

Impinj, Inc. Indy RS1000 FCC 15.207:2017 FCC 15.247:2017 RFID Transceiver

Report #7LAY0128





NVLAP Lab Code: 200629-0

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.

EAR-Controlled Data - This document contains technical data whose export and reexport/retransfer is subject to control by the U.S. Department of Commerce under the Export Administration Act and the Export Administration Regulations. The Department of Commerce's prior written approval may be required for the export or re-export/retransfer of such technical data to any foreign person, foreign entity or foreign organization whether in the United States or abroad.

More: https://www.bis.doc.gov/index.php/forms-documents/regulations-docs/14-commerce-country-chart/fileT

# **CERTIFICATE OF TEST**



### Last Date of Test: November 22, 2017 Impinj, Inc. Model: Indy RS1000

## **Radio Equipment Testing**

 Standards
 Method

 Specification
 Method

 FCC 15.207:2017
 ANSI C63.10:2013

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	
7.5	Duty Cycle	Yes	N/A	
7.8.2	Carrier Frequency Separation	Yes	Pass	
7.8.3	Number of Hopping Frequencies	Yes	Pass	
7.8.4	Dwell Time	Yes	Pass	
7.8.5	Output Power	Yes	Pass	
7.8.6	Band Edge Compliance	Yes	Pass	
7.8.6	Band Edge Compliance - Hopping Mode	Yes	Pass	
7.8.7	Occupied Bandwidth	Yes	Pass	
7.8.8	Spurious Conducted Emissions	Yes	Pass	
11.10.2	Power Spectral Density	No	N/A	Not required for FHSS devices.

### **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



### **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

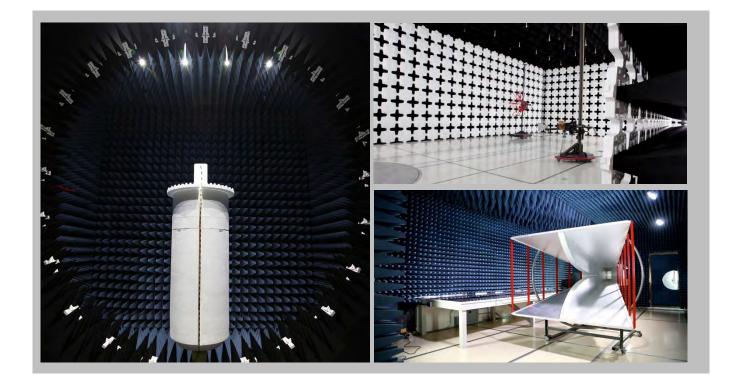
For details on the Scopes of our Accreditations, please visit: <u>http://portlandcustomer.element.com/ts/scope/scope.htm</u> <u>http://gsi.nist.gov/global/docs/cabs/designations.html</u>

# FACILITIES





California Labs OC01-17	Minnesota Labs MN01-08, MN10	New York Labs NY01-04	Oregon Labs EV01-12	Texas Labs TX01-09	Washington	
41 Tesla	9349 W Broadway Ave.	4939 Jordan Rd.	22975 NW Evergreen Pkwy		19201 120 <sup>th</sup> Ave NE	
Irvine, CA 92618	Brooklyn Park, MN 55445	Elbridge, NY 13060	Hillsboro, OR 97124	Plano, TX 75074	Bothell, WA 98011	
(949) 861-8918	(612)-638-5136	(315) 554-8214	(503) 844-4066	(469) 304-5255	(425)984-6600	
		NV	LAP			
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	
	Innov	ation, Science and Eco	nomic Development Can	ada		
2834B-1, 2834B-3	2834E-1, 2834E-3	N/A	2834D-1, 2834D-2	2834G-1	2834F-1	
		BS	MI			
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R	
		VC	CI			
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.

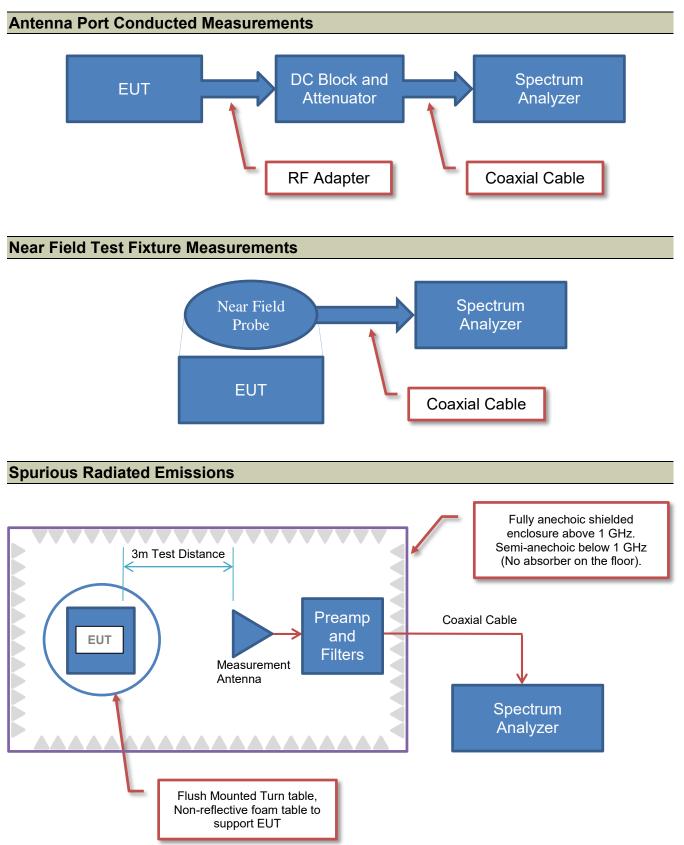
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable 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)	0	0
AC Powerline Conducted Emissions (dB)	0	0

# **Test Setup Block Diagrams**





# **PRODUCT DESCRIPTION**



### **Client and Equipment Under Test (EUT) Information**

Company Name:	Impinj, Inc.
Address:	400 Fairview Ave N
City, State, Zip:	Seattle WA 90109
Test Requested By:	Bill Ashley
Model:	Indy RS1000
First Date of Test:	November 21, 2017
Last Date of Test:	November 22, 2017
Receipt Date of Samples:	November 21, 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:

Indy RS1000 is a completely integrated surface-mount RAIN RFID reader module.

### Testing Objective:

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

# **CONFIGURATIONS**



### Configuration 7LAY0128-1

Software/Firmware Running during test			
Description	Version		
Indy Demo Tool	1.6.8.14		

EUT				
Description	Manufacturer	Model/Part Number	Serial Number	
RFID Reader Module	Impinj, Inc.	Indy RS1000	110121170091	

Peripherals in test setup boundary					
Description Manufacturer Model/Part Number Serial Number					
Laptop	Dell	Latitude E7240	N/A		
AC Power Adapter	ITE Power Supply	HK-AB-050A400-D5	N/A		

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
USB Cable	No	1.0m	No	Laptop	RFID Reader Module
DC Power	No	1.2m	Yes	AC Power Adapter	RFID Reader Module
AC Power	No	1.7m	No	AC Mains	AC Power Adapter

# **CONFIGURATIONS**



### Configuration 7LAY0128-2

Software/Firmware Running during test			
Description	Version		
Indy Demo Tool	1.6.8.14		

EUT				
Description	Manufacturer	Model/Part Number	Serial Number	
RFID Reader Module	Impinj, Inc.	Indy RS1000	110121170091	

Peripherals in test setup boundary				
Description	Manufacturer	Model/Part Number	Serial Number	
Laptop	Dell	Latitude E7240	N/A	
AC Power Adapter	ITE Power Supply	HK-AB-050A400-D5	N/A	
AC Power Adapter (Laptop)	Dell	LA55NM130	N/A	
9 dBic Panel Antenna	Laird	S9028PCLJ-IP1	N/A	

Cables								
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2			
USB Cable	No	1.0m	No	Laptop	RFID Reader Module			
DC Power	No	1.2m	Yes	AC Power Adapter	RFID Reader Module			
AC Power	No	1.7m	No	AC Mains	AC Power Adapter			
AC Power (Laptop)	No	0.9m	No	AC Mains	AC Power Adapter (Laptop)			
DC Power (Laptop)	No	1.9m	No	AC Power Adapter (Laptop)	Laptop			
RF Cable	Yes	2.4m	No	RFID Reader Module	Panel Antenna			

# **CONFIGURATIONS**



### Configuration 7LAY0128-3

Software/Firmware Running during test				
Description	Version			
Indy Demo Tool	1.6.8.14			

EUT						
Description	Manufacturer	Model/Part Number	Serial Number			
RFID Reader Module	Impinj, Inc.	Indy RS1000	110121170091			

Peripherals in test setup boundary						
Description Manufacturer Model/Part Number Serial Number						
Laptop	Dell	Latitude E7240	N/A			
9 dBic Panel Antenna	Laird	S9028PCLJ-IP1	N/A			

Cables								
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2			
USB Cable	No	1.0m	No	Laptop	RFID Reader Module			
RF Cable	Yes	2.4m	No	RFID Reader Module	Panel Antenna			
DC Power	No	1.0m	No	DC Mains	RFID Reader Module			

# **MODIFICATIONS**



### **Equipment Modifications**

Item	Date	Test	Modification	Note	Disposition of EUT
1	11/21/2017	Carrier Frequency Separation	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	11/21/2017	Number of Hopping Frequencies	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	11/21/2017	Dwell Time	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	11/21/2017	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.
5	11/21/2017	Band Edge Compliance - Hopping Mode	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	11/21/2017	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.
7	11/21/2017	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.
8	11/21/2017	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.
9	11/22/2017	Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
10	11/22/2017	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.



### **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 500hm measuring port is terminated by a 500hm EMI meter or a 500hm resistive load. All 500hm measuring ports of the LISN are terminated by 500hm. 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
Receiver	Rohde & Schwarz	ESCI	ARE	8/23/2017	8/23/2018
LISN	Solar Electronics	9252-50-R-24-BNC	LIM	8/16/2017	8/16/2018
Cable - Conducted Cable Assembly	Element	NC4, HHF, TYL	NC4A	4/17/2017	4/17/2018

### **MEASUREMENT UNCERTAINTY**

Description		
Expanded k=2	2.4 dB	-2.4 dB
	·	•

### **CONFIGURATIONS INVESTIGATED**

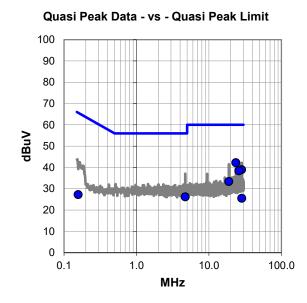
7LAY0128-3

### **MODES INVESTIGATED**

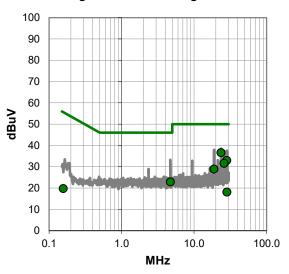
Continuously Transmitting RFID at Default Power = 27 dBm, Very Fast Mode, Mid Channel 26, 915.25 MHz.



EUT:	Indy RS1000	)			Work Order:	7LAY0128		
Serial Number:	1101211700	91			Date:	11/22/2017		
Customer:	Impinj, Inc.				Temperature:	22°C		
Attendees:	Paul Archer	Paul Archer			Relative Humidity:	58%		
Customer Project:	None				Bar. Pressure:	1017 mb		
Tested By:	Richard Melli	roth			Job Site:	NC05		
Power:	5 VDC				Configuration:	7LAY0128-3		
TEST SPECIFIC	CATIONS							
Specification:				Method:				
FCC 15.207:2017				ANSI C63.10	:2013			
TEST PARAME	TERS							
Run #: 1		Line:	Positive Lead	A	dd. Ext. Attenuation (dB	): 0		
COMMENTS None								
EUT OPERATING MODES								
Continuously Transmitting RFID at Default Power = 27 dBm, Very Fast Mode, Mid Channel 26, 915.25 MHz.								
DEVIATIONS FROM TEST STANDARD								
None								



Average Data - vs - Average Limit





### **RESULTS - Run #1**

Quasi Peak Data - vs - Quasi Peak Limit							
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)		
23.592	20.2	22.0	42.2	60.0	-17.8		
28.309	16.4	22.5	38.9	60.0	-21.1		
25.947	16.1	22.3	38.4	60.0	-21.6		
18.874	11.8	21.6	33.4	60.0	-26.6		
4.718	5.7	20.5	26.2	56.0	-29.8		
28.478	2.9	22.6	25.5	60.0	-34.5		
0.157	6.9	20.3	27.2	65.6	-38.4		

#### Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
23.592	14.6	22.0	36.6	50.0	-13.4
28.309	10.4	22.5	32.9	50.0	-17.1
25.947	9.3	22.3	31.6	50.0	-18.4
18.874	7.3	21.6	28.9	50.0	-21.1
4.718	2.4	20.5	22.9	46.0	-23.1
28.478	-4.5	22.6	18.1	50.0	-31.9
0.157	-0.6	20.3	19.7	55.6	-35.9

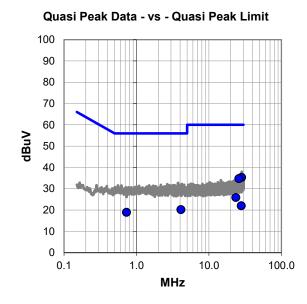
### CONCLUSION

Pass

Tested By



EUT:	Indy RS1000	)			Work Order:	7LAY0128		
Serial Number:	1101211700	91			Date:	11/22/2017		
Customer:	Impinj, Inc.				Temperature:	22°C		
Attendees:	Paul Archer				Relative Humidity:	58%		
Customer Project:	None				Bar. Pressure:	1017 mb		
Tested By:	Richard Mell	roth			Job Site:	NC05		
Power:	5 VDC				Configuration:	7LAY0128-3		
TEST SPECIFIC	CATIONS							
Specification:				Method:				
FCC 15.207:2017				ANSI C63.10	):2013			
TEST PARAME	TERS							
Run #: 2		Line:	Negative Lead	А	dd. Ext. Attenuation (dB	): 0		
COMMENTS None								
EUT OPERATING MODES								
Continuously Transmitting RFID at Default Power = 27 dBm, Very Fast Mode, Mid Channel 26, 915.25 MHz.								
DEVIATIONS FROM TEST STANDARD								
None								



100 90 80 70 60 dBuV 50 40 30 100 20 Ö 10 0 0.1 1.0 10.0 100.0 MHz

Average Data - vs - Average Limit



### RESULTS - Run #2

Q	Quasi Peak Data - vs - Quasi Peak Limit										
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)						
28.315	12.8	22.5	35.3	60.0	-24.7						
25.954	12.4	22.3	34.7	60.0	-25.3						
23.585	3.9	22.0	25.9	60.0	-34.1						
4.119	-0.3	20.5	20.2	56.0	-35.8						
0.729	-1.3	20.2	18.9	56.0	-37.1						
27.981	-0.5	22.5	22.0	60.0	-38.0						

### Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
28.315	6.9	22.5	29.4	50.0	-20.6
25.954	6.9	22.3	29.2	50.0	-20.8
0.729	-4.3	20.2	15.9	46.0	-30.1
4.119	-4.9	20.5	15.6	46.0	-30.4
23.585	-4.0	22.0	18.0	50.0	-32.0
27.981	-5.0	22.5	17.5	50.0	-32.5

### CONCLUSION

Pass

Tested By

# SPURIOUS RADIATED EMISSIONS



PSA-ESCI 2017.09.18

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

Dense Reader Mode, PR-ASK	
Very Fast Mode, DSB-ASK	
Very Sensitive Mode, DSB-ASK	

#### **CHANNELS TESTED**

Low Channel 1, 902.75 MHz Mid Channel 26, 915.25 MHz High Channel 50, 927.25 MHz

### POWER SETTINGS INVESTIGATED

5 VDC

### **CONFIGURATIONS INVESTIGATED**

7LAY0128 - 2

#### FREQUENCY RANGE INVESTIGATED

Start Frequency 30 MHz

Stop Frequency 12.4 GHz

### 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	24-Jun-2017	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYL	11-Aug-2017	24 mo
Antenna - Double Ridge	EMCO	3115	AHM	10-Jun-2016	24 mo
Antenna - Standard Gain	EMCO	3160-07	AHP	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAB	11-Jul-2017	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVZ	19-May-2017	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOK	18-Aug-2017	12 mo
Cable	Element	Bilog Cables	NC1	11-Jul-2017	12 mo
Cable	Element	3115 Horn Cable	NC2	19-May-2017	12 mo
Cable	Element	Standard Gain Horn Cable	NC3	19-May-2017	12 mo
Filter - Low Pass	Micro-Tronics	LPM50003	LFE	19-Oct-2017	12 mo
Filter - High Pass	Micro-Tronics	HPM50114	HFN	27-Dec-2016	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	LFF	27-Dec-2016	12 mo
Filter - Band Pass/Notch	K&L Microwave	3TNF-500/1000-N/N	HHO	17-Apr-2017	12 mo

### **MEASUREMENT BANDWIDTHS**

Frequency Range	Peak Data	Quasi-Peak Data	Average Data
(MHz)	(kHz)	(kHz)	(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.

## SPURIOUS RADIATED EMISSIONS



Woi	rk Order:		Y0128		Date:	22-No		Q.	1 3	5		
	Project:		one	Terr	nperature:	22	°C	N	US	11		
	Job Site:		C01		Humidity:	53%		P.				
Serial	Number:		1170091	Barome	tric Pres.:	1018	mbar	Te	sted by:	Richard Mel	llroth	
		Indy RS10	00									
	guration:											
		Impinj, Inc										
		Paul Arch	er									
EU.	T Power:											
Operatin	ng Mode:		sly Transm , and data		at Default Po	wer = 27	dBm. See cor	nments ne	ext to dat	ta points for E	EUT chai	nnel,
De	viations	None										
Co	omments	None										
Fest Specif	fications						Test Method					
CC 15.247							ANSI C63.10:	2013				
Run #	15	Test Di	stance (m)	) 3	Antenna H	leight(s)	1 t	to 4(m)		Results	F	Pass
Run #	15	Test Di	stance (m)	) 3	Antenna H	eight(s)	1 t	to 4(m)		Results	F	Pass
	15	Test Di	stance (m)	) 3	Antenna H	leight(s)	1 t	to 4(m)		Results	F	Pass
<b>Run #</b> 80	15	Test Di	stance (m)	) 3	Antenna H	leight(s)	11	to 4(m)		Results	F	Pass
	15	Test Di	stance (m)	) 3	Antenna H	leight(s)	11	to 4(m)		Results	F	Pass
80	15	Test Di	stance (m)	) 3	Antenna H	leight(s)	11	to 4(m)		Results	F	Pass
	15	Test Di	stance (m)	) 3	Antenna H	leight(s)	11	to 4(m)		Results	F	Pass
80	15	Test Di	stance (m)	) 3	Antenna H	leight(s)		to 4(m)		Results	F	Pass
80	15	Test Di	stance (m	) 3	Antenna H	leight(s)	1t	to 4(m)		Results	F	Pass
80	15	Test Di	stance (m)	) 3	Antenna H	leight(s)		to 4(m)		Results		Pass
80	15	Test Di	stance (m)	) 3	Antenna H	leight(s)		to 4(m)		Results	F	Pass
80	15	Test Di	stance (m)	) 3	Antenna H	leight(s)		to 4(m)		Results	F	Pass
80	15	Test Di	stance (m	) 3	Antenna H	leight(s)		io 4(m)		Results	F	
80	15	Test Di	stance (m)	) 3	Antenna H	leight(s)		io 4(m)		Results	F	
80			stance (m		Antenna H	leight(s)		io 4(m)		Results		
80	15	Test Di	stance (m)		Antenna H	leight(s)		to 4(m)		Results		
80 70 60 50 <b>w/\ngp</b> 40	15	Test Di	stance (m)		Antenna H	leight(s)		to 4(m)		Results	-	
80		Test Di			Antenna H	leight(s)		to 4(m)		Results	F	
80 70 60 <b>w/Mgp</b> 40		Test Di	stance (m)		Antenna H			to 4(m)		Results	-	
80 70 60 <b>m</b> <b>M</b> <b>M</b> <b>M</b> <b>M</b> <b>B</b> <b>D</b> 30			stance (m		Antenna H	leight(s)		io 4(m)		Results		
80 70 60 <b>w/Mgp</b> 40		Test Di	stance (m)		Antenna H	leight(s)		to 4(m)		Results	-	
80 70 60 <b>m</b> <b>M</b> <b>M</b> <b>M</b> <b>M</b> <b>B</b> <b>D</b> 30		Test Di			Antenna H			to 4(m)		Results	-	
80 70 60 50 <b>W/Ng</b> 40 30 20		Test Di			Antenna H	leight(s)		to 4(m)		Results	F	
80 70 60 50 <b>W/MB</b> 40 30					Antenna H			to 4(m)		Results	F	
80 70 60 50 <b>W/Ng</b> 40 30 20					Antenna H	leight(s)		o 4(m)			F	
80 70 60 50 <b>m</b> <b>m</b> <b>m</b> <b>m</b> <b>m</b> <b>m</b> <b>m</b> <b>m</b> <b>m</b> <b>m</b>		Test Dia			Antenna H					Results	F	
80 70 60 50 40 30 20 10		Test Di								Results	F	Pass
80 70 60 50 <b>m</b> <b>m</b> <b>m</b> <b>m</b> <b>m</b> <b>m</b> <b>m</b> <b>m</b> <b>m</b> <b>m</b>					Antenna H					Results	F	

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
1830.495	49.3	-2.3	1.1	45.0	3.0	0.0	Horz	AV	0.0	47.0	54.0	-7.0	Mid Ch, Dense Reader, EUT Horz
1830.510	49.2	-2.3	1.1	45.0	3.0	0.0	Horz	AV	0.0	46.9	54.0	-7.1	Mid Ch, Very Fast, EUT Horz
1830.510	48.9	-2.3	1.2	44.0	3.0	0.0	Horz	AV	0.0	46.6	54.0	-7.4	Mid Ch, Very Sensitive, EUT Horz
1830.530	48.7	-2.3	2.7	44.0	3.0	0.0	Vert	AV	0.0	46.4	54.0	-7.6	Mid Ch, Very Fast, EUT Horz
1830.480	48.6	-2.3	1.2	51.0	3.0	0.0	Horz	AV	0.0	46.3	54.0	-7.7	Mid Ch, Very Fast, EUT Vert
1830.485	48.5	-2.3	1.6	57.0	3.0	0.0	Horz	AV	0.0	46.2	54.0	-7.8	Mid Ch, Very Fast, EUT Flat
1830.470	48.4	-2.3	2.1	29.0	3.0	0.0	Vert	AV	0.0	46.1	54.0	-7.9	Mid Ch, Very Fast, EUT Flat
1854.465	47.5	-2.0	2.2	64.0	3.0	0.0	Vert	AV	0.0	45.5	54.0	-8.5	High Ch, Very Fast, EUT Horz
1830.465	47.1	-2.3	1.7	148.0	3.0	0.0	Vert	AV	0.0	44.8	54.0	-9.2	Mid Ch, Very Fast, EUT Vert
1805.515	47.0	-2.6	2.2	57.0	3.0	0.0	Vert	AV	0.0	44.4	54.0	-9.6	Low Ch, Very Fast, EUT Horz
1854.490	45.8	-2.0	2.2	156.0	3.0	0.0	Horz	AV	0.0	43.8	54.0	-10.2	High Ch, Very Fast, EUT Horz
1805.510	46.3	-2.6	1.0	159.0	3.0	0.0	Horz	AV	0.0	43.7	54.0	-10.3	Low Ch, Very Fast, EUT Horz
7416.555	27.7	14.0	1.6	329.0	3.0	0.0	Horz	AV	0.0	41.7	54.0	-12.3	High Ch, Very Fast, EUT Horz
7416.735	27.7	14.0	1.6	129.0	3.0	0.0	Vert	AV	0.0	41.7	54.0	-12.3	High Ch, Very Fast, EUT Horz
7320.615	27.9	13.5	1.6	89.0	3.0	0.0	Horz	AV	0.0	41.4	54.0	-12.6	Mid Ch, Very Fast, EUT Horz
7321.050	27.9	13.5	1.6	87.0	3.0	0.0	Vert	AV	0.0	41.4	54.0	-12.6	Mid Ch, Very Fast, EUT Horz
5416.345	27.0	10.0	1.6	324.0	3.0	0.0	Horz	AV	0.0	37.0	54.0	-17.0	Low Ch, Very Fast, EUT Horz
5415.895	27.0	10.0	1.6	342.0	3.0	0.0	Vert	AV	0.0	37.0	54.0	-17.0	Low Ch, Very Fast, EUT Horz
3610.995	32.7	3.3	2.0	181.0	3.0	0.0	Horz	AV	0.0	36.0	54.0	-18.0	Low Ch, Very Fast, EUT Horz
4576.080	27.6	7.4	1.6	360.0	3.0	0.0	Horz	AV	0.0	35.0	54.0	-19.0	Mid Ch, Very Fast, EUT Horz
4576.680	27.6	7.4	2.6	65.0	3.0	0.0	Vert	AV	0.0	35.0	54.0	-19.0	Mid Ch, Very Fast, EUT Horz
4635.050	27.4	7.6	1.6	342.0	3.0	0.0	Horz	AV	0.0	35.0	54.0	-19.0	High Ch, Very Fast, EUT Horz
4635.535	27.4	7.6	1.6	53.0	3.0	0.0	Vert	AV	0.0	35.0	54.0	-19.0	High Ch, Very Fast, EUT Horz

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
4512.705	27.5	7.3	1.6	287.0	3.0	0.0	Horz	AV	0.0	34.8	54.0	-19.2	Low Ch, Very Fast, EUT Horz
4512.400	27.5	7.3	1.6	337.0	3.0	0.0	Vert	AV	0.0	34.8	54.0	-19.2	Low Ch, Very Fast, EUT Horz
3661.045	30.3	3.7	1.6	32.0	3.0	0.0	Horz	AV	0.0	34.0	54.0	-20.0	Mid Ch, Very Fast, EUT Horz
3708.980	30.1	3.9	1.6	170.0	3.0	0.0	Vert	AV	0.0	34.0	54.0	-20.0	High Ch, Very Fast, EUT Horz
3660.980	30.0	3.7	1.6	80.0	3.0	0.0	Vert	AV	0.0	33.7	54.0	-20.3	Mid Ch, Very Fast, EUT Horz
2781.745	33.7	-0.1	2.0	14.0	3.0	0.0	Vert	AV	0.0	33.6	54.0	-20.4	High Ch, Very Fast, EUT Horz
3610.995	30.2	3.3	1.6	85.0	3.0	0.0	Vert	AV	0.0	33.5	54.0	-20.5	Low Ch, Very Fast, EUT Horz
3709.070	29.3	3.9	1.6	97.0	3.0	0.0	Horz	AV	0.0	33.2	54.0	-20.8	High Ch, Very Fast, EUT Horz
7418.165	38.8	14.0	1.6	129.0	3.0	0.0	Vert	PK	0.0	52.8	74.0	-21.2	High Ch, Very Fast, EUT Horz
7321.635	39.0	13.5	1.6	89.0	3.0	0.0	Horz	PK	0.0	52.5	74.0	-21.5	Mid Ch, Very Fast, EUT Horz
7321.555	39.0	13.5	1.6	87.0	3.0	0.0	Vert	PK	0.0	52.5	74.0	-21.5	Mid Ch, Very Fast, EUT Horz
7416.945	38.4	14.0	1.6	329.0	3.0	0.0	Horz	PK	0.0	52.4	74.0	-21.6	High Ch, Very Fast, EUT Horz
2745.695	32.3	-0.2	2.0	3.0	3.0	0.0	Vert	AV	0.0	32.1	54.0	-21.9	Mid Ch, Very Fast, EUT Horz
2708.205	32.3	-0.2	1.6	343.0	3.0	0.0	Vert	AV	0.0	32.1	54.0	-21.9	Low Ch, Very Fast, EUT Horz
2781.840	29.9	-0.1	1.6	58.0	3.0	0.0	Horz	AV	0.0	29.8	54.0	-24.2	High Ch, Very Fast, EUT Horz
2745.700	29.6	-0.2	3.5	238.0	3.0	0.0	Horz	AV	0.0	29.4	54.0	-24.6	Mid Ch, Very Fast, EUT Horz
1830.600	51.3	-2.3	1.1	45.0	3.0	0.0	Horz	PK	0.0	49.0	74.0	-25.0	Mid Ch, Dense Reader, EUT Horz
2708.150	29.2	-0.2	1.6	33.0	3.0	0.0	Horz	AV	0.0	29.0	54.0	-25.0	Low Ch, Very Fast, EUT Horz
1830.485	51.2	-2.3	1.1	45.0	3.0	0.0	Horz	PK	0.0	48.9	74.0	-25.1	Mid Ch, Very Fast, EUT Horz
1830.350	50.9	-2.3	1.2	44.0	3.0	0.0	Horz	PK	0.0	48.6	74.0	-25.4	Mid Ch, Very Sensitive, EUT Horz
1830.500	50.8	-2.3	1.2	51.0	3.0	0.0	Horz	PK	0.0	48.5	74.0	-25.5	Mid Ch, Very Fast, EUT Vert
1830.575	50.7	-2.3	2.7	44.0	3.0	0.0	Vert	PK	0.0	48.4	74.0	-25.6	Mid Ch, Very Fast, EUT Horz
1830.415	50.6	-2.3	1.6	57.0	3.0	0.0	Horz	PK	0.0	48.3	74.0	-25.7	Mid Ch, Very Fast, EUT Flat
1830.480	50.5	-2.3	2.1	29.0	3.0	0.0	Vert	PK	0.0	48.2	74.0	-25.8	Mid Ch, Very Fast, EUT Flat
5417.920	38.2	10.0	1.6	324.0	3.0	0.0	Horz	PK	0.0	48.2	74.0	-25.8	Low Ch, Very Fast, EUT Horz
1854.575	49.8	-2.0	2.2	64.0	3.0	0.0	Vert	PK	0.0	47.8	74.0	-26.2	High Ch, Very Fast, EUT Horz
1830.520	49.7	-2.3	1.7	148.0	3.0	0.0	Vert	PK	0.0	47.4	74.0	-26.6	Mid Ch, Very Fast, EUT Vert
5417.880	37.4	10.0	1.6	342.0	3.0	0.0	Vert	PK	0.0	47.4	74.0	-26.6	Low Ch, Very Fast, EUT Horz
4514.290	39.7	7.3	1.6	337.0	3.0	0.0	Vert	PK	0.0	47.0	74.0	-27.0	Low Ch, Very Fast, EUT Horz
1805.425	49.4	-2.6	2.2	57.0	3.0	0.0	Vert	PK	0.0	46.8	74.0	-27.2	Low Ch, Very Fast, EUT Horz
4636.935	39.1	7.6	1.6	342.0	3.0	0.0	Horz	PK	0.0	46.7	74.0	-27.3	High Ch, Very Fast, EUT Horz
1854.480	48.6	-2.0	2.2	156.0	3.0	0.0	Horz	PK	0.0	46.6	74.0	-27.4	High Ch, Very Fast, EUT Horz
1805.555	49.0	-2.6	1.0	159.0	3.0	0.0	Horz	PK	0.0	46.4	74.0	-27.6	Low Ch, Very Fast, EUT Horz
4576.195	39.0	7.4	2.6	65.0	3.0	0.0	Vert	PK	0.0	46.4	74.0	-27.6	Mid Ch, Very Fast, EUT Horz
4636.950	38.8	7.6	1.6	53.0	3.0	0.0	Vert	PK	0.0	46.4	74.0	-27.6	High Ch, Very Fast, EUT Horz
4576.515	38.4	7.4	1.6	360.0	3.0	0.0	Horz	PK	0.0	45.8	74.0	-28.2	Mid Ch, Very Fast, EUT Horz
4513.400	38.4	7.3	1.6	287.0	3.0	0.0	Horz	PK	0.0	45.7	74.0	-28.3	Low Ch, Very Fast, EUT Horz
3611.140	41.5	3.3	2.0	181.0	3.0	0.0	Horz	PK	0.0	44.8	74.0	-29.2	Low Ch, Very Fast, EUT Horz
3661.190	40.9	3.7	1.6	80.0	3.0	0.0	Vert	PK	0.0	44.6	74.0	-29.4	Mid Ch, Very Fast, EUT Horz
3660.635	40.8	3.7	1.6	32.0	3.0	0.0	Horz	PK	0.0	44.5	74.0	-29.5	Mid Ch, Very Fast, EUT Horz
3708.495	40.6	3.9	1.6	170.0	3.0	0.0	Vert	PK	0.0	44.5	74.0	-29.5	High Ch, Very Fast, EUT Horz
3709.305	40.2	3.9	1.6	97.0	3.0	0.0	Horz	PK	0.0	44.1	74.0	-29.9	High Ch, Very Fast, EUT Horz
3611.240	40.4	3.3	1.6	85.0	3.0	0.0	Vert	PK	0.0	43.7	74.0	-30.3	Low Ch, Very Fast, EUT Horz
2781.790	42.1	-0.1	2.0	14.0	3.0	0.0	Vert	PK	0.0	42.0	74.0	-32.0	High Ch, Very Fast, EUT Horz
2709.090	41.9	-0.2	1.6	343.0	3.0	0.0	Vert	PK	0.0	41.7	74.0	-32.3	Low Ch, Very Fast, EUT Horz
2745.300	41.0	-0.2	2.0	3.0	3.0	0.0	Vert	PK	0.0	40.8	74.0	-33.2	Mid Ch, Very Fast, EUT Horz
2782.075	40.6	-0.1	1.6	58.0	3.0	0.0	Horz	PK	0.0	40.5	74.0	-33.5	High Ch, Very Fast, EUT Horz
2744.735	40.4	-0.2	3.5	238.0	3.0	0.0	Horz	PK	0.0	40.2	74.0	-33.8	Mid Ch, Very Fast, EUT Horz
2708.365	40.0	-0.2	1.6	33.0	3.0	0.0	Horz	PK	0.0	39.8	74.0	-34.2	Low Ch, Very Fast, EUT Horz

## **DUTY CYCLE**



XMit 2017.09.21

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	Keysight	N9010A	AFO	19-May-17	19-May-18
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	20-Apr-17	20-Apr-18
Attenuator	Weinschel	54A-6	TYQ	25-Oct-17	25-Oct-18
Attenuator	Fairview Microwave	SA4014-20	TKV	9-Mar-17	9-Mar-18
Block - DC	Fairview Microwave	SD3379	AMU	20-Apr-17	20-Apr-18
Generator - Signal	Agilent	N5183A	TIA	6-Apr-16	6-Apr-18

#### **TEST DESCRIPTION**

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



XMit 2017.09.21

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	Keysight	N9010A	AFO	19-May-17	19-May-18
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	20-Apr-17	20-Apr-18
Attenuator	Weinschel	54A-6	TYQ	25-Oct-17	25-Oct-18
Attenuator	Fairview Microwave	SA4014-20	TKV	9-Mar-17	9-Mar-18
Block - DC	Fairview Microwave	SD3379	AMU	20-Apr-17	20-Apr-18
Generator - Signal	Agilent	N5183A	TIA	6-Apr-16	6-Apr-18

#### **TEST DESCRIPTION**

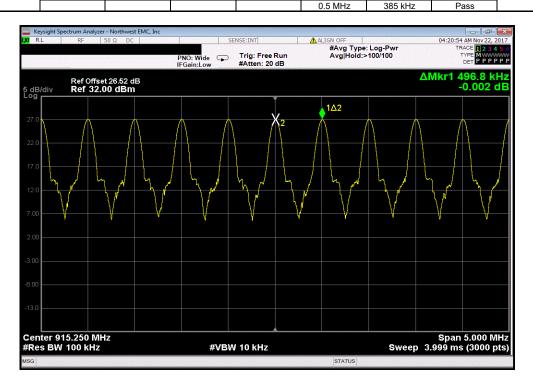
The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The channel carrier frequencies in the 902-928 MHz band must be separated by 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. The EUT was operated in pseudorandom hopping mode. The spectrum was scanned across two adjacent peaks. The separation between the peaks of these channels was measured.



			NweTx 2016.09.14.2	XMit 2017.09.21						
EUT	Indy RS1000	Work Order:	7LAY0128							
Serial Number	110121170091	Date:	21-Nov-17							
Customer	Impinj, Inc.	Temperature:	21.6 °C							
Attendees	Paul Archer		41.2% RH							
Project		Barometric Pres.:	1013 mbar							
	Richard Mellroth Power: 5 VDC	Job Site:	NC02							
TEST SPECIFICAT	IONS Test Method									
FCC 15.247:2017	ANSI C63.10:2013									
COMMENTS										
Transmitting at De	Transmitting at Defaut Power Setting = 27dBm									
DEVIATIONS FRO	M TEST STANDARD									
None										
Configuration #	1 Signature									
	· · · · · · · · · · · · · · · · · · ·		Limit							
		Value	(≥)	Results						
Hopping Mode										
	Dense Reader, PR-ASK									
	Mid Channel, 915.25 MHz	0.5 MHz	45 kHz	Pass						
	Very Fast, DSB-ASK									
	Mid Channel, 915.25 MHz	0.5 MHz	385 kHz	Pass						
	Very Sensitive, DSB-ASK									
	Mid Channel, 915.25 MHz	0.5 MHz	83 kHz	Pass						

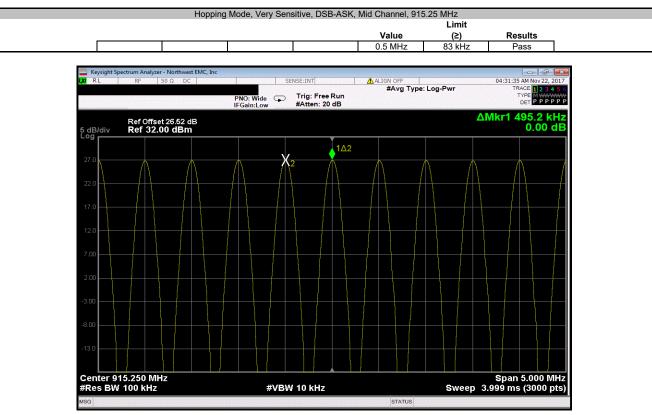


weTx 2016.09.14.2 XMit 2017.09.21 Hopping Mode, Dense Reader, PR-ASK, Mid Channel, 915.25 MHz Limit **(≥)** 45 kHz Value Results 0.5 MHz Pass Keysight ! R L 03:51:39 AM Nov 22, 2017 AL1 TRACE 1 2 3 4 5 6 TYPE M WWWW DET P P P P P #Avg Type: Log-Pwr Avg|Hold:>100/100 PNO: Wide Trig: Free Run IFGain:Low #Atten: 20 dB ΔMkr1 501.8 kHz 0.000 dB Ref Offset 26.52 dB Ref 32.00 dBm 5 dB/div Log 1<u>Δ</u>2 X2 Center 915.250 MHz #Res BW 100 kHz Span 5.000 MHz Sweep 3.999 ms (3000 pts) #VBW 10 kHz STATUS Hopping Mode, Very Fast, DSB-ASK, Mid Channel, 915.25 MHz Limit Value (≥) Results





NweTx 2016.09.14.2 XMit 2017.09.21





XMit 2017.09.21

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	Keysight	N9010A	AFO	19-May-17	19-May-18
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	20-Apr-17	20-Apr-18
Attenuator	Weinschel	54A-6	TYQ	25-Oct-17	25-Oct-18
Attenuator	Fairview Microwave	SA4014-20	TKV	9-Mar-17	9-Mar-18
Block - DC	Fairview Microwave	SD3379	AMU	20-Apr-17	20-Apr-18
Generator - Signal	Agilent	N5183A	TIA	6-Apr-16	6-Apr-18

#### **TEST DESCRIPTION**

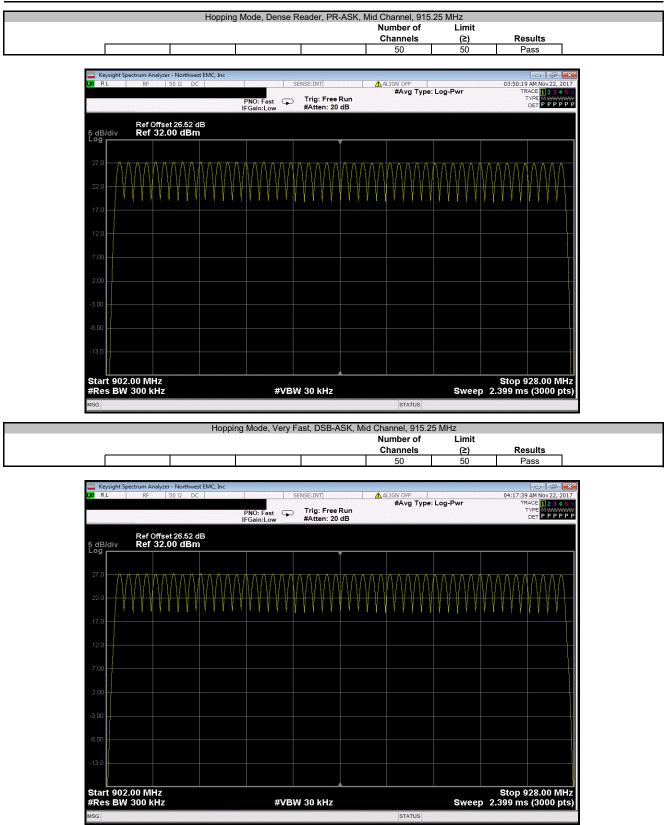
The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The number of hopping frequencies was measured across the authorized band. The hopping function of the EUT was enabled.



						NweTx 2016.09.14.2	XMit 2017.09.21
	Indy RS1000				Work Order:		
Serial Number	: 110121170091					21-Nov-17	
Customer	Impinj, Inc.				Temperatures	21.6 °C	
	Paul Archer				Humidity	41.2% RH	
Project					Barometric Pres.:		
	Richard Mellroth		Power:	5 VDC	Job Site:	NC02	
TEST SPECIFICAT	TIONS			Test Method			
FCC 15.247:2017				ANSI C63.10:2013			
COMMENTS				•			
Transmitting at De	efaut Power Setting = 27dE	3m					
······							
DEVIATIONS FRO	M TEST STANDARD						
None							
			n. n				
Configuration #	1		VIGI				
-		Signature	pre ic				
		<u>v</u>			Number of	Limit	
					Channels	(≥)	Results
Hopping Mode							
	Dense Reader, PR-ASK						
	Mid Channel	, 915.25 MHz			50	50	Pass
	Very Fast, DSB-ASK						
		, 915.25 MHz			50	50	Pass
	Very Sensitive, DSB-ASK						
		, 915.25 MHz			50	50	Pass

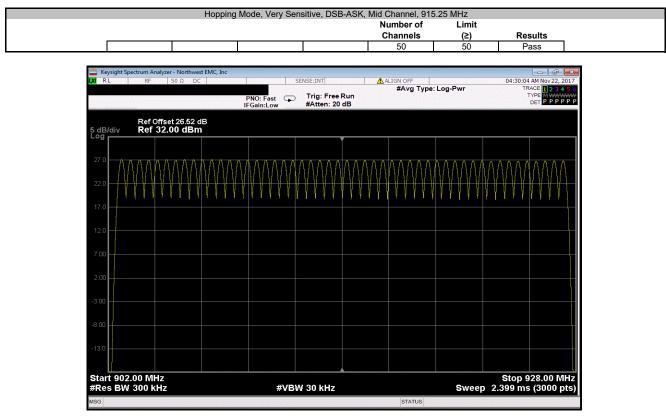


NweTx 2016.09.14.2 XMit 2017.09.21





NweTx 2016.09.14.2 XMit 2017.09.21





XMit 2017.09.21

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	Keysight	N9010A	AFO	19-May-17	19-May-18
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	20-Apr-17	20-Apr-18
Attenuator	Weinschel	54A-6	TYQ	25-Oct-17	25-Oct-18
Attenuator	Fairview Microwave	SA4014-20	TKV	9-Mar-17	9-Mar-18
Block - DC	Fairview Microwave	SD3379	AMU	20-Apr-17	20-Apr-18
Generator - Signal	Agilent	N5183A	TIA	6-Apr-16	6-Apr-18

#### **TEST DESCRIPTION**

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The average dwell time per hopping channel was measured at one hopping channel in the middle of the authorized band. The hopping function of the EUT was enabled.

The dwell time limit for frequency hopping systems in the 902-928 MHz band is determined by the 20 dB bandwidth of the hopping channel:

If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the average time of ocupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the average time of ocupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.



CUT	Indy RS1000					Work Order: 7	NweTx 2016.09.14.2	2 XMit 20
	r: 110121170091						21-Nov-17	
	r: Impinj, Inc.					Temperature: 2		
	: Paul Archer					Humidity: 4		
	t: None					Barometric Pres.: 1		
	/: Richard Mellroth		Power: 5 VDC			Job Site:		
EST SPECIFICAT			Test Method			JOD Site. I	1002	
C 15.247:2017	1015		ANSI C63.10:2013	)				
0 15.247.2017			ANSI 603.10.2013	)				
OMMENTS								
	efaut Power Setting = 27dBm							
Ū	·							
	M TEST STANDARD							
one	-							
onfiguration #	1		01.1					
ingulation #		Signature	hisic					
				Pulse Width	Number of	Total On Time	Limit	_
				(ms)	Pulses	(ms)	(ms)	Results
pping Mode	Dense Reader, PR-ASK							
	Single Pulse Width			196.8	N/A	N/A	N/A	N/A
	1 Second Sweep			N/A	1	N/A	N/A	N/A
	5 Second Sweep			N/A	1	N/A	N/A	N/A
	10 Second Sweep			N/A	1	N/A	N/A	N/A
					1			
	20 Second Sweep			N/A	2	N/A	N/A	N/A
	Dwell Time Calculation Very Fast, DSB-ASK	ก		196.8	2	393.6	≤ 400	Pass
	Single Pulse Width			197,165	N/A	N/A	N/A	N/A
	1 Second Sweep			N/A	1	N/A	N/A	N/A
	2 Second Sweep			N/A	1	N/A	N/A	N/A
	5 Second Sweep			N/A	1	N/A	N/A	N/A
	10 Second Sweep			N/A	1	N/A	N/A	N/A
					1	197.165	≤ 400	Pass
		٦		197.165		197,105		
	Dwell Time Calculation	n		197.165	1	197.165	≤ 400	1 455
		n		197.165	N/A	N/A	≤ 400 N/A	N/A
	Dwell Time Calculation Very Sensitive, DSB-ASK Single Pulse Width	n						
	Dwell Time Calculation Very Sensitive, DSB-ASK Single Pulse Width 1 Second Sweep	n		196.765 N/A		N/A N/A	N/A N/A	N/A N/A
	Dwell Time Calculation Very Sensitive, DSB-ASK Single Pulse Width 1 Second Sweep 5 Second Sweep	n		196.765 N/A N/A		N/A N/A N/A	N/A N/A N/A	N/A N/A N/A
	Dwell Time Calculation Very Sensitive, DSB-ASK Single Pulse Width 1 Second Sweep	n		196.765 N/A		N/A N/A	N/A N/A	N/A N/A



	Ho	ppping Mode, Dense Pulse Width		Total On Time		
		(ms)	Pulses	(ms)	(ms)	Results
		196.8	N/A	N/A	N/A	N/A
_						
Keysight Spect	rum Analyzer - Northwest EMC RF 50 Ω DC		SENSE:INT	ALIGN OFF		07:17:40 AM Nov 22, 2017
	10 002 00		Trig Delay-1.000 m		: Log-Pwr	TRACE 1 2 3 4 5 6
		PNO: Wide ↔→ IFGain:Low	#Atten: 20 dB			
	Ref Offset 26.52 dB				L	Mkr1 196.8 ms
5 dB/div Log	Ref 30.00 dBm	1		▲1∆2		0.90 dB
		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				
25.0	<u>↑</u> 3   P P					
20.0						
15.0						
10.0						
10.0						
5.00						
						TRIG LVL
0.00						MOLVE
-5.00						
-10.0						
-15.0						
-13.0						
Center 015	.250000 MHz					Span 0 Hz
Res BW 10		#VB	W 10 kHz		Sweep 4	00.0 ms (3001 pts)
MSG				STATUS		-
		opping Mode, Dense	Poodor DD ASK N	Aid Channel 01	5 25 MH-	
		Pulse Width		Total On Time		
		(ms)	Pulses	(ms)	(ms)	Results
		N/A	1	N/A	N/A	N/A
Keysight Spect	rum Analyzer - Northwest EMC	Inc				
	RF 50 Ω DC		SENSE:INT Trig Delay-50.00 m	ALIGN OFF	e: Log-Pwr	07:22:57 AM Nov 22, 2017
		PNO: Wide 🔸	Trig: Video	s Avg Type	E. LOG-F WI	TRACE 1 2 3 4 5 6 TYPE WWWWWW DET P N N N N N
		IFGain:Low	#Atten: 20 dB			
5 dB/div	Ref Offset 26.52 dB Ref 30.00 dBm					
5 dB/div Log						\_1∆2
25.0					¥2 <sup>111</sup> 11	чту-т-т <sup>а</sup> ций
20.0						
15.0						
15.0						
10.0						
10.0						
5.00						

Center 915.250000 MHz Res BW 100 kHz

STATUS

#VBW 10 kHz

Span 0 Hz Sweep 1.000 s (3001 pts)



Hopping Mode, Dense Reader, PR-ASK, Mid Channel, 915.25 MHz Pulse Width Number of Total On Time Limit (ms) N/A (ms) Pulses (ms) Results N/A 1 N/A N/A 07:24:19 AM Nov 22, 2017 TRACE 1 2 3 4 5 6 TYPE WWWWW DET P N N N N nalyzer - Northwest EMC, Inc Keysight S SENSE:INT ALIGN OFF Trig Delay-50.00 ms Avg Type: Log-Pwr PNO: Wide Trig: Video IFGain:Low #Atten: 20 dB Ref Offset 26.52 dB Ref 30.00 dBm 5 dB/div Center 915.250000 MHz Res BW 100 kHz Span 0 Hz Sweep 5.000 s (3001 pts) #VBW 10 kHz STATUS

	Hopping	Mode, Dense Re	eader, PR-ASK,	Mid Channel, 915	.25 MHz		
		Pulse Width	Number of	Total On Time	Limit		
		(ms)	Pulses	(ms)	(ms)	Results	_
		N/A	1	N/A	N/A	N/A	

RL RL	rum Analyzer - Northwest EN RF 50 Ω DC	ic, inc	CENCE JUT	A ALICH OFF	
KL	RF 50 Ω DC		SENSE:INT Trig Delay-50.00 m	ALIGN OFF Avg Type: Log-Pwr	07:24:47 AM Nov 22, 201 TRACE 1 2 3 4 5
		PNO:Wide ← IFGain:Low	(b) NCND (c) and compared and compared and compared with the compared of th	is Avg Type: Log-Pwr	TYPE WWWWW DET P NNN
dB/div	Ref Offset 26.52 dB Ref 30.00 dBm				
					*
25.0					
0.0					
5.0					
).0					
00					
00					TRIG L
).0					
5.0					
			1		
enter 915. es BW 10	.250000 MHz 0 kHz	#V	'BW 10 kHz		Span 0 H Sweep 10.00 s (3001 pt
G				STATUS	



NweTx 2016.09.14.2 XMit 2017.09.21

	Pulse Width	Number of	Total On Time	Limit	
r	(ms)	Pulses	(ms)	(ms)	Results
	N/A	2	N/A	N/A	N/A
Keysight Spectrum Analyzer - Northwest EMC, Inc					- 6 <b>-</b>
KL RF 50Ω DC	SE	Trig Delay-50.00 n	ALIGN OFF	an Dum	07:25:34 AM Nov 22, 2017
	PNO: Wide +++	Trig: Video #Atten: 20 dB	ns Avgrype.L	og-rwi	TRACE 1 2 3 4 5 ( TYPE WWWWWW DET P NNNN
Ref Offset 26.52 dB 5 dB/div Ref 30.00 dBm					
Log					
25.0					
23.0					
20.0					
20.0					
15.0					
15.0					
10.0					
5.00					
5.00					
					TRIG LVL
0.00					
-5.00					
-5.00					
-10.0					
-10.0					
15.0					
-15.0					
		1			
Center 915.250000 MHz Res BW 100 kHz	#VBW	/ 10 kHz		Sweep	Span 0 Hz 20.00 s (3001 pts)
MSG			STATUS		

	 Pulse Width	Number of	Total On Time		
	(ms)	Pulses	(ms)	(ms)	Results
	196.8	2	393.6	≤ 400	Pass

**Calculation Only** 

No Screen Capture Required



		Hoppin	g Mode, Very Pulse Width		Mid Channel, 915 Total On Time		
	•		(ms)	Pulses	(ms)	(ms)	Results
			197.165	N/A	N/A	N/A	N/A
	trum Analyzer - Northwe						
(XI) RL	RF 50 Ω D0			SENSE:INT Trig Delay-1.00	ALIGN OFF 0 ms #Avg Typ	be: Log-Pwr	07:33:48 AM Nov 22, 2 TRACE 2 3 4
			PNO: Wide ++ IFGain:Low	, Trig: Video #Atten: 20 dB			DET PPPP
	Ref Offset 26.52	зB					ΔMkr1 197.2 n -1.36 c
5 dB/div Log	Ref 30.00 dBn						-1.00 C
25.0		X		hill ou un thought it a		₩₩₩₩	
20.0							
15.0							
10.0							
5.00							
0.00							TRIG
-5.00							
-5.00							
-10.0							
-15.0							
Center 915 Res BW 10	5.250000 MHz			3W 10 kHz	······	<b>.</b>	Span 0 400.2 ms (3001 p
NCS DW TO	VV KITZ		#¥6			oweeh	400.2 ms (300 r p
MSG					STATUS		
MSG		Honnin	a Modo, Vonu	East DSP ASK		25 MUz	
MSG		Hoppin	Pulse Width	n Number of	Mid Channel, 915 Total On Time	e Limit	
MSG		Hoppin			Mid Channel, 915 Total On Time (ms)	e Limit (ms)	Results N/A
			Pulse Width (ms)	n Number of Pulses	Mid Channel, 915 Total On Time	e Limit	N/A
Keysight Spec	trum Analyzer - Northwe RF 50 Ω DC	st EMC, Inc	Pulse Width (ms)	Number of Pulses 1	Mid Channel, 915 Total On Time (ms) N/A	e Limit (ms) N/A	N/A
Keysight Spec		st EMC, Inc	Pulse Width (ms) N/A	Number of Pulses 1 SENSE:INT Trig Delay-50.0 Trig: Video	Mid Channel, 915 Total On Time (ms) N/A	e Limit (ms)	N/A
Keysight Spec	RF 50 Ω DC	st EMC, Inc	Pulse Width (ms) N/A	Number of Pulses 1 SENSE:INT Trig Delay-50.0	Mid Channel, 915 Total On Time (ms) N/A	e Limit (ms) N/A	N/A
Keysight Spec		st EMC, Inc	Pulse Width (ms) N/A	Number of Pulses 1 SENSE:INT Trig Delay-50.0 Trig: Video	Mid Channel, 915 Total On Time (ms) N/A	e Limit (ms) N/A	N/A
Keysight Spec (X RL 5 dB}div	Ref Offset 26.52 c Ref 30.00 dBn	st EMC, Inc	Pulse Width (ms) N/A PNO: Wide IFGein:Low	Number of Pulses 1 SENSE:INT Trig Delay-50.0 Trig: Video	Mid Channel, 915 Total On Time (ms) N/A	e Limit (ms) N/A	N/A
Keysight Spec	Ref Offset 26.52 c Ref 30.00 dBn	st EMC, Inc	Pulse Width (ms) N/A PNO: Wide IFGein:Low	Number of Pulses 1 SENSE:INT Trig Delay-50.0 Trig: Video	Mid Channel, 915 Total On Time (ms) N/A	e Limit (ms) N/A	N/A
Keysight Spec (X RL 5 dB}div	Ref Offset 26.52 c Ref 30.00 dBn	st EMC, Inc	Pulse Width (ms) N/A PNO: Wide IFGein:Low	Number of Pulses 1 SENSE:INT Trig Delay-50.0 Trig: Video	Mid Channel, 915 Total On Time (ms) N/A	e Limit (ms) N/A	N/A
E dB/div	Ref Offset 26.52 c Ref 30.00 dBn	st EMC, Inc	Pulse Width (ms) N/A PNO: Wide IFGein:Low	Number of Pulses 1 SENSE:INT Trig Delay-50.0 Trig: Video	Mid Channel, 915 Total On Time (ms) N/A	e Limit (ms) N/A	N/A
Keysight Spec	Ref Offset 26.52 c Ref 30.00 dBn	st EMC, Inc	Pulse Width (ms) N/A PNO: Wide IFGein:Low	Number of Pulses 1 SENSE:INT Trig Delay-50.0 Trig: Video	Mid Channel, 915 Total On Time (ms) N/A	e Limit (ms) N/A	N/A
E dB/div	Ref Offset 26.52 c Ref 30.00 dBn	st EMC, Inc	Pulse Width (ms) N/A PNO: Wide IFGein:Low	Number of Pulses 1 SENSE:INT Trig Delay-50.0 Trig: Video	Mid Channel, 915 Total On Time (ms) N/A	e Limit (ms) N/A	N/A
<b>Keysight Spec</b> <b>5 dB/div</b> 25.0 20.0 15.0	Ref Offset 26.52 c Ref 30.00 dBn	st EMC, Inc	Pulse Width (ms) N/A PNO: Wide IFGein:Low	Number of Pulses 1 SENSE:INT Trig Delay-50.0 Trig: Video	Mid Channel, 915 Total On Time (ms) N/A	e Limit (ms) N/A	N/A
Keysight Spec           E         dB/div           25.0	Ref Offset 26.52 c Ref 30.00 dBn	st EMC, Inc	Pulse Width (ms) N/A PNO: Wide IFGein:Low	Number of Pulses 1 SENSE:INT Trig Delay-50.0 Trig: Video	Mid Channel, 915 Total On Time (ms) N/A	e Limit (ms) N/A	N/A 07:34:31 AM Nov 22, 2 TRACE 234 TYPE WWW DET P P P
<b>5 dB/div</b> 25 0 20.0 15.0	Ref Offset 26.52 c Ref 30.00 dBn	st EMC, Inc	Pulse Width (ms) N/A PNO: Wide IFGein:Low	Number of Pulses 1 SENSE:INT Trig Delay-50.0 Trig: Video	Mid Channel, 915 Total On Time (ms) N/A	e Limit (ms) N/A	N/A
Keysight Spec           E         dB/div           25.0	Ref Offset 26.52 c Ref 30.00 dBn	st EMC, Inc	Pulse Width (ms) N/A PNO: Wide IFGein:Low	Number of Pulses 1 SENSE:INT Trig Delay-50.0 Trig: Video	Mid Channel, 915 Total On Time (ms) N/A	e Limit (ms) N/A	N/A 07:34:31 AM Nov 22, 2 TRACE 234 TYPE WWW DET P P P
Keysight Spec           Keysight Spec           J           B           J           B           J           B           J           B           J           B           J           B           J           B           J           B           J <t< td=""><td>Ref Offset 26.52 c Ref 30.00 dBn</td><td>st EMC, Inc</td><td>Pulse Width (ms) N/A PNO: Wide IFGein:Low</td><td>Number of Pulses 1 SENSE:INT Trig Delay-50.0 Trig: Video</td><td>Mid Channel, 915 Total On Time (ms) N/A</td><td>e Limit (ms) N/A</td><td>N/A 07:34:31 AM Nov 22, 2 TRACE 234 TYPE WWW DET P P P</td></t<>	Ref Offset 26.52 c Ref 30.00 dBn	st EMC, Inc	Pulse Width (ms) N/A PNO: Wide IFGein:Low	Number of Pulses 1 SENSE:INT Trig Delay-50.0 Trig: Video	Mid Channel, 915 Total On Time (ms) N/A	e Limit (ms) N/A	N/A 07:34:31 AM Nov 22, 2 TRACE 234 TYPE WWW DET P P P
Keysight Spector           2         dB3/div           2         0           16.0         0           5.00         0           -5.00         0           -10.0         0	Ref Offset 26.52 c Ref 30.00 dBn	st EMC, Inc	Pulse Width (ms) N/A PNO: Wide IFGein:Low	Number of Pulses 1 SENSE:INT Trig Delay-50.0 Trig: Video	Mid Channel, 915 Total On Time (ms) N/A	e Limit (ms) N/A	N/A 07:34:31 AM Nov 22, 2 TRACE 234 TYPE WWW DET P P P
Keysight Spec           5         dB/div           225.0	Ref Offset 26.52 c Ref 30.00 dBn	st EMC, Inc	Pulse Width (ms) N/A PNO: Wide IFGein:Low	Number of Pulses 1 SENSE:INT Trig Delay-50.0 Trig: Video	Mid Channel, 915 Total On Time (ms) N/A	e Limit (ms) N/A	N/A 07:34:31 AM Nov 22, 2 TRACE 234 TYPE WWW DET P P P



	пор	pping Mode, Very F Pulse Width		Total On Time	Limit	
		(ms)	Pulses	(ms)	(ms)	Results
I		N/A	1	N/A	N/A	N/A
Keysight Spectrum Ar	nalyzer - Northwest EMC, Inc 50 Ω DC		SENSE:INT	A ALICH OFF		07:34:55 AM Nov 22, 201
	50 X DC		Trig Delay-50.00 ms	ALIGN OFF #Avg Type:	_og-Pwr	TRACE 1 2 3 4 5
		PNO: Wide +++ IFGain:Low	#Atten: 20 dB			TYPE WWWWWW DET P P P P
Ref C	Offset 26.52 dB <b>30.00 dBm</b>					
5 dB/div Ref						
25.0						
20.0						
20.0						
15.0						
10.0						
5.00						
0.00						TRIG LV
-5.00						
-10.0						
-15.0						
			1			
			¥ '			
Center 915.250 Res BW 100 kH	łz	oping Mode, Very I	W 10 kHz Fast, DSB-ASK, Mic		MHz	Span 0 H 2.000 s (3001 pts
Res BW 100 kH	łz		Fast, DSB-ASK, Mic			
Res BW 100 kH	Hz Hop	pping Mode, Very F Pulse Width (ms) N/A	Fast, DSB-ASK, Mic Number of Pulses	Channel, 915.25 Total On Time (ms)	MHz Limit (ms)	2.000 s (3001 pts Results N/A
Res BW 100 kH	łz	pping Mode, Very F Pulse Width (ms) N/A	Fast, DSB-ASK, Mic Number of Pulses 1	Channel, 915.25 Total On Time (ms) N/A	MHz Limit (ms) N/A	2.000 s (3001 pts Results N/A 07:35:15 AM NOV 22, 201
Res BW 100 kH	12 Hop	pping Mode, Very F Pulse Width (ms) N/A	Fast, DSB-ASK, Mic Number of Pulses 1 5ense:inti Trig Delay-50.00 ms	Channel, 915.25 Total On Time (ms) N/A	MHz Limit (ms) N/A	2.000 s (3001 pts Results N/A
Res BW 100 kH	IZ Hop nalyzer - Northwest EMC, Inc 50Ω DC	pping Mode, Very I Pulse Width (ms) N/A PNO: Wide →→	Fast, DSB-ASK, Mic Number of Pulses 1 SENSE:INT Trig Delay-50.00 ms Trig: Video	Channel, 915.25 Total On Time (ms) N/A	MHz Limit (ms) N/A	2.000 s (3001 pts Results N/A 07:35:15 AM NOV 22, 201 TRACE 0.23 4 45 TRACE 0.23 4 45
Res BW 100 kH	Hop halyzer - Northwest EMC, Inc 50 Ω DC	pping Mode, Very I Pulse Width (ms) N/A PNO: Wide →→	Fast, DSB-ASK, Mic Number of Pulses 1 SENSE:INT Trig Delay-50.00 ms Trig: Video	Channel, 915.25 Total On Time (ms) N/A	MHz Limit (ms) N/A	2.000 s (3001 pts Results N/A 07:35:15 AM NOV 22, 201 TRACE 0.23 4 45 TRACE 0.23 4 45
Res BW 100 kH	IZ Hop nalyzer - Northwest EMC, Inc 50Ω DC	pping Mode, Very I Pulse Width (ms) N/A PNO: Wide →→	Fast, DSB-ASK, Mic Number of Pulses 1 SENSE:INT Trig Delay-50.00 ms Trig: Video	Channel, 915.25 Total On Time (ms) N/A	MHz Limit (ms) N/A	2.000 s (3001 pts Results N/A 07:35:15 AM NOV 22, 201 TRACE 0.23 4 45 TRACE 0.23 4 45
Res BW 100 kH	IZ Hop nalyzer - Northwest EMC, Inc 50Ω DC	pping Mode, Very I Pulse Width (ms) N/A PNO: Wide →→	Fast, DSB-ASK, Mic Number of Pulses 1 SENSE:INT Trig Delay-50.00 ms Trig: Video	Channel, 915.25 Total On Time (ms) N/A	MHz Limit (ms) N/A	2.000 s (3001 pts Results N/A 07:35:15 AM NOV 22, 201 TRACE 0.23 4 45 TRACE 0.23 4 45
Res BW 100 kH	IZ Hop nalyzer - Northwest EMC, Inc 50Ω DC	pping Mode, Very I Pulse Width (ms) N/A PNO: Wide →→	Fast, DSB-ASK, Mic Number of Pulses 1 SENSE:INT Trig Delay-50.00 ms Trig: Video	Channel, 915.25 Total On Time (ms) N/A	MHz Limit (ms) N/A	2.000 s (3001 pts Results N/A 07:35:15 AM NOV 22, 201 TRACE 0.23 4 45 TRACE 0.23 4 45
Res BW 100 kH	IZ Hop nalyzer - Northwest EMC, Inc 50Ω DC	pping Mode, Very I Pulse Width (ms) N/A PNO: Wide →→	Fast, DSB-ASK, Mic Number of Pulses 1 SENSE:INT Trig Delay-50.00 ms Trig: Video	Channel, 915.25 Total On Time (ms) N/A	MHz Limit (ms) N/A	2.000 s (3001 pts Results N/A 07:35:15 AM NOV 22, 201 TRACE 0.23 4 45 TRACE 0.23 4 45
Res BW 100 kH	IZ Hop nalyzer - Northwest EMC, Inc 50Ω DC	pping Mode, Very I Pulse Width (ms) N/A PNO: Wide →→	Fast, DSB-ASK, Mic Number of Pulses 1 SENSE:INT Trig Delay-50.00 ms Trig: Video	Channel, 915.25 Total On Time (ms) N/A	MHz Limit (ms) N/A	2.000 s (3001 pts Results N/A 07:35:15 AM NOV 22, 201 TRACE 0.23 4 45 TRACE 0.23 4 45
Res BW 100 kH	IZ Hop nalyzer - Northwest EMC, Inc 50Ω DC	pping Mode, Very I Pulse Width (ms) N/A PNO: Wide →→	Fast, DSB-ASK, Mic Number of Pulses 1 SENSE:INT Trig Delay-50.00 ms Trig: Video	Channel, 915.25 Total On Time (ms) N/A	MHz Limit (ms) N/A	2.000 s (3001 pts Results N/A 07:35:15 AM NOV 22, 201 TRACE 0.23 4 45 TRACE 0.23 4 45
Res BW 100 kH	IZ Hop nalyzer - Northwest EMC, Inc 50Ω DC	pping Mode, Very I Pulse Width (ms) N/A PNO: Wide →→	Fast, DSB-ASK, Mic Number of Pulses 1 SENSE:INT Trig Delay-50.00 ms Trig: Video	Channel, 915.25 Total On Time (ms) N/A	MHz Limit (ms) N/A	2.000 s (3001 pts Results N/A 07:35:15 AM NOV 22, 201 TRACE 0.23 4 45 TRACE 0.23 4 45
Res BW 100 kH	IZ Hop nalyzer - Northwest EMC, Inc 50Ω DC	pping Mode, Very I Pulse Width (ms) N/A PNO: Wide →→	Fast, DSB-ASK, Mic Number of Pulses 1 SENSE:INT Trig Delay-50.00 ms Trig: Video	Channel, 915.25 Total On Time (ms) N/A	MHz Limit (ms) N/A	2.000 s (3001 pts Results N/A 07:35:15 AM NOV 22, 201 TRACE 0 28 4 54 TRACE 0 28 4 54
Res         BWI         100 kH           MISG	IZ Hop nalyzer - Northwest EMC, Inc 50Ω DC	pping Mode, Very I Pulse Width (ms) N/A PNO: Wide →→	Fast, DSB-ASK, Mic Number of Pulses 1 SENSE:INT Trig Delay-50.00 ms Trig: Video	Channel, 915.25 Total On Time (ms) N/A	MHz Limit (ms) N/A	2.000 s (3001 pts Results N/A 07:35:15 AM Nov 22, 201 TRACE 12 3 45 TYPE PP PP
Res BW 100 kH           MSG           MSG	IZ Hop nalyzer - Northwest EMC, Inc 50Ω DC	pping Mode, Very I Pulse Width (ms) N/A PNO: Wide →→	Fast, DSB-ASK, Mic Number of Pulses 1 SENSE:INT Trig Delay-50.00 ms Trig: Video	Channel, 915.25 Total On Time (ms) N/A	MHz Limit (ms) N/A	2.000 s (3001 pts Results N/A 07:35:15 AM Nov 22, 201 TRACE 12 3 45 TYPE PP PP
Res BW 100 kH           MSG           MSG           MSG           Keysight Spectrum Ar           MR           Ref C           5 dB/div           Ref C           25.0           20.0           10.0           5.00           0.00	IZ Hop nalyzer - Northwest EMC, Inc 50Ω DC	pping Mode, Very I Pulse Width (ms) N/A PNO: Wide →→	Fast, DSB-ASK, Mic Number of Pulses 1 SENSE:INT Trig Delay-50.00 ms Trig: Video	Channel, 915.25 Total On Time (ms) N/A	MHz Limit (ms) N/A	2.000 s (3001 pts Results N/A 07:35:15 AM Nov 22, 201 TRACE 12 3 45 TYPE PP PP
Res         BW         100 kH           MISG	IZ Hop nalyzer - Northwest EMC, Inc 50Ω DC	pping Mode, Very I Pulse Width (ms) N/A PNO: Wide →→	Fast, DSB-ASK, Mic Number of Pulses 1 SENSE:INT Trig Delay-50.00 ms Trig: Video	Channel, 915.25 Total On Time (ms) N/A	MHz Limit (ms) N/A	2.000 s (3001 pts Results N/A 07:35:15 AM Nov 22, 201 TRACE 12 3 45 TYPE PP PP
Res         BWI 100 kH           MSG	12 Hop nalyzer - Northwest EMC, Inc 50 Ω DC 50 Ω DC	pping Mode, Very I Pulse Width (ms) N/A PNO: Wide →→	Fast, DSB-ASK, Mic Number of Pulses 1 SENSE:INT Trig Delay-50.00 ms Trig: Video	Channel, 915.25 Total On Time (ms) N/A	MHz Limit (ms) N/A	2.000 s (3001 pts Results N/A 07:35:15 AM Nov 22, 201 TRACE 12 3 45 TYPE PP PP



NweTx 2016.09.14.2 XMit 2017.09.21

			Pulse Width	Number of	Total On Time	Limit	
			(ms)	Pulses	(ms)	(ms)	Results
			N/A	1	N/A	N/A	N/A
		r - Northwest EMC, Inc					
LXI RL	RF	50 Ω DC	SI	ENSE:INT	ALIGN OFF		07:36:03 AM Nov 22, 2017
			PNO: Wide ↔→ IFGain:Low	Trig Delay-50.00 r Trig: Video #Atten: 20 dB	ns #Avg Type:	Log-Pwr	TRACE 1 2 3 4 5 6 TYPE WWWWWW DET PPPPP
5 dB/div	Ref Offse Ref 30.	et 26.52 dB 00 dBm					
Log							
25.0							
20.0							
20.0							
20.0							
15.0							
10.0							
5.00							
							TRIG LVL
0.00							TRIGLVL
-5.00							
-10.0							
-15.0							
				1			
Center 91	5 25000	MHz		↓ I			Span 0 Hz
Res BW 1			#VBV	/ 10 kHz		Sween	10.00 s (3001 pts)
MSG					STATUS		P.•,
					PIAIDS		

	торри	ng moue, very re	131, DOD-AOIX, IVI			
		Pulse Width	Number of	Total On Time	Limit	
		(ms)	Pulses	(ms)	(ms)	Results
		197.165	1	197.165	≤ 400	Pass

**Calculation Only** 

No Screen Capture Required



Hopping Mode, Very Sensitive, DSB-ASK, Mid Channel, 915.25 MHz Pulse Width Number of Total On Time Limit **(ms)** 196.765 (ms) N/A Pulses (ms) Results N/A N/A N/A 07:29:20 AM Nov 22, 2017 TRACE 2 3 4 5 6 TYPE WWWWWW DET P P P P P P west EMC, In Keysight ! R L SENSE:INT ALIGN OFF Trig Delay-1.000 ms #Avg Type: Log-Pwr PNO: Wide →→ Trig: Video IFGain:Low #Atten: 20 dB ΔMkr1 196.8 ms 0.50 dB Ref Offset 26.52 dB Ref 30.00 dBm 5 dB/div **↓**1∆2 Xs.1.100 Latin 1.110 Latin Latin Latin Carton Center 915.250000 MHz Res BW 100 kHz Span 0 Hz Sweep 400.2 ms (3001 pts) #VBW 10 kHz STATUS

Hopping	Mode, Very Sens	sitive, DSB-ASK,	Mid Channel, 915	.25 MHz		
	Pulse Width	Number of	Total On Time	Limit		
	(ms)	Pulses	(ms)	(ms)	Results	
	N/A	1	N/A	N/A	N/A	

Keysight Spectrum Analyzer - Northwest EMC, RL RF 50 Ω DC		SENSE:INT	ALIGN OFF	07:30:02 AM Nov 22, 201
RL RF 50Ω DC		Trig Delay-50.00 ms	#Avg Type: Log-Pwr	TRACE 1 2 3 4 5
	PNO: Wide ↔→ IFGain:Low	Trig: Video #Atten: 20 dB	Wind Type. Logit Wi	TYPE WWWWW DET P P P P P
Ref Offset 26.52 dB dB/div Ref 30.00 dBm				
og		V		
25.0		^ <b>12</b>		
20.0				
15.0				
10.0				
5.00				
).00				TRIG L
.00				
.00				
0.0				
5.0				
enter 915.250000 MHz es BW 100 kHz	#VB	N 10 kHz	Swei	Span 0 H ep 1.000 s (3001 pts
G G	<i>"•</i> •••••		STATUS	sp 11000 0 (0001 pt.



Hopping Mode, Very Sensitive, DSB-ASK, Mid Channel, 915.25 MHz Pulse Width Number of Total On Time Limit (ms) N/A (ms) Pulses (ms) Results N/A 1 N/A N/A 07:30:18 AM Nov 22, 2017 TRACE 1 2 3 4 5 6 TYPE WWWWW DET P P P P P P m Analyzer - Northwest EMC, Inc Keysight Sj SENSE:INT ALIGN OFF Trig Delay-50.00 ms #Avg Type: Log-Pwr PNO: Wide →→ Trig: Video IFGain:Low #Atten: 20 dB Ref Offset 26.52 dB Ref 30.00 dBm 5 dB/div Log Center 915.250000 MHz Res BW 100 kHz Span 0 Hz Sweep 5.000 s (3001 pts) #VBW 10 kHz STATUS

Hopping	Mode, Very Sens	sitive, DSB-ASK,	Mid Channel, 915	5.25 MHz		
	Pulse Width	Number of	Total On Time	Limit		
	(ms)	Pulses	(ms)	(ms)	Results	
	N/A	1	N/A	N/A	N/A	

PNO: Wide         Trig Delay-50.00 ms         #Avg Type: Log-Pwr         Trace D234           Ref Offset 26.52 dB         Ref 30.00 dBm         0 </th <th>Keysight Spectrum Analyzer - Northwest EMC, I</th> <th></th> <th></th> <th></th>	Keysight Spectrum Analyzer - Northwest EMC, I			
PN0: Wide IFGain:Low     Trig: Video #Atten: 20 dB     Trig: Video #Atten: 20 dB       dB/div     Ref Offset 26.52 dB       dB/div     Ref 30.00 dBm       50     Image: Strategy of the set of	X RL RF 50Ω DC			07:30:42 AM Nov 22, 2017
agy of 30.00 dBm         S.0       Image: Solution of the second seco		PNO: Wide Trig: Video	#Avg Type: Log-Pwr	TRACE 1 2 3 4 5 TYPE WWWWW DET PPPP
	Ref Offset 26.52 dB dB/div Ref 30.00 dBm			
	25.0			
	20.0			
	15.0			
	10.0			
	5.00			
	0.00			TRIG LY
5.0	.00			
5.0	0.0			
	15.0	1		
	Center 915.250000 MHz Res BW 100 kHz		Swee	Span 0 H p 10.00 s (3001 pts
G STATUS	sg			



NweTx 2016.09.14.2 XMit 2017.09.21

	Pulse Width (ms)	Number of Pulses	Total On Time (ms)	Limit	Results
	N/A	2	N/A	(ms) N/A	N/A
	N/A	2	IN/A	N/A	11/6
Keysight Spectrum Analyzer - Northwest EMC, I					
XX RL RF 50Ω DC	SEI	Trig Delay-50.00 m	ALIGN OFF	Log-Pwr	07:31:17 AM Nov 22, 2017 TRACE 1 2 3 4 5 6
	PNO: Wide ↔→ IFGain:Low	Trig: Video #Atten: 20 dB		Logit	TYPE WWWWWW DET PPPPP
Ref Offset 26.52 dB 5 dB/div Ref 30.00 dBm					
LUG					- *
25.0					
20.0					
15.0					
10.0					
10.0					
5.00					
0.00					TRIG LVL
-5.00					
-10.0					
-15.0					
Center 915.250000 MHz Res BW 100 kHz	#VBW	1 10 kHz		Sweep	Span 0 Hz 20.00 s (3001 pts)
MSG			STATUS		

	 Pulse Width	Number of	Total On Time	Limit	
	(ms)	Pulses	(ms)	(ms)	Results
	196.765	2	393.53	≤ 400	Pass

**Calculation Only** 

No Screen Capture Required



XMit 2017.09.21

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	Keysight	N9010A	AFO	19-May-17	19-May-18
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	20-Apr-17	20-Apr-18
Attenuator	Weinschel	54A-6	TYQ	25-Oct-17	25-Oct-18
Attenuator	Fairview Microwave	SA4014-20	TKV	9-Mar-17	9-Mar-18
Block - DC	Fairview Microwave	SD3379	AMU	20-Apr-17	20-Apr-18
Generator - Signal	Agilent	N5183A	TIA	6-Apr-16	6-Apr-18

#### TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The peak output power was measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting in a no hop mode at the data rate(s) listed in the datasheet.

The method found in ANSI C63.10:2013 Section 7.8.5 was used for a FHSS radio.

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



							NweTx 2016.09.14.2	XMit 2017.09.21
EUT:	Indy RS1000					Work Order:	7LAY0128	
Serial Number:	110121170091					Date: 2	21-Nov-17	
Customer:	Impinj, Inc.					Temperature:	21.5 °C	
Attendees:	Paul Archer					Humidity: 4	11.5% RH	
Project:	None					Barometric Pres.:	1013 mbar	
Tested by:	Richard Mellroth		Power:	5 VDC		Job Site:	NC02	
TEST SPECIFICAT	IONS			Test Method				
FCC 15.247:2017				ANSI C63.10:2013				
COMMENTS								
Transmitting at De	faut Power Setting = 27dB	3m						
	M TEST STANDARD							
None								
	1		01 1					
Configuration #	'		MAN					
comgulation #	1	Signature	hren					
Comgutation #	1	Signature	the in				Limit	
-		Signature	Men			Value	Limit (≤)	Result
Non-Hopping Mode		Signature	KUEIL			Value		Result
-	Dense Reader, PR-ASK		ANE IL				(≤)	
-	Dense Reader, PR-ASK Low Channel	I 1, 902.75 MHz	KUE IL			26.332 dBm	<b>(≤)</b> 30 dBm	Pass
-	Dense Reader, PR-ASK Low Channel Mid Channel	i 1, 902.75 MHz 26, 915.25 MHz	Men.		_	26.332 dBm 26.197 dBm	(≤) 30 dBm 30 dBm	Pass Pass
-	Dense Reader, PR-ASK Low Channel Mid Channel High Channel	I 1, 902.75 MHz	YUE IL			26.332 dBm	<b>(≤)</b> 30 dBm	Pass
-	Dense Reader, PR-ASK Low Channel High Channel High Channel Very Fast, DSB-ASK	l 1, 902.75 MHz 26, 915.25 MHz al 50, 927.25 MHz	KUE IL			26.332 dBm 26.197 dBm 25.914 dBm	(≤) 30 dBm 30 dBm 30 dBm	Pass Pass Pass
-	Dense Reader, PR-ASK Low Channel Mid Channel High Channel Very Fast, DSB-ASK Low Channel	I 1, 902.75 MHz 26, 915.25 MHz al 50, 927.25 MHz 1 1, 902.75 MHz	KNE IL			26.332 dBm 26.197 dBm 25.914 dBm 26.358 dBm	(≤) 30 dBm 30 dBm 30 dBm 30 dBm	Pass Pass Pass Pass
-	Dense Reader, PR-ASK Low Channel Mid Channel High Channel Very Fast, DSB-ASK Low Channel Mid Channel	i 1, 902.75 MHz 26, 915.25 MHz al 50, 927.25 MHz I 1, 902.75 MHz 26, 915.25 MHz	VUE IL			26.332 dBm 26.197 dBm 25.914 dBm 26.358 dBm 26.62 dBm	(≤) 30 dBm 30 dBm 30 dBm 30 dBm 30 dBm	Pass Pass Pass Pass Pass
-	Dense Reader, PR-ASK Low Channel High Channel Very Fast, DSB-ASK Low Channel Mid Channel High Channe	I 1, 902.75 MHz 26, 915.25 MHz al 50, 927.25 MHz I 1, 902.75 MHz 26, 915.25 MHz al 50, 927.25 MHz al 50, 927.25 MHz	VUE IL			26.332 dBm 26.197 dBm 25.914 dBm 26.358 dBm	(≤) 30 dBm 30 dBm 30 dBm 30 dBm	Pass Pass Pass Pass
-	Dense Reader, PR-ASK Low Channel High Channel Very Fast, DSB-ASK Low Channel Mid Channel High Channel High Channel	I 1, 902.75 MHz 26, 915.25 MHz al 50, 927.25 MHz I 1, 902.75 MHz 26, 915.25 MHz al 50, 927.25 MHz	VUE IL			26.332 dBm 26.197 dBm 25.914 dBm 26.358 dBm 26.62 dBm 27.13 dBm	(≤) 30 dBm 30 dBm 30 dBm 30 dBm 30 dBm	Pass Pass Pass Pass Pass Pass
-	Dense Reader, PR-ASK Low Channel High Channel Very Fast, DSB-ASK Low Channel High Channel Very Sensitive, DSB-ASK Low Channel	I 1, 902.75 MHz 26, 915.25 MHz 8 50, 927.25 MHz 11, 902.75 MHz 26, 915.25 MHz 9 50, 927.25 MHz 11, 902.75 MHz	VUE IL			26.332 dBm 26.197 dBm 25.914 dBm 26.358 dBm 26.62 dBm 27.13 dBm 26.517 dBm	(≤) 30 dBm 30 dBm 30 dBm 30 dBm 30 dBm 30 dBm 30 dBm	Pass Pass Pass Pass Pass Pass Pass
-	Dense Reader, PR-ASK Low Channel High Channel Very Fast, DSB-ASK Low Channel High Channel High Channel Very Sensitive, DSB-ASK Low Channel Mid Channel	I 1, 902.75 MHz 26, 915.25 MHz 3 50, 927.25 MHz 26, 915.26 MHz 3 60, 927.25 MHz 3 60, 927.25 MHz 1 1, 902.75 MHz 26, 915.25 MHz	VUE IL			26.332 dBm 26.197 dBm 25.914 dBm 26.358 dBm 26.62 dBm 27.13 dBm 26.517 dBm 26.643 dBm	(≤) 30 dBm 30 dBm 30 dBm 30 dBm 30 dBm 30 dBm 30 dBm	Pass Pass Pass Pass Pass Pass Pass Pass
-	Dense Reader, PR-ASK Low Channel High Channel Very Fast, DSB-ASK Low Channel High Channel High Channel Very Sensitive, DSB-ASK Low Channel Mid Channel	I 1, 902.75 MHz 26, 915.25 MHz 8 50, 927.25 MHz 11, 902.75 MHz 26, 915.25 MHz 9 50, 927.25 MHz 11, 902.75 MHz	VUE IL			26.332 dBm 26.197 dBm 25.914 dBm 26.358 dBm 26.62 dBm 27.13 dBm 26.517 dBm	(≤) 30 dBm 30 dBm 30 dBm 30 dBm 30 dBm 30 dBm 30 dBm	Pass Pass Pass Pass Pass Pass Pass



NweTx 2016 09 14 2 XMit 2017 09 21

				Value	Limit	Result
				26.332 dBm	(≤) 30 dBm	Pass
Keysight Spectrum Analyz	zer - Northwest EMC, Inc 50 Ω DC		SENSE:INT	ALIGN OFF		02:49:07 AM Nov 22, 2017
		PNO: Fast 🕞	Trig: Free Run	#Avg Type: Avg Hold:>1	Log-Pwr 100/100	TRACE 1 2 3 4 5 6
		IFGain:Low	#Atten: 20 dB			
Ref Offs 5 dB/div Ref 31	set 26.52 dB .00 dBm				IVIKET	902.744 5 MHz 26.332 dBm
5 dB/div Ref 31			1			
26.0			<b>↓</b> − − • • •			
21.0						
16.0						
11.0						
6.00						
1.00						
1.00						
-4.00						
-9.00						
-14.0						
Center 902.7500						Span 1.000 MHz
#Res BW 510 kHz	4	#VE	3W 1.5 MHz		Sweep 1	.066 ms (1000 pts)
MSG	Non-Hoppin	ig Mode, Densi	e Reader, PR-ASK	STATUS	915.25 MHz	
MSG	Non-Hoppin	ig Mode, Densi	e Reader, PR-ASK		-	Result Pass
		ig Mode, Denso	e Reader, PR-ASK	, Mid Channel 26, 9 Value	015.25 MHz Limit (≤)	Pass
Keysight Spectrum Analyz		ig Mode, Densi	e Reader, PR-ASK	, Mid Channel 26, 9 Value 26.197 dBm	015.25 MHz Limit (S) 30 dBm	Pass
Keysight Spectrum Analyz	zer - Northwest EMC, Inc	PNO: Fast	SENSE:INT	, Mid Channel 26, 9 Value 26.197 dBm	015.25 MHz Limit (≤) 30 dBm	Pass 02:53:35 AM Nov 22, 2017 TRACE 23 4 5 5
Keysight Spectrum Analyz	zer - Northwest EMC, Inc 50 Ω DC		SENSE:INT	, Mid Channel 26, 9 Value 26.197 dBm ALIGN OFF #Avg Type:	015.25 MHz Limit (S) 30 dBm	Pass 02:53:35 AM Nov 22, 2017 TRACE 23 45 G TYPE M DET P P P P P
Keysight Spectrum Analyz	zer - Northwest EMC, Inc	PNO: Fast	SENSE:INT	, Mid Channel 26, 9 Value 26.197 dBm ALIGN OFF #Avg Type:	015.25 MHz Limit (S) 30 dBm	Pass 02:53:35 AM Nov 22, 2017 TRACE 23 4 5 5
Keysight Spectrum Analyz	zer - Northwest EMC, Inc 50 Ω DC	PNO: Fast	SENSE:INT	, Mid Channel 26, 9 Value 26.197 dBm ALIGN OFF #Avg Type:	015.25 MHz Limit (S) 30 dBm	Pass 02:53:35 AM Nov 22, 2017 TRACE 23:4 5 o TYPE MUMPPP 915.242 5 MHz
Keysight Spectrum Analyz	zer - Northwest EMC, Inc 50 Ω DC	PNO: Fast	SENSE:INT Trig: Free Run #Atten: 20 dB	, Mid Channel 26, 9 Value 26.197 dBm ALIGN OFF #Avg Type:	015.25 MHz Limit (S) 30 dBm	Pass 02:53:35 AM Nov 22, 2017 TRACE 23:4 5 o TYPE MUMPPP 915.242 5 MHz
Keysight Spectrum Analyz R RL RF S dB/div Ref Offs Log	zer - Northwest EMC, Inc 50 Ω DC	PNO: Fast	SENSE:INT Trig: Free Run #Atten: 20 dB	, Mid Channel 26, 9 Value 26.197 dBm ALIGN OFF #Avg Type:	015.25 MHz Limit (S) 30 dBm	Pass 02:53:35 AM Nov 22, 2017 TRACE 23:4 5 o TYPE MUMPPP 915.242 5 MHz
Keysight Spectrum Analyz RE RF 5 dB/div Ref 31 26.0 21.0	zer - Northwest EMC, Inc 50 Ω DC	PNO: Fast	SENSE:INT Trig: Free Run #Atten: 20 dB	, Mid Channel 26, 9 Value 26.197 dBm ALIGN OFF #Avg Type:	015.25 MHz Limit (S) 30 dBm	Pass 02:53:35 AM Nov 22, 2017 TRACE 23:4 5 o TYPE MUMPPP 915.242 5 MHz
Keysight Spectrum Analyz R RL RF S dB/div Ref Offs Log	zer - Northwest EMC, Inc 50 Ω DC	PNO: Fast	SENSE:INT Trig: Free Run #Atten: 20 dB	, Mid Channel 26, 9 Value 26.197 dBm ALIGN OFF #Avg Type:	015.25 MHz Limit (S) 30 dBm	Pass 02:53:35 AM Nov 22, 2017 TRACE 23:4 5 o TYPE MUMPPP 915.242 5 MHz
Keysight Spectrum Analyz RE RF 5 dB/div Ref 31 26.0 21.0	zer - Northwest EMC, Inc 50 Ω DC	PNO: Fast	SENSE:INT Trig: Free Run #Atten: 20 dB	, Mid Channel 26, 9 Value 26.197 dBm ALIGN OFF #Avg Type:	015.25 MHz Limit (S) 30 dBm	Pass 02:53:35 AM Nov 22, 2017 TRACE 23:4 5 o TYPE MUMPPP 915.242 5 MHz
Keysight Spectrum Analyz R RL RF S dB/div Ref 31 26.0 21.0 16.0 11.0	zer - Northwest EMC, Inc 50 Ω DC	PNO: Fast	SENSE:INT Trig: Free Run #Atten: 20 dB	, Mid Channel 26, 9 Value 26.197 dBm ALIGN OFF #Avg Type:	015.25 MHz Limit (S) 30 dBm	Pass 02:53:35 AM Nov 22, 2017 TRACE 23:4 5 o TYPE MUMPPP 915.242 5 MHz
Keysight Spectrum Analyz X RL RF 5 dB/div Ref Offs 26.0 21.0 16.0	zer - Northwest EMC, Inc 50 Ω DC	PNO: Fast	SENSE:INT Trig: Free Run #Atten: 20 dB	, Mid Channel 26, 9 Value 26.197 dBm ALIGN OFF #Avg Type:	015.25 MHz Limit (S) 30 dBm	Pass 02:53:35 AM Nov 22, 2017 TRACE 23:4 5 o TYPE MUMPPP 915.242 5 MHz
Keysight Spectrum Analyz R RL RF S dB/div Ref 31 26.0 21.0 16.0 11.0	zer - Northwest EMC, Inc 50 Ω DC	PNO: Fast	SENSE:INT Trig: Free Run #Atten: 20 dB	, Mid Channel 26, 9 Value 26.197 dBm ALIGN OFF #Avg Type:	015.25 MHz Limit (S) 30 dBm	Pass 02:53:35 AM Nov 22, 2017 TRACE 23:4 5 o TYPE MUMPPP 915.242 5 MHz
Keysight Spectrum Analyz RL RF S dB/div Ref 31 26.0 21.0 16.0 11.0 6.00	zer - Northwest EMC, Inc 50 Ω DC	PNO: Fast	SENSE:INT Trig: Free Run #Atten: 20 dB	, Mid Channel 26, 9 Value 26.197 dBm ALIGN OFF #Avg Type:	015.25 MHz Limit (S) 30 dBm	Pass 02:53:35 AM Nov 22, 2017 TRACE 23:4 5 o TYPE MUMPPP 915.242 5 MHz
Keysight Spectrum Analyz           Keysight Spectrum Analyz           Ref Offs           dB/div         Ref Offs           26.0         21.0           16.0         11.0           1.00         1.00           -4.00         1.00	zer - Northwest EMC, Inc 50 Ω DC	PNO: Fast	SENSE:INT Trig: Free Run #Atten: 20 dB	, Mid Channel 26, 9 Value 26.197 dBm ALIGN OFF #Avg Type:	015.25 MHz Limit (S) 30 dBm	Pass 02:53:35 AM Nov 22, 2017 TRACE 23:4 5 o TYPE MUMPPP 915.242 5 MHz
Keysight Spectrum Analyz Keysight Spectrum Analyz RL RF 5 dB/div Ref 0ffs 26.0 21.0 16.0 1.00	zer - Northwest EMC, Inc 50 Ω DC	PNO: Fast	SENSE:INT Trig: Free Run #Atten: 20 dB	, Mid Channel 26, 9 Value 26.197 dBm ALIGN OFF #Avg Type:	015.25 MHz Limit (S) 30 dBm	Pass 02:53:35 AM Nov 22, 2017 TRACE 23:4 5 o TYPE MUMPPP 915.242 5 MHz
Keysight Spectrum Analyz           Keysight Spectrum Analyz           Ref Offs           dB/div         Ref Offs           26.0         21.0           16.0         11.0           1.00         1.00           -4.00         1.00	zer - Northwest EMC, Inc 50 Ω DC	PNO: Fast	SENSE:INT Trig: Free Run #Atten: 20 dB	, Mid Channel 26, 9 Value 26.197 dBm ALIGN OFF #Avg Type:	015.25 MHz Limit (S) 30 dBm	Pass 02:53:35 AM Nov 22, 2017 TRACE 23:4 5 o TYPE MUMPPP 915.242 5 MHz
Keysight Spectrum Analyz           Ref Offs           5 dB/div         Ref Offs           26.0         21.0           11.0         26.0           11.0         21.0           11.0         21.0           11.0         21.0           11.0         21.0           11.00         21.0           11.00         21.0	zer - Northwest EMC, Inc 50 Ω DC	PNO: Fast	SENSE:INT Trig: Free Run #Atten: 20 dB	, Mid Channel 26, 9 Value 26.197 dBm ALIGN OFF #Avg Type:	015.25 MHz Limit (S) 30 dBm	Pass 02:53:35 AM Nov 22, 2017 TRACE 23:4 5 o TYPE MUMPPP 915.242 5 MHz

MSG



	Non-H	lopping Mode, Dense Reader, PR-AS	K, High Channel 50,			
			Value	Limit (≤)	Result	
			25.914 dBm	30 dBm	Pass	
Keysight Spectru	ım Analyzer - Northwest EMC	C, Inc				×
X/RL	RF 50 Ω DC	SENSE:INT	ALIGN OFF #Avg Type:	Log-Pwr	02:58:07 AM Nov 22, 2 TRACE 1 2 3 4 TYPE MWWW DET P P P F	017 5 6
		PNO: Fast Trig: Free Run IFGain:Low #Atten: 20 dB	Avg Hold:>			and the second second
R 5 dB/div R	tef Offset 26.52 dB Ref 31.00 dBm			Mkr1	927.241 5 M 25.914 dE	
5 dB/div R		× 1				
26.0						
21.0						
16.0						
10.10						
11.0						
6.00						
1.00						
-4.00						
-9.00						
-14.0						
Center 927.2					Span 1.000 M	
#Res BW 51	0 KHz	#VBW 1.5 MHz -Hopping Mode, Very Fast, DSB-ASH		2.75 MHz Limit	.066 ms (1000 p	iHz its)
#Res BW 51	0 KHz			2.75 MHz	Result Pass	Hz its)
#Res BW 51	0 kHz Non	n-Hopping Mode, Very Fast, DSB-ASH	K, Low Channel 1, 90 Value 26.358 dBm	2.75 MHz Limit (≤)	066 ms (1000 p Result Pass	ots)
#Res BW 51	0 kHz Non	n-Hopping Mode, Very Fast, DSB-ASF 	K, Low Channel 1, 90 Value 26.358 dBm	2.75 MHz Limit (≤) 30 dBm	066 ms (1000 p Result Pass 03:06:31 AM Nov 22, TRACE	ets)
#Res BW 51	0 kHz Non Im Analyzer - Northwest EMC RF 50 Ω DC	n-Hopping Mode, Very Fast, DSB-ASk	K, Low Channel 1, 90 Value 26.358 dBm	2.75 MHz Limit (≤) 30 dBm	066 ms (1000 p Result Pass 03:06:11 AM Nov 22, TRACE 23 TYPE M OT P P P 902.735 7 M	•ts) •2017 •566 •PP
#Res BW 51	0 kHz Non	n-Hopping Mode, Very Fast, DSB-ASF 	K, Low Channel 1, 90 Value 26.358 dBm	2.75 MHz Limit (≤) 30 dBm	066 ms (1000 p Result Pass 03:06:31 AM Nov 22, TRACE 123 TYPE MWW DET P P P	ets)
Keysight Spectru Keysight Spectru RL 5 dB/div	0 kHz Non im Analyzer - Northwest EMC RF 50 2 DC 1 Ref Offset 26.52 dB	n-Hopping Mode, Very Fast, DSB-ASF 	K, Low Channel 1, 90 Value 26.358 dBm	2.75 MHz Limit (≤) 30 dBm	066 ms (1000 p Result Pass 03:06:11 AM Nov 22, TRACE 23 TYPE M OT P P P 902.735 7 M	155) 1017 566 177 177 177 177 177 177 177 177 177 1
Keysight Spectru Keysight Spectru Keysig	0 kHz Non im Analyzer - Northwest EMC RF 50 2 DC 1 Ref Offset 26.52 dB	n-Hopping Mode, Very Fast, DSB-ASł C,Inc C,Inc SENSE:INT PNO: Fast →→ Trig: Free Run IFGain:Low #Atten: 20 dB	K, Low Channel 1, 90 Value 26.358 dBm	2.75 MHz Limit (≤) 30 dBm	066 ms (1000 p Result Pass 03:06:11 AM Nov 22, TRACE 23 TYPE M OT P P P 902.735 7 M	2017 5 6 9 P P
Keysight Spectru Keysight Spectru RL 5 dB/div	0 kHz Non im Analyzer - Northwest EMC RF 50 2 DC 1 Ref Offset 26.52 dB	n-Hopping Mode, Very Fast, DSB-ASł C,Inc C,Inc SENSE:INT PNO: Fast →→ Trig: Free Run IFGain:Low #Atten: 20 dB	K, Low Channel 1, 90 Value 26.358 dBm	2.75 MHz Limit (≤) 30 dBm	066 ms (1000 p Result Pass 03:06:11 AM Nov 22, TRACE 23 TYPE M OT P P P 902.735 7 M	2017 5 6 9 P P
Keysight Spectru Keysight Spectru Keysig	0 kHz Non im Analyzer - Northwest EMC RF 50 2 DC 1 Ref Offset 26.52 dB	n-Hopping Mode, Very Fast, DSB-ASł C,Inc C,Inc SENSE:INT PNO: Fast →→ Trig: Free Run IFGain:Low #Atten: 20 dB	K, Low Channel 1, 90 Value 26.358 dBm	2.75 MHz Limit (≤) 30 dBm	066 ms (1000 p Result Pass 03:06:11 AM Nov 22, TRACE 23 TYPE M OT P P P 902.735 7 M	x 017 P P Hz
Keysight Spectru Keysight Spectru RL 5 dB/div 26.0 21.0	0 kHz Non im Analyzer - Northwest EMC RF 50 2 DC 1 Ref Offset 26.52 dB	n-Hopping Mode, Very Fast, DSB-ASł C,Inc C,Inc SENSE:INT PNO: Fast →→ Trig: Free Run IFGain:Low #Atten: 20 dB	K, Low Channel 1, 90 Value 26.358 dBm	2.75 MHz Limit (≤) 30 dBm	066 ms (1000 p Result Pass 03:06:11 AM Nov 22, TRACE 23 TYPE M OT P P P 902.735 7 M	x 017 P P Hz
#Res BW 51           //sg           //sg <td>0 kHz Non im Analyzer - Northwest EMC RF 50 2 DC 1 Ref Offset 26.52 dB</td> <td>n-Hopping Mode, Very Fast, DSB-ASł C,Inc C,Inc SENSE:INT PNO: Fast →→ Trig: Free Run IFGain:Low #Atten: 20 dB</td> <td>K, Low Channel 1, 90 Value 26.358 dBm</td> <td>2.75 MHz Limit (≤) 30 dBm</td> <td>066 ms (1000 p Result Pass 03:06:11 AM Nov 22, TRACE 23 TYPE M OT P P P 902.735 7 M</td> <td>x 017 P P Hz</td>	0 kHz Non im Analyzer - Northwest EMC RF 50 2 DC 1 Ref Offset 26.52 dB	n-Hopping Mode, Very Fast, DSB-ASł C,Inc C,Inc SENSE:INT PNO: Fast →→ Trig: Free Run IFGain:Low #Atten: 20 dB	K, Low Channel 1, 90 Value 26.358 dBm	2.75 MHz Limit (≤) 30 dBm	066 ms (1000 p Result Pass 03:06:11 AM Nov 22, TRACE 23 TYPE M OT P P P 902.735 7 M	x 017 P P Hz
#Res BW 51           //SG           //SG <td>0 kHz Non im Analyzer - Northwest EMC RF 50 2 DC 1 Ref Offset 26.52 dB</td> <td>n-Hopping Mode, Very Fast, DSB-ASł C,Inc C,Inc SENSE:INT PNO: Fast →→ Trig: Free Run IFGain:Low #Atten: 20 dB</td> <td>K, Low Channel 1, 90 Value 26.358 dBm</td> <td>2.75 MHz Limit (≤) 30 dBm</td> <td>066 ms (1000 p Result Pass 03:06:11 AM Nov 22, TRACE 23 TYPE M OT P P P 902.735 7 M</td> <td>x 017 P P Hz</td>	0 kHz Non im Analyzer - Northwest EMC RF 50 2 DC 1 Ref Offset 26.52 dB	n-Hopping Mode, Very Fast, DSB-ASł C,Inc C,Inc SENSE:INT PNO: Fast →→ Trig: Free Run IFGain:Low #Atten: 20 dB	K, Low Channel 1, 90 Value 26.358 dBm	2.75 MHz Limit (≤) 30 dBm	066 ms (1000 p Result Pass 03:06:11 AM Nov 22, TRACE 23 TYPE M OT P P P 902.735 7 M	x 017 P P Hz
#Res BW 51           //sg           //sg <td>0 kHz Non im Analyzer - Northwest EMC RF 50 2 DC 1 Ref Offset 26.52 dB</td> <td>n-Hopping Mode, Very Fast, DSB-ASł C,Inc C,Inc SENSE:INT PNO: Fast →→ Trig: Free Run IFGain:Low #Atten: 20 dB</td> <td>K, Low Channel 1, 90 Value 26.358 dBm</td> <td>2.75 MHz Limit (≤) 30 dBm</td> <td>066 ms (1000 p Result Pass 03:06:11 AM Nov 22, TRACE 23 TYPE M OT P P P 902.735 7 M</td> <td>2017 5 6 9 P P</td>	0 kHz Non im Analyzer - Northwest EMC RF 50 2 DC 1 Ref Offset 26.52 dB	n-Hopping Mode, Very Fast, DSB-ASł C,Inc C,Inc SENSE:INT PNO: Fast →→ Trig: Free Run IFGain:Low #Atten: 20 dB	K, Low Channel 1, 90 Value 26.358 dBm	2.75 MHz Limit (≤) 30 dBm	066 ms (1000 p Result Pass 03:06:11 AM Nov 22, TRACE 23 TYPE M OT P P P 902.735 7 M	2017 5 6 9 P P
#Res BW 51           //SG           //SG <td>0 kHz Non im Analyzer - Northwest EMC RF 50 2 DC 1 Ref Offset 26.52 dB</td> <td>n-Hopping Mode, Very Fast, DSB-ASł C,Inc C,Inc SENSE:INT PNO: Fast →→ Trig: Free Run IFGain:Low #Atten: 20 dB</td> <td>K, Low Channel 1, 90 Value 26.358 dBm</td> <td>2.75 MHz Limit (≤) 30 dBm</td> <td>066 ms (1000 p Result Pass 03:06:11 AM Nov 22, TRACE 23 TYPE M OT P P P 902.735 7 M</td> <td>15) 1017 5 6 9 P P</td>	0 kHz Non im Analyzer - Northwest EMC RF 50 2 DC 1 Ref Offset 26.52 dB	n-Hopping Mode, Very Fast, DSB-ASł C,Inc C,Inc SENSE:INT PNO: Fast →→ Trig: Free Run IFGain:Low #Atten: 20 dB	K, Low Channel 1, 90 Value 26.358 dBm	2.75 MHz Limit (≤) 30 dBm	066 ms (1000 p Result Pass 03:06:11 AM Nov 22, TRACE 23 TYPE M OT P P P 902.735 7 M	15) 1017 5 6 9 P P
Keysight Spectru           Keysight	0 kHz Non im Analyzer - Northwest EMC RF 50 2 DC 1 Ref Offset 26.52 dB	n-Hopping Mode, Very Fast, DSB-ASł C,Inc C,Inc SENSE:INT PNO: Fast →→ Trig: Free Run IFGain:Low #Atten: 20 dB	K, Low Channel 1, 90 Value 26.358 dBm	2.75 MHz Limit (≤) 30 dBm	066 ms (1000 p Result Pass 03:06:11 AM Nov 22, TRACE 23 TYPE M OT P P P 902.735 7 M	ets)
#Res BW 51           //sg           //sg <td>0 kHz Non im Analyzer - Northwest EMC RF 50 2 DC 1 Ref Offset 26.52 dB</td> <td>n-Hopping Mode, Very Fast, DSB-ASł C,Inc C,Inc SENSE:INT PNO: Fast →→ Trig: Free Run IFGain:Low #Atten: 20 dB</td> <td>K, Low Channel 1, 90 Value 26.358 dBm</td> <td>2.75 MHz Limit (≤) 30 dBm</td> <td>066 ms (1000 p Result Pass 03:06:11 AM Nov 22, TRACE 23 TYPE M OT P P P 902.735 7 M</td> <td>•ts) •2017 •566 •PP</td>	0 kHz Non im Analyzer - Northwest EMC RF 50 2 DC 1 Ref Offset 26.52 dB	n-Hopping Mode, Very Fast, DSB-ASł C,Inc C,Inc SENSE:INT PNO: Fast →→ Trig: Free Run IFGain:Low #Atten: 20 dB	K, Low Channel 1, 90 Value 26.358 dBm	2.75 MHz Limit (≤) 30 dBm	066 ms (1000 p Result Pass 03:06:11 AM Nov 22, TRACE 23 TYPE M OT P P P 902.735 7 M	•ts) •2017 •566 •PP
Keysight Spectru           5 dB/div         R           26.0         21.0           16.0         11.0           6.00         4.00	0 kHz Non im Analyzer - Northwest EMC RF 50 2 DC 1 Ref Offset 26.52 dB	n-Hopping Mode, Very Fast, DSB-ASł C,Inc C,Inc SENSE:INT PNO: Fast →→ Trig: Free Run IFGain:Low #Atten: 20 dB	K, Low Channel 1, 90 Value 26.358 dBm	2.75 MHz Limit (≤) 30 dBm	066 ms (1000 p Result Pass 03:06:11 AM Nov 22, TRACE 23 TYPE M OT P P P 902.735 7 M	15) 1017 5 6 1017
Keysight Spectru           5 dB/div         R           26.0         21.0           16.0         11.0           6.00         4.00	0 kHz Non m Analyzer - Northwest EMC RF 50 Ω DC tef 0ffset 26.52 dB tef 31.00 dBm 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	n-Hopping Mode, Very Fast, DSB-ASł C,Inc C,Inc SENSE:INT PNO: Fast →→ Trig: Free Run IFGain:Low #Atten: 20 dB	K, Low Channel 1, 90 Value 26.358 dBm	2.75 MHz Limit (S) 30 dBm	066 ms (1000 p Result Pass 03:06:11 AM Nov 22, TRACE 23 TYPE M OT P P P 902.735 7 M	its) 1017 HZ HZ



NweTx 2016.09.14.2 XMit 2017.09.21 Non-Hopping Mode, Very Fast, DSB-ASK, Mid Channel 26, 915.25 MHz Limit **(≤)** 30 dBm Value Result 26.62 dBm Pass est EMC, In 03:11:00 AM Nov 22, 2017 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P P P P P P Keysight ! ALIGN O #Avg Type: Log-Pwr Avg|Hold: 100/100 PNO: Fast ++ Trig: Free Run IFGain:Low #Atten: 20 dB Mkr1 915.229 7 MHz 26.620 dBm Ref Offset 26.52 dB Ref 32.00 dBm 5 dB/div 1 Center 915.2500 MHz #Res BW 1.0 MHz Span 1.500 MHz Sweep 1.066 ms (1000 pts) #VBW 3.0 MHz STATUS Non-Hopping Mode, Very Fast, DSB-ASK, High Channel 50, 927.25 MHz Limit Value Result (≤) 27.13 dBm 30 dBm Pass

Keysight Spectrum Analyzer - Northwest EMC, Inc			
X RL RF 50Ω DC	PNO: Fast Trig: Free Run IFGain:Low #Atten: 20 dB	ALIGN OFF #Avg Type: Log-Pwr Avg Hold: 100/100	03:16:43 AM Nov 22, 2017 TRACE 1 2 3 4 5 6 TYPE M WWWW DET P P P P P
Ref Offset 26.52 dB		Mk	r1 927.247 7 MHz 27.130 dBm
27.0	1		
22.0			
17.0			
12.0			
7.00			
2.00			
3.00			
3.00			
13.0			
Center 927.2500 MHz #Res BW 1.0 MHz	#VBW 3.0 MHz	Sweep	Span 1.500 MH 1.066 ms (1000 pts
ISG		STATUS	



NweTx 2016.09.14.2 XMit 2017.09.21 Non-Hopping Mode, Very Sensitive, DSB-ASK, Low Channel 1, 902.75 MHz Limit **(≤)** 30 dBm Value Result 26.517 dBm Pass est EMC, In Keysight S 03:22:04 AM Nov 22, 2017 ALIGN O #Avg Type: Log-Pwr Avg|Hold: 100/100 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P P P P P PNO: Fast ++ Trig: Free Run IFGain:Low #Atten: 20 dB Mkr1 902.745 5 MHz 26.517 dBm Ref Offset 26.52 dB Ref 31.00 dBm 5 dB/div 1 Center 902.7500 MHz #Res BW 510 kHz Span 1.000 MHz Sweep 1.066 ms (1000 pts) #VBW 1.5 MHz STATUS Non-Hopping Mode, Very Sensitive, DSB-ASK, Mid Channel 26, 915.25 MHz Limit Value Result (≤) 26.643 dBm 30 dBm Pass Keysight Spectrum Analyzer - Northwest EMC, Inc. 

RL	RF 50 Ω DC		SENSE:INT	ALIGN OFF	03:26:37 AM Nov 22, 2017
		PNO: Fast +++	Trig: Free Run #Atten: 20 dB	#Avg Type: Log-Pwr Avg Hold: 100/100	TRACE 12345 TYPE MWWWW DET PPPPP
dB/div	Ref Offset 26.52 dB Ref 31.00 dBm			MI	kr1 915.245 5 MH 26.643 dBn
_			1		
26.0					
16.0					
11.0					
6.00					
.00					
.00					
.00					
4.0					
	5.2500 MHz 510 kHz	#VB	W 1.5 MHz	Swee	Span 1.000 MH 1.066 ms (1000 pts
SG				STATUS	



Non-Hopping Mode, Very Sensitive, DSB-ASK, High Channel 50, 927.25 MHz Limit **(≤)** 30 dBm Value Result 26.692 dBm Pass vest EMC, Inc 03:30:22 AM Nov 22, 2017 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P P P P P P alyzer - Norti Keysight Sj ALIGN O #Avg Type: Log-Pwr Avg|Hold: 100/100 PNO: Fast ++ Trig: Free Run IFGain:Low #Atten: 20 dB Mkr1 927.247 5 MHz 26.692 dBm Ref Offset 26.52 dB Ref 32.00 dBm 5 dB/div 1 Center 927.2500 MHz #Res BW 510 kHz Span 1.000 MHz Sweep 1.066 ms (1000 pts) #VBW 1.5 MHz STATUS



XMit 2017.09.21

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	Keysight	N9010A	AFO	19-May-17	19-May-18
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	20-Apr-17	20-Apr-18
Attenuator	Weinschel	54A-6	TYQ	25-Oct-17	25-Oct-18
Attenuator	Fairview Microwave	SA4014-20	TKV	9-Mar-17	9-Mar-18
Block - DC	Fairview Microwave	SD3379	AMU	20-Apr-17	20-Apr-18
Generator - Signal	Agilent	N5183A	TIA	6-Apr-16	6-Apr-18

#### **TEST DESCRIPTION**

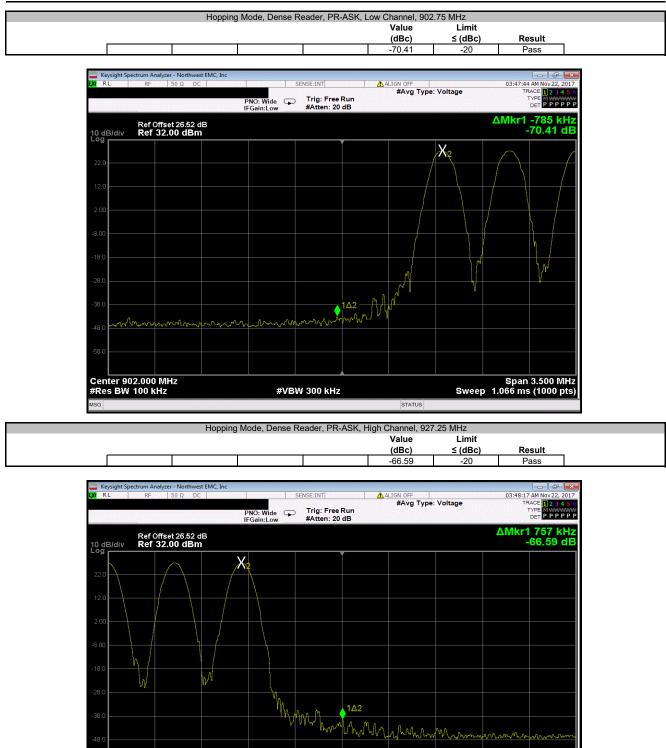
The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to its normal pseudo-random hopping sequence. The EUT was transmitting at the data rate(s) listed in the datasheet.

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

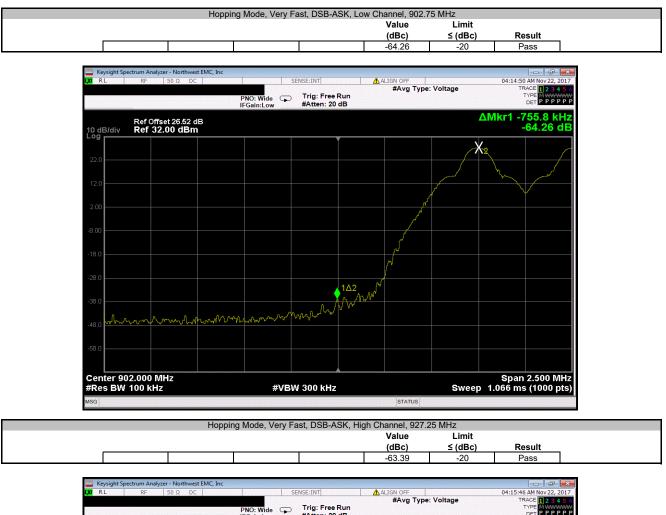


			NweTx 2016.09.14.2	XMit 2017.09.21
	Indy RS1000	Work Order:		
	r: 110121170091		21-Nov-17	
	r: Impinj, Inc.	Temperature:		
	: Paul Archer	Humidity:		
	t: None	Barometric Pres.:		
	r: Richard Mellroth Power: 5 VDC	Job Site:	NC02	
TEST SPECIFICA				
FCC 15.247:2017	ANSI C63.10:2013			
COMMENTS				
Transmitting at D	efaut Power Setting = 27dBm			
-	-			
DEVIATIONS FRC	OM TEST STANDARD			
None				
Configuration #				
	Signature			
		Value	Limit	
		(dBc)	≤ (dBc)	Result
Hopping Mode				
	Dense Reader, PR-ASK			
	Low Channel, 902.75 MHz	-70.41	-20	Pass
	High Channel, 927.25 MHz	-66.59	-20	Pass
	Very Fast, DSB-ASK			
	Low Channel, 902.75 MHz	-64.26	-20	Pass
	High Channel, 927.25 MHz	-63.39	-20	Pass
	Very Sensitive, DSB-ASK			
	Low Channel, 902.75 MHz	-67.06	-20	Pass
	High Channel, 927.25 MHz	-66.91	-20	Pass





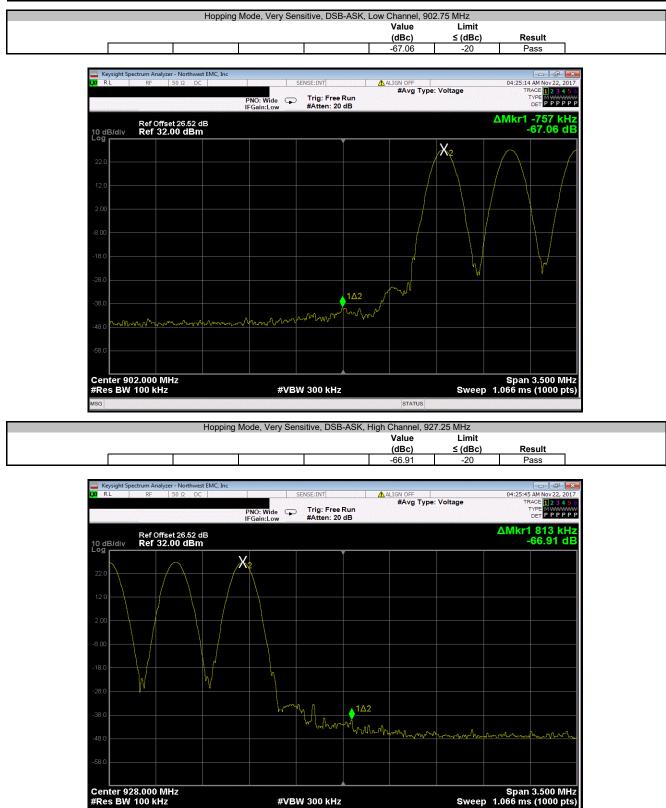








NweTx 2016.09.14.2 XMit 2017.09.21



STATUS



XMit 2017.09.21

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	Keysight	N9010A	AFO	19-May-17	19-May-18
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	20-Apr-17	20-Apr-18
Attenuator	Weinschel	54A-6	TYQ	25-Oct-17	25-Oct-18
Attenuator	Fairview Microwave	SA4014-20	TKV	9-Mar-17	9-Mar-18
Block - DC	Fairview Microwave	SD3379	AMU	20-Apr-17	20-Apr-18
Generator - Signal	Agilent	N5183A	TIA	6-Apr-16	6-Apr-18

#### **TEST DESCRIPTION**

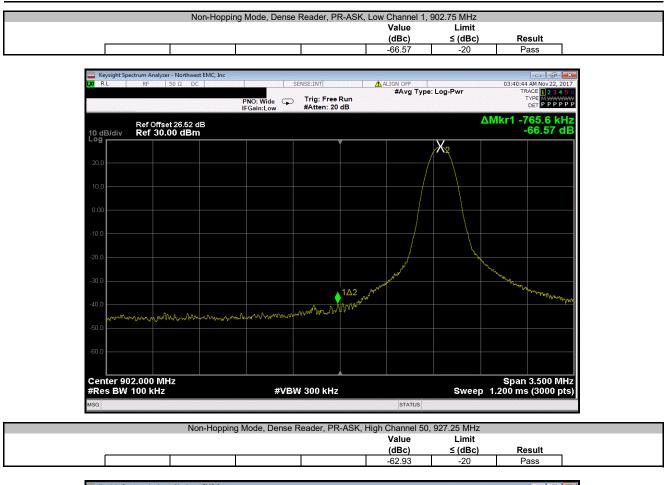
The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to low and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet in a no hop mode. The channels closest to the band edges were selected.

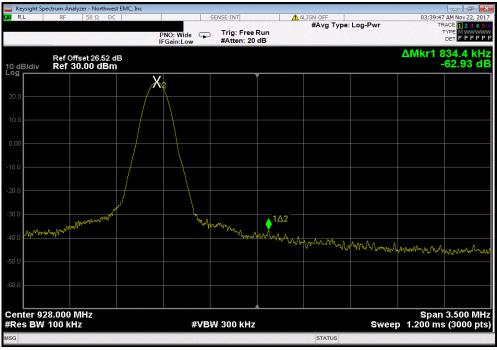
The spectrum was scanned below the lower band edge and above the higher band edge.



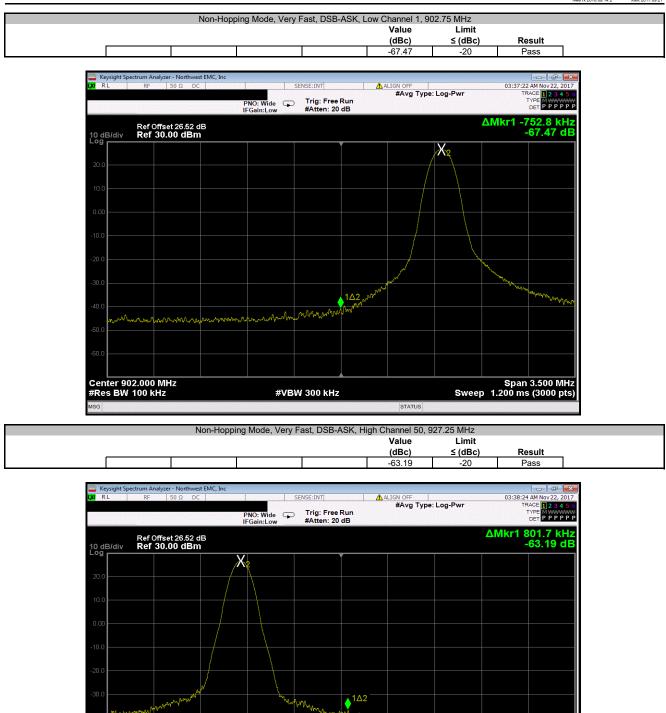
EUT							Nwe1x 2016.09.14.2	XMit 2017.09.21
	Indy RS1000				W	ork Order: 7		
Serial Numbe	r: 110121170091					Date: 2	1-Nov-17	
	r: Impinj, Inc.				Tei	mperature: 2		
Attendees	: Paul Archer					Humidity: 4	1.4% RH	
Projec	t: None				Barom	etric Pres.: 1	013 mbar	
	: Richard Mellroth		Power:			Job Site: N	C02	
TEST SPECIFICA	TIONS			Test Method				
FCC 15.247:2017				ANSI C63.10:2013				
COMMENTS								
Transmitting at D	efaut Power Setting = 27dE	Bm						
	<b>j</b>							
DEVIATIONS FRO	DM TEST STANDARD							
None								
		5	21 1					
Configuration #	1		VIAN					
		Signature	har in					
		Signature	protecte			/alue	Limit	
		Signature	province in			/alue dBc)	Limit ≤ (dBc)	Result
Non-Hopping Mod		Signature	protection					Result
Non-Hopping Mod	Dense Reader, PR-ASK	· · ·	protection		(	dBc)	≤ (dBc)	
Non-Hopping Mod	Dense Reader, PR-ASK Low Channe	I 1, 902.75 MHz	parte		) 	dBc) 66.57	<b>≤ (dBc)</b> -20	Pass
Non-Hopping Mod	Dense Reader, PR-ASK Low Channe High Channe	· · ·	pac ic		) 	dBc)	≤ (dBc)	
Non-Hopping Mod	Dense Reader, PR-ASK Low Channe High Channe Very Fast, DSB-ASK	i 1, 902.75 MHz I 50, 927.25 MHz	protecte		)  -	dBc) 66.57 62.93	<b>≤ (dBc)</b> -20 -20	Pass Pass
Non-Hopping Mod	Dense Reader, PR-ASK Low Channe High Channe Very Fast, DSB-ASK Low Channe	I 1, 902.75 MHz I 50, 927.25 MHz I 1, 902.75 MHz	protic		) - - -	dBc) 66.57 62.93 67.47	≤ (dBc) -20 -20 -20	Pass Pass Pass
Non-Hopping Mod	Dense Reader, PR-ASK Low Channe High Channe Very Fast, DSB-ASK Low Channe High Channe	I 1, 902.75 MHz I 50, 927.25 MHz I 1, 902.75 MHz I 50, 927.25 MHz	pac ic		) - - -	dBc) 66.57 62.93	<b>≤ (dBc)</b> -20 -20	Pass Pass
Non-Hopping Mod	Dense Reader, PR-ASK Low Channe High Channe Very Fast, DSB-ASK Low Channe High Channe Very Sensitive, DSB-ASK	i 1, 902.75 MHz 9 50, 927.25 MHz 1 1, 902.75 MHz 9 50, 927.25 MHz	paere		) - - - -	66.57 62.93 67.47 63.19	≤ (dBc) -20 -20 -20 -20	Pass Pass Pass Pass
Non-Hopping Mod	Dense Reader, PR-ASK Low Channe High Channe Very Fast, DSB-ASK Low Channe High Channe Very Sensitive, DSB-ASK Low Channe	I 1, 902.75 MHz I 50, 927.25 MHz I 1, 902.75 MHz I 30, 927.25 MHz	paere		) - - - - -	dBc) 66.57 62.93 67.47	≤ (dBc) -20 -20 -20	Pass Pass Pass





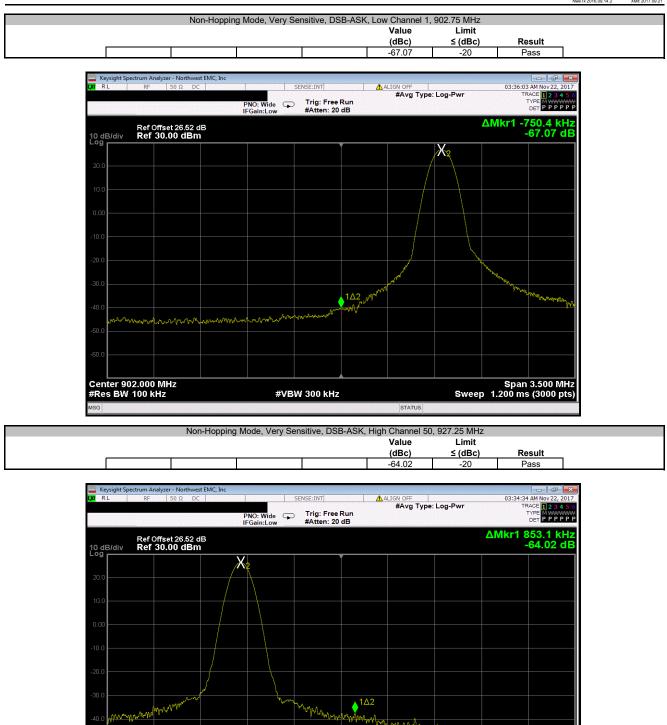
















XMit 2017.09.21

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	Keysight	N9010A	AFO	19-May-17	19-May-18
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	20-Apr-17	20-Apr-18
Attenuator	Weinschel	54A-6	TYQ	25-Oct-17	25-Oct-18
Attenuator	Fairview Microwave	SA4014-20	TKV	9-Mar-17	9-Mar-18
Block - DC	Fairview Microwave	SD3379	AMU	20-Apr-17	20-Apr-18
Generator - Signal	Agilent	N5183A	TIA	6-Apr-16	6-Apr-18

#### **TEST DESCRIPTION**

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The 20 dB occupied bandwidth was measured with the EUT set to low, medium and high transmit frequencies in the band. The EUT was transmitting at the data rate(s) listed in the datasheet in a no-hop mode.



						NweTx 2016.09.14.2	XMit 2017.09.21
EUT:	Indy RS1000				Work Order:		
Serial Number:	110121170091				Date:	21-Nov-17	
Customer:	Impinj, Inc.				Temperature:	21.6 °C	
Attendees:	Paul Archer				Humidity:	41.1% RH	
Project:	None				Barometric Pres.:	1013 mbar	
Tested by:	Richard Mellroth		Power:	5 VDC	Job Site:	NC02	
TEST SPECIFICATI	IONS			Test Method			
FCC 15.247:2017				ANSI C63.10:2013			
COMMENTS							
Transmitting at Def	faut Power Setting = 27dB	m					
-							
	I TEST STANDARD						
None							
			01 1				
Configuration #	1		VUGIL				
		Signature	1-				
						Limit	
					Value	(≤)	Result
Non-Hopping Mode							
	Dense Reader, PR-ASK						-
		1, 902.75 MHz			44.958 kHz	500 kHz	Pass
		26, 915.25 MHz			44.065 kHz	500 kHz	Pass
		I 50, 927.25 MHz			44.091 kHz	500 kHz	Pass
	Very Fast, DSB-ASK	1 000 75 MU			004 700 141-	500 HIL-	Deer
		1, 902.75 MHz			384.769 kHz	500 kHz	Pass
		26, 915.25 MHz			381.319 kHz	500 kHz	Pass
		I 50, 927.25 MHz			384.339 kHz	500 kHz	Pass
	Very Sensitive, DSB-ASK	1 000 75 MU			82.655 kHz	500 kHz	Pass
		1, 902.75 MHz					
		26, 915.25 MHz			82.276 kHz	500 kHz	Pass
	High Channel	I 50, 927.25 MHz			82.5 kHz	500 kHz	Pass

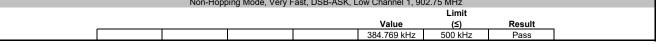


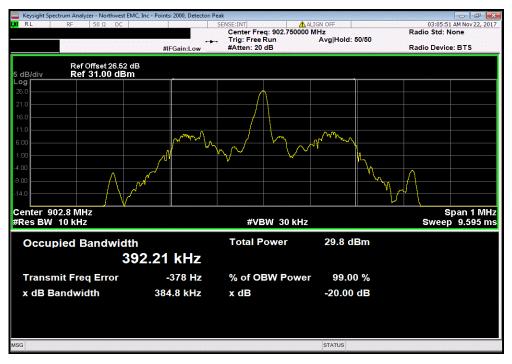
(Mit 2017.09.21 Non-Hopping Mode, Dense Reader, PR-ASK, Low Channel 1, 902.75 MHz Limit **(≤)** 500 kHz Value Result 44.958 kHz Pass NSE:INT ALIGN OFF Center Freq: 902.750000 MHz Trig: Free Run Avg|Hold: 50/50 #Atten: 20 dB 02:47:29 AM Nov 22, 2017 RL Radio Std: None ----Radio Device: BTS #IFGain:Low dBid Ref 31.00 dBm M M  $\mathcal{M}$ Span 100 kHz Sweep 95.69 ms Center 902.8 MHz #Res BW 1 kHz #VBW 3 kHz Total Power 30.5 dBm **Occupied Bandwidth** 55.101 kHz -1.034 kHz Transmit Freq Error % of OBW Power 99.00 % x dB Bandwidth 44.96 kHz x dB -20.00 dB STATUS Non-Hopping Mode, Dense Reader, PR-ASK, Mid Channel 26, 915.25 MHz Limit Value (≤) Result





veTx 2016.09.14.2 XMit 2017.09.21 Non-Hopping Mode, Dense Reader, PR-ASK, High Channel 50, 927.25 MHz Limit Value Result (≤) 44.091 kHz 500 kHz Pass NSE:INT ALIGN OFF Center Freq: 927.250000 MHz Trig: Free Run Avg|Hold: 50/50 #Atten: 20 dB 02:57:05 AM Nov 22, 2017 RL Radio Std: None ----Radio Device: BTS #IFGain:Low Ref Offset 26.52 dB Ref 31.00 dBm dBid WY Center 927.3 MHz #Res BW 1 kHz Span 100 kHz Sweep 95.69 ms #VBW 3 kHz Total Power 30.2 dBm **Occupied Bandwidth** 54.473 kHz -1.254 kHz Transmit Freq Error % of OBW Power 99.00 % x dB Bandwidth 44.09 kHz x dB -20.00 dB STATUS Non-Hopping Mode, Very Fast, DSB-ASK, Low Channel 1, 902.75 MHz Limit

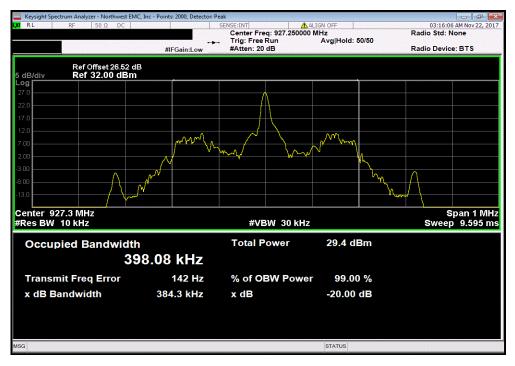






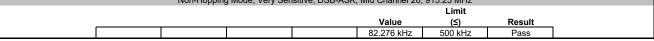
XMit 2017.09.21 Non-Hopping Mode, Very Fast, DSB-ASK, Mid Channel 26, 915.25 MHz Limit **(≤)** 500 kHz Value Result 381.319 kHz Pass NSE:INT ALIGN OFF Center Freq: 915.250000 MHz Trig: Free Run Avg|Hold: 50/50 #Atten: 20 dB 03:10:19 AM Nov 22, 2017 RL Radio Std: None ----Radio Device: BTS #IFGain:Low Ref Offset 26.52 dB Ref 32.00 dBm dB/d mm Center 915.3 MHz #Res BW 10 kHz Span 1 MHz Sweep 9.595 ms #VBW 30 kHz Total Power 29.1 dBm **Occupied Bandwidth** 403.85 kHz -1.085 kHz Transmit Freq Error % of OBW Power 99.00 % x dB Bandwidth 381.3 kHz x dB -20.00 dB STATUS

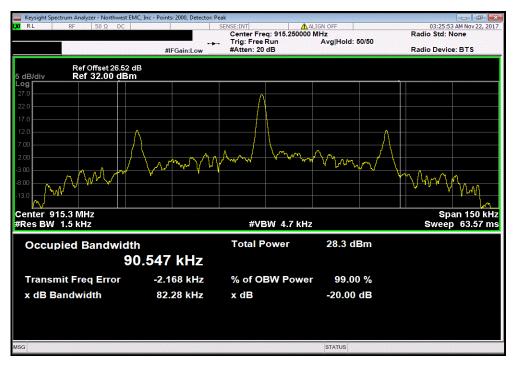
	Non-Hopp	ing wode, very F	ast, DSB-ASK, HI	ign Channel 50, 9	27.25 MHZ	
					Limit	
				Value	(≤)	Result
				384.339 kHz	500 kHz	Pass



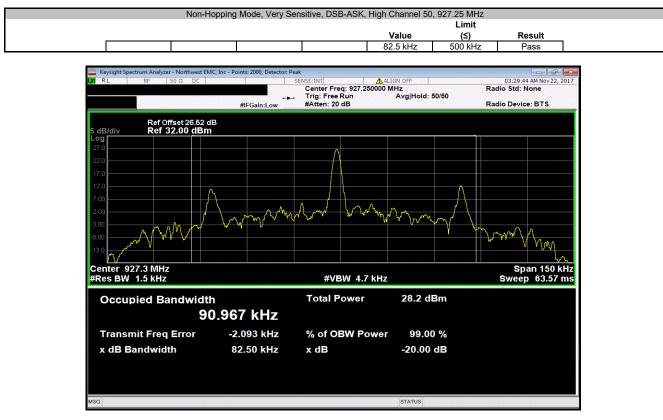


XMit 2017.09.21 Non-Hopping Mode, Very Sensitive, DSB-ASK, Low Channel 1, 902.75 MHz Limit Value Result (≤) 82.655 kHz 500 kHz Pass NSE:INT ALIGN OFF Center Freq: 902.750000 MHz Trig: Free Run Avg|Hold: 50/50 #Atten: 20 dB 03:21:12 AM Nov 22, 2017 RL Radio Std: None ----Radio Device: BTS #IFGain:Low Ref Offset 26.52 dB Ref 31.00 dBm dBid  $\mathcal{W}$ w north mr Center 902.8 MHz #Res BW 1.5 kHz Span 150 kHz Sweep 63.57 ms #VBW 4.7 kHz Total Power 28.7 dBm **Occupied Bandwidth** 89.003 kHz 215 Hz Transmit Freq Error % of OBW Power 99.00 % x dB Bandwidth 82.66 kHz x dB -20.00 dB STATUS Non-Hopping Mode, Very Sensitive, DSB-ASK, Mid Channel 26, 915.25 MHz











XMit 2017.09.21

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

Let Eden ment					
Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	19-May-17	19-May-18
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	20-Apr-17	20-Apr-18
Attenuator	Weinschel	54A-6	TYQ	25-Oct-17	25-Oct-18
Attenuator	Fairview Microwave	SA4014-20	TKV	9-Mar-17	9-Mar-18
Block - DC	Fairview Microwave	SD3379	AMU	20-Apr-17	20-Apr-18
Generator - Signal	Agilent	N5183A	TIA	6-Apr-16	6-Apr-18

#### **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 in a no-hop mode. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.



	dy RS1000		Work Order:	NweTx 2016.09.14.2	XMit
Serial Number: 11				21-Nov-17	
Customer: In			Temperature:		
Attendees: Pa			Humidity:		
Project: N			Barometric Pres.:		
	ichard Mellroth	Power: 5 VDC	Job Site:		
EST SPECIFICATION		Test Method			
CC 15.247:2017		ANSI C63.10:2013			
COMMENTS					
ransmitting at Defau	t Power Setting = 27dBm				
DEVIATIONS FROM T	EST STANDARD				
lone					
		01 10			
Configuration #	1	VASIL			
	Signature	2			
		Frequency	Max Value	Limit	
		Range	(dBc)	≤ (dBc)	Resu
Non-Hopping Mode	and Deader DD 4014				
D	ense Reader, PR-ASK	20 MU (0 5 OU	05.0		
	Low Channel 1, 902.75 MHz	30 MHz - 12.5 GHz	-65.8	-20	Pass
	Low Channel 1, 902.75 MHz	12.5 GHz - 25 GHz	-62.96	-20	Pass
	Mid Channel 26, 915.25 MHz	30 MHz - 12.5 GHz	-65.42	-20	Pass
	Mid Channel 26, 915.25 MHz	12.5 GHz - 25 GHz	-63	-20	Pass
	High Channel 50, 927.25 MHz	30 MHz - 12.5 GHz	-64.89	-20	
_	High Channel 50, 927.25 MHz	30 MHz - 12.5 GHz 12.5 GHz - 25 GHz	-64.89 -62.55	-20 -20	
V	High Channel 50, 927.25 MHz ery Fast, DSB-ASK	12.5 GHz - 25 GHz	-62.55	-20	Pass
V	High Channel 50, 927.25 MHz ery Fast, DSB-ASK Low Channel 1, 902.75 MHz	12.5 GHz - 25 GHz 30 MHz - 12.5 GHz	-62.55 -65.17	-20 -20	Pass
V	High Channel 50, 927.25 MHz ery Fast, DSB-ASK Low Channel 1, 902.75 MHz Low Channel 1, 902.75 MHz	12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz	-62.55 -65.17 -63.01	-20 -20 -20	Pass Pass Pass
V	High Channel 50, 927.25 MHz ery Fast, DSB-ASK Low Channel 1, 902.75 MHz Low Channel 1, 902.75 MHz Mid Channel 26, 915.25 MHz	12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 30 MHz - 12.5 GHz	-62.55 -65.17 -63.01 -66.4	-20 -20 -20 -20	Pass Pass Pass Pass
V	High Channel 50, 927.25 MHz ery Fast, DSB-ASK Low Channel 1, 902.75 MHz Low Channel 1, 902.75 MHz Mid Channel 26, 915.25 MHz Mid Channel 26, 915.25 MHz	12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 12.5 GHz - 25 GHz	-62.55 -65.17 -63.01 -66.4 -63.54	-20 -20 -20 -20 -20	Pass Pass Pass Pass Pass
V	High Channel 50, 927.25 MHz ery Fast, DSB-ASK Low Channel 1, 902.75 MHz Low Channel 1, 902.75 MHz Mid Channel 26, 915.25 MHz	12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 30 MHz - 12.5 GHz	-62.55 -65.17 -63.01 -66.4 -63.54 -66.42	-20 -20 -20 -20 -20 -20 -20	Pass Pass Pass Pass Pass
V	High Channel 50, 927.25 MHz ery Fast, DSB-ASK Low Channel 1, 902.75 MHz Low Channel 1, 902.75 MHz Mid Channel 26, 915.25 MHz Mid Channel 26, 915.25 MHz	12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 12.5 GHz - 25 GHz	-62.55 -65.17 -63.01 -66.4 -63.54	-20 -20 -20 -20 -20	Pass Pass Pass Pass Pass Pass Pass
_	High Channel 50, 927.25 MHz ery Fast, DSB-ASK Low Channel 1, 902.75 MHz Low Channel 1, 902.75 MHz Mid Channel 26, 915.25 MHz Mid Channel 26, 915.25 MHz High Channel 50, 927.25 MHz	12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 30 MHz - 12.5 GHz	-62.55 -65.17 -63.01 -66.4 -63.54 -66.42	-20 -20 -20 -20 -20 -20 -20	Pass Pass Pass Pass Pass Pass Pass
_	High Channel 50, 927.25 MHz ery Fast, DSB-ASK Low Channel 1, 902.75 MHz Low Channel 1, 902.75 MHz Mid Channel 26, 915.25 MHz Mid Channel 26, 915.25 MHz High Channel 50, 927.25 MHz High Channel 50, 927.25 MHz	12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 30 MHz - 12.5 GHz	-62.55 -65.17 -63.01 -66.4 -63.54 -66.42	-20 -20 -20 -20 -20 -20 -20	Pass Pass Pass Pass Pass Pass Pass
_	High Channel 50, 927.25 MHz ery Fast, DSB-ASK Low Channel 1, 902.75 MHz Low Channel 1, 902.75 MHz Mid Channel 26, 915.25 MHz Mid Channel 26, 915.25 MHz High Channel 50, 927.25 MHz High Channel 50, 927.25 MHz High Channel 50, 927.25 MHz High Channel 50, 927.25 MHz	12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz	-62.55 -65.17 -63.01 -66.4 -63.54 -66.42 -62.82	-20 -20 -20 -20 -20 -20 -20	Pass Pass Pass Pass Pass Pass Pass Pass
_	High Channel 50, 927.25 MHz ery Fast, DSB-ASK Low Channel 1, 902.75 MHz Low Channel 1, 902.75 MHz Mid Channel 26, 915.25 MHz Mid Channel 26, 915.25 MHz High Channel 50, 927.25 MHz High Channel 50, 927.25 MHz ery Sensitive, DSB-ASK Low Channel 1, 902.75 MHz	12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 30 MHz - 12.5 GHz 30 MHz - 12.5 GHz	-62.55 -65.17 -63.01 -66.4 -63.54 -66.42 -62.82 -62.82 -65.79	-20 -20 -20 -20 -20 -20 -20 -20 -20	Pass Pass Pass Pass Pass Pass Pass Pass
_	High Channel 50, 927.25 MHz ery Fast, DSB-ASK Low Channel 1, 902.75 MHz Low Channel 1, 902.75 MHz Mid Channel 26, 915.25 MHz Mid Channel 26, 915.25 MHz High Channel 50, 927.25 MHz High Channel 50, 927.25 MHz ery Sensitive, DSB-ASK Low Channel 1, 902.75 MHz Mid Channel 26, 915.25 MHz	12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 30 MHz - 12.5 GHz 30 MHz - 12.5 GHz 30 MHz - 12.5 GHz	-62.55 -65.17 -63.01 -66.4 -63.54 -66.42 -62.82 -62.82 -65.79 -62.33 -65.91	-20 -20 -20 -20 -20 -20 -20 -20 -20 -20	Pass Pass Pass Pass Pass Pass Pass Pass
_	High Channel 50, 927.25 MHz ery Fast, DSB-ASK Low Channel 1, 902.75 MHz Low Channel 1, 902.75 MHz Mid Channel 26, 915.25 MHz Mid Channel 26, 915.25 MHz High Channel 50, 927.25 MHz ery Sensitive, DSB-ASK Low Channel 1, 902.75 MHz Low Channel 1, 902.75 MHz	12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz	-62.55 -65.17 -63.01 -66.4 -66.42 -66.42 -62.82 -65.79 -65.79 -62.33	-20 -20 -20 -20 -20 -20 -20 -20 -20 -20	Pass Pass Pass Pass Pass Pass Pass Pass

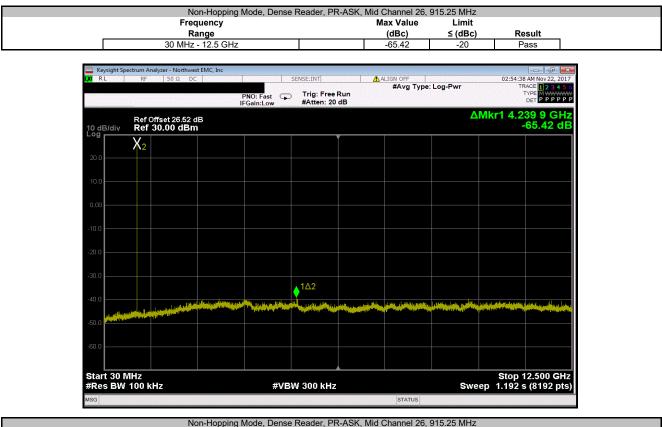


	quency		Max Value	Limit	
	ange		(dBc)	≤ (dBc)	Result
30 MHz	- 12.5 GHz		-65.8	-20	Pass
Keysight Spectrum Analyzer - Northwe					
<mark>(X)</mark> RL RF 50Ω D		SENSE:INT	ALIGN OFF #Avg Type	: Log-Pwr	02:50:07 AM Nov 22, 201 TRACE 2 3 4 5
	PNO: Fast	Trig: Free Run			TRACE 1 2 3 4 5 TYPE M WWWW DET P P P P P
	IFGain:Low	#Atten: 20 dB			
Ref Offset 26.52	dB			ΔMk	r1 4.096 8 GH
10 dB/div Ref 30.00 dBr	n				-65.80 dl
X <sub>2</sub>					
20.0					
10.0					
10.0					
0.00					
0,00					
10.0					
-10.0					
-20.0					
-20.0					
-30.0					
-30.0		1Δ2			
-40.0		♥			
		الماليس والمراجع ويتحاج	Building strend films inter-	وفوالبو ويتأخلون والتقليم والقاني	والبابانة لايوسيل بالتجوية أأتنا
-50.0					
-60.0					
Start 30 MHz					Stop 12.500 GH
#Res BW 100 kHz	#VI	300 kHz		Sweep	1.192 s (8192 pts
MSG			STATUS		

Non-nopping wode, Dense r	Reader, PR-ASK,	Low Channel 1,	902.75 WITZ	
Frequency		Max Value	Limit	
Range		(dBc)	≤ (dBc)	Result
12.5 GHz - 25 GHz		-62.96	-20	Pass

RL	Spectrum Analyze	50 Ω DC			SENSE:INT	A A	LIGN OFF		02:51:06	AM Nov 22, 20
			F	PNO: Fast 🖵	Trig: Free #Atten: 20	Run	#Avg Type:	Log-Pwr	1000	ACE 1 2 3 4 S TYPE M WWWW DET P P P P
dB/div	Ref Offso Ref 30.	et 26.52 dE 00 dBm	3					Ν	/kr1 23.6 -36	60 1 GF 6.78 dBi
<sup>og</sup>						Ĭ				
0.0										
D.0										
.00										
0.0										
0.0										
).0										
										1
).0 (	in the state of th			a di kana ta di katala kat						
).0										
D.O										
	2.500 GHz W 100 kHz			#VB	W 300 kHz			Swe	Stop 2 ep 1.195 s	25.000 GH
G				<i>"</i> •D			STATUS	- Ome	-op-11130 s	Action 2 pr

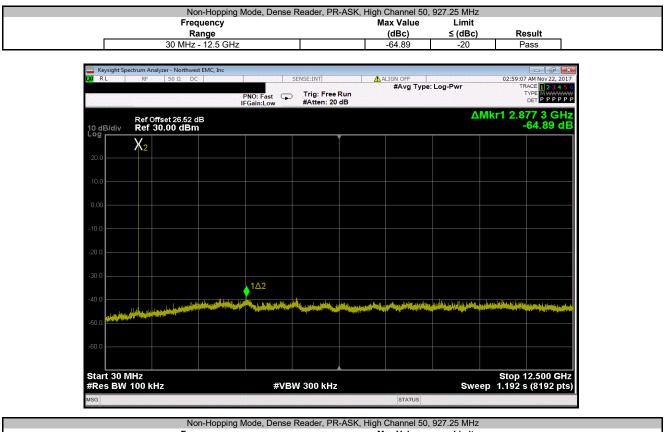




Non-Hopping Mode, Dense Reader, PR-ASK, Mid Channel 26, 915.25 MHz									
Frequency	M	lax Value	Limit						
Range		(dBc)	≤ (dBc)	Result					
12.5 GHz - 25 GHz		-63	-20	Pass					

RL	R	F 5	Ω 0	DC			S	ENSE:INT	A	LIGN OFF		02:55	35 AM Nov 22, 201
					1	PNO: Fast Gain:Low	Ģ	Trig: Free I #Atten: 20	Run dB	#Avg Type	Log-Pwr		TRACE 1 2 3 4 5 TYPE M WWWM DET P P P P P
0 dB/	Re div <b>R</b> e	f Offset ef 30.0	26.52 0 dB	2 dB m								Mkr1 24.	906 9 GH 36.92 dBr
°g									1				
20.0													
10.0													
0.00													
0.0													
0.0													
0.0													
0.0								that o	ىر ئىشىرىي	والمراجع والمراجع والمراجع	Construction of the last	Hillion attact to broth	Proceeding on the second
									had a set of the set o	an Mathematica and	and the second	And I and A state of the second s	
i0.0													
60.0													
	12.500 0 BW 100						VBV	V 300 kHz			 Sv	Stop	25.000 GH s (8192 pt
G	544 100	-111/2				"	<b>V D</b> V	- 500 MIZ		STATUS		Asep 11190	5 (0152 pt

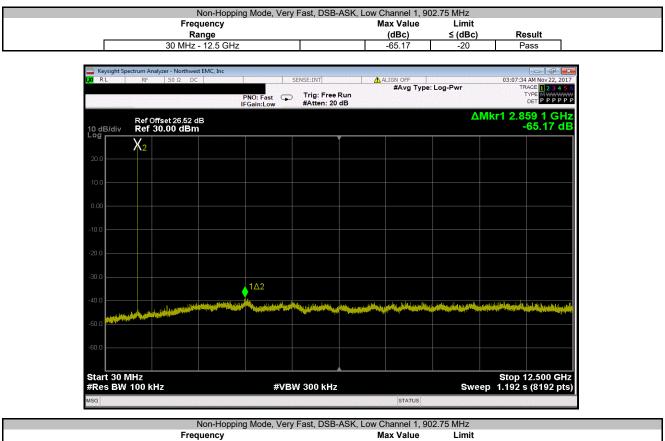




Non-Hopping Mode, Dense Reader, PR-ASK, High Channel 50, 927.25 MHz							
Frequency		Max Value	Limit				
Range		(dBc)	≤ (dBc)	Result			
12.5 GHz - 25 GHz		-62.55	-20	Pass			

Keysight Spectrum Analyzer - Northwest E		SENSE:INT	ALIGN OFF	03:00:04 AM Nov 22, 201
	PNO: Fast G IFGain:Low		#Avg Type: Log-Pwr	TRACE 1 2 3 4 5 TYPE MWWW DET P P P P P
Ref Offset 26.52 dB 0 dB/div Ref 30.00 dBm				Mkr1 24.023 3 GH -36.80 dBr
°g		Ť		
20.0				
10.0				
).00				
10.0				
20.0				
30.0				1
0.0	arinda			
io.o	and a second product of the second descent of the second descent of the second descent of the second descent de			
60.0				
tart 12.500 GHz Res BW 100 kHz	#V	BW 300 kHz		Stop 25.000 GH Sweep 1.195 s (8192 pt
G			STATUS	Shoop into a land pa





rien riepping mede, renj r	 	2	
Frequency	Max Value	Limit	
Range	(dBc)	≤ (dBc)	Result
12.5 GHz - 25 GHz	-63.01	-20	Pass

Keysight Spectrum Analyzer - Northwest EMG RL RF 50 Ω DC		SENSE:INT	ALIGN OFF	03:08:35 AM Nov 22, 201
	PNO: Fast G	Trig: Free Run #Atten: 20 dB	#Avg Type: Log-P	TRACE 2 3 4 5 TYPE M WWW DET P P P P
Ref Offset 26.52 dB 0 dB/div Ref 30.00 dBm				Mkr1 24.682 6 GH -36.95 dBr
og		Ť		
0.0				
0.0				
.00				
0.0				
0.0				
0.0				
0.0		يسانانه ما أفسه سرح مريا		
and the second			سىم (ماة 1943)، المطلقة (يا الله عن المكلك من أنه من أناف المراجع عن الم	
0.0				
0.0				
tart 12.500 GHz Res BW 100 kHz	#VB	W 300 kHz		Stop 25.000 GH Sweep 1.195 s (8192 pt
3G			STATUS	· · ·

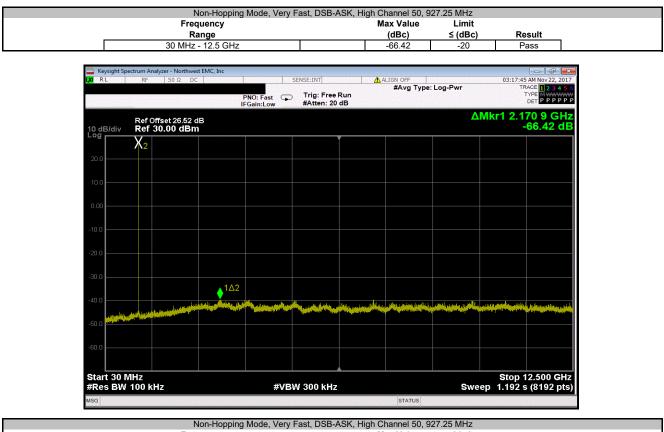


Frequ			Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz -	196		-66.4	-20	Pass	1
30 WHZ -	12.5 0112	1	-00.4	-20	1 833	4
Keysight Spectrum Analyzer - Northwest	EMC Inc					57
CX RL RF 50 Ω DC		SENSE:INT	ALIGN OFF		03:12:07 AM Nov 22, 2	2017
		Trig: Free Run	#Avg Type	: Log-Pwr	TRACE 1 2 3 4	<b>1 5 6</b>
	PNO: Fast	#Atten: 20 dB			TYPE MWWW DET PPPP	P P P
Ref Offset 26.52 dE	1			ΔMk	r1 2.920 0 GI	
10 dB/div Ref 30.00 dBm	,				-66.40 c	dB
Log X2		Ť Ť				
20.0						
20.0						
10.0						
0.00						
-10.0						
-20.0						
-30.0						
-50.0	1Δ2					
-40.0	and the state of the					
المجامعة والمعالية والمعالم والمعالم والمعالي والمحالي والمحالية						
-50.0						
-60.0						
Start 30 MHz		· · · · · · · · · · · · · · · · · · ·			Stop 12.500 G	Hz
#Res BW 100 kHz	#VB	W 300 kHz		Sweep	1.192 s (8192 p	ots)
MSG			STATUS			a de la

Non-Hopping Mode, Very F	ast, DSB-ASK, N	1id Channel 26, 9	15.25 MHz	
Frequency		Max Value	Limit	
Range		(dBc)	≤ (dBc)	Result
12.5 GHz - 25 GHz		-63.54	-20	Pass

RL	ectrum Analyzer - Nort RF 50 Ω			SENSE:INT		IGN OFF		03:13:0	5 AM Nov 22, 20
			PNO: Fast G		un	#Avg Type	Log-Pwr		RACE 1 2 3 4 5 TYPE MWWW DET PPPP
	Ref Offset 26.	52 dB						Mkr1 23.7	73 0 GH 7.10 dBi
) dB/div	Ref 30.00 d	Bm						-0	7.10 UB
0.0									
0.0									
.00									
0.0									
0.0									
~ ~									
0.0									1
0.0					control alternation	tanta mala sala sala sala	للاستفاق والمسا	فالبلادين والمساغاتين	Lindstated and the
A MARINE MARINE	And Provident Autom	enteri dina di sultari	فتغط ويراد احتلوهم التبعظم		alist of all the state	and a loss of the second s	and a second	and the second se	designment of the last
0.0									
0.0									
tart 12.5								Ston	25.000 GH
	100 kHz		#VE	300 kHz			Sv	veep 1.195	s (8192 <u>pt</u>
G						STATUS			





Non-hopping mode, very Fast, DSD-ASK, high Channel 50, 927.25 MHz							
Frequency		Max Value	Limit				
Range		(dBc)	≤ (dBc)	Result			
12.5 GHz - 25 GHz		-62.82	-20	Pass			

RL	trum Analyzer - North RF 50 Ω	DC		SENSE:INT	A	ALIGN OFF		03:18:4	5 AM Nov 22, 20
			PNO: Fast G		Run	#Avg Type	: Log-Pwr		RACE 1234 TYPE MWWW DET P P P P
) dB/div	Ref Offset 26.5 Ref 30.00 dE	2 dB 3m						Mkr1 23.7 -3	′22 7 GF 6.00 dBi
°g					Ĭ				
0.0									
0.0									
.00									
0.0									
0.0									
0.0									¢1
0.0		و قرار در بار از بر بر منظمات بر زمی	المحقق والديناة المعر الالتقريبة		li data para series		an aid an bear a binner		
0.0	A CONTRACTOR OF	the second s	and the second	فتعاليه فالمتلا والمتحر والمتحر والتحرير ال					
0.0									
tart 12.50 Res BW 1			#VE	3W 300 kHz			Sw	Stop /eep 1.195	25.000 GF s (8192 pt
G						STATUS			



Range 30 MHz - 12.5 GH:			< (dBc)	Result
00 WITZ - 12.0 OT 1	7	(dBc) -65.79	≤ (dBc) -20	Pass
		-00.75	-20	1 435
Keysight Spectrum Analyzer - Northwest EMC, Inc				
X RL RF 50 Ω DC	SENSE:INT	ALIGN OFF #Avg Type	· Log-Pwr	03:23:05 AM Nov 22, 2017 TRACE 1 2 3 4 5 (
	PNO: Fast Trig: Free Ru IFGain:Low #Atten: 20 dB			
Ref Offset 26.52 dB			ΔMk	r1 9.854 5 GHz
10 dB/div Ref 30.00 dBm			1	-65.79 dE
Χ2				
20.0				
10.0				
0.00				
0.00				
-10.0				
-20.0				
-30.0				▲1∆2
-40.0			the second second second	
-50 0	والمالين والتلاحية العربية المتعاجل والمتعاجل والمتعاجب والمتعاجب			
-50.0				
-60.0				
Start 30 MHz #Res BW 100 kHz	#VBW 300 kHz		Surcon	Stop 12.500 GHz
#Res BW 100 KHZ	#VEW 300 KHZ	STATUS	Sweep	1.192 s (8192 pts)

Non-Hopping Mode, Very Ser	nsitive, DSB-ASK, Low Channel	1, 902.75 MHz	
Frequency	Max Value	Limit	
Range	(dBc)	≤ (dBc)	Result
12.5 GHz - 25 GHz	-62.33	-20	Pass

RL	ectrum Analyzer - North RF 50 Ω	DC		SENSE:INT	1	ALIGN OFF		03:24:4	7 AM Nov 22, 20
			PNO: Fast G		Run	#Avg Type	: Log-Pwr		RACE 1234 TYPE MWWW DET PPPP
0 dB/div	Ref Offset 26.5 Ref 30.00 df	2 dB 3m						Mkr1 23.8 -3	840 2 GH 6.17 dBi
<sup>og</sup>					Y				
20.0									
10.0									
10.0									
).00									
0.0									
20.0									
0.0									1
							المقالمين والمقار		
40.0 <b>متعداد</b>		personal and a second state	المترجع المحمد المتقاد		to be Detrided to be				
50.0	o bela superior	and a second date of a second s	an te a se address a straf filme a s						
50.0									
tart 12.5	00 GHz							Stop	25.000 GH
Res BW	100 kHz		#V	BW 300 kHz			Sw	eep 1.195	s (8192 pt
G						STATUS			



	luency ange		Max Value (dBc)	Limit ≤ (dBc)	Result
	- 12.5 GHz		-65.91	-20	Pass
Keysight Spectrum Analyzer - Northwes		•		-	
RL RF 50Ω DC		SENSE:INT	ALIGN OFF		03:27:44 AM Nov 22, 2017
	PNO: Fast 🕞 IFGain:Low	Trig: Free Run #Atten: 20 dB	#Avg Type:	Log-Pwr	TRACE 1 2 3 4 5 TYPE M WWWWW DET P P P P P
Ref Offset 26.52 d 10 dB/div Ref 30.00 dBm				ΔΜκ	1 9.260 8 GHz -65.91 dE
Log X <sub>2</sub>		Y Y			
20.0					
10.0					
0.00					
-10.0					
-10.0					
-20.0					
-30.0					
				↓ <sup>1</sup> /	
	فيالمونين وإيرامه والمتعادين والمتقادين	And a start of the second second	ووالالاوة الفرور الطريبية	والمالح والأطري والمتعاد والمتعاد	وروابي التقالير والفلا ومتالين الطقار
-50.0					
-60.0					
Start 30 MHz	II.	A			Stop 12.500 GHz
#Res BW 100 kHz	#VB	W 300 kHz		Sweep	1.192 s (8192 pts
MSG			STATUS		

Non-hopping wode, very sen	Silive, DSD-ASK, IVIU Chann	ei 20, 915.25 ivin	Z
Frequency	Max Val	ue Limit	
Range	(dBc)	≤ (dBc	) Result
12.5 GHz - 25 GHz	-62.99	-20	Pass

RL		Northwest EMC, Inc		SENSE:INT	ALIGN OFF		03:28:49	AM Nov 22, 20
			PNO: Fast G		#Avg Type	Log-Pwr	TR	ACE 1 2 3 4 5 TYPE M WWW DET P P P P F
) dB/div	Ref Offset: Ref 30.00	26.52 dB ) dBm					/lkr1 23.6 -36	95 2 GH 6.56 dBi
°g				T T				
0.0								
0.0								
~								
.00								
D.O								
0.0								
0.0								
							•	1
0.0	ulto be the line shafed	ور . رسار فالالتشريق واروان	الألفان المحمد والمالية وليتعفيه والمت				الخليب العسرة سافي اويا	Constant of the section of
		States and a state of the state of the state	and a second	and the second difference of the second differ				
0.0								
0.0								
	500 GHz / 100 kHz			BW 300 kHz		0	Stop 2 eep 1.195 s	25.000 GF
Kes DW			#V	BW JUU KHZ	STATUS	SWO	eep 1.195 s	to la shr



	iency 1ge		Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz -		1	-65.34	-20	Pass
50 WHZ -	12.5 6112		-00.04	-20	1 435
Keysight Spectrum Analyzer - Northwest					- 8 -
LX/ RL RF 50 Ω DC	S	ENSE:INT	ALIGN OFF #Avg Type	Log-Pwr	03:31:24 AM Nov 22, 2017 TRACE 1 2 3 4 5 6
	PNO: Fast 😱 IFGain:Low	Trig: Free Run #Atten: 20 dB	#109 ijpe	. Log i mi	TYPE MWWWW DET PPPPP
Ref Offset 26.52 dE 10 dB/div Ref 30.00 dBm	}			ΔMki	1 2.889 5 GHz -65.34 dB
Log X2		Ť			
20.0					
10.0					
0.00					
-10.0					
20.0					
-20.0					
-30.0					
	1Δ2				
-40.0	الاستادانية أورادين المتحج المحاجة الترجيلية		ent la mais de la mais	Index the configuration and the	
المعالية معاقلها بالماج ومطالعه والمأسولة ومعاليا والمالي	A REAL PROPERTY AND A REAL				
-50.0					
-60.0					
Start 30 MHz #Res BW 100 kHz	#VBV	V 300 kHz		Sweep	Stop 12.500 GHz 1.192 s (8192 pts)
MSG			STATUS		

		,	
Frequency	Max Value	Limit	
Range	(dBc)	≤ (dBc)	Result
12.5 GHz - 25 GHz	-63.25	-20	Pass

