NORTHWEST EMC

Exigent Sensors LLC

Bedshaker 520, model number CFBS520

FCC 15.247:2016

Report # EXIG0005

NVLAP Lab Code: 200676-0

CERTIFICATE OF TEST

NORTHWEST EMC
2014-12-10

Last Date of Test: January 12, 2016
Exigent Sensors LLC
Model: Bedshaker 520, model number CFBS520

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2016	ANSI C63.10:2013

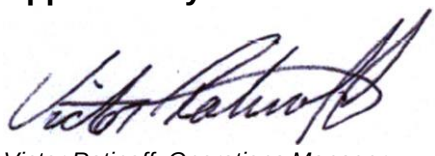
Results

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:



Victor Ratinoff, 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

NORTHWEST EMC
REV 2014.10.14

Revision Number	Description	Date	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

REV 2015.2.19

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 Northwest EMC to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

IC - Recognized by Industry Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with IC.

European Union

European Commission – Validated by the European Commission as a Conformity Assessment Body (CAB) under the EMC directive and 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://www.nwemc.com/accreditations/
http://gsi.nist.gov/global/docs/cabs/designations.html

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 WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) for each test is on each data sheet. 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.

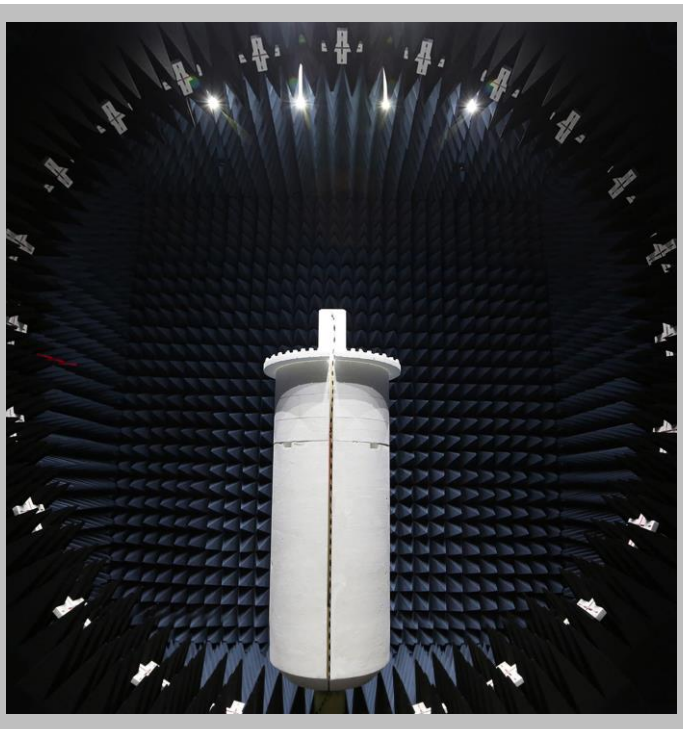
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

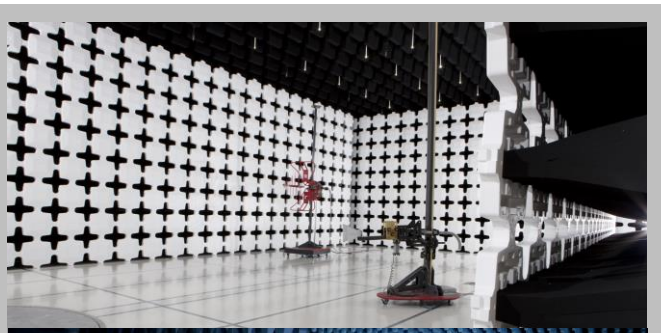
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%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

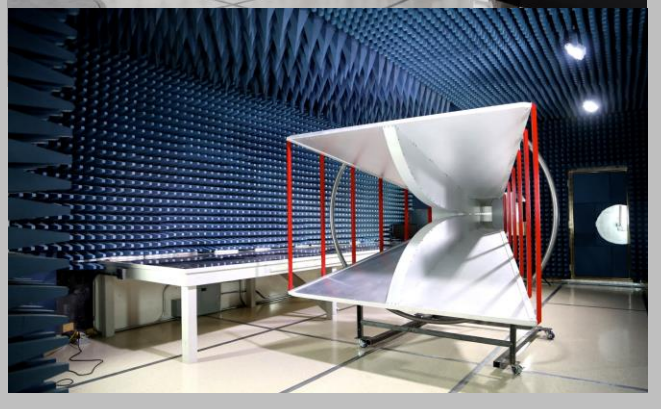
FACILITIES

NORTHWEST EMC
REV 2015.2.19

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
Industry 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







PRODUCT DESCRIPTION

2014-12-10

Client and Equipment Under Test (EUT) Information

Company Name:	Exigent Sensors LLC
Address:	11331 Markon Drive
City, State, Zip:	Garden Grove, CA 92841
Test Requested By:	Chad Christensen
Model:	Bedshaker 520, model number CFBS520
First Date of Test:	January 11, 2016
Last Date of Test:	January 12, 2016
Receipt Date of Samples:	January 11, 2016
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
The device is a 902 MHz – 928 MHz DTS radio with duty cycle sharing on two channels.

Testing Objective:
Seeking to demonstrate compliance under FCC 15.247:2016 for operation in the 902 - 928 MHz Band.

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration EXIG0005- 1

Software/Firmware Running during test	
Description	**Version**
Test Software	FCC_TST_SW_1-11-2016

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Bedshaker 520	Exigent Sensors LLC	CFBS520	Sample 1

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Interconnecting Cable	No	1.5m	No	Base unit (hardwired)	Shaker (hardwired)

MODIFICATIONS

NORTHWEST EMC
2014-12-10

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	1/11/2016	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
2	1/12/2016	Duty Cycle	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
3	1/12/2016	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
4	1/12/2016	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
5	1/12/2016	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
6	1/12/2016	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
7	1/12/2016	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

DUTY CYCLE

XMit 2015.01.14

TEST DESCRIPTION

The Duty Cycle (x) of the DTS 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. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used

The test software provided for operation in a fixed, single channel mode allows the EUT to operate continuously at 100% Duty Cycle.

In real world application, the unit will be limited to a maximum Duty Cycle of <50% (50.417ms on time, in any 100ms period) on each of the two available operating frequencies.

DUTY CYCLE

NORTHWEST EMC

XMit 2015.01.14

EUT:	**Bedshaker 520, model number CFBS520**			**Work Order:**	**EXIG0005**
Serial Number:	**Sample 1**			**Date:**	**01/12/16**
Customer:	**Exigent Sensors LLC**			**Temperature:**	**18.6°C**
Attendees:	**Chad Christensen**			**Humidity:**	**37%**
Project:	**None**			**Barometric Pres.:**	**1023.3**
Tested by:	**Johnny Candelas & Mike Tran**	**Power:**	**Battery**	**Job Site:**	**OC13**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

Unit was set to normal real worl operating mode

DEVIATIONS FROM TEST STANDARD

None

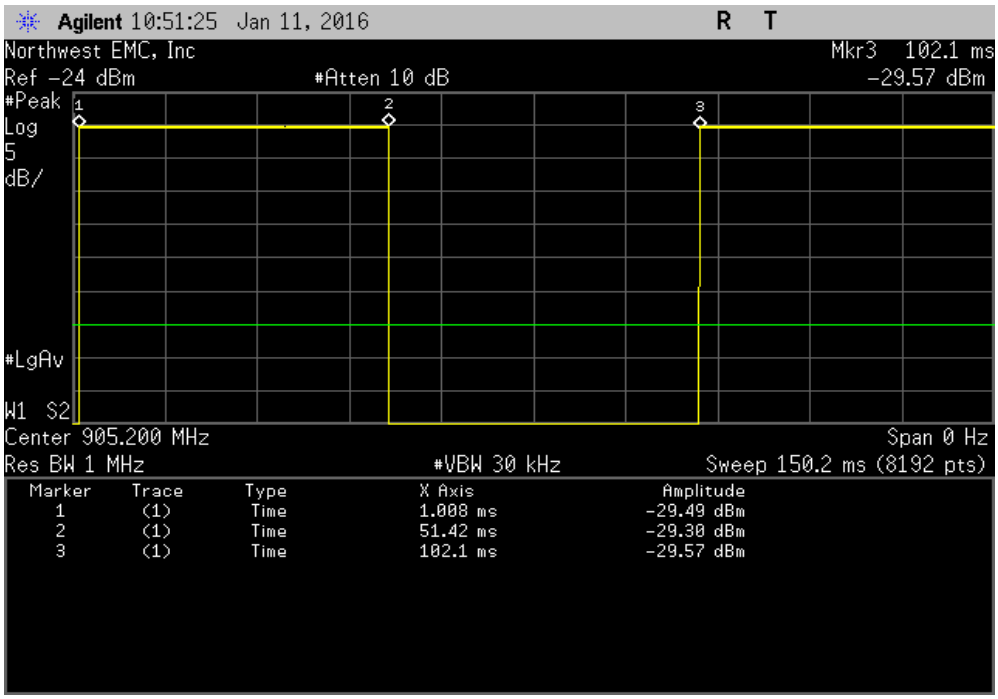
Configuration #	**1**	*Signature*

	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
Hopping Mode						
Low Channel, 905.2 MHz	50.417 ms	101.118 ms	1	49.9	N/A	N/A
Low Channel, 905.2 MHz	N/A	N/A	5	N/A	N/A	N/A

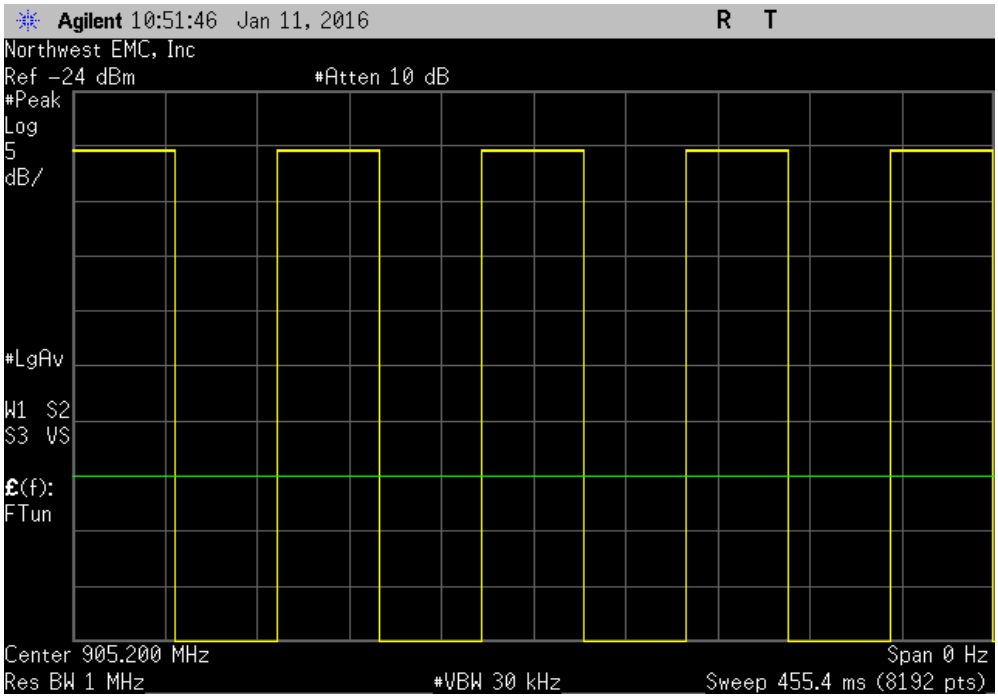
DUTY CYCLE

XMit 2015.01.14

Hopping Mode, Low Channel, 905.2 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	50.417 ms	101.118 ms	1	49.9	N/A	N/A



Hopping Mode, Low Channel, 905.2 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



OCCUPIED BANDWIDTH

XMit 2015.01.14

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.	Interval (mo)
Generator - Signal	Agilent	E8257D	TGU	2/5/2015	36
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	0
Attenuator	Fairview Microwave	SA18E-10	TKS	4/8/2015	12
Block - DC	Aeroflex	INMET 8535	AMO	4/8/2015	12
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFD	7/23/2015	12

TEST DESCRIPTION

The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99% (approximate 26 dB) emission bandwidth (EBW) was also measured at the same time.

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

OCCUPIED BANDWIDTH

NORTHWEST EMC

XMit 2015.01.14

EUT:	Bedshaker 520, model number CFBS520			**Work Order:**	EXIG0005
Serial Number:	Sample 1			**Date:**	01/12/16
Customer:	Exigent Sensors LLC			**Temperature:**	18.6°C
Attendees:	Chad Christensen			**Humidity:**	37%
Project:	None			**Barometric Pres.:**	1023.3
Tested by:	Johnny Candelas & Mike Tran	**Power:**	Battery	**Job Site:**	OC13

TEST SPECIFICATIONS	Test Method
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

DC Block + 20dB attenuator + Coax Cable + Patch Cable = 21.6dB total offset

DEVIATIONS FROM TEST STANDARD

None

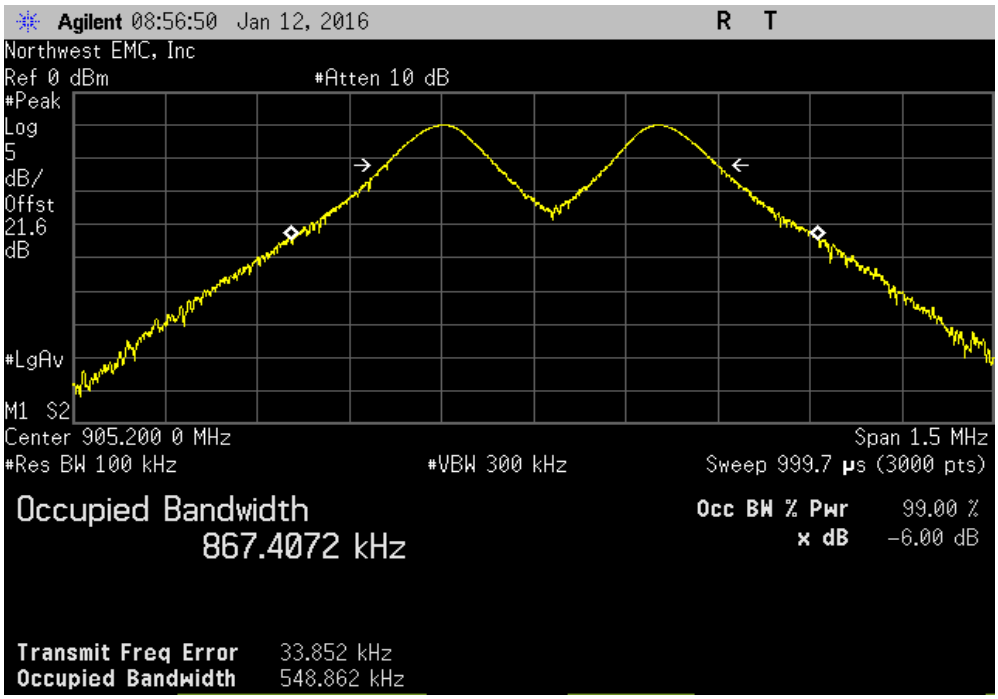
Configuration #	1	Signature

	Value	Limit (≥)	Result
Low Channel, 905.2MHz	548.862 kHz	500 kHz	Pass
High Channel, 913.2MHz	549.815 kHz	500 kHz	Pass

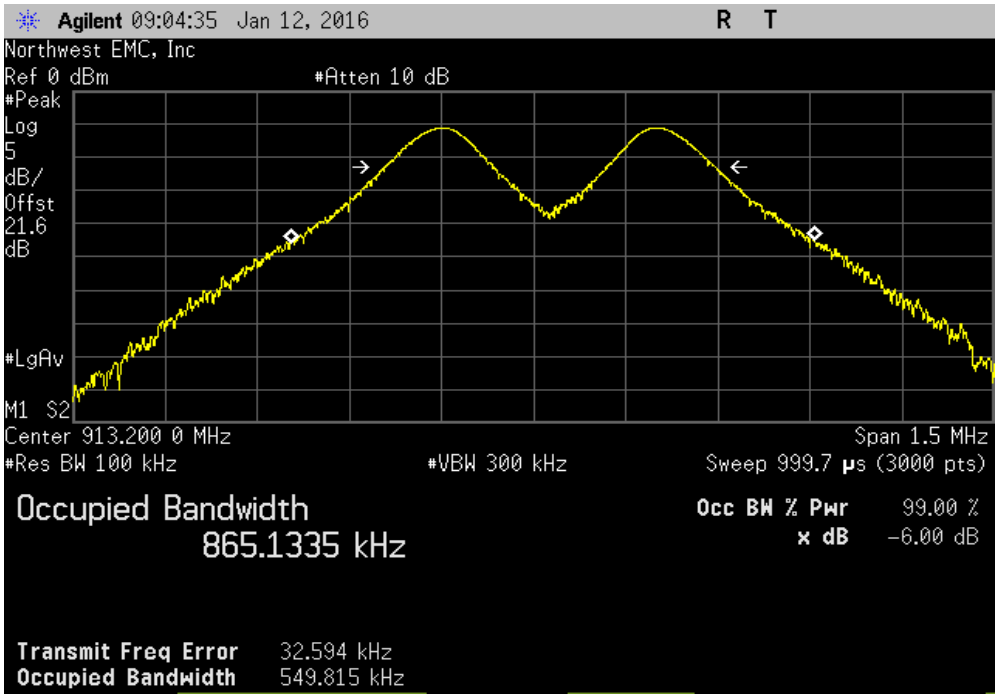
OCCUPIED BANDWIDTH

XMit 2015.01.14

Low Channel, 905.2MHz						
				Value	Limit (≥)	Result
				548.862 kHz	500 kHz	Pass



High Channel, 913.2MHz						
				Value	Limit (≥)	Result
				549.815 kHz	500 kHz	Pass



OUTPUT POWER

XMit 2015.01.14

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.	Interval (mo)
Generator - Signal	Agilent	E8257D	TGU	2/5/2015	36
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	0
Attenuator	Fairview Microwave	SA18E-10	TKS	4/8/2015	12
Block - DC	Aeroflex	INMET 8535	AMO	4/8/2015	12
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFD	7/23/2015	12

TEST DESCRIPTION

The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input.

Prior to measuring peak transmit power the DTS 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 found in ANSI C63.10:2013 Section 11.10.2 was used because the RBW on the analyzer was greater than the DTS Bandwidth of the radio..

De Facto EIRP Limit: Per 47 CFR 15.247 (b)(1-3), the EUT meets the de facto EIRP limit of +36 dBm.

OUTPUT POWER

NORTHWEST EMC

XMit 2015.01.14

EUT:	**Bedshaker 520, model number CFBS520**			**Work Order:**	**EXIG0005**
Serial Number:	**Sample 1**			**Date:**	**01/12/16**
Customer:	**Exigent Sensors LLC**			**Temperature:**	**18.6°C**
Attendees:	**Chad Christensen**			**Humidity:**	**37%**
Project:	**None**			**Barometric Pres.:**	**1023.3**
Tested by:	**Johnny Candelas & Mike Tran**	**Power:**	**Battery**	**Job Site:**	**OC13**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

DC Block + 20dB attenuator + Coax Cable + Patch Cable = 21.6dB total offset

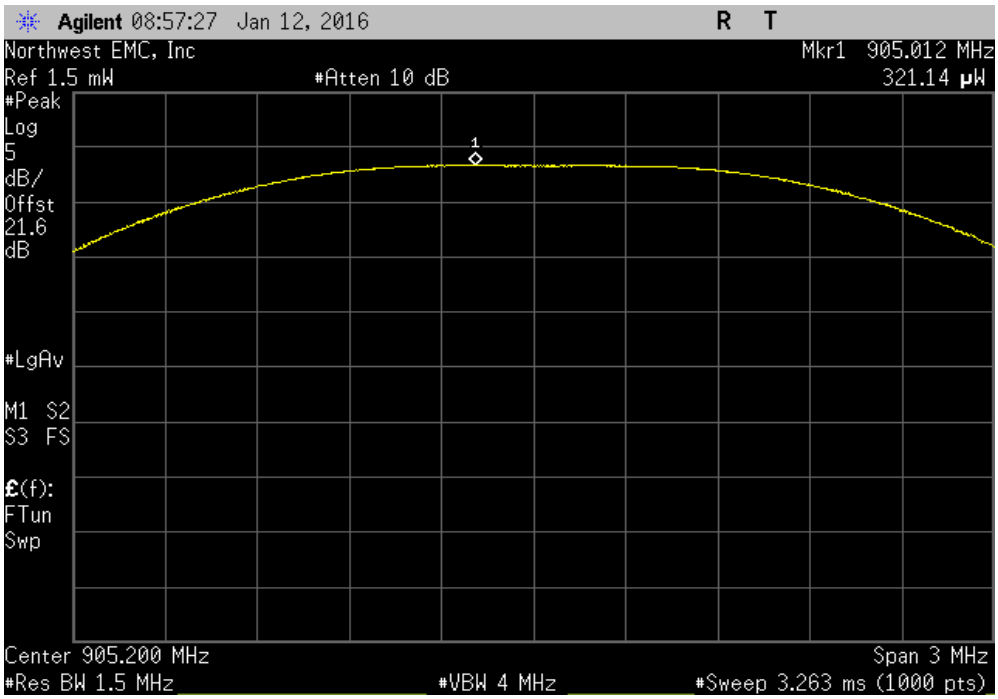
DEVIATIONS FROM TEST STANDARD

None

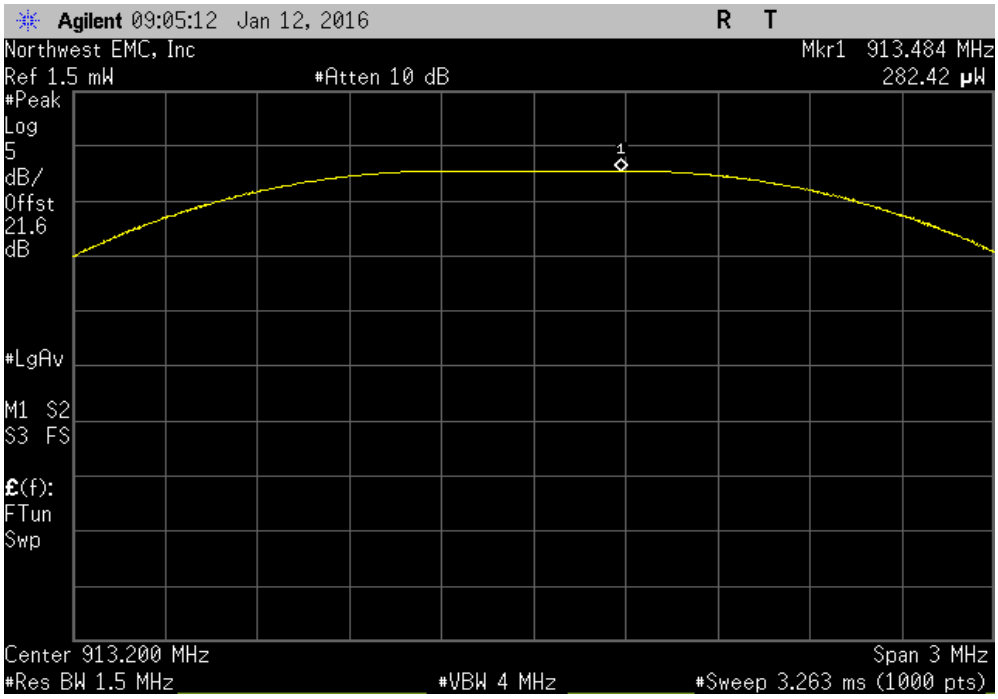
Configuration #	**1**	*Signature*

	Value	**Limit (<)**	**Result**
Low Channel, 905.2MHz	321.144 uW	0.25 W	Pass
High Channel, 913.2MHz	282.423 uW	0.25 W	Pass

Low Channel, 905.2MHz						
				Value	Limit (<)	Result
				321.144 uW	0.25 W	Pass



High Channel, 913.2MHz						
				Value	Limit (<)	Result
				282.423 uW	0.25 W	Pass



POWER SPECTRAL DENSITY

XMit 2015.01.14

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.	Interval (mo)
Generator - Signal	Agilent	E8257D	TGU	2/5/2015	36
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	0
Attenuator	Fairview Microwave	SA18E-10	TKS	4/8/2015	12
Block - DC	Aeroflex	INMET 8535	AMO	4/8/2015	12
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFD	7/23/2015	12

TEST DESCRIPTION

The maximum power spectral density measurements was measured using the channels and modes as called out on the following data sheets.

A direct connection was made between the RF output of the EUT and a spectrum analyzer. External attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input.

Per the procedure outlined in ANSI C63.10 the peak power spectral density was measured in a 3 kHz RBW.

POWER SPECTRAL DENSITY

NORTHWEST EMC

XMit 2015.01.14

EUT:	**Bedshaker 520, model number CFBS520**			**Work Order:**	**EXIG0005**
Serial Number:	**Sample 1**			**Date:**	**01/12/16**
Customer:	**Exigent Sensors LLC**			**Temperature:**	**18.6°C**
Attendees:	**Chad Christensen**			**Humidity:**	**37%**
Project:	**None**			**Barometric Pres.:**	**1023.3**
Tested by:	**Johnny Candelas & Mike Tran**	**Power:**	**Battery**	**Job Site:**	**OC13**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

DC Block + 20dB attenuator + Coax Cable + Patch Cable = 21.6dB total offset

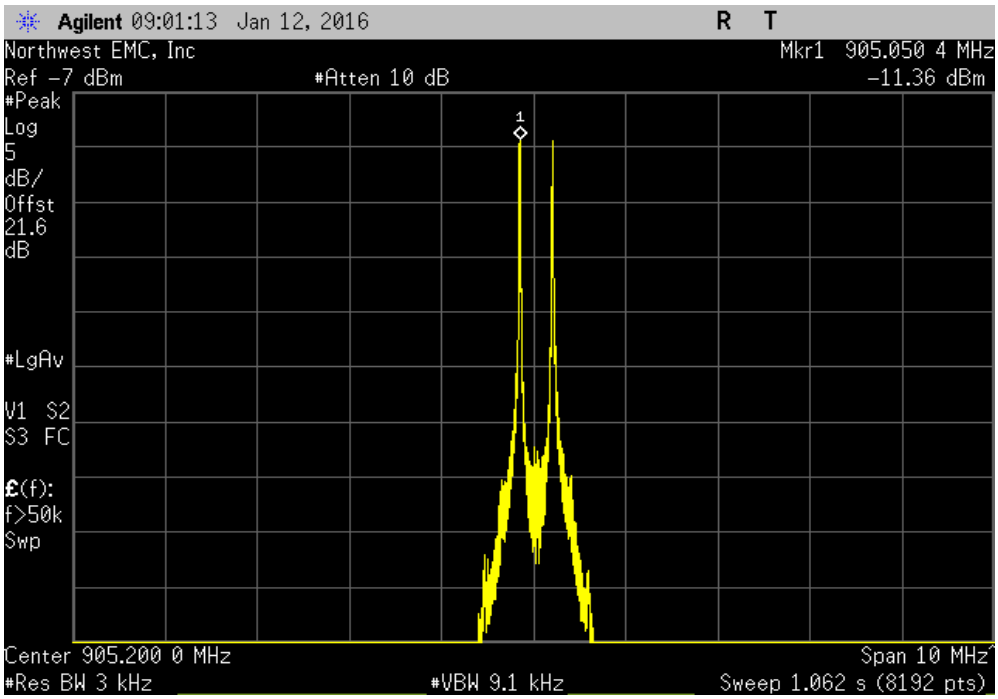
DEVIATIONS FROM TEST STANDARD

None

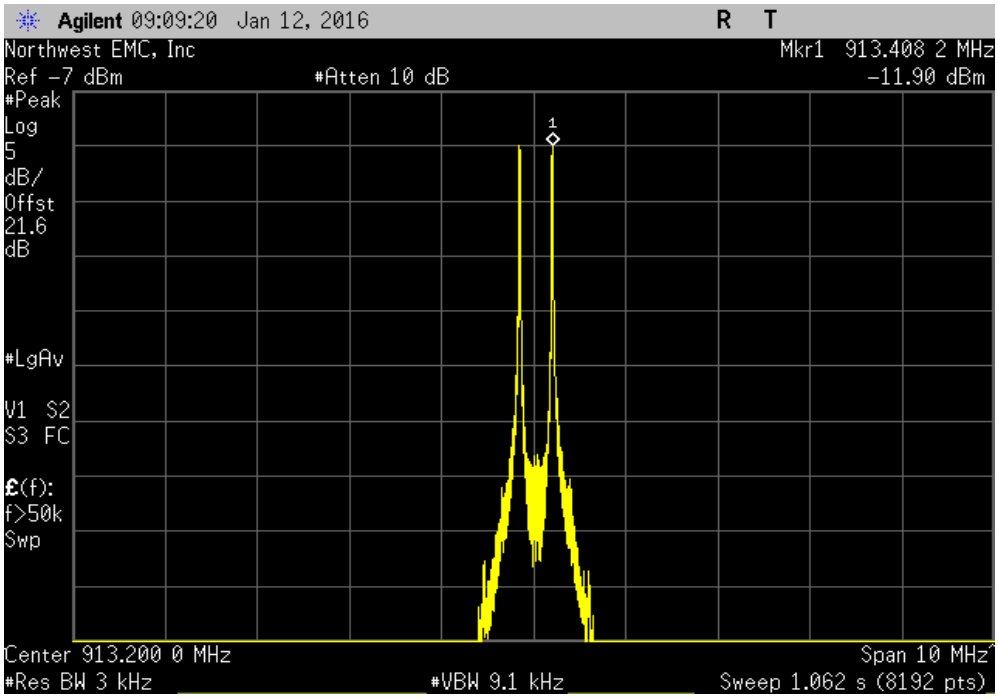
Configuration #	**1**	*Signature*

	Value dBm/3kHz	**Limit < dBm/3kHz**	**Results**
Low Channel, 905.2MHz	-11.364	8	Pass
High Channel, 913.2MHz	-11.905	8	Pass

Low Channel, 905.2MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-11.364	8	Pass



High Channel, 913.2MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-11.905	8	Pass



SPURIOUS CONDUCTED EMISSIONS

XMit 2015.01.14

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.	Interval (mo)
Generator - Signal	Agilent	E8257D	TGU	2/5/2015	36
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	0
Attenuator	Fairview Microwave	SA18E-10	TKS	4/8/2015	12
Block - DC	Aeroflex	INMET 8535	AMO	4/8/2015	12
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFD	7/23/2015	12

TEST DESCRIPTION

The spurious RF conducted emissions were measured with the EUT set to low and high transmit frequencies. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. 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

NORTHWEST EMC

XMit 2015.01.14

EUT:	**Bedshaker 520, model number CFBS520**			**Work Order:**	**EXIG0005**
Serial Number:	**Sample 1**			**Date:**	**01/12/16**
Customer:	**Exigent Sensors LLC**			**Temperature:**	**18.6°C**
Attendees:	**Chad Christensen**			**Humidity:**	**37%**
Project:	**None**			**Barometric Pres.:**	**1023.3**
Tested by:	**Johnny Candelas & Mike Tran**	**Power:**	**Battery**	**Job Site:**	**OC13**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

DC Block + 20dB attenuator + Coax Cable + Patch Cable = 21.6dB total offset

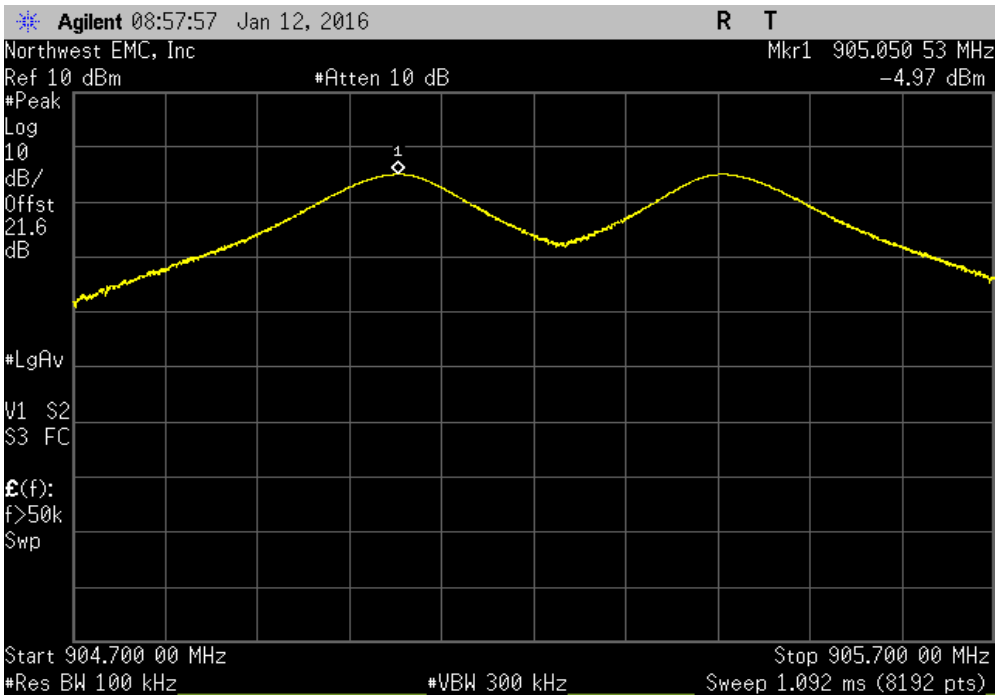
DEVIATIONS FROM TEST STANDARD

None

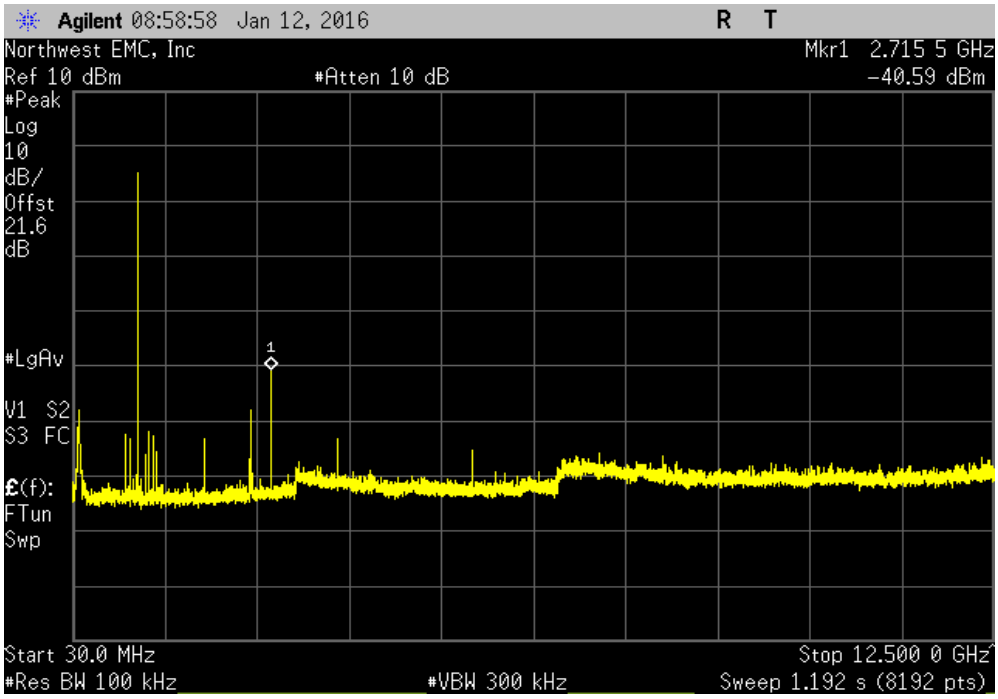
Configuration #	**1**	*Signature*

	Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result
Low Channel, 905.2MHz	Fundamental	N/A	N/A	N/A
Low Channel, 905.2MHz	30 MHz - 12.5 GHz	-35.62	-20	Pass
High Channel, 913.2MHz	Fundamental	N/A	N/A	N/A
High Channel, 913.2MHz	30 MHz - 12.5 GHz	-38.15	-20	Pass

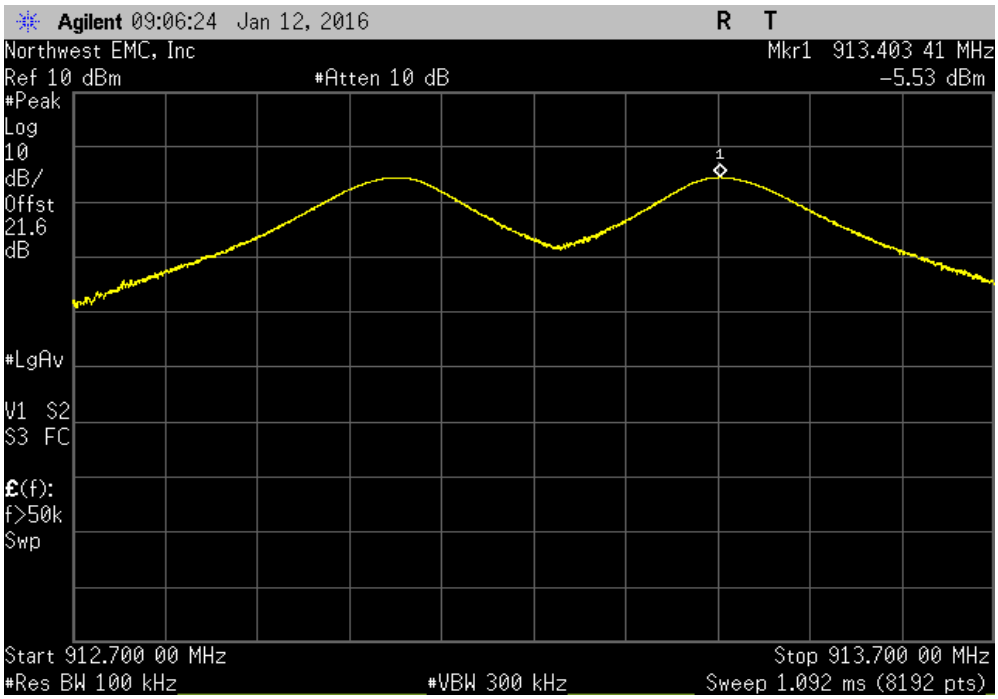
Low Channel, 905.2MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



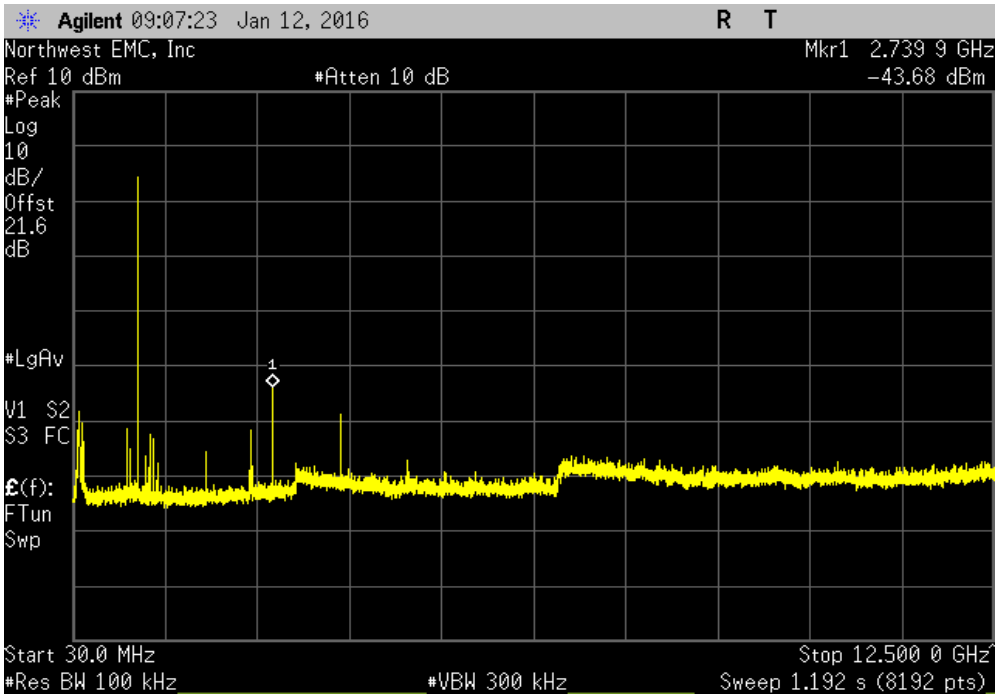
Low Channel, 905.2MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-35.62	-20	Pass



High Channel, 913.2MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



High Channel, 913.2MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-38.15	-20	Pass



BAND EDGE COMPLIANCE

XMit 2015.01.14

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.	Interval (mo)
Generator - Signal	Agilent	E8257D	TGU	2/5/2015	36
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	0
Attenuator	Fairview Microwave	SA18E-10	TKS	4/8/2015	12
Block - DC	Aeroflex	INMET 8535	AMO	4/8/2015	12
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFD	7/23/2015	12

TEST DESCRIPTION

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 the available band. The channels closest to the band edges were selected. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. 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

NORTHWEST EMC

XMit 2015.01.14

EUT:	Bedshaker 520, model number CFBS520			**Work Order:**	EXIG0005
Serial Number:	Sample 1			**Date:**	01/12/16
Customer:	Exigent Sensors LLC			**Temperature:**	18.6°C
Attendees:	Chad Christensen			**Humidity:**	37%
Project:	None			**Barometric Pres.:**	1023.3
Tested by:	Johnny Candelas & Mike Tran	**Power:**	Battery	**Job Site:**	OC13

TEST SPECIFICATIONS	Test Method
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

DC Block + 20dB attenuator + Coax Cable + Patch Cable = 21.6dB total offset

DEVIATIONS FROM TEST STANDARD

None

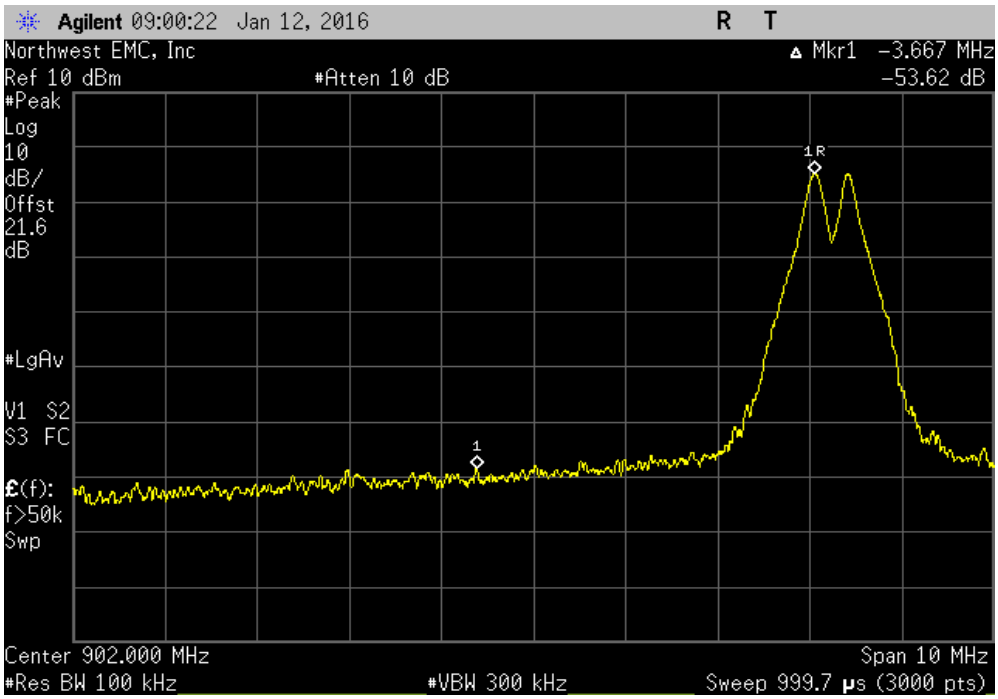
Configuration #	1	Signature

	Value (dBc)	Limit ≤ (dBc)	Result
Low Channel, 905.2MHz	-53.62	-20	Pass
High Channel, 913.2MHz	-55.44	-20	Pass

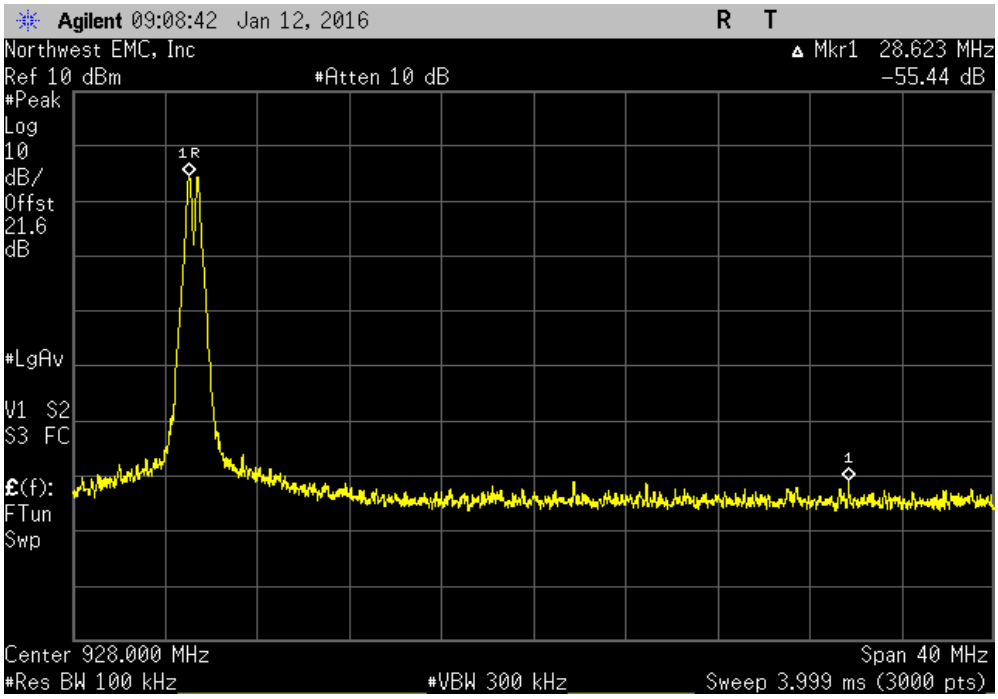
BAND EDGE COMPLIANCE

XMit 2015.01.14

Low Channel, 905.2MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-53.62	-20	Pass



High Channel, 913.2MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-55.44	-20	Pass



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 on Low Ch, 905.2 MHz & High Ch, 913.2 MHz

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

EXIG0005 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	10000 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	HFR	3/5/2015	12 mo
Filter - Low Pass	Micro-Tronics	LPM50003	LFA	11/3/2015	12 mo
Attenuator	Coaxicom	66702 3910AF-20	TKI	3/4/2015	12 mo
Attenuator	Coaxicom	66702 3910AF-10	TKG	3/4/2015	12 mo
Filter - High Pass	Micro-Tronics	HPM50108	HFW	2/9/2015	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOE	8/31/2015	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AHR	NCR	0 mo
Cable	Northwest EMC	8-18GHz RE Cables	OCO	8/26/2015	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-4D-010120-30-10P-1	AOP	8/26/2015	12 mo
Antenna - Double Ridge	EMCO	3115	AHB	3/10/2014	24 mo
Cable	Northwest EMC	1-8GHz RE Cables	OCJ	8/26/2015	12 mo
Antenna - Biconilog	EMCO	3142B	AXK	10/6/2014	24 mo
Cable	Northwest EMC	10kHz-1GHz RE Cables	OCH	3/4/2015	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1064-9079	AOO	3/5/2015	12 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	11/19/2015	12 mo

TEST DESCRIPTION

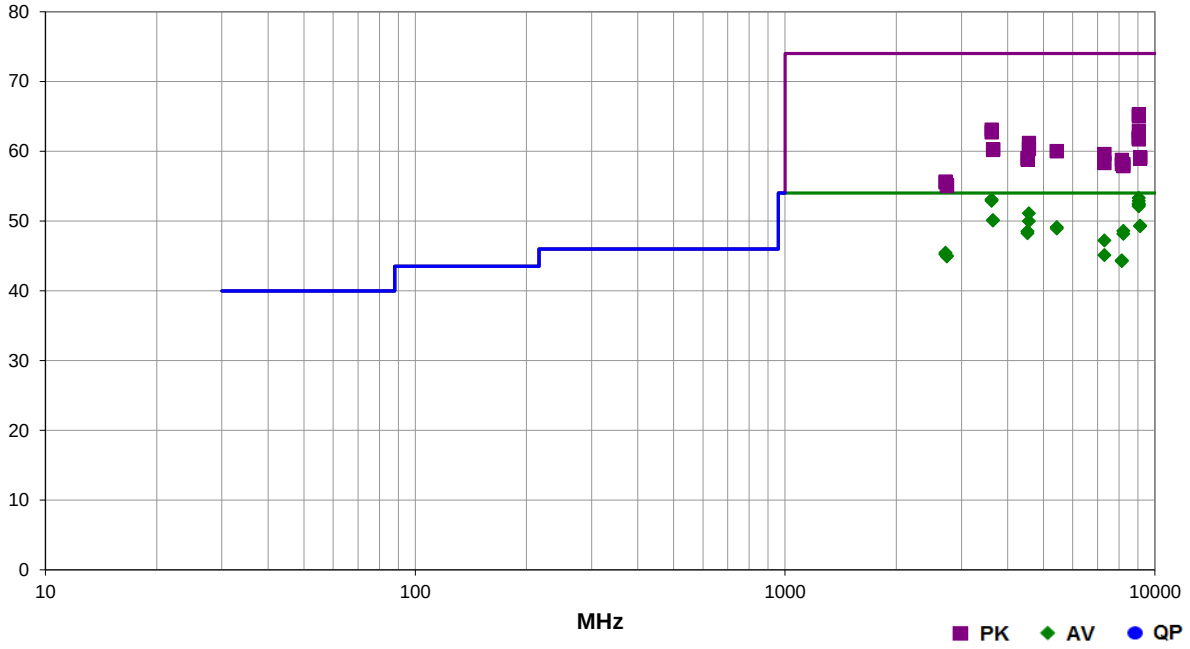
The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low and high transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization. A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

SPURIOUS RADIATED EMISSIONS

Work Order:	EXIG0005	**Date:**	01/11/16		
Project:	None	**Temperature:**	20.1 °C		
Job Site:	OC10	**Humidity:**	48.2% RH		
Serial Number:	Sample 1	**Barometric Pres.:**	1024 mbar	**Tested by:**	Johnny Candelas
EUT:	Bedshaker 520, model number CFBS520				
Configuration:	1				
Customer:	Exigent Sensors LLC				
Attendees:	Chad Christensen				
EUT Power:	Battery				
Operating Mode:	Transmitting on Low Ch, 905.2 MHz & High Ch, 913.2 MHz				
Deviations:	None				
Comments:	Using -6dB Duty Cycle Correction Factor on AVG readings, based on 50.417ms on time, in a 100ms period.				

Test Specifications	**N/A**	**Test Method**	
FCC 15.247:2016		ANSI C63.10:2013	

Run #	5	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



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
9054.083	68.0	-8.7	1.6	332.0	-6.0	0.0	Horz	AV	0.0	53.3	54.0	-0.7	EUT Vert, Low Ch
3620.200	52.1	7.0	1.6	49.0	-6.0	0.0	Horz	AV	0.0	53.1	54.0	-0.9	EUT Vert, Low Ch
3620.225	51.9	7.0	1.6	50.0	-6.0	0.0	Vert	AV	0.0	52.9	54.0	-1.1	EUT Horiz, Low Ch
9050.533	67.6	-8.7	1.3	351.0	-6.0	0.0	Horz	AV	0.0	52.9	54.0	-1.1	EUT Horiz, Low Ch
9050.517	67.2	-8.7	1.3	353.0	-6.0	0.0	Vert	AV	0.0	52.5	54.0	-1.5	EUT Horiz, Low Ch
9050.517	67.1	-8.7	1.6	9.0	-6.0	0.0	Vert	AV	0.0	52.4	54.0	-1.6	EUT Vert, Low Ch
9054.100	67.0	-8.7	1.4	301.0	-6.0	0.0	Vert	AV	0.0	52.3	54.0	-1.7	EUT on Side, Low Ch
9054.083	66.8	-8.7	1.4	301.0	-6.0	0.0	Horz	AV	0.0	52.1	54.0	-1.9	EUT on Side, Low Ch
4567.033	47.3	9.8	1.0	289.0	-6.0	0.0	Horz	AV	0.0	51.1	54.0	-2.9	EUT Vert, High Ch
3652.233	48.9	7.2	1.2	58.0	-6.0	0.0	Horz	AV	0.0	50.1	54.0	-3.9	EUT Vert, High Ch
3652.217	48.9	7.2	1.2	57.0	-6.0	0.0	Vert	AV	0.0	50.1	54.0	-3.9	EUT Horiz, High Ch
4565.250	46.2	9.8	1.2	259.0	-6.0	0.0	Vert	AV	0.0	50.0	54.0	-4.0	EUT Horiz, High Ch
9134.050	64.0	-8.7	1.4	339.0	-6.0	0.0	Horz	AV	0.0	49.3	54.0	-4.7	EUT Vert, High Ch
9130.517	63.9	-8.7	1.3	339.0	-6.0	0.0	Vert	AV	0.0	49.2	54.0	-4.8	EUT Horiz, High Ch
5432.442	42.3	12.8	1.2	340.0	-6.0	0.0	Vert	AV	0.0	49.1	54.0	-4.9	EUT Horiz, Low Ch
5430.317	42.1	12.8	1.2	341.0	-6.0	0.0	Horz	AV	0.0	48.9	54.0	-5.1	EUT Vert, Low Ch
8220.633	64.5	-9.9	1.2	360.0	-6.0	0.0	Vert	AV	0.0	48.6	54.0	-5.4	EUT Horiz, High Ch
4527.033	44.9	9.6	1.0	290.0	-6.0	0.0	Vert	AV	0.0	48.5	54.0	-5.5	EUT Horiz, Low Ch
4527.033	44.6	9.6	1.0	291.0	-6.0	0.0	Horz	AV	0.0	48.2	54.0	-5.8	EUT Vert, Low Ch
8220.633	64.1	-9.9	1.2	360.0	-6.0	0.0	Horz	AV	0.0	48.2	54.0	-5.8	EUT Vert, High Ch

7307.283	37.0	16.2	1.1	81.0	-6.0	0.0	Horz	AV	0.0	47.2	54.0	-6.8	EUT Vert, High Ch
2716.150	48.7	2.7	1.2	231.0	-6.0	0.0	Horz	AV	0.0	45.4	54.0	-8.6	EUT Vert, Low Ch
9054.067	74.0	-8.7	1.3	351.0	0.0	0.0	Horz	PK	0.0	65.3	74.0	-8.7	EUT Horiz, Low Ch
2715.200	48.5	2.7	1.2	231.0	-6.0	0.0	Vert	AV	0.0	45.2	54.0	-8.8	EUT Horiz, Low Ch
7307.233	34.9	16.2	1.2	71.0	-6.0	0.0	Vert	AV	0.0	45.1	54.0	-8.9	EUT Horiz, High Ch
2739.217	48.2	2.8	1.2	230.0	-6.0	0.0	Horz	AV	0.0	45.0	54.0	-9.0	EUT Vert, High Ch
9050.433	73.7	-8.7	1.3	353.0	0.0	0.0	Vert	PK	0.0	65.0	74.0	-9.0	EUT Horiz, Low Ch
2739.217	48.1	2.8	1.2	230.0	-6.0	0.0	Vert	AV	0.0	44.9	54.0	-9.1	EUT Horiz, High Ch
8148.683	32.2	18.2	1.2	360.0	-6.0	0.0	Vert	AV	0.0	44.4	54.0	-9.6	EUT Horiz, Low Ch
8145.508	32.1	18.1	1.2	23.0	-6.0	0.0	Horz	AV	0.0	44.2	54.0	-9.8	EUT Vert, Low Ch
3620.142	56.1	7.0	1.6	49.0	0.0	0.0	Horz	PK	0.0	63.1	74.0	-10.9	EUT Vert, Low Ch
9054.017	71.6	-8.7	1.6	332.0	0.0	0.0	Horz	PK	0.0	62.9	74.0	-11.1	EUT Vert, Low Ch
3620.267	55.7	7.0	1.6	50.0	0.0	0.0	Vert	PK	0.0	62.7	74.0	-11.3	EUT Horiz, Low Ch
9050.467	70.7	-8.7	1.6	9.0	0.0	0.0	Vert	PK	0.0	62.0	74.0	-12.0	EUT Vert, Low Ch
9054.067	70.6	-8.7	1.4	301.0	0.0	0.0	Vert	PK	0.0	61.9	74.0	-12.1	EUT on Side, Low Ch
9054.067	70.4	-8.7	1.4	301.0	0.0	0.0	Horz	PK	0.0	61.7	74.0	-12.3	EUT on Side, Low Ch
4567.150	51.4	9.8	1.0	289.0	0.0	0.0	Horz	PK	0.0	61.2	74.0	-12.8	EUT Vert, High Ch
3653.600	53.1	7.2	1.2	57.0	0.0	0.0	Vert	PK	0.0	60.3	74.0	-13.7	EUT Horiz, High Ch
4565.233	50.5	9.8	1.2	259.0	0.0	0.0	Vert	PK	0.0	60.3	74.0	-13.7	EUT Horiz, High Ch
3652.283	53.0	7.2	1.2	58.0	0.0	0.0	Horz	PK	0.0	60.2	74.0	-13.8	EUT Vert, High Ch
5432.550	47.2	12.8	1.2	341.0	0.0	0.0	Horz	PK	0.0	60.0	74.0	-14.0	EUT Vert, Low Ch
5430.183	47.2	12.8	1.2	340.0	0.0	0.0	Vert	PK	0.0	60.0	74.0	-14.0	EUT Horiz, Low Ch
7306.967	43.4	16.2	1.1	81.0	0.0	0.0	Horz	PK	0.0	59.6	74.0	-14.4	EUT Vert, High Ch
9134.033	67.8	-8.7	1.4	339.0	0.0	0.0	Horz	PK	0.0	59.1	74.0	-14.9	EUT Vert, High Ch
4526.900	49.4	9.6	1.0	290.0	0.0	0.0	Vert	PK	0.0	59.0	74.0	-15.0	EUT Horiz, Low Ch
9130.500	67.6	-8.7	1.3	339.0	0.0	0.0	Vert	PK	0.0	58.9	74.0	-15.1	EUT Horiz, High Ch
4525.167	49.2	9.6	1.0	291.0	0.0	0.0	Horz	PK	0.0	58.8	74.0	-15.2	EUT Vert, Low Ch
8145.350	40.6	18.1	1.2	360.0	0.0	0.0	Vert	PK	0.0	58.7	74.0	-15.3	EUT Horiz, Low Ch
7307.283	42.1	16.2	1.2	71.0	0.0	0.0	Vert	PK	0.0	58.3	74.0	-15.7	EUT Horiz, High Ch
8220.650	68.1	-9.9	1.2	360.0	0.0	0.0	Vert	PK	0.0	58.2	74.0	-15.8	EUT Horiz, High Ch
8145.508	40.0	18.1	1.2	23.0	0.0	0.0	Horz	PK	0.0	58.1	74.0	-15.9	EUT Vert, Low Ch
8220.650	67.8	-9.9	1.2	360.0	0.0	0.0	Horz	PK	0.0	57.9	74.0	-16.1	EUT Vert, High Ch
2716.200	52.9	2.7	1.2	231.0	0.0	0.0	Horz	PK	0.0	55.6	74.0	-18.4	EUT Vert, Low Ch
2716.125	52.8	2.7	1.2	231.0	0.0	0.0	Vert	PK	0.0	55.5	74.0	-18.5	EUT Horiz, Low Ch
2739.167	52.3	2.8	1.2	230.0	0.0	0.0	Horz	PK	0.0	55.1	74.0	-18.9	EUT Vert, High Ch
2740.167	52.2	2.8	1.2	230.0	0.0	0.0	Vert	PK	0.0	55.0	74.0	-19.0	EUT Horiz, High Ch