



Southfork Solutions, Inc.

Advex Monitor

FCC 15.247:2017

902 - 928 MHz Other Wideband (DTS) Transceiver

Report # SOUT0001.1



NVLAP Lab Code: 200881-0



This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America. This Report shall not be reproduced, except in full without written approval of the laboratory.



CERTIFICATE OF TEST

Last Date of Test: September 8, 2017
Southfork Solutions, Inc.
Model: Advex Monitor

Radio Equipment Testing

Standards

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

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	No	N/A	Not required for a battery powered EUT.
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	
11.9.1.1	Output Power	Yes	Pass	
11.10.2	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:

A handwritten signature in blue ink.

Matt Nuernberg, 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



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 – Within Element, we have a EU Notified Body validated for the EMCD and RED Directives.

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>

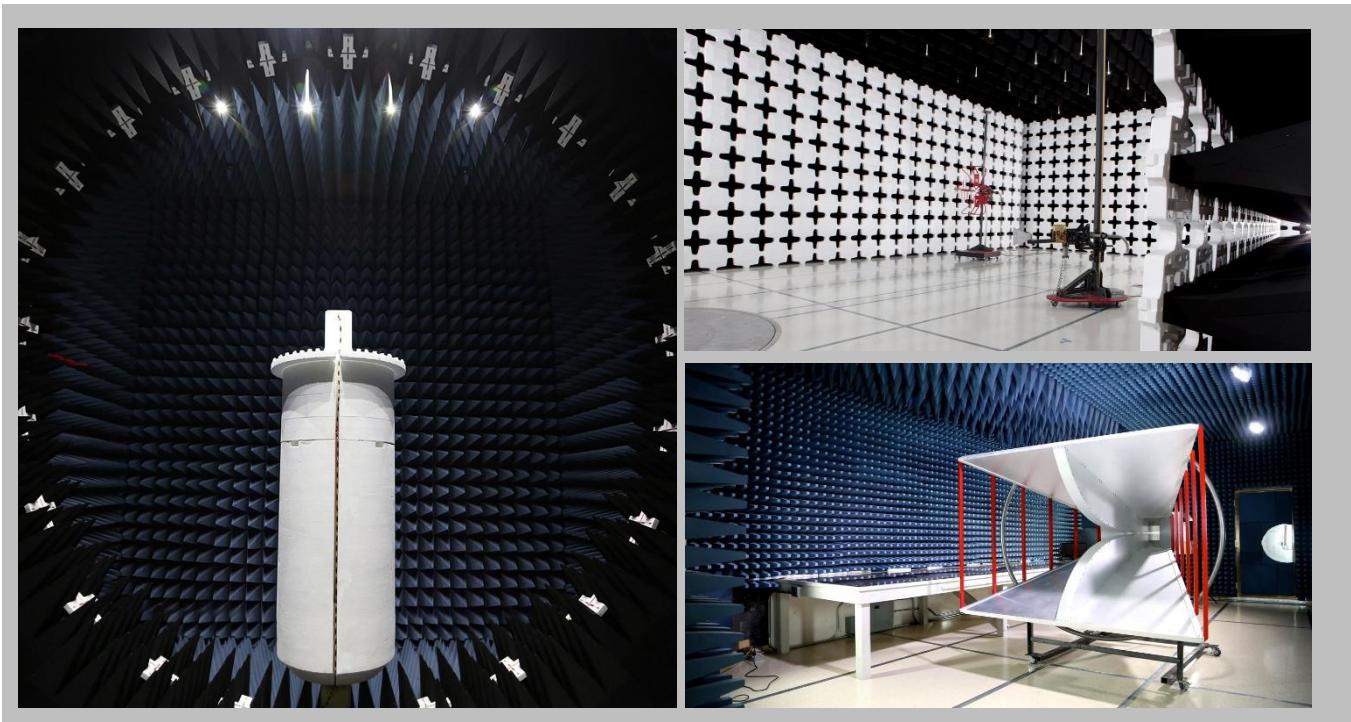
FACILITIES



2017.9.15



California Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Minnesota Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	New York Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	Oregon Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	Texas Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Washington Labs NC01-05 19201 120 th 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, 2834E-3	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



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.

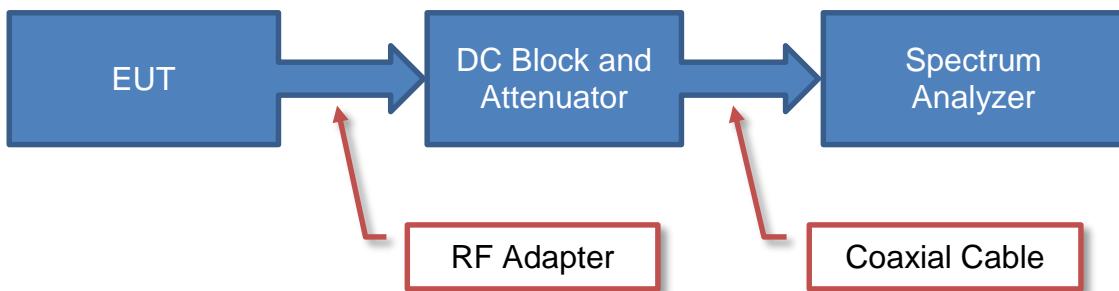
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable 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.

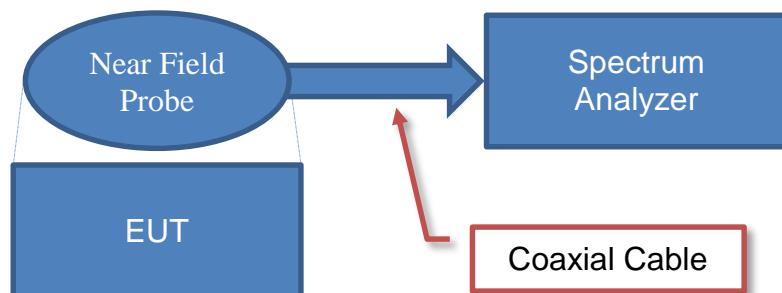
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	2.4 dB	-2.4 dB

Test Setup Block Diagrams

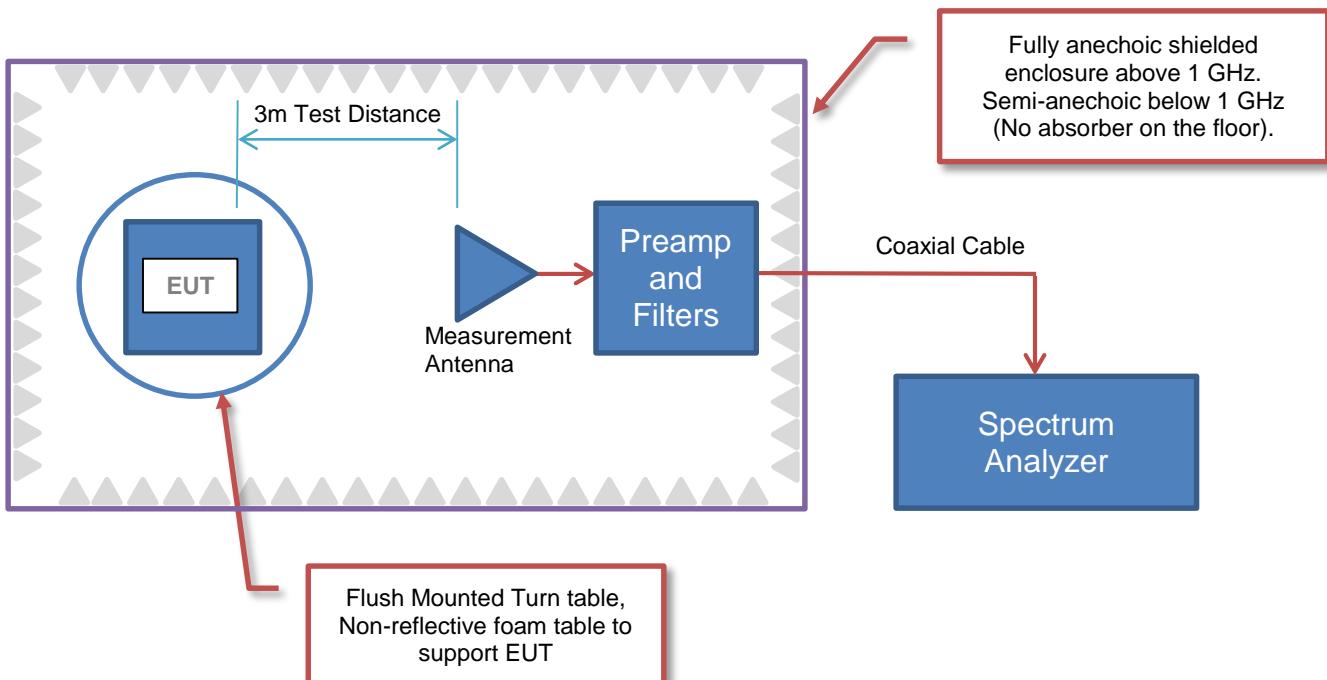
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION



Client and Equipment Under Test (EUT) Information

Company Name:	Southfork Solutions, Inc.
Address:	8021 W. 17th South
City, State, Zip:	Idaho Falls, ID 83402
Test Requested By:	Lucas Anderson
Model:	Advex Monitor
First Date of Test:	September 7, 2017
Last Date of Test:	September 8, 2017
Receipt Date of Samples:	September 7, 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 Advex Monitor will periodically wake from sleep mode and attempt to find wireless commands. If a wireless command is found the Advex Monitor will respond back with its unique asset id and optional payload data.

Testing Objective:

Seeking to demonstrate compliance under FCC 15.247:2017 for operation in the 902 - 928 MHz Band.

CONFIGURATIONS



Configuration SOUT0001- 1

Software/Firmware Running during test	
Description	Version
Firmware	gen4150kHz

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Advex Monitor	Southfork Solutions Inc.	Gen 4	83129

Configuration SOUT0001- 3

Software/Firmware Running during test	
Description	Version
Firmware	gen4150kHz

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Advex Monitor	Southfork Solutions, Inc.	Gen 4	251683437

MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	9/7/2017	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.
2	9/8/2017	Duty Cycle	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	9/8/2017	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.
4	9/8/2017	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.
5	9/8/2017	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.
6	9/8/2017	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.
7	9/8/2017	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.



PSA-ESCI 2017.06.01

SPURIOUS RADIATED EMISSIONS

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 902.5MHz

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

SOUT0001 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	18000 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
Filter - Band Pass/Notch	K&L Microwave	3TNF-500/1000-N/N	HGS	8/7/2017	12 mo
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	1/6/2017	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVV	2/14/2017	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AIQ	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	2/14/2017	12 mo
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	7/12/2017	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	0 mo
Filter - High Pass	Micro-Tronics	HPM50108	LFM	9/22/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	2/14/2017	12 mo
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	12/1/2016	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AJA	6/23/2016	24 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AVO	12/1/2016	12 mo
Cable	ESM Cable Corp.	Bilog Cables	MNH	12/1/2016	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYD	1/6/2016	24 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.

As provided the EUT operated at a 52.9% duty cycle using the testing software. A duty cycle correction factor (DCCF) has been applied to correct this to a 100% duty cycle. The formula used for this is $DCCF=10\log(100/52.9)$. In the field, the EUT operates at a 2.3% duty cycle. To account for this the formula is $DCCF=20\log(2.3/100)$. To combine the two values the formula is $DCCF=10\log(100/52.9)+20\log(2.3/100) = -30\text{dB}$.

SPURIOUS RADIATED EMISSIONS

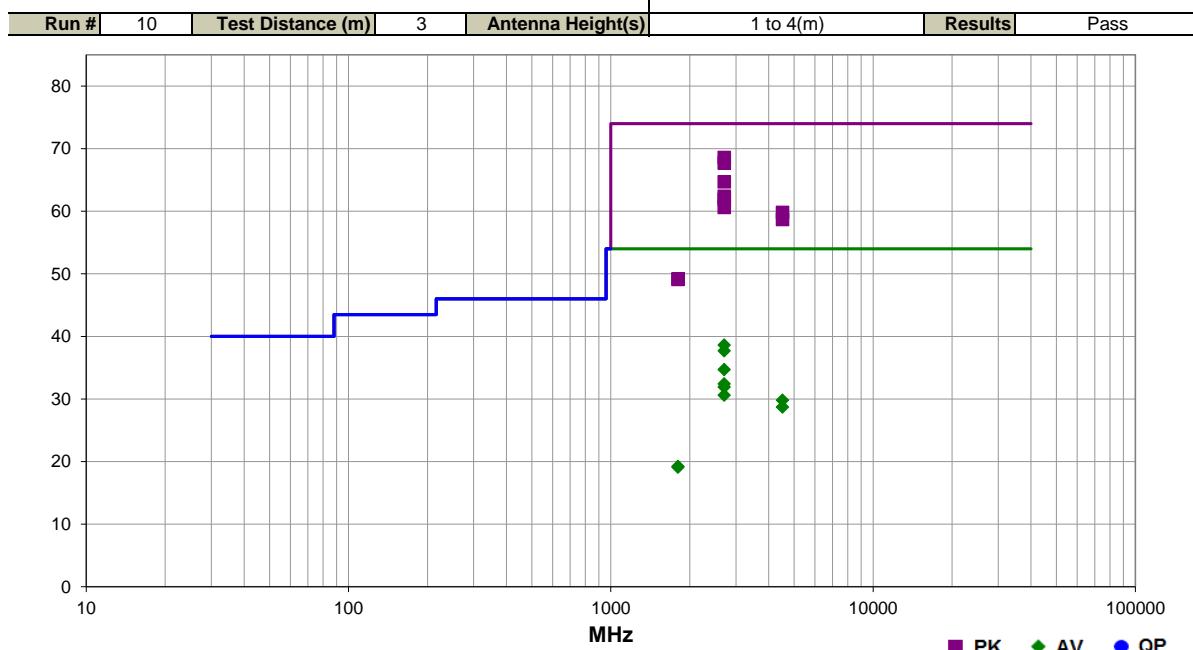


EmIR5 2017.07.11

PSA-ESCI 2017.06.01

Work Order:	SOUT0001	Date:	09/07/17	Tested by:	Chris Patterson
Project:	None	Temperature:	22.1 °C		
Job Site:	MN05	Humidity:	44.3% RH		
Serial Number:	83129	Barometric Pres.:	1019 mbar		
EUT:	Advex Monitor				
Configuration:	1				
Customer:	Southfork Solutions, Inc.				
Attendees:	Luke Anderson				
EUT Power:	Battery				
Operating Mode:	Transmitting at 902.5MHz				
Deviations:	None				
Comments:	None				

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



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2707.208	70.7	-2.1	1.0	17.0	0.0	Vert	PK	0.0	68.6	74.0	-5.4	EUT Vert	
2707.892	69.8	-2.1	1.0	229.0	0.0	Horz	PK	0.0	67.7	74.0	-6.3	EUT Horz	
2707.883	66.8	-2.1	1.0	308.9	0.0	Horz	PK	0.0	64.7	74.0	-9.3	EUT On Side	
2707.858	64.5	-2.1	1.0	336.9	0.0	Vert	PK	0.0	62.4	74.0	-11.6	EUT On Side	
2707.167	64.0	-2.1	1.3	282.0	0.0	Horz	PK	0.0	61.9	74.0	-12.1	EUT Vert	
2707.667	62.7	-2.1	1.0	157.0	0.0	Vert	PK	0.0	60.6	74.0	-13.4	EUT Horz	
4512.125	54.6	5.2	2.3	187.0	0.0	Horz	PK	0.0	59.8	74.0	-14.2	EUT Horz	
4513.108	53.5	5.2	1.0	350.0	0.0	Vert	PK	0.0	58.7	74.0	-15.3	EUT Vert	
2707.208	70.7	-2.1	1.0	17.0	-30.0	0.0	Vert	AV	0.0	38.6	54.0	-15.4	EUT Vert
2707.892	69.8	-2.1	1.0	229.0	-30.0	0.0	Horz	AV	0.0	37.7	54.0	-16.3	EUT Horz
2707.883	66.8	-2.1	1.0	308.9	-30.0	0.0	Horz	AV	0.0	34.7	54.0	-19.3	EUT On Side
2707.858	64.5	-2.1	1.0	336.9	-30.0	0.0	Vert	AV	0.0	32.4	54.0	-21.6	EUT On Side
2707.167	64.0	-2.1	1.3	282.0	-30.0	0.0	Horz	AV	0.0	31.9	54.0	-22.1	EUT Vert
2707.667	62.7	-2.1	1.0	157.0	-30.0	0.0	Vert	AV	0.0	30.6	54.0	-23.4	EUT Horz
4512.125	54.6	5.2	2.3	187.0	-30.0	0.0	Horz	AV	0.0	29.8	54.0	-24.2	EUT Horz
1805.233	53.5	-4.3	1.0	9.0	0.0	Horz	PK	0.0	49.2	74.0	-24.8	EUT Horz	
1804.833	53.4	-4.3	1.0	17.0	0.0	Vert	PK	0.0	49.1	74.0	-24.9	EUT Vert	
4513.108	53.5	5.2	1.0	350.0	-30.0	0.0	Vert	AV	0.0	28.7	54.0	-25.3	EUT Vert
1805.233	53.5	-4.3	1.0	9.0	-30.0	0.0	Horz	AV	0.0	19.2	54.0	-34.8	EUT Horz
1804.833	53.4	-4.3	1.0	17.0	-30.0	0.0	Vert	AV	0.0	19.1	54.0	-34.9	EUT Vert

DUTY CYCLE



XMit 2017.02.08

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
Generator - Signal	Agilent	E4422B	TGQ	3/17/2015	3/17/2018
Cable	ESM Cable Corp	TTBJ141 KMKM-72	MNP	NCR	NCR
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/16/2017	3/16/2018

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The Duty Cycle (x) of the single channel operation of the radio as controlled by the provided test software was measured for each of the EUT operating modes.

There is no compliance requirement to be met by this test, so therefore no Pass / Fail criteria.

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.

If the transmit duty cycle < 98 percent, burst gating may have been used during some of the other tests in this report to only take the measurement during the burst duration.

DUTY CYCLE



TbTx 2017.07.11 XMit 2017.02.08

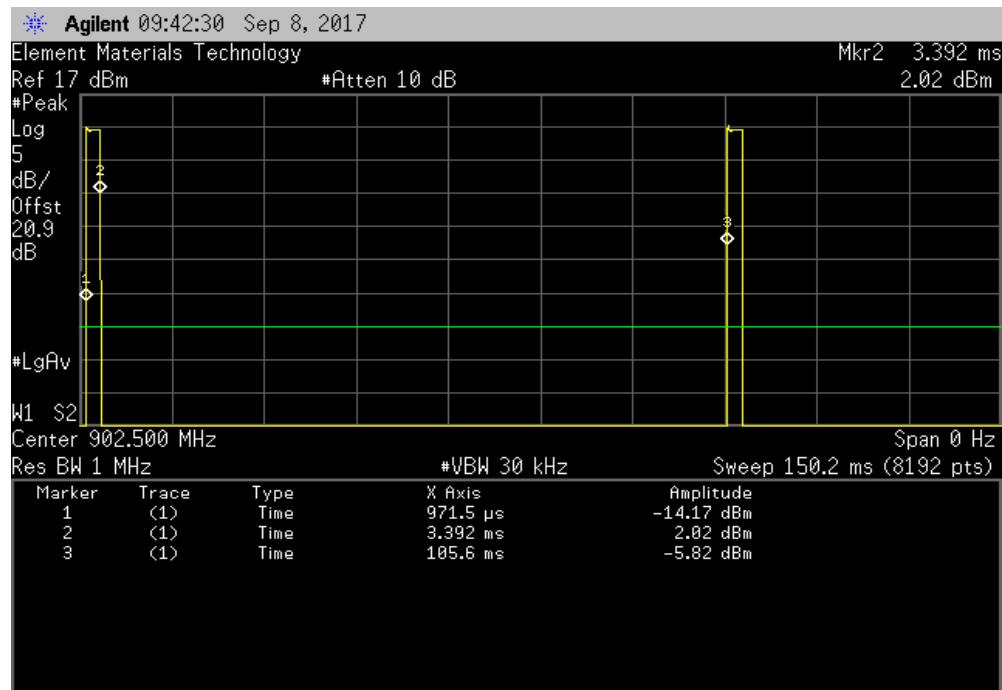
EUT:	Advex Monitor		Work Order:	SOUT0001	
Serial Number:	251683437		Date:	09/08/17	
Customer:	Southfork Solutions, Inc.		Temperature:	22.2 °C	
Attendees:	Luke Anderson		Humidity:	45.5% RH	
Project:	None		Barometric Pres.:	1026 mbar	
Tested by:	Kyle McMullan	Power:	Battery	Job Site:	MN08
TEST SPECIFICATIONS					
FCC 15.247:2017		ANSI C63.10:2013			
COMMENTS					
The Duty Cycle was measured with the EUT operating with the worst possible duty cycle that a production unit could have.					
DEVIATIONS FROM TEST STANDARD					
None					
Configuration #	3	 <i>Kyle McMullan</i> <i>Signature</i>			
		Pulse Width	Period	Number of Pulses	Value (%)
902.5 MHz		2.42 ms	104.61 ms	1	2.3
902.5 MHz		N/A	N/A	2	N/A
				Limit (%)	Results

DUTY CYCLE

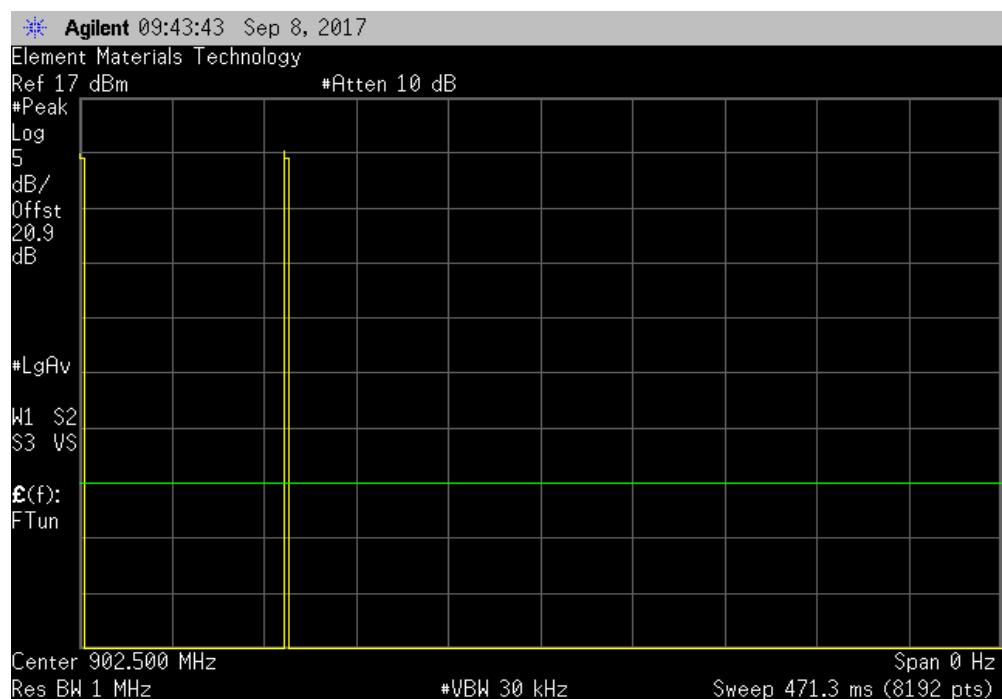


TbTx 2017.07.11 XMII 2017.02.08

902.5 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
2.42 ms	104.61 ms	1	2.3	N/A	N/A	N/A



902.5 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	2	N/A	N/A	N/A	N/A



DUTY CYCLE



XMIT 2017.02.08

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
Generator - Signal	Agilent	E4422B	TGQ	3/17/2015	3/17/2018
Cable	ESM Cable Corp	TTBJ141 KMKM-72	MNP	NCR	NCR
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/16/2017	3/16/2018

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The Duty Cycle (x) of the single channel operation of the radio as controlled by the provided test software was measured for each of the EUT operating modes.

There is no compliance requirement to be met by this test, so therefore no Pass / Fail criteria.

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.

If the transmit duty cycle < 98 percent, burst gating may have been used during some of the other tests in this report to only take the measurement during the burst duration.

DUTY CYCLE



TbTx 2017.07.11 XMit 2017.02.08

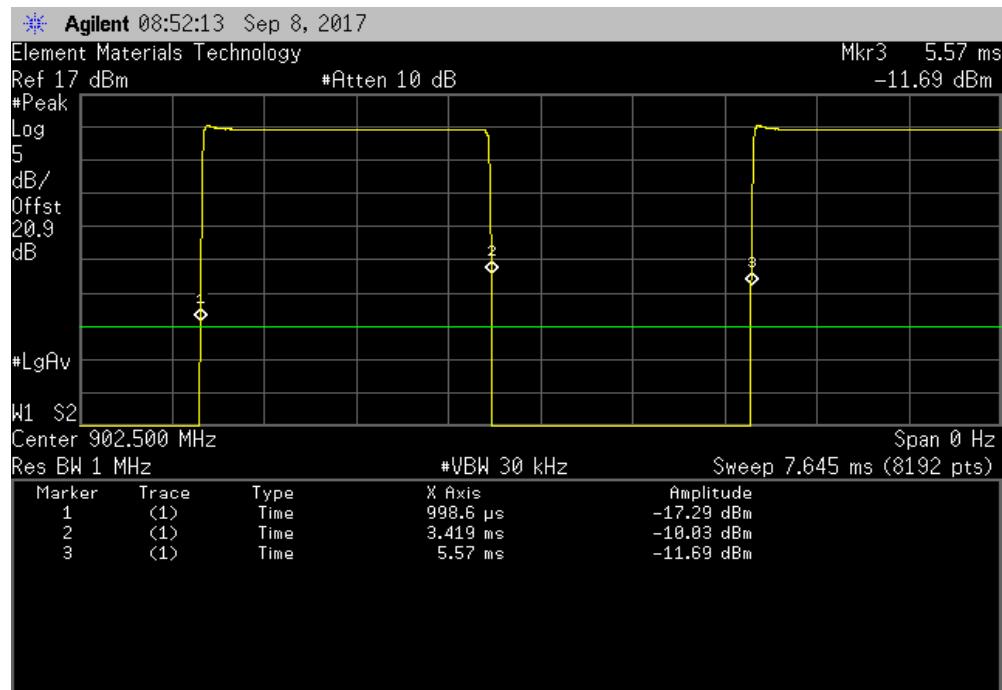
EUT:	Advex Monitor	Work Order:	SOUT0001				
Serial Number:	251683437	Date:	09/08/17				
Customer:	Southfork Solutions, Inc.	Temperature:	22.3 °C				
Attendees:	Luke Anderson	Humidity:	44.9% RH				
Project:	None	Barometric Pres.:	1026 mbar				
Tested by:	Kyle McMullan	Job Site:	MN08				
TEST SPECIFICATIONS		Test Method					
FCC 15.247:2017		ANSI C63.10:2013					
COMMENTS							
The measurement was taken using software that increased the duty cycle to an unrealist level. A level not possible for a production unit. This software was used to make it practical to measure Spurious Radiated Emissions.							
DEVIATIONS FROM TEST STANDARD							
None							
Configuration #	3	Signature					
		<i>Kyle McMullan</i>					
		Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
902.5 MHz		2.42 ms	4.572 ms	1	52.9	N/A	N/A
902.5 MHz		N/A	N/A	5	N/A	N/A	N/A

DUTY CYCLE

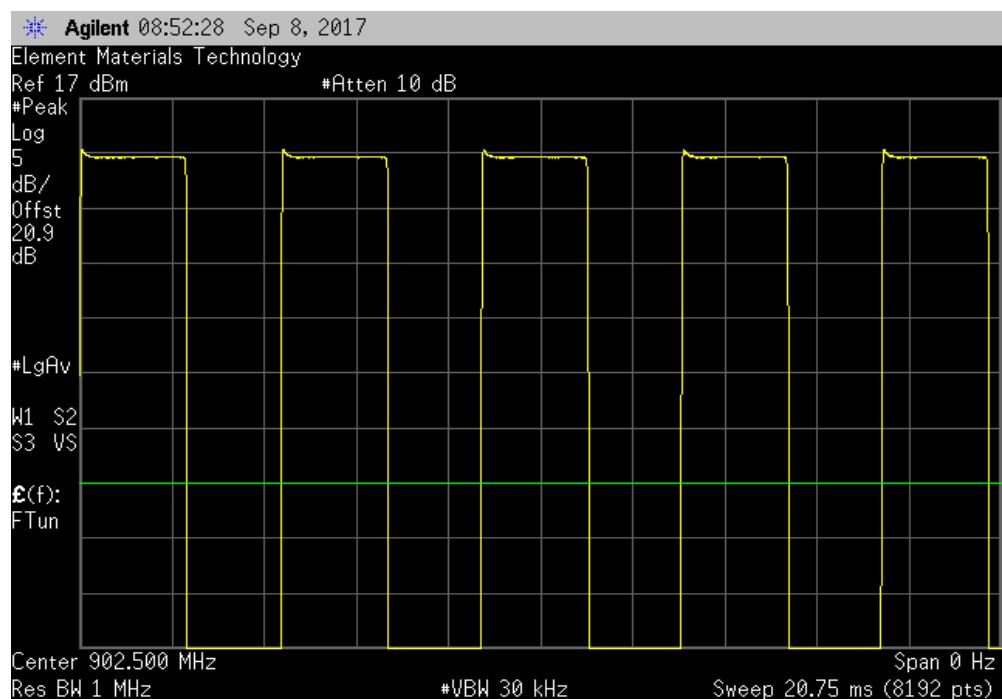


TbTx 2017.07.11 XMII 2017.02.08

902.5 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
2.42 ms	4.572 ms	1	52.9	N/A	N/A	



902.5 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	



OCCUPIED BANDWIDTH



XMIT 2017.02.08

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
Generator - Signal	Agilent	E4422B	TGQ	3/17/2015	3/17/2018
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Cable	ESM Cable Corp	TTBJ141 KMKM-72	MNP	NCR	NCR
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/16/2017	3/16/2018

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



TbTx 2017.07.11

XMit 2017.02.08

EUT:	Advex Monitor	Work Order:	SOUT0001
Serial Number:	251683437	Date:	09/08/17
Customer:	Southfork Solutions, Inc.	Temperature:	22.3 °C
Attendees:	Luke Anderson	Humidity:	44.5% RH
Project:	None	Barometric Pres.:	1026 mbar
Tested by:	Kyle McMullan	Job Site:	MN08
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2017		ANSI C63.10:2013	
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	3	 <i>Kyle McMullan</i> <i>Signature</i>	
		Value	Limit (>)
		528.167 kHz	500 kHz
		Result	
		Pass	

902.5 MHz

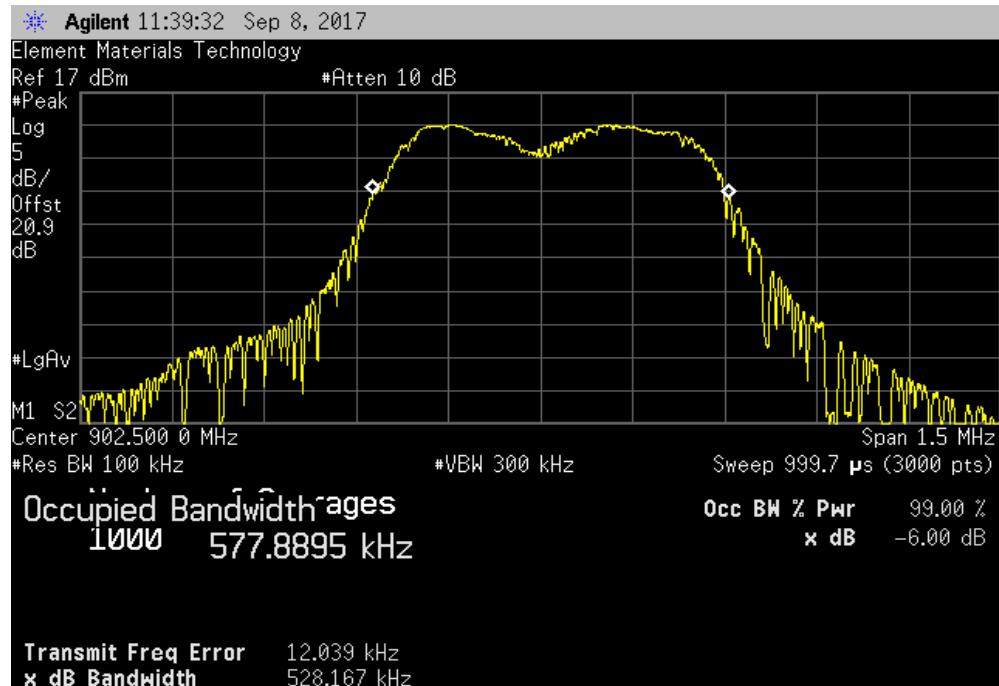
OCCUPIED BANDWIDTH



TbtTx 2017.07.11

XMit 2017.02.08

902.5 MHz				Limit		
				(>)	Value	Result
				528.167 kHz	500 kHz	Pass



OUTPUT POWER



XMit 2017.02.08

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
Generator - Signal	Agilent	E4422B	TGQ	3/17/2015	3/17/2018
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Cable	ESM Cable Corp	TTBJ141 KMKM-72	MNP	NCR	NCR
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/16/2017	3/16/2018

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum.

Prior to measuring peak transmit power the DTS bandwidth (B) was measured.

The method found in ANSI C63.10:2013 Section 11.9.1.1 was used because the RBW on the analyzer was greater than the DTS Bandwidth of the radio.

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

OUTPUT POWER



TbtTx 2017.07.11 XMit 2017.02.08

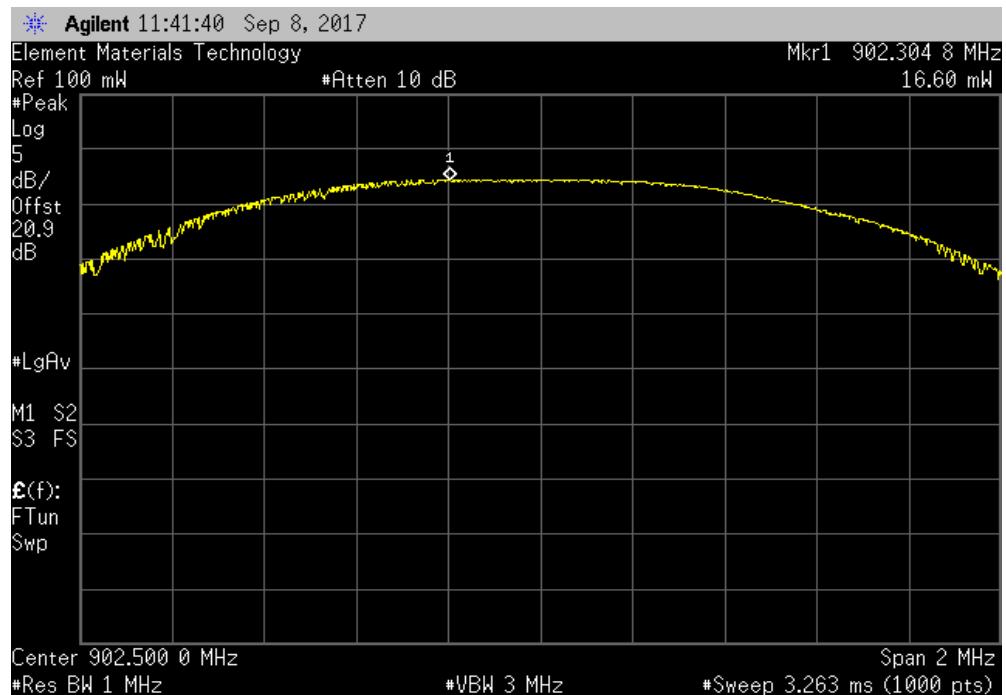
EUT:	Advex Monitor	Work Order:	SOUT0001
Serial Number:	251683437	Date:	09/08/17
Customer:	Southfork Solutions, Inc.	Temperature:	22.3 °C
Attendees:	Luke Anderson	Humidity:	44.1% RH
Project:	None	Barometric Pres.:	1026 mbar
Tested by:	Kyle McMullan	Job Site:	MN08
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2017		ANSI C63.10:2013	
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	3	 <i>Kyle McMullan</i> <i>Signature</i>	
		Value	Limit (≤)
902.5 MHz		16.60 mW	1 W
		Result	
		Pass	

OUTPUT POWER



TbTx 2017.07.11 XMII 2017.02.08

902.5 MHz		Value	Limit (<)	Result
		16.60 mW	1 W	Pass



POWER SPECTRAL DENSITY



XMit 2017.02.08

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
Generator - Signal	Agilent	E4422B	TGQ	3/17/2015	3/17/2018
Cable	ESM Cable Corp	TTBJ141 KMKM-72	MNP	NCR	NCR
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/16/2017	3/16/2018

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 peak power spectral density was measured in a 3 kHz RBW.

POWER SPECTRAL DENSITY



TbTx 2017.07.11 Xmit 2017.02.08

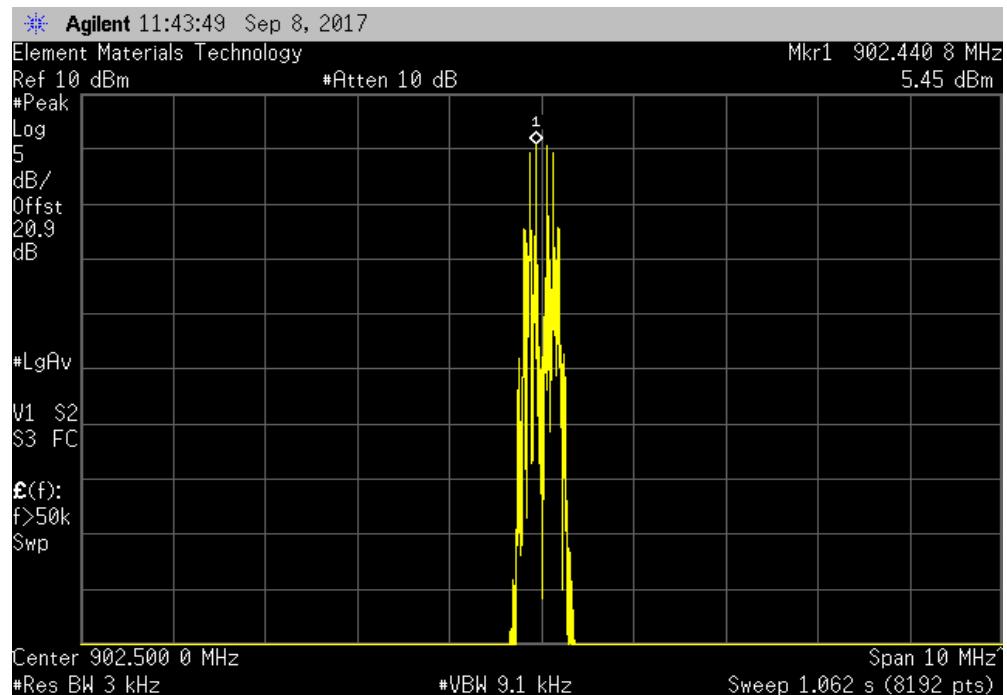
EUT:	Advex Monitor	Work Order:	SOUT0001
Serial Number:	251683437	Date:	09/08/17
Customer:	Southfork Solutions, Inc.	Temperature:	22.2 °C
Attendees:	Luke Anderson	Humidity:	43.8% RH
Project:	None	Barometric Pres.:	1026 mbar
Tested by:	Kyle McMullan	Job Site:	MN08
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2017		ANSI C63.10:2013	
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	3	 <i>Kyle McMullan</i> <small>Signature</small>	
		Value dBm/3kHz	Limit < dBm/3kHz
902.5 MHz		5.45	8
		Results	
		Pass	

POWER SPECTRAL DENSITY



TbTx 2017.07.11 XMII 2017.02.08

902.5 MHz				Value dBm/3kHz	Limit < dBm/3kHz	Results
				5.45	8	Pass



SPURIOUS CONDUCTED EMISSIONS



XMit 2017.02.08

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
Generator - Signal	Agilent	E4422B	TGQ	3/17/2015	3/17/2018
Cable	ESM Cable Corp	TTBJ141 KMKM-72	MNP	NCR	NCR
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/16/2017	3/16/2018

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



TbTx 2017.07.11

XMit 2017.02.08

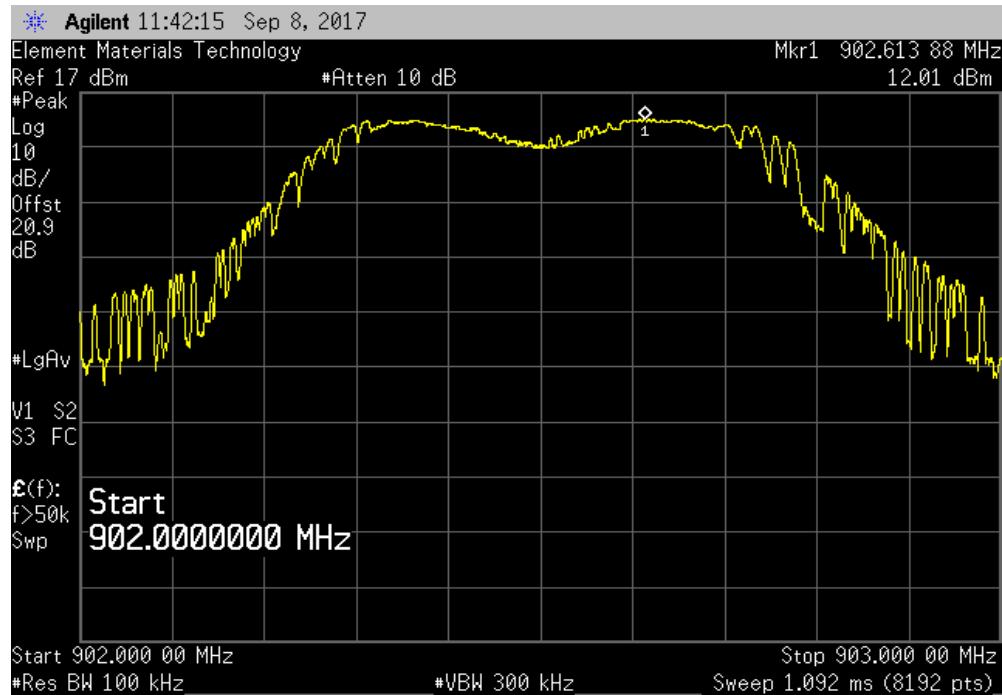
EUT: Advex Monitor	Work Order: SOUT0001		
Serial Number: 251683437	Date: 09/08/17		
Customer: Southfork Solutions, Inc.	Temperature: 22.2 °C		
Attendee: Luke Anderson	Humidity: 43.8% RH		
Project: None	Barometric Pres.: 1026 mbar		
Tested by: Kyle McMullan	Job Site: MN08		
TEST SPECIFICATIONS			
FCC 15.247:2017	Test Method: ANSI C63.10:2013		
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	3	Signature:	
Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result
Fundamental 30 MHz - 12 GHz	N/A -41.84	N/A -20	N/A Pass
902.5 MHz			
902.5 MHz			

SPURIOUS CONDUCTED EMISSIONS

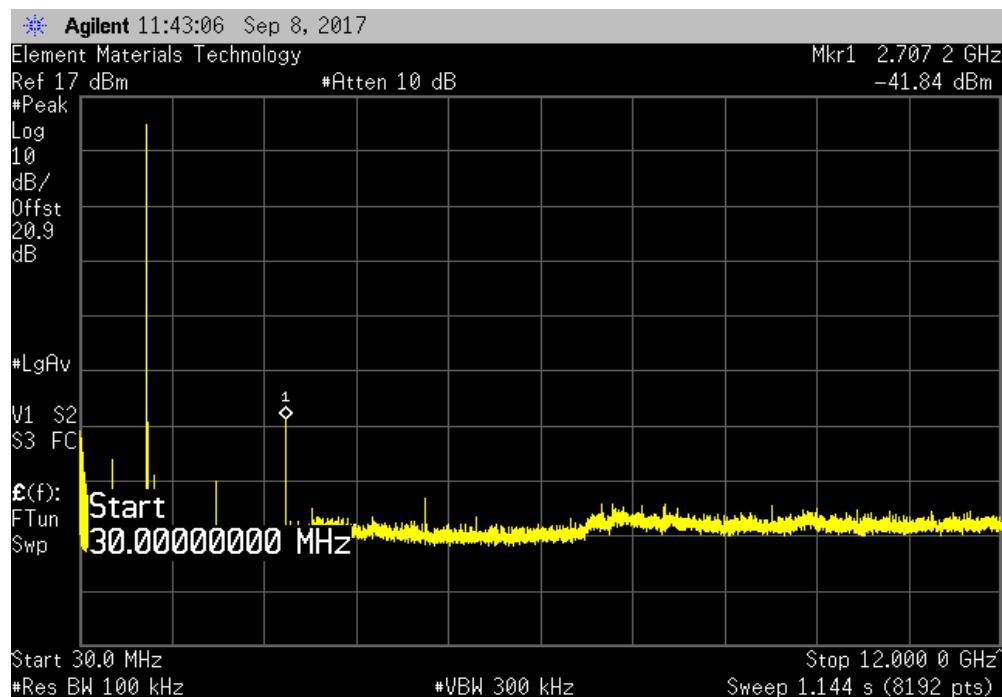


TbTx 2017.07.11 XMII 2017.02.08

902.5 MHz		Max Value (dBc)	Limit ≤ (dBc)	Result
Frequency Range	Fundamental	N/A	N/A	N/A



902.5 MHz		Max Value (dBc)	Limit ≤ (dBc)	Result
Frequency Range	30 MHz - 12 GHz	-41.84	-20	Pass



BAND EDGE COMPLIANCE



XMit 2017.02.08

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
Generator - Signal	Agilent	E4422B	TGQ	3/17/2015	3/17/2018
Cable	ESM Cable Corp	TTBJ141 KMKM-72	MNP	NCR	NCR
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/16/2017	3/16/2018

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.

BAND EDGE COMPLIANCE



TbTx 2017.07.11 XMit 2017.02.08

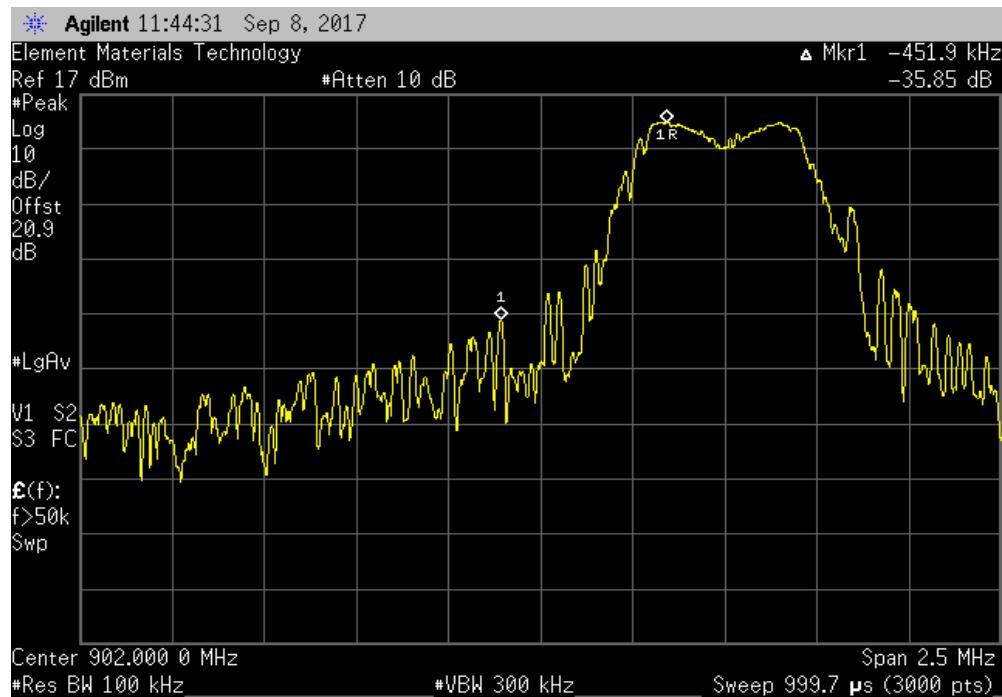
EUT:	Advex Monitor	Work Order:	SOUT001	
Serial Number:	251683437	Date:	09/08/17	
Customer:	Southfork Solutions, Inc.	Temperature:	22.2 °C	
Attendees:	Luke Anderson	Humidity:	43.5% RH	
Project:	None	Barometric Pres.:	1026 mbar	
Tested by:	Kyle McMullan	Power:	Battery	
TEST SPECIFICATIONS		Test Method		
FCC 15.247:2017		ANSI C63.10:2013		
COMMENTS				
None				
DEVIATIONS FROM TEST STANDARD				
None				
Configuration #	3	 <i>Kyle McMullan</i> <i>Signature</i>		
		Value (dBc)	Limit ≤ (dBc)	
Low Band, 902.5 MHz		-35.85	-20	Pass
High Band, 902.5 MHz		-73.9	-20	Pass

BAND EDGE COMPLIANCE



TbTx 2017.07.11 XMII 2017.02.08

Low Band, 902.5 MHz		
	Value (dBc)	Limit ≤ (dBc)
	-35.85	-20



High Band, 902.5 MHz		
	Value (dBc)	Limit ≤ (dBc)
	-73.9	-20

