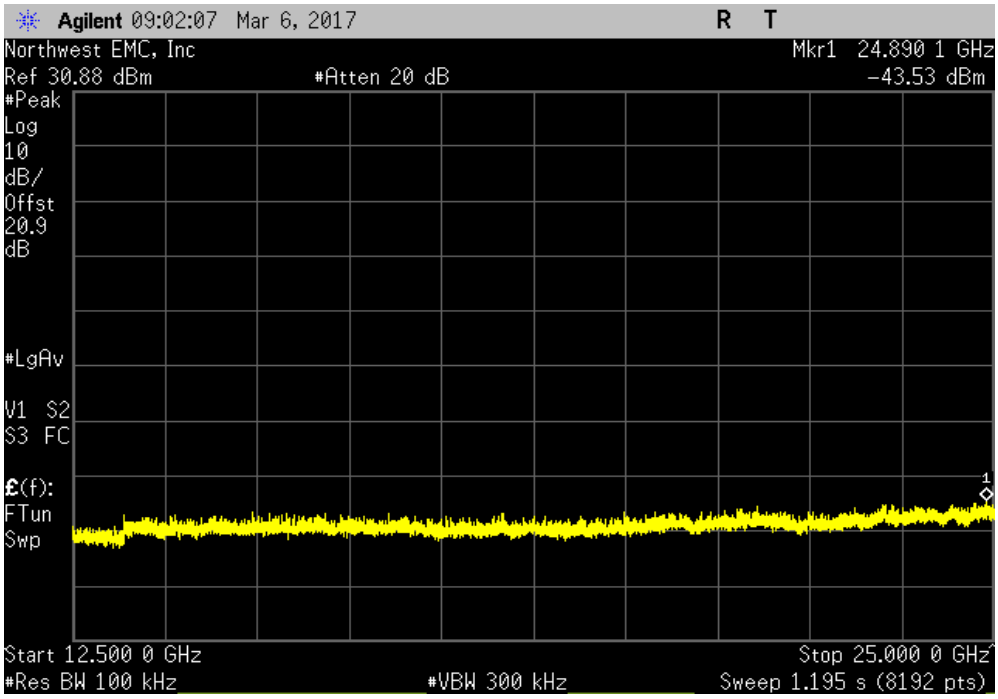
FSK Modulation, Mid Channel 3, 917 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



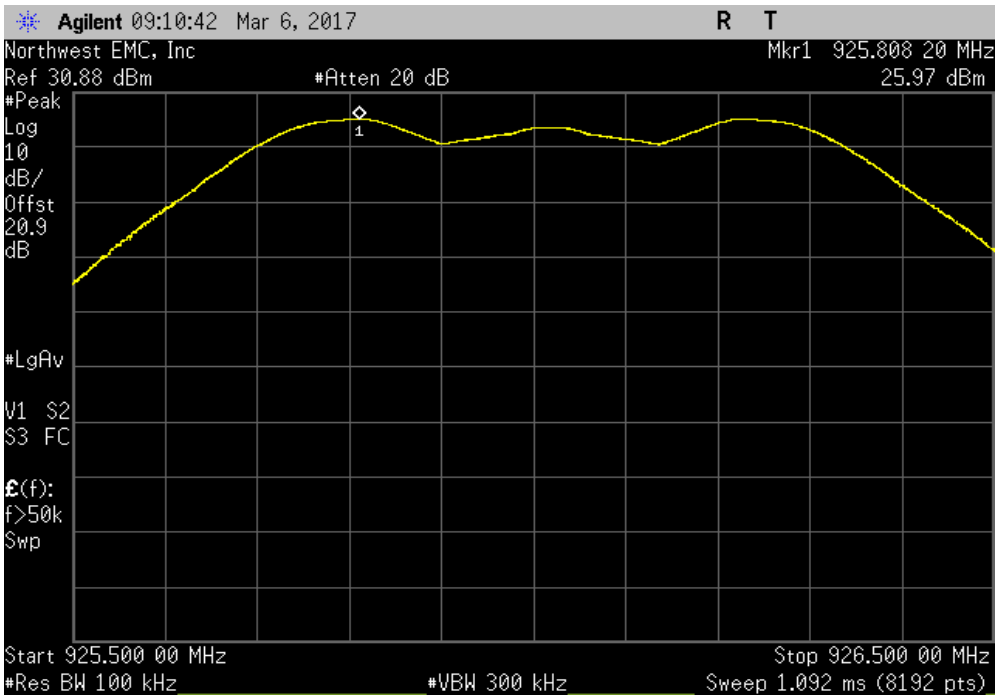
FSK Modulation, Mid Channel 3, 917 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz		-65.97	-30	Pass



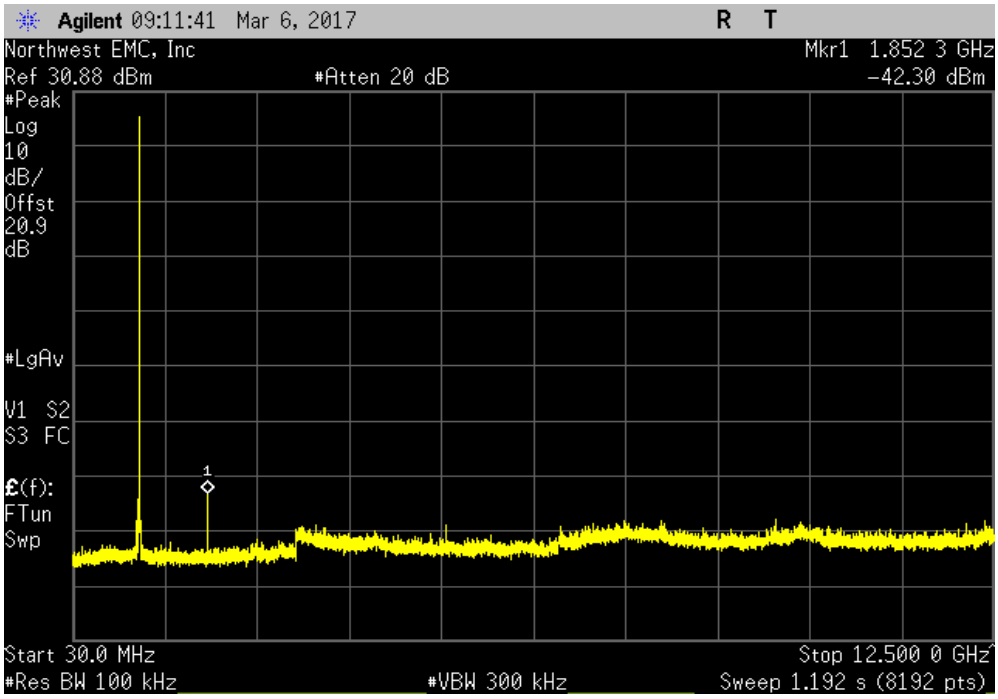
FSK Modulation, Mid Channel 3, 917 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-69.66	-30	Pass



FSK Modulation, High Channel 12, 926 MHz						
	Frequency Range			**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
	Fundamental			N/A	N/A	N/A



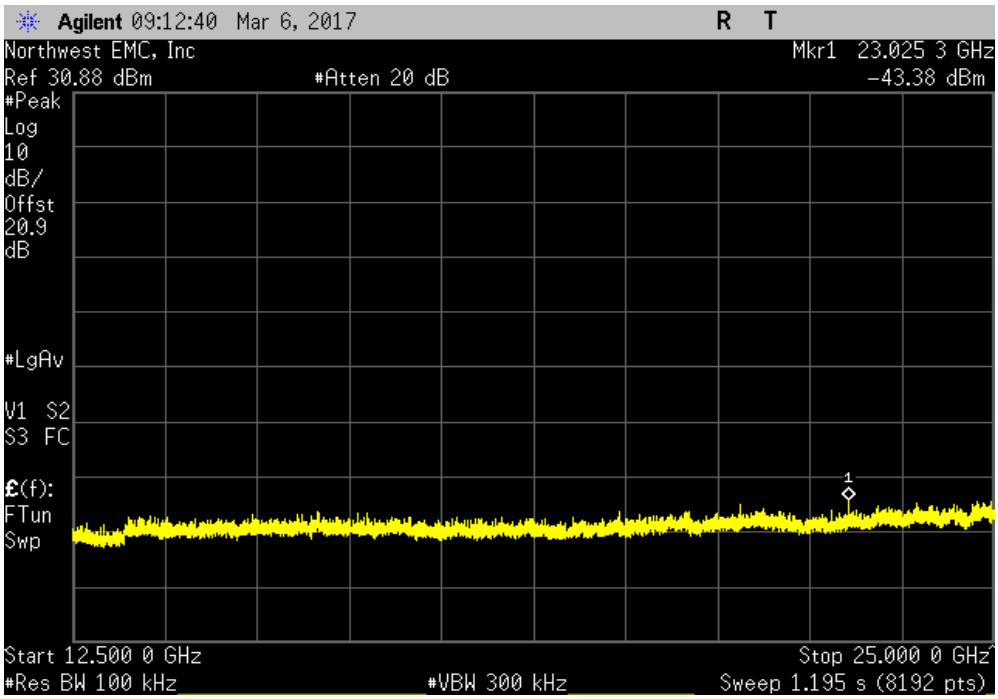
FSK Modulation, High Channel 12, 926 MHz					
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz		-68.27	-30	Pass



SPURIOUS CONDUCTED EMISSIONS

NweTx 2016.09.14.2 XMit 2017.01.26

FSK Modulation, High Channel 12, 926 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-69.35	-30	Pass



BAND EDGE COMPLIANCE

XMit 2017.01.26

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	6/23/2016	6/23/2017
Attenuator	Weinschel	54A-20	TYR	11/18/2016	11/18/2017
Block - DC	Weinschel Corp.	7006	AMS	11/18/2016	11/18/2017
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	6/7/2016	6/7/2017
Generator - Signal	Agilent	N5183A	TIA	4/6/2016	4/6/2018

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in each available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

The spectrum was scanned below the lower band edge and above the higher band edge.

An RMS detector was used to match the method called out for Output Power. Because the reference level was taken with an RMS detector, the attenuation requirement is -30 dBc.

BAND EDGE COMPLIANCE

NweTx 2016.09.14.2 XMit 2017.01.26

EUT:	**SEL-FT50**			**Work Order:**	**SCHW0215**
Serial Number:	**A01951775**			**Date:**	**03/06/17**
Customer:	**Schweitzer Engineering Laboratories, Inc.**			**Temperature:**	**22.2 °C**
Attendees:	**Miralem Cosic**			**Humidity:**	**27.9% RH**
Project:	**None**			**Barometric Pres.:**	**1011 mbar**
Tested by:	**Richard Mellroth**	**Power:**	**15 VDC**	**Job Site:**	**NC01**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2017	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

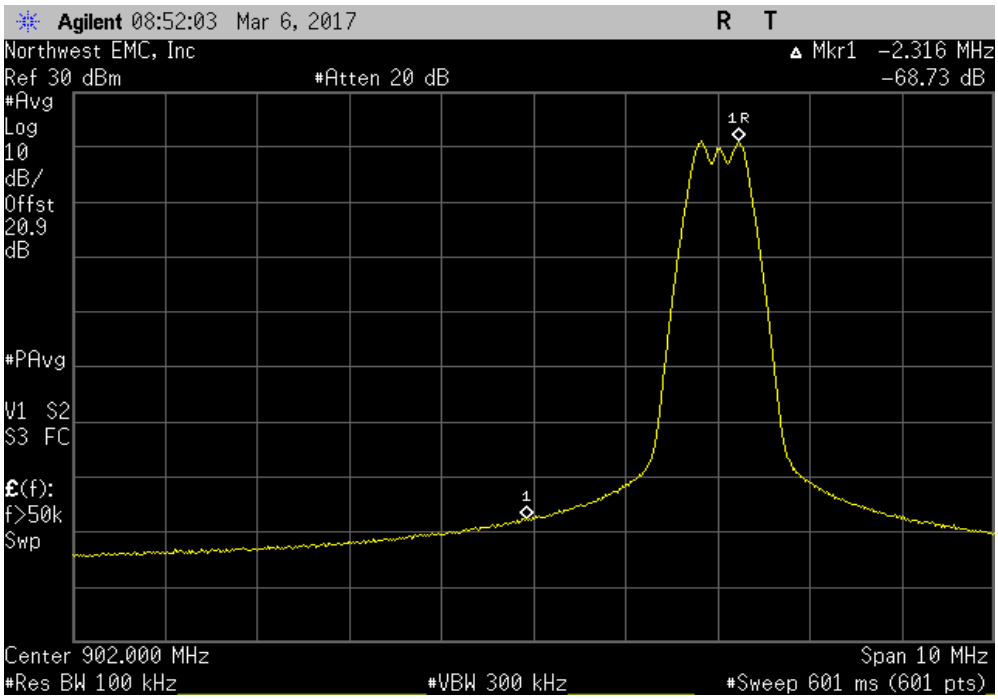
Configuration #	**1**	*Signature*

	Value (dBc)	**Limit ≤ (dBc)**	**Result**
FSK Modulation			
Low Channel 1, 904 MHz	-68.73	-30	Pass
High Channel 12, 926 MHz	-63.93	-30	Pass

BAND EDGE COMPLIANCE

NweTx 2016.09.14.2 XMit 2017.01.26

FSK Modulation, Low Channel 1, 904 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-68.73	-30	Pass



FSK Modulation, High Channel 12, 926 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-63.93	-30	Pass