



# **IMPINJ INC TEST REPORT**

# FOR THE

#### **RFID READER, IPJ-REV**

# FCC PART 15 SUBPART C SECTIONS 15.207 & 15.247 AND RSS-210 ISSUE 7

# TESTING

#### DATE OF ISSUE: FEBRUARY 23, 2009

### **PREPARED FOR:**

Impinj, Inc. 701 N. 34th Street Seattle, WA 98103

P.O. No.: 100974 W.O. No.: 89028

### **PREPARED BY:**

Mary Ellen Clayton CKC Laboratories, Inc. 5046 Sierra Pines Drive Mariposa, CA 95338

Date of test: February 9-12, 2009

# Report No.: FC09-014

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# **ADMINISTRATIVE INFORMATION**

**DATE OF TEST:** February 9-12, 2009

**DATE OF RECEIPT:** February 9, 2009

**REPRESENTATIVE:** Mike Thomas

MANUFACTURER: Impinj, Inc. 701 N. 34th Street Seattle, WA 98103 **TEST LOCATION:** 

CKC Laboratories, Inc. 110 Olinda Place Brea, CA 92823

TEST METHOD: ANSI C63.4 (2003), RSS-210 Issue 7 and RSS GEN Issue 2

**PURPOSE OF TEST:** To perform the testing of the RFID Reader, IPJ-REV with the requirements for FCC Part 15 Subpart C Sections 15.207 & 15.247and RSS-210 devices.

APPROVALS

**QUALITY ASSURANCE:** 

**TEST PERSONNEL:** 

Steve Behm, Director of Engineering Services

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Armando Del Angel, Test Engineer

= Mita

Donald Jones, Senior EMC Engineer / Lab Manager



# SUMMARY OF RESULTS

Test	Specification	Results
Voltage Variation	FCC Part 15.31(e)	Pass
Conducted Emissions	FCC Part 15.207	Pass
20dB Bandwidth	FCC Part 15.247(a)	Pass
Frequency Separation	FCC Part 15.247(a)	Pass
Number of Hopping Channels	FCC Part 15.247(a)	Pass
Average Time of Occupancy	FCC Part 15.247(a)	Pass
RF Power Output	FCC Part 15.247(b)	Pass
Antenna Conducted Spurious	FCC Part 15.247(d)	Pass
Emissions		
OATS Spurious Emissions	FCC Part 15.209/15.247(d)	Pass
Bandedge		Pass
99% Bandwidth	RSS-210 Issue 7 and RSS GEN Issue 2	Pass

# **CONDITIONS DURING TESTING**

No modifications to the EUT were necessary during testing.

# FCC 15.31(m) Number Of Channels

This device was tested on three channels.

# FCC 15.33(a) Frequency Ranges Tested

15.207 Conducted Emissions: 150 kHz – 30 MHz 15.209/15.247 Radiated Emissions: 9 kHz – 19 GHz

# **EUT Operating Frequency**

The EUT was operating in the 902-928 MHz band.



# EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The customer declares the EUT tested by CKC Laboratories was representative of a production unit.

# EQUIPMENT UNDER TEST

#### **Circular Patch Antenna**

Manuf: Cushcraft Model: S90289CLJ Serial: 092436

# AC/DC Adaptor

Manuf: CUI Model: DSA-60W-20 Serial: ETS240250UC-P11P-DB

# Mini-Guardrail

Manuf: Impinj Inc. Model: IPJ-A0303-0000E Serial: 0069

# **Guardwall Antenna**

Manuf: Impinj Inc. Model: IPJ-A0402-USA Serial: 0116

# PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

#### Wireless G Router

Manuf: Belkin Model: F5D7230-4 Serial: 2028723009696

# **Switch POE**

Manuf: NETGEAR Model: FS108P Serial: 1DL1863H0073E

# **RFID Reader**

Manuf: Impinj Inc. Model: IPJ-REV Serial: 940-08-21-0006

# Antenna Cable

Manuf: Manhattan/CDT Model: M4213 Serial: 1354 E12091

# **Brickyard Antenna**

Manuf: CSL Model: CS777-2 Serial: V25078 EP00090

# Laptop Computer

Manuf: Dell Model: Latitude Serial: 6497402833



# **REPORT OF EMISSIONS MEASUREMENTS**

# **TESTING PARAMETERS**

# **TEMPERATURE AND HUMIDITY DURING TESTING**

The temperature during testing was within  $+15^{\circ}$ C and  $+35^{\circ}$ C. The relative humidity was between 20% and 75%.

The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

#### **CORRECTION FACTORS**

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in  $dB\mu V/m$ , the spectrum analyzer reading in  $dB\mu V$  was corrected by using the following formula. This reading was then compared to the applicable specification limit.

	SAMPLE CALCULA	TIONS
	Meter reading	$(dB\mu V)$
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	<b>Distance</b> Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	$(dB\mu V/m)$



# TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. The following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used. When conducted emissions testing was performed, a 10 dB external attenuator was used with internal offset correction in the analyzer.

# SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the highest readings, this is indicated as a "QP" or an "Ave" on the appropriate rows of the data sheets. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

# <u>Peak</u>

In this mode, the spectrum analyzer/receiver readings were recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the measuring device called "peak hold," the measuring device had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

# **Quasi-Peak**

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the quasi-peak detector.

# Average

For certain frequencies, average measurements may be made using the spectrum analyzer/receiver. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.



# FCC 15.31(e) - VOLTAGE VARIATIONS

#### Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Mag Loop	2156	06/04/2008	06/04/2010	AN00052
Antenna	2453	12/22/2008	12/22/2010	AN01994
EMCO 3115 Horn	9606-4854	11/12/2007	11/12/2009	AN01412
Horn Antenna, Active	1114018	11/13/2008	11/13/2010	2742
	NT / A	07/02/2000	07/00/0010	A NIO 5 5 4 5
Heliax cable	N/A	07/22/2008	07/22/2010	AN05545
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03123
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03122
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03121
Cable 30'	11	11/05/2008	11/05/2010	ANP05366
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Cable 20'	16	11/10/2008	11/10/2010	ANP05360
Cable 6'	51	12/30/2008	12/30/2010	ANP05361
Pasternack Coax		07/20/2007	07/20/2009	AN05425
HP 8447D Preamp	2944A08601	07/08/2008	07/08/2010	AN01517
HP 83017A Pre-amp	3123A00464	10/02/2007	10/02/2009	AN01271
Filter	2	05/01/2008	05/01/2010	2750
Filter	311SH10-	12/02/2008	12/02/2010	3116
	3000/T10000-0/0			
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872

Test Conditions / Notes:

20°C / 26% relative humidity / 102.3 kPa.

The Unit is an RF reader. It is connected directly to the spectrum analyzer through a special cable provided by the customer due to the fact that it will provide the required attenuation for the unit to comply with the limit in this situation.

The EUT will be in transmitting mode throughout the test in the LOW, MEDIUM and HIGH channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 32.5 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 902.75, 915.25 & 927.25



# **Test Setup Photos**







Frequency	Voltage	30dBm	32.5dBm w/ cable	Limit
(MHz)				(dBuV)
902.75	+15%	136.5dBuV	136.6dBuV	137.0
902.75	Nominal	136.8dBuV	136.6dBuV	137.0
902.75	-15%	136.5dBuV	136.6dBuV	137.0
915.25	+15%	137.0dBuV	136.9dBuV	137.0
915.25	Nominal	136.6dBuV	136.9dBuV	137.0
915.25	-15%	136.9dBuV	136.6dBuV	137.0
927.25	+15%	136.8dBuV	136.4dBuV	137.0
927.25	Nominal	136.7dBuV	136.4dBuV	137.0
927.25	-15%	136.8dBuV	136.4dBuV	137.0

# **AC/DC converter**

# POE

Frequency	Voltage	30dBm	Limit
(MHz)			(dBuV)
902.75	+15%	136.5dBuV	137.0
902.75	Nominal	136.5dBuV	137.0
902.75	-15%	136.4dBuV	137.0
915.25	+15%	136.6dBuV	137.0
915.25	Nominal	136.6dBuV	137.0
915.25	-15%	136.6dBuV	137.0
927.25	+15%	136.6dBuV	137.0
927.25	Nominal	136.7dBuV	137.0
927.25	-15%	136.7dBuV	137.0

Notes: The unit is connected directly to the PSA and depending on the power output the measurement will be taken in the RF port or in the end of the cable. The unit's AC/DC converter & POE will be connected to a programmable power supply so we can vary the voltage from 85% to 115% of the nominal voltage.



# FCC 15.207 – AC CONDUCTED EMISSIONS

# **Test Setup Photos**





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### **Test Data Sheets**

Test Location:

CKC Laboratories •22116 23rd Dr SE • Bothell, WA 98021-4413 • 425-402-1717

Customer:	Impinj Inc
Specification:	FCC 15.207 - AVE
Work Order #:	89028
Test Type:	<b>Conducted Emissions</b>
Equipment:	<b>RFID Reader</b>
Manufacturer:	Impinj
Model:	IPJ-REV
S/N:	940-08-21-0006

Date: 2/12/2009 Time: 10:32:49 AM Sequence#: 2 Tested By: Armando Del Angel 110V 60Hz

#### Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Cable 20'	16	11/10/2008	11/10/2010	ANP05360
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Cable 30'	11	11/05/2008	11/05/2010	ANP05366
Agilent E4440A	MY46186330	01/31/2008	01/31/2010	AN02872
Attenuator	9912	03/21/2008	03/21/2010	ANP05503
Filter	G7752	07/21/2008	07/21/2010	AN02611
EMCO LISN	9606-1049	06/01/2007	06/01/2009	AN01492

#### Equipment Under Test (\* = EUT):

Function	Manufacturer	Model #	S/N
Circular patch antenna	Cushcraft	S90289CLJ	092436
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Antenna cable	Manhattan/CDT	M4213	1354 E12091

# Support Devices:

Function	Manufacturer	Model #	S/N
Wireless G Router	Belkin	F5D7230-4	2028723009696
Laptop Computer	Dell	Latitude	6497402833

### Test Conditions / Notes:

20°C / 26% relative humidity / 102.3 kPa.

Testing AC conducted emissions per FCC 15.207.

The Unit is an RF reader. It is located in the back edge of the test table.

All its ports are being exercised. It is being powered by an AC/DC converter.

It is connected to a laptop outside the chamber through a shielded ethernet cable.

The antenna is located on the wooden table.

The EUT will be in transmitter mode throughout the test.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting: 32.5 dBm Operating frequency: 902-928MHz. Frequency range of measurement = 150kHz - 30MHz, RBW=1kHz, VBW=1kHz.



Trans	ducer Legend	l:									
T1=CA	B-ANP0537	1				T2=FIL	-AN0261	11-072108			
T3=CA	B-ANP0536	5				T4=AT	Γ-ANP55	503-03210	8		
T5=CA	B-ANP0536	0				T6=CD	N-AN01	492-06010	07 - Neutra	1	
		P						<b>T</b> 1	1		
Measu	<u>rement Data:</u>	Re D 1	eading list	ted by ma	argin.	77.4	D' /	Test Lea	d: Neutral	. ·	D 1
#	Freq	Rdng	11	12 T6	13	14	Dist	Corr	Spec	Margin	Polar
	MHz	dBuV	dB	10 dB	dB	dB	Table	dBuV	dBuV	dB	Δnt
1	187.815k	<u>abµ v</u> 37.5	+0.0	+0.2	+0.0	+10.1	$\pm 0.0$	<u>48 0</u>	<u>ubµ v</u> 54.1	-6.1	Neutr
1	107.0158	57.5	+0.0	+0.2	10.0	10.1	10.0	10.0	51.1	0.1	rteuu
2	363.071k	30.6	+0.1	+0.1	+0.0	+10.1	+0.0	41.2	48.7	-7.5	Neutr
			+0.1	+0.2							
3	423.429k	28.3	+0.1	+0.1	+0.0	+10.1	+0.0	38.9	47.4	-8.5	Neutr
			+0.1	+0.2							
4	247.446k	31.6	+0.0	+0.2	+0.0	+10.1	+0.0	42.1	51.8	-9.7	Neutr
	176 0071	22.2	+0.0	+0.2	.0.0	. 10.1	.0.0	42.0	54.6	107	NT (
5	1/6.90/k	33.3	+0.0	+0.3	+0.0	+10.1	+0.0	43.9	54.6	-10./	Neutr
6	105 81/1	31.3	+0.0	+0.2	+0.0	+10.1	+0.0	/1.8	53.8	12.0	Noutr
0	195.014K	51.5	+0.0+0.0	+0.2 $+0.2$	$\pm 0.0$	+10.1	$\pm 0.0$	41.0	55.0	-12.0	INCUU
7	661.953k	22.1	+0.0	+0.2	+0.0	+10.1	+0.0	32.8	46.0	-13.2	Neutr
			+0.1	+0.2							
8	207.449k	29.5	+0.0	+0.2	+0.0	+10.1	+0.0	40.0	53.3	-13.3	Neutr
			+0.0	+0.2							
9	2.774M	22.0	+0.1	+0.1	+0.1	+10.1	+0.0	32.7	46.0	-13.3	Neutr
10	240.0041	20.1	+0.1	+0.2		10.1		20.6		10 7	<b>NT</b>
10	240.901k	28.1	+0.0	+0.2	+0.0	+10.1	+0.0	38.6	52.1	-13.5	Neutr
11	2 501M	21.2	+0.0	+0.2	+0.1	+10.1	+0.0	31.0	46.0	1/1	Noutr
11	2.39111	21.2	+0.1 $+0.1$	+0.1 +0.2	+0.1	+10.1	+0.0	51.9	40.0	-14.1	INCUU
12	602.322k	21.0	+0.1	+0.2	+0.0	+10.1	+0.0	31.7	46.0	-14.3	Neutr
			+0.1	+0.2							
13	254.718k	26.6	+0.0	+0.2	+0.0	+10.1	+0.0	37.1	51.6	-14.5	Neutr
			+0.0	+0.2							
14	2.532M	20.8	+0.1	+0.1	+0.1	+10.1	+0.0	31.5	46.0	-14.5	Neutr
1.5	205 (201	25.0	+0.1	+0.2	.0.0	. 10.1	.0.0	25.4	<b>50</b> 1	147	
15	305.622k	25.0	+0.0	+0.1	+0.0	+10.1	+0.0	35.4	50.1	-14./	Neutr
16	723 766k	20.5	+0.0	+0.2	±0.1	±10.1	+0.0	31.2	46.0	-1/1 8	Neutr
10	723.700K	20.5	+0.0 +0.1	+0.2 $+0.2$	+0.1	+10.1	$\pm 0.0$	51.2	40.0	-14.0	INCUU
17	2.833M	19.9	+0.1	+0.1	+0.1	+10.1	+0.0	30.6	46.0	-15.4	Neutr
			+0.1	+0.2							
18	317.257k	23.6	+0.1	+0.1	+0.0	+10.1	+0.0	34.2	49.8	-15.6	Neutr
			+0.1	+0.2							
19	2.714M	19.7	+0.1	+0.1	+0.1	+10.1	+0.0	30.4	46.0	-15.6	Neutr
	405 0 101	10.0	+0.1	+0.2		. 10.1		20.5	46.0	157	NT -
20	485.242k	19.8	+0.1	+0.2	+0.0	+10.1	+0.0	30.5	46.2	-15.7	Neutr
21	962 260k	10.1	+0.1	+0.2	+0.1	+10.1	+0.0	29.8	46.0	-16.2	Neutr
21	702.200K	17.1	+0.0	+0.2	10.1	10.1	10.0	27.0	+0.0	10.2	itteuu
22	2.230M	18.9	+0.1	+0.1	+0.1	+10.1	+0.0	29.6	46.0	-16.4	Neutr
			+0.1	+0.2							



23	2.468M	18.9	+0.1	+0.1	+0.1	+10.1	+0.0	29.6	46.0	-16.4	Neutr
			+0.1	+0.2							
24	902.721k	18.8	+0.0	+0.2	+0.1	+10.1	+0.0	29.5	46.0	-16.5	Neutr
			+0.1	+0.2							
25	310.713k	23.0	+0.0	+0.1	+0.0	+10.1	+0.0	33.4	50.0	-16.6	Neutr
			+0.0	+0.2							
26	327.438k	22.3	+0.1	+0.1	+0.0	+10.1	+0.0	32.9	49.5	-16.6	Neutr
			+0.1	+0.2							
27	465.607k	19.3	+0.1	+0.2	+0.0	+10.1	+0.0	30.0	46.6	-16.6	Neutr
			+0.1	+0.2							
28	1.145M	18.7	+0.0	+0.2	+0.1	+10.1	+0.0	29.4	46.0	-16.6	Neutr
			+0.1	+0.2							
29	2.293M	18.7	+0.1	+0.1	+0.1	+10.1	+0.0	29.4	46.0	-16.6	Neutr
			+0.1	+0.2							
30	354.345k	21.6	+0.1	+0.1	+0.0	+10.1	+0.0	32.2	48.9	-16.7	Neutr
			+0.1	+0.2							

CKC Laboratories Date: 2/12/2009 Time: 10:32:49 AM Impinj Inc WO#: 89028 FCC 15.207 - AVE Test Lead: Neutral 110V 60Hz Sequence#: 2 Polarity: Neutral Notes:





Test Location:	CKC Laboratories	•22116 23rd Dr SE •	• Bothell,	WA 98021-4413	• 425-402-1717
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Customer:	Impinj Inc
Specification:	FCC 15.207 - AVE
Work Order #:	89028
Test Type:	Conducted Emissions
Equipment:	RFID Reader
Manufacturer:	Impinj
Model:	IPJ-REV
S/N:	940-08-21-0006

Date:	2/12/2009
Time:	11:32:45
Sequence#:	3
Tested By:	Armando Del Angel
-	110V 60Hz

#### Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Cable 20'	16	11/10/2008	11/10/2010	ANP05360
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Cable 30'	11	11/05/2008	11/05/2010	ANP05366
Agilent E4440A	MY46186330	01/31/2008	01/31/2010	AN02872
Attenuator	9912	03/21/2008	03/21/2010	ANP05503
Filter	G7752	07/21/2008	07/21/2010	AN02611
EMCO LISN	9606-1049	06/01/2007	06/01/2009	AN01492

#### Equipment Under Test (\* = EUT):

Manufacturer	Model #	S/N
Cushcraft	S90289CLJ	092436
Impinj	IPJ-REV	940-08-21-0006
Manufacturer	Model #	S/N
	Manufacturer Cushcraft Impinj Manufacturer	Manufacturer Model #   Cushcraft S90289CLJ   Impinj IPJ-REV   Manufacturer Model #

Function	Manufacturer	Model #	S/IN
Wireless G Router	Belkin	F5D7230-4	2028723009696
Laptop Computer	Dell	Latitude	6497402833
Switch POE	NETGEAR	FS108P	1DL1863H0073E

#### Test Conditions / Notes:

20°C / 26% relative humidity / 102.3 kPa.

Testing AC conducted emissions per FCC 15.207.

The Unit is an RF reader. It is located in the back edge of the test table.

All its ports are being exercised. It is being powered by POE.

It is connected to a laptop outside the chamber through a shielded ethernet cable.

The antenna is located on the wooden table.

The EUT will be in transmitter mode throughout the test.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting: 30.0 dBm

Operating frequency: 902-928MHz. Frequency range of measurement = 150kHz - 30MHz, RBW=1kHz, VBW=1kHz.



Tran	sducer Legend	l:									
T1=C	AB-ANP0537	1				T2=FIL	-AN0261	11-072108			
T3=C.	AB-ANP0536	6				T4=AT	Γ-ANP5:	503-03210	8		
T5=C.	AB-ANP0536	C				T6=CD	N-AN01	492-06010	)7 - Line		
Measu	urement Data:	Re	eading lis	ted by ma	argin.			Test Lea	d: Line		
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6							
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	494.048k	31.1	+0.1	+0.2	+0.0	+10.1	+0.0	41.7	46.1	-4.4	Line
	Ave		+0.1	+0.1							
^	494.048k	34.0	+0.1	+0.2	+0.0	+10.1	+0.0	44.6	46.1	-1.5	Line
			+0.1	+0.1							
3	556.911k	30.4	+0.1	+0.2	+0.0	+10.1	+0.0	41.0	46.0	-5.0	Line
	Ave		+0.1	+0.1							
^	556.911k	34.0	+0.1	+0.2	+0.0	+10.1	+0.0	44.6	46.0	-1.4	Line
			+0.1	+0.1							
5	741.219k	29.8	+0.0	+0.2	+0.1	+10.1	+0.0	40.4	46.0	-5.6	Line
			+0.1	+0.1							
6	372.525k	31.3	+0.1	+0.1	+0.0	+10.1	+0.0	41.8	48.4	-6.6	Line
	0.5.1.(0).6	20.0	+0.1	+0.1	0.0	10.1	0.0	12.0	<b>7</b> 0.0		<b>.</b> .
1	27.163M	30.8	+0.2	+0.2	+0.3	+10.1	+0.0	42.8	50.0	-7.2	Line
	010 1 (7)	21.5	+0.3	+0.9	0.0	10.1	0.0	41.0	10.0	0.1	<b>T</b> ·
8	312.16/k	31.5	+0.0	+0.1	+0.0	+10.1	+0.0	41.8	49.9	-8.1	Line
	(70 (70)	07.0	+0.0	+0.1	.0.0	. 10.1	. 0. 0	27.0	16.0	0.0	<b>T</b> ·
9	6/8.6/9K	21.2	+0.1	+0.2	+0.0	+10.1	+0.0	37.8	46.0	-8.2	Line
10	100 72 41-	24.6	+0.1	+0.1		+ 10.1	10.0	15.0	54.0	0.0	Lina
10	190.724K	54.0	+0.0	+0.2	+0.0	+10.1	+0.0	43.0	54.0	-9.0	Line
11	617 5021	26.4	+0.0	+0.1		+10.1		27.0	46.0	0.0	Lina
11	017.373K	20.4	+0.1	+0.2 +0.1	$\pm 0.0$	$\pm 10.1$	$\pm 0.0$	37.0	40.0	-9.0	Line
12	26 608M	28.9	+0.2	+0.1	+0.3	+10.1	+0.0	40.9	50.0	-91	Line
12	20.000101	20.7	+0.2	+0.2	10.5	110.1	10.0	40.7	50.0	7.1	Line
13	803 031k	24.8	+0.0	+0.2	+0.1	+10.1	+0.0	35.4	46.0	-10.6	Line
15	00010011	21.0	+0.1	+0.1	10.1	110.1	10.0	5511	10.0	10.0	Line
14	27.341M	27.3	+0.2	+0.2	+0.3	+10.1	+0.0	39.3	50.0	-10.7	Line
11	27.5 1111	27.5	+0.2	+0.2	10.5	110.1	10.0	57.5	2010	10.7	Line
15	26.492M	26.8	+0.2	+0.2	+0.3	+10.1	+0.0	38.8	50.0	-11.2	Line
			+0.3	+0.9							
16	26.553M	26.5	+0.2	+0.2	+0.3	+10.1	+0.0	38.5	50.0	-11.5	Line
			+0.3	+0.9							
17	27.218M	25.8	+0.2	+0.2	+0.3	+10.1	+0.0	37.8	50.0	-12.2	Line
			+0.3	+0.9							
18	27.410M	25.7	+0.2	+0.2	+0.3	+10.1	+0.0	37.8	50.0	-12.2	Line
			+0.3	+1.0							
19	432.883k	23.7	+0.1	+0.2	+0.0	+10.1	+0.0	34.3	47.2	-12.9	Line
			+0.1	+0.1							
20	26.944M	24.4	+0.2	+0.2	+0.3	+10.1	+0.0	36.4	50.0	-13.6	Line
			+0.3	+0.9							
21	923.985k	21.7	+0.0	+0.2	+0.1	+10.1	+0.0	32.3	46.0	-13.7	Line
			+0.1	+0.1							
22	24.902M	24.3	+0.2	+0.2	+0.3	+10.1	+0.0	36.2	50.0	-13.8	Line

+0.3

+0.8



23	26.855M	24.2	+0.2	+0.2	+0.3	+10.1	+0.0	36.2	50.0	-13.8	Line
			+0.3	+0.9							
24	24.532M	23.9	+0.2	+0.2	+0.3	+10.1	+0.0	35.8	50.0	-14.2	Line
			+0.3	+0.8							
25	987.776k	21.0	+0.0	+0.2	+0.1	+10.1	+0.0	31.6	46.0	-14.4	Line
			+0.1	+0.1							
26	24.964M	23.7	+0.2	+0.2	+0.3	+10.1	+0.0	35.6	50.0	-14.4	Line
			+0.3	+0.8							
27	179.815k	29.4	+0.0	+0.3	+0.0	+10.1	+0.0	39.9	54.5	-14.6	Line
			+0.0	+0.1							
28	24.354M	23.5	+0.2	+0.2	+0.3	+10.1	+0.0	35.4	50.0	-14.6	Line
			+0.3	+0.8							
29	27.896M	23.1	+0.2	+0.2	+0.3	+10.1	+0.0	35.2	50.0	-14.8	Line
			+0.3	+1.0							
30	176.907k	29.2	+0.0	+0.3	+0.0	+10.1	+0.0	39.7	54.6	-14.9	Line
			+0.0	+0.1							
31	25.875M	22.9	+0.2	+0.2	+0.3	+10.1	+0.0	34.9	50.0	-15.1	Line
			+0.3	+0.9							
32	26.670M	22.9	+0.2	+0.2	+0.3	+10.1	+0.0	34.9	50.0	-15.1	Line
			+0.3	+0.9							

CKC Laboratories Date: 2/12/2009 Time: 11:32:45 Impinj Inc WO#: 89028 FCC 15.207 - AVE Test Lead: Line 110V 60Hz Sequence#: 3 Polarity: Line Notes:





Test Location:	CKC Laboratories	•22116 23rd Dr SE •	• Bothell,	WA 98021-4413	• 425-402-1717
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Customer:	Impinj Inc
Specification:	FCC 15.207 - AVE
Work Order #:	89028
Test Type:	Conducted Emissions
Equipment:	RFID Reader
Manufacturer:	Impinj
Model:	IPJ-REV
S/N:	940-08-21-0006

Date:	2/12/2009
Time:	11:37:34
Sequence#:	4
Tested By:	Armando Del Angel
-	110V 60Hz

#### Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Cable 20'	16	11/10/2008	11/10/2010	ANP05360
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Cable 30'	11	11/05/2008	11/05/2010	ANP05366
Agilent E4440A	MY46186330	01/31/2008	01/31/2010	AN02872
Attenuator	9912	03/21/2008	03/21/2010	ANP05503
Filter	G7752	07/21/2008	07/21/2010	AN02611
EMCO LISN	9606-1049	06/01/2007	06/01/2009	AN01492

#### Equipment Under Test (\* = EUT):

	<b></b> ( <b>_</b> ),			
Function	Manufacturer	Model #	S/N	
Circular patch antenna	Cushcraft	S90289CLJ	092436	
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006	
Support Devices:				
Function	Manufacturer	Model #	S/N	

Function	Manufacturer	Model #	S/N
Wireless G Router	Belkin	F5D7230-4	2028723009696
Laptop Computer	Dell	Latitude	6497402833
Switch POE	NETGEAR	FS108P	1DL1863H0073E

#### Test Conditions / Notes:

20°C / 26% relative humidity / 102.3 kPa.

Testing AC conducted emissions per FCC 15.207.

The Unit is an RF reader. It is located in the back edge of the test table.

All its ports are being exercised. It is being powered by POE.

It is connected to a laptop outside the chamber through a shielded ethernet cable.

The antenna is located on the wooden table.

The EUT will be in transmitter mode throughout the test.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting: 30.0 dBm

Operating frequency: 902-928MHz. Frequency range of measurement = 150kHz - 30MHz, RBW=1kHz, VBW=1kHz.



Trans	sducer Legend	l:									
T1=C	AB-ANP0537	1				T2=FIL	-AN0261	1-072108			
T3=C4	AB-ANP05366	5				T4=ATT-ANP5503-032108					
T5=C4	AB-ANP05360	)				T6=CDI	N-AN014	492-06010	7 - Neutra	1	
Measu	irement Data:	Re	eading list	ted by ma	ırgin.			Test Lead	d: Neutral		
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	115	115	<b>T</b> 11			110	
1	MHZ	<u>abh A</u>		dB				<u>dBµ V</u>			Ant
1	334.840K	52.0	+0.1	+0.2	+0.0	+10.1	+0.0	43.3	40.0	-2.1	Neutr
^	554 840k	35.5	+0.1	+0.2	+0.0	+10.1	+0.0	46.2	46.0	+0.2	Neutr
	557.0 IOK	55.5	+0.1	+0.2	10.0	110.1	10.0	70.2	-0.0	10.2	1 YOUU
3	493.487k	32.2	+0.1	+0.2	+0.0	+10.1	+0.0	42.9	46.1	-3.2	Neutr
	Ave		+0.1	+0.2							
^	493.487k	35.2	+0.1	+0.2	+0.0	+10.1	+0.0	45.9	46.1	-0.2	Neutr
			+0.1	+0.2							
5	739.763k	32.1	+0.0	+0.2	+0.1	+10.1	+0.0	42.8	46.0	-3.2	Neutr
	272 5241	22.6	+0.1	+0.2	.0.0	. 10.1	.0.0	42.0	40.4	5.2	NT
D	372.524K	32.6	+0.1	+0.1	+0.0	+10.1	+0.0	45.2	48.4	-5.2	Neutr
7	677 773k	29.2	+0.1	+0.2	±0.0	<u>⊥10 1</u>	-LO 0	30.0	46.0	-6.1	Neutr
/	U//.223K	<i>LJ.L</i>	+0.1	+0.2	±0.0	710.1	$\pm 0.0$	ر.رر	40.0	-0.1	muu
8	27.163M	31.0	+0.2	+0.2	+0.3	+10.1	+0.0	43.3	50.0	-6.7	Neutr
	-,		+0.3	+1.2							
9	312.893k	32.3	+0.0	+0.1	+0.0	+10.1	+0.0	42.7	49.9	-7.2	Neutr
			+0.0	+0.2							
10	615.411k	28.0	+0.1	+0.2	+0.0	+10.1	+0.0	38.7	46.0	-7.3	Neutr
11	002 0201	26.0	+0.1	+0.2	0.1	10.1	2.0	267	16.0	0.2	<b>N</b> T (
11	803.030k	26.0	+0.0	+0.2	+0.1	+10.1	+0.0	36.7	46.0	-9.3	Neutr
12	26 608M	28.4	+0.1	+0.2	+0.3	+10.1	+0.0	40.7	50.0	-93	Neutr
1-	20.000111	20.1	+0.2	+1.2	10.5	110.1	10.0	70.7	50.0	2.5	Tituu
13	27.341M	28.1	+0.2	+0.2	+0.3	+10.1	+0.0	40.4	50.0	-9.6	Neutr
			+0.3	+1.2							
14	26.492M	27.9	+0.2	+0.2	+0.3	+10.1	+0.0	40.2	50.0	-9.8	Neutr
			+0.3	+1.2							
15	23.130M	27.5	+0.2	+0.2	+0.3	+10.1	+0.0	39.7	50.0	-10.3	Neutr
16	101 4501	22.0	+0.3	+1.1	+0.0	+ 10.1	+0.0	12 /	54.0	10.6	Noutr
10	191.4JUK	32.9	+0.0	+0.2 +0.2	+0.0	+10.1	+0.0	43.4	34.0	-10.0	Ineuu
17	26 553M	26.8	+0.0	+0.2 +0.2	+0.3	+10.1	+0.0	39.1	50.0	-10.9	Neutr
17	20.000101	20.0	+0.2	+1.2	10.5	10.1	10.0	57.1	20.0	10.9	riouti
18	923.985k	24.2	+0.0	+0.2	+0.1	+10.1	+0.0	34.9	46.0	-11.1	Neutr
			+0.1	+0.2							
19	23.867M	26.2	+0.2	+0.2	+0.3	+10.1	+0.0	38.4	50.0	-11.6	Neutr
			+0.3	+1.1							
20	27.403M	26.0	+0.2	+0.2	+0.3	+10.1	+0.0	38.4	50.0	-11.6	Neutr
21	007 77(1	- 22.6	+0.3	+1.3	+0.1	. 10.1	.0.0	24.2	46.0	11.7	Number
21	987.776K	23.6	+0.0 $\pm0.1$	+0.2	+0.1	+10.1	+0.0	34.3	46.0	-11./	Neutr
22	23 744M	25.5	+0.1	+0.2	+0.3	+10.1	+0.0	37.7	50.0	-12.3	Neutr
	2017 1111	20.0	+0.2	+1.1	10.5	10.1	10.0	5111	2010	12.5	riouti



23	433.609k	24.0	+0.1	+0.2	+0.0	+10.1	+0.0	34.7	47.2	-12.5	Neutr
			+0.1	+0.2							
24	23.436M	25.3	+0.2	+0.2	+0.3	+10.1	+0.0	37.5	50.0	-12.5	Neutr
			+0.3	+1.1							
25	23.374M	25.1	+0.2	+0.2	+0.3	+10.1	+0.0	37.3	50.0	-12.7	Neutr
			+0.3	+1.1							
26	23.067M	24.9	+0.2	+0.2	+0.3	+10.1	+0.0	37.1	50.0	-12.9	Neutr
			+0.3	+1.1							
27	27.218M	24.8	+0.2	+0.2	+0.3	+10.1	+0.0	37.1	50.0	-12.9	Neutr
			+0.3	+1.2							
28	26.923M	24.2	+0.2	+0.2	+0.3	+10.1	+0.0	36.5	50.0	-13.5	Neutr
			+0.3	+1.2							
29	24.354M	24.2	+0.2	+0.2	+0.3	+10.1	+0.0	36.4	50.0	-13.6	Neutr
			+0.3	+1.1							
30	26.855M	24.1	+0.2	+0.2	+0.3	+10.1	+0.0	36.4	50.0	-13.6	Neutr
			+0.3	+1.2							
31	26.457M	23.6	+0.2	+0.2	+0.3	+10.1	+0.0	35.9	50.0	-14.1	Neutr
			+0.3	+1.2							
32	27.876M	23.3	+0.2	+0.2	+0.3	+10.1	+0.0	35.7	50.0	-14.3	Neutr
			+0.3	+1.3							

CKC Laboratories Date: 2/12/2009 Time: 11:37:34 Impinj Inc WO#: 89028 FCC 15.207 - AVE Test Lead: Neutral 110V 60Hz Sequence#: 4 Polarity: Neutral Notes:



Page 21 of 122 Report No: FC09-014



Test Location:	CKC Laboratories	•22116 23rd Dr SE •	Bothell,	WA 98021-4413	• 425-402-1717
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Customer:	Impinj Inc		
Specification:	FCC 15.207 - AVE		
Work Order #:	89028	Date:	2/12/2009
Test Type:	Conducted Emissions	Time:	10:28:14 AM
Equipment:	RFID Reader	Sequence#:	1
Manufacturer:	Impinj	Tested By:	Armando Del Angel
Model:	IPJ-REV		110V 60Hz
S/N:	940-08-21-0006		

# **Test Equipment:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Cable 20'	16	11/10/2008	11/10/2010	ANP05360
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Cable 30'	11	11/05/2008	11/05/2010	ANP05366
Agilent E4440A	MY46186330	01/31/2008	01/31/2010	AN02872
Attenuator	9912	03/21/2008	03/21/2010	ANP05503
Filter	G7752	07/21/2008	07/21/2010	AN02611
EMCO LISN	9606-1049	06/01/2007	06/01/2009	AN01492

#### Equipment Under Test (\* = EUT):

Function	Manufacturer	Model #	S/N
Circular patch antenna	Cushcraft	S90289CLJ	092436
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Antenna cable	Manhattan/CDT	M4213	1354 E12091

#### Support Devices:

Function	Manufacturer	Model #	S/N
Wireless G Router	Belkin	F5D7230-4	2028723009696
Laptop Computer	Dell	Latitude	6497402833

#### Test Conditions / Notes:

20°C / 26% relative humidity / 102.3 kPa.

Testing AC conducted emissions per FCC 15.207.

The Unit is an RF reader. It is located in the back edge of the test table. All its ports are being exercised. It is being powered by an AC/DC converter. It is connected to a laptop outside the chamber through a shielded ethernet cable.

The antenna is located on the wooden table.

The EUT will be in transmitter mode throughout the test.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting: 32.5 dBm

Operating frequency: 902-928MHz. Frequency range of measurement = 150kHz - 30MHz, RBW=1kHz, VBW=1kHz.



Trans	ducer Legend	<i>l</i> :									
T1=CA	B-ANP0537	1				T2=FIL	-AN0261	1-072108			
T3=CA	B-ANP0536	6				T4=AT	Γ-ANP55	503-03210	8		
T5=CA	B-ANP0536	0				T6=CD	N-AN014	492-06010	07 - Line		
Measu	romont Data:	• R4	eading lis	ted by ma	aroin			Test Lea	l· I ine		
#	Frea	Rdng	T1	T2	T3	Т4	Dist	Corr	Spec	Margin	Polar
	Tieq	Rung	T5	T6	15	1 1	Dist	Coll	spee	Margin	1 olui
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	188.542k	35.4	+0.0	+0.2	+0.0	+10.1	+0.0	45.8	54.1	-8.3	Line
			+0.0	+0.1							
2	362.344k	29.9	+0.1	+0.1	+0.0	+10.1	+0.0	40.4	48.7	-8.3	Line
			+0.1	+0.1							
3	2.965M	26.7	+0.1	+0.1	+0.1	+10.1	+0.0	37.3	46.0	-8.7	Line
			+0.1	+0.1							
4	423.429k	27.1	+0.1	+0.1	+0.0	+10.1	+0.0	37.6	47.4	-9.8	Line
	100 1701		+0.1	+0.1	0.0	10.1	0.0	41.0	52.0	10.1	<b>.</b> .
5	192.178k	31.4	+0.0	+0.2	+0.0	+10.1	+0.0	41.8	53.9	-12.1	Line
6	245 2641	20.2	+0.0	+0.1		+ 10.1		20.6	51.0	12.2	Lina
0	243.204K	29.2	+0.0	+0.2 $\pm0.1$	+0.0	+10.1	+0.0	39.0	51.9	-12.3	Lille
7	662 680k	21.5	+0.0	+0.1	+0.0	+10.1	+0.0	32.1	46.0	-13.9	Line
,	002.000K	21.3	+0.1	+0.2	10.0	110.1	10.0	52.1	40.0	15.7	Line
8	2.591M	20.5	+0.1	+0.1	+0.1	+10.1	+0.0	31.1	46.0	-14.9	Line
0	210 / 111	2010	+0.1	+0.1				0111	1010	1.112	2
9	2.532M	20.3	+0.1	+0.1	+0.1	+10.1	+0.0	30.9	46.0	-15.1	Line
			+0.1	+0.1							
10	2.778M	20.3	+0.1	+0.1	+0.1	+10.1	+0.0	30.9	46.0	-15.1	Line
			+0.1	+0.1							
11	602.322k	20.2	+0.1	+0.2	+0.0	+10.1	+0.0	30.8	46.0	-15.2	Line
			+0.1	+0.1							
12	2.833M	20.1	+0.1	+0.1	+0.1	+10.1	+0.0	30.7	46.0	-15.3	Line
12	542 (011	10.0	+0.1	+0.1	.0.0	. 10.1	. 0. 0	20.5	16.0	155	<b>T</b> ·
13	542.691K	19.9	+0.1	+0.2	+0.0	+10.1	+0.0	30.5	46.0	-15.5	Line
14	2 714M	10.8	+0.1	+0.1	+0.1	+ 10.1		30.4	46.0	15.6	Lino
14	2./1411	19.0	+0.1	+0.1 +0.1	$\pm 0.1$	+10.1	+0.0	50.4	40.0	-13.0	Lille
15	307 077k	23.7	+0.0	+0.1	+0.0	+10.1	+0.0	34.0	50.0	-16.0	Line
15	507.077K	23.1	+0.0	+0.1	10.0	110.1	10.0	51.0	50.0	10.0	Line
16	2.472M	19.3	+0.1	+0.1	+0.1	+10.1	+0.0	29.9	46.0	-16.1	Line
			+0.1	+0.1							
17	259.808k	24.4	+0.0	+0.2	+0.0	+10.1	+0.0	34.8	51.4	-16.6	Line
			+0.0	+0.1							
18	723.766k	18.5	+0.0	+0.2	+0.1	+10.1	+0.0	29.1	46.0	-16.9	Line
			+0.1	+0.1							
19	2.293M	18.3	+0.1	+0.1	+0.1	+10.1	+0.0	28.9	46.0	-17.1	Line
			+0.1	+0.1	- · ·			<b>.</b>			<b>.</b> .
20	2.651M	18.3	+0.1	+0.1	+0.1	+10.1	+0.0	28.9	46.0	-17.1	Line
	471 4051	10 6	+0.1	+0.1	.0.0	10.1		20.2	165	17.2	Tion
21	471.425K	18.6	+0.1 +0.1	+0.2	+0.0	+10.1	+0.0	29.2	40.5	-17.5	Line
22	511 /211	18.0	+0.1	+0.1	+0.0	+10.1	+0.0	28.6	46.0	_17 /	Line
22	J11.721K	10.0	+0.1	+0.2	10.0	10.1	10.0	20.0	-0.0	-1/.4	Line



23	308.531k	22.1	+0.0	+0.1	+0.0	+10.1	+0.0	32.4	50.0	-17.6	Line
			+0.0	+0.1							
24	408.158k	19.5	+0.1	+0.1	+0.0	+10.1	+0.0	30.0	47.7	-17.7	Line
			+0.1	+0.1							
25	410.340k	19.3	+0.1	+0.1	+0.0	+10.1	+0.0	29.8	47.6	-17.8	Line
			+0.1	+0.1							
26	294.714k	22.2	+0.0	+0.1	+0.0	+10.1	+0.0	32.5	50.4	-17.9	Line
			+0.0	+0.1							
27	310.713k	21.7	+0.0	+0.1	+0.0	+10.1	+0.0	32.0	50.0	-18.0	Line
			+0.0	+0.1							
28	844.482k	17.4	+0.0	+0.2	+0.1	+10.1	+0.0	28.0	46.0	-18.0	Line
			+0.1	+0.1							
29	395.068k	19.4	+0.1	+0.1	+0.0	+10.1	+0.0	29.9	48.0	-18.1	Line
			+0.1	+0.1							
30	2.230M	17.3	+0.1	+0.1	+0.1	+10.1	+0.0	27.9	46.0	-18.1	Line
			+0.1	+0.1							

CKC Laboratories Date: 2/12/2009 Time: 10:28:14 AM Impinj Inc WO#: 89028 FCC 15.207 - AVE Test Lead: Line 110V 60Hz Sequence#: 1 Polarity: Line Notes:





# FCC 15.247(a) – 20dB BANDWIDTH

Test	Ea	uir	om	ent
	- 4			~~~

Asset #	Name	Manufacturer	Model	Model Serial		Cal Due
P05747	Attenuator	Pasternack	PE7004-20	NA	4/3/2008	4/3/2010
P05748	Attenuator	Pasternack	PE7004-20	NA	4/3/2008	4/3/2010
P05371	Cable 6'	Belden	Belden RG-214 RG214 49 11/10/2008		11/10/2008	11/10/2010
	Spectrum					
2872	Analyzer	Agilent	E4440A	MY46186330	1/31/2008	1/31/2010

# **Test Conditions**

EUT is transmitting at maximum rate. PSA is on max hold, marker-to-peak function is set on the peak of each channel (LOW, MID, HIGH), and then the marker will be positioned 20dB below the peak on one side and then on the other side. The separation between those two is the 20dB bandwidth.

# **Test Setup Photos**



# **Test Data**

Channel	Frequency	20dB Bandwidth	Limit
LOW	902.75MHz	456.0 kHz	500kHz
MID	915.25MHz	456.0hHz	500kHz
HIGH	927.25MHz	454.0kHz	500kHz



# FCC 15.247(a)(1) - 20dB BANDWIDTH - LOW CHANNEL



FCC 15.247(a)(1) - 20dB BANDWIDTH - MID CHANNEL





# FCC 15.247(a)(1) - 20dB BANDWIDTH - HIGH CHANNEL





# FCC 15.247(a) – FREQUENCY SEPARATION

Test	Ea	ui	pm	ent
LCDC	LY	uı	P111	CIIU

Asset #	Name	Manufacturer	Model	Serial	Cal date	Cal Due
P05747	Attenuator	Pasternack	PE7004-20	NA	4/3/2008	4/3/2010
P05748	Attenuator	Pasternack	PE7004-20	NA	4/3/2008	4/3/2010
P05371	Cable 6'	Belden	RG-214	RG214 49	11/10/2008	11/10/2010
	Spectrum					
2872	Analyzer	Agilent	E4440A	MY46186330	1/31/2008	1/31/2010

# **Test Conditions**

EUT is transmitting with the Hopping function enabled at maximum rate, PSA is on max hold and the span is wide enough to capture two adjacent signals. Two markers are positioned in the peak of each signal and the delta of those two markers is the frequency separation between signals.

# **Test Setup Photos**





# **Test Data**

# Result: 500 kHz





# FCC 15.247(a) – NUMBER OF HOPPING CHANNELS

	P					
Asset #	Name	Manufacturer	Model	Serial	Cal date	Cal Due
P05747	Attenuator	Pasternack	PE7004-20	NA	4/3/2008	4/3/2010
P05748	Attenuator	Pasternack	PE7004-20	NA	4/3/2008	4/3/2010
P05371	Cable 6'	Belden	RG-214	RG214 49	11/10/2008	11/10/2010
	Spectrum					
2872	Analyzer	Agilent	E4440A	MY46186330	1/31/2008	1/31/2010

# **Test Equipment**

# **Test Conditions**

EUT is transmitting with the Hopping function enabled at maximum rate, PSA is on max hold and the span is wide enough to capture all the channels (902-928MHz at least). All the signals within the screen are the number of hopping channels.

Result: 50 Channels

Notes: The setup included 16 RFID tags coupled to the transmitter to operate with maximum transmitter duty cycle during hopping tests.



# **Test Setup Photos**



# **Test Data**







# FCC 15.247(a) – AVERAGE TIME OF OCCUPANCY

Asset #	Name	Manufacturer	Model	Serial	Cal date	Cal Due
P05747	Attenuator	Pasternack	PE7004-20	NA	4/3/2008	4/3/2010
P05748	Attenuator	Pasternack	PE7004-20	NA	4/3/2008	4/3/2010
P05371	Cable 6'	Belden	RG-214	RG214 49	11/10/2008	11/10/2010
2872	Spectrum Analyzer	Agilent	E4440A	MY46186330	1/31/2008	1/31/2010

### **Test Equipment**

# **Test Conditions**

EUT is transmitting with the Hopping function enabled at maximum rate; PSA is on oscilloscope mode (0Hz span) and on max hold. Frequency is centered in a channel and the sweep time long enough to capture the dwell time (500ms). The sweep time is then increased to view the number of hops over a 10 second period. The combination of these measurements yields the total on time per channel over a 10 second period. A total of 10 sets of measurements were taken and the average was calculated to determine the result.

# **Test Setup Photos**





# **Test Data**

Dwell time per hop	Number of signals in a 20 seconds span	Result	Limit
198.6ms	2	397.2ms	400ms

Notes: 10 measurements were taken to determine the dwell time per hop, and ten measurements were taken to determine how many times the hop would repeat in a 20 seconds interval. Manufacturer declares one operational mode which has occupied bandwidth less than 250 kHz. Therefore, the more stringent requirement was employed.

# FCC 15.247(a)(1) - AVERAGE TIME



# FCC 15.247(a)(1) - DWELL TIME





# FCC 15.247(b) – RF POWER OUTPUT

**Test Setup Photos** 





# **Test Data**

Test Location: CKC Laboratories •22116 23rd Dr SE • Bothell, WA 98021-4413 • 425-402-1717

Customer:	Impinj Inc		
Specification:	15.247(b)(2) RF power Output		
Work Order #:	89028	Date:	2/9/2009
Test Type:	Radiated Scan	Time:	10:19:06
Equipment:	RFID Reader	Sequence#:	1
Manufacturer:	Impinj	Tested By:	Armando Del Angel
Model:	IPJ-REV		
S/N:	940-08-21-0006		

#### Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Attenuator		04/03/2008	04/03/2010	5747
Attenuator		04/03/2008	04/03/2010	5748

#### Equipment Under Test (\* = EUT):

Function	Manufacturer	Model #	S/N
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006

#### Support Devices:

Function	Manufacturer	Model #	S/N	
Laptop Computer	Dell	Latitude	6497402833	
Wireless G Router	Belkin	F5D7230-4	2028723009696	

#### Test Conditions / Notes:

20°C / 26% relative humidity / 102.3 kPa. RF Output Power FCC 15.247(b)(2). The Unit is an RF reader. It is connected directly to the spectrum analyzer. The EUT will be in transmitting mode throughout the test in the LOW, MEDIUM and HIGH channel. Remote support computer sends commands to the EUT to exercise the intended functionalities. Power setting = 30 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 902.75, 915.25 & 927.25

#### Transducer Legend:

T1=CAB-ANP05371 T3=ATT-ANP05748-040308 T2=ATT-ANP05747-040308

Measu	rement Data:	Re	eading lis	ted by ma	argin.		Te	st Distanc	e: No Dist	ance	
#	Freq	Rdng	T1	T2	T3		Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	927.246M	95.9	+0.5	+20.0	+19.9		+0.0	136.3	137.0	-0.7	Condu
									High Char	nnel	
2	902.754M	96.0	+0.3	+20.0	+19.9		+0.0	136.2	137.0	-0.8	Condu
							Low Channel				
3	915.234M	95.9	+0.4	+20.0	+19.9		+0.0	136.2	137.0	-0.8	Condu
									Mid Chan	nel	



Test Location:	CKC Laboratories	•22116 23rd Dr SE	• Bothell, W	A 98021-4413	• 425-402-1717
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Customer:	Impinj Inc		
Specification:	15.247(b)(2) RF power Output		
Work Order #:	89028	Date:	2/9/2009
Test Type:	Radiated Scan	Time:	09:57:17
Equipment:	RFID Reader	Sequence#:	2
Manufacturer:	Impinj	Tested By:	Armando Del Angel
Model:	IPJ-REV	-	-
S/N:	940-08-21-0006		

#### Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Attenuator		04/03/2008	04/03/2010	5747
Attenuator		04/03/2008	04/03/2010	5748

#### Equipment Under Test (\* = EUT):

Function	Manufacturer	Model #	S/N
Antenna cable	Manhattan/CDT	M4213	1354 E12091
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
Support Devices:			

Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	Latitude	6497402833
Wireless G Router	Belkin	F5D7230-4	2028723009696

#### Test Conditions / Notes:

20C / 26% relative humidity / 102.3 kPa.

RF Output Power FCC 15.247(b)(2)

The Unit is an RF reader. It is connected directly to the spectrum analyzer through

a special cable provided by the customer due to the fact that it will provide the required attenuation

for the unit to comply with the limit in this situation.

The EUT will be in transmitting mode throughout the test in the LOW, MEDIUM and HIGH channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 32.5 dBm

Operating Frequency range = 902 - 928MHz

Frequency under test = 902.75, 915.25 & 927.25

#### *Transducer Legend:* T1=ATT-ANP05747-040308

|--|

Measu	rement Data:	Re	Reading listed by margin.			. Test Distance: No Distance					
#	Freq	Rdng	T1	T2			Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	902.754M	96.3	+20.0	+19.9			+0.0	136.2	137.0	-0.8	Condu
									Low Chan	inel	
2	915.260M	96.3	+20.0	+19.9			+0.0	136.2	137.0	-0.8	Condu
							Mid Channel				
3	927.246M	96.1	+20.0	+19.9			+0.0	136.0	137.0	-1.0	Condu
						High Channel					


Test Location:	CKC Laboratories	•22116 23rd Dr SE	• Bothell, W	A 98021-4413	• 425-402-1717
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Customer:	Impinj Inc		
Specification:	15.247(b)(2) RF power Output		
Work Order #:	89028	Date:	2/12/2009
Test Type:	Radiated Scan	Time:	14:11:16
Equipment:	RFID Reader	Sequence#:	3
Manufacturer:	Impinj	Tested By:	Armando Del Angel
Model:	IPJ-REV		
S/N:	940-08-21-0006		

## Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Attenuator		04/03/2008	04/03/2010	5747
Attenuator		04/03/2008	04/03/2010	5748
Equipment Under T	<i>Test</i> (* = EUT):			
Function	Manufacturer	Model #		S/N
RFID Reader*	Impinj	IPJ-REV		940-08-21-0006

Support Devices:			
Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	Latitude	6497402833
Wireless G Router	Belkin	F5D7230-4	2028723009696
Switch POE	NETGEAR	FS108P	1DL1863H0073E

### Test Conditions / Notes:

20C / 26% relative humidity / 102.3 kPa.

RF Output Power FCC 15.247(b)(2)

The Unit is an RF reader. It is connected directly to the spectrum analyzer through

a special cable provided by the customer due to the fact that it will provide the required attenuation for the unit to comply with the limit in this situation.

The EUT will be in transmitting mode throughout the test in the LOW, MEDIUM and HIGH channel. Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 30.0dBm Operating Frequency range = 902 - 928MHz Frequency under test = 902.75, 915.25 & 927.25

# Transducer Legend: T1=CAB-ANP05371 T2=ATT-ANP05747-040308 T3=ATT-ANP05748-040308 T2=ATT-ANP05747-040308

Measu	rement Data:	Re	eading lis	ted by ma	argin.		Te	st Distand	e: No Dist	ance	
#	Freq	Rdng	T1	T2	T3		Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	927.250M	96.3	+0.5	+20.0	+19.9		+0.0	136.7	137.0	-0.3	Condu
							179		100% Pow	ver HIGH	101
2	915.250M	96.3	+0.4	+20.0	+19.9		+0.0	136.6	137.0	-0.4	Condu
							179		100% Pow	ver MID	101
3	902.750M	96.3	+0.3	+20.0	+19.9		+0.0	136.5	137.0	-0.5	Condu
							179		100% Pow	ver LOW	101



# FCC 15.247(d) – ANTENNA CONDUCTED SPURIOUS EMISSIONS

# **Test Setup Photos**





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## **Test Data Sheets**

Test Location:

CKC Laboratories •22116 23rd Dr SE • Bothell, WA 98021-4413 • 425-402-1717

Customer:	Impinj Inc
Specification:	FCC 15.247(d) Conducted
Work Order #:	89028
Test Type:	Radiated Scan
Equipment:	RFID Reader
Manufacturer:	Impinj
Model:	IPJ-REV
S/N:	940-08-21-0006

Date: 2/9/2009 Time: 17:18:53 Sequence#: 6 Tested By: Armando Del Angel

## Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872
Attenuator		04/03/2008	04/03/2010	05747
Attenuator	9912	03/21/2008	03/21/2010	ANP05503
Cable 6'	RG214 49	11/10/2008	11/10/2010	P05371

Equipment Under Test (* = EUT):						
Function	Manufacturer	Model #	S/N			
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006			
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB			
Support Devices:						
Function	Manufacturer	Model #	S/N			
Laptop Computer	Dell	Latitude	6497402833			
Wireless G Router	Belkin	F5D7230-4	2028723009696			

## Test Conditions / Notes:

20°C / 26% relative humidity / 102.3 kPa.

Testing Conducted Spurious Emissions per FCC 15.247(d).

The Unit is an RF reader. The measurements will be taken from the RF port. The EUT will be in transmitting mode throughout the test in the LOW channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 30.0 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 902.75MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency: 9kHz - 150kHz RBW= 200Hz, VBW= 200Hz 150kHz-30MHz RBW= 9kHz, VBW= 9kHz 30MHz - 1GHz RBW= 120kHz, VBW=120kHz 1GHz-19GHz RBW= 1 MHz, VBW=1 MHz. eke sting the Future ORATORIES, INC.

*Transducer Legend:* T1=CAB-ANP05371 T3=ATT-ANP5503-032108

# T2=ATT-ANP05747-040308

Measu	rement Data:	Re	eading lis	ted by ma	argin.		Te	st Distance	e: No Dist	ance	
#	Freq	Rdng	T1	T2	T3		Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	902.750M	104.1	+0.3	+20.0	+10.1		+0.0	134.5	137.0	-2.5	Condu
							360				157
2	3992.000M	45.6	+0.0	+20.0	+10.2		+0.0	75.8	117.0	-41.2	Condu
							360				157
3	3128.000M	44.5	+0.0	+20.0	+10.2		+0.0	74.7	117.0	-42.3	Condu
							360				157
4	12400.000	54.2	+0.0	+20.1	+0.0		+0.0	74.3	117.0	-42.7	Condu
	М										
							360				157
5	16216.000	48.5	+0.0	+20.3	+0.0		+0.0	68.8	117.0	-48.2	Condu
	М						260				1.57
	1 40 45 000	10.0	0.0	20.2	0.0		360	<i>(</i> ) <i>(</i> )	117.0	40.4	15/
6	14845.000	48.3	+0.0	+20.3	+0.0		+0.0	68.6	117.0	-48.4	Condu
	M						260				157
7	7200.0001	16.2		120.0			500	66.7	117.0	50.9	137 Condu
/	7500.000M	40.2	+0.0	+20.0	+0.0		+0.0	00.2	117.0	-30.8	157
8	778 500M	32.6	⊥0 5	±20.0	±10.1		<u></u>	63.2	117.0	-53.8	Condu
0	778.500141	52.0	10.5	120.0	110.1		360	05.2	117.0	-55.0	157
9	581.000M	31.2	+0.4	+20.0	+10.1		+0.0	617	117.0	-55 3	Condu
	501.000101	51.2	10.4	120.0	110.1		360	01.7	117.0	55.5	157
10	187 200M	23.8	+0.2	+20.0	+10.1		+0.0	54.1	117.0	-62.9	Condu
10	10,1200111						360	0.111	11/10	0217	157
11	270.800M	23.5	+0.3	+20.0	+10.1		+0.0	53.9	117.0	-63.1	Condu
							360				157
12	57.020M	19.6	+0.1	+20.0	+10.0		+0.0	49.7	117.0	-67.3	Condu
							360				157
13	999.995k	14.1	+0.0	+20.0	+10.1		+0.0	44.2	117.0	-72.8	Condu
							360				157
14	1.319M	12.3	+0.0	+20.0	+10.1		+0.0	42.4	117.0	-74.6	Condu
							360				157
15	12.194M	11.7	+0.1	+20.0	+10.0		+0.0	41.8	117.0	-75.2	Condu
							360				157
16	10.902k	6.8	+0.0	+20.0	+10.1		+0.0	36.9	117.0	-80.1	Condu
							360				157
17	44.567k	3.0	+0.0	+20.0	+10.1		+0.0	33.1	117.0	-83.9	Condu
1							360				157



Customer:	Impinj Inc		
Specification:	FCC 15.247(d) Conducted		
Work Order #:	89028	Date:	2/9/2009
Test Type:	Radiated Scan	Time:	17:12:46
Equipment:	RFID Reader	Sequence#:	5
Manufacturer:	Impinj	Tested By:	Armando Del Angel
Model:	IPJ-REV		
S/N:	940-08-21-0006		

## Test Equipment:

				-
Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872
Attenuator	NA	04/03/2008	04/03/2010	05747
Attenuator	9912	03/21/2008	03/21/2010	ANP05503
Cable 6'	RG214 49	11/10/2008	11/10/2010	P05371
Cable	NA	12/2/2008	12/2/2010	03121

## Equipment Under Test (\* = EUT):

Equipment Chaef 10			
Function	Manufacturer	Model #	S/N
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB

### Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	Latitude	6497402833
Wireless G Router	Belkin	F5D7230-4	2028723009696

## Test Conditions / Notes:

20°C / 26% relative humidity / 102.3 kPa.

Testing Conducted Spurious Emissions per FCC 15.247(d).

The Unit is an RF reader. The measurements will be taken from the RF port. The EUT will be in transmitting mode throughout the test in the MID channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 30.0 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 927.25MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency: 9kHz - 150kHz RBW= 200Hz, VBW= 200Hz 150kHz-30MHz RBW= 9kHz, VBW= 9kHz 30MHz - 1GHz RBW= 120kHz, VBW=120kHz 1GHz-19GHz RBW= 1 MHz, VBW=1 MHz. CKC M Testing the Future

## Transducer Legend:

T1=CAB-ANP05371	T2=CAB-ANP03121-120208
T3=ATT-ANP05747-040308	T4=ATT-ANP5503-032108

Measu	rement Data:	Re	eading lis	ted by ma	argin.		Te	st Distance	e: No Dista	ance	
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	915.250M	104.1	+0.4	+0.0	+20.0	+10.1	+0.0	134.6	137.0	-2.4	Condu
							360				157
2	2746.000M	46.2	+0.0	+1.4	+20.1	+10.2	+0.0	77.9	117.0	-39.1	Condu
							360				157
3	4564.000M	52.5	+0.0	+2.0	+20.0	+0.0	+0.0	74.5	117.0	-42.5	Condu
							360				157
4	16174.000	50.1	+0.0	+2.9	+20.3	+0.0	+0.0	73.3	117.0	-43.7	Condu
	Μ										
							360				157
5	7930.000M	46.8	+0.0	+2.5	+20.0	+0.0	+0.0	69.3	117.0	-47.7	Condu
							360				157
6	12484.000	45.2	+0.0	+3.1	+20.2	+0.0	+0.0	68.5	117.0	-48.5	Condu
	М										
							360				157
7	431.200M	24.0	+0.5	+0.0	+20.0	+10.1	+0.0	54.6	117.0	-62.4	Condu
							360				157
8	333.000M	23.9	+0.3	+0.0	+20.0	+10.1	+0.0	54.3	117.0	-62.7	Condu
							360				157
9	216.000M	23.5	+0.3	+0.0	+20.0	+10.1	+0.0	53.9	117.0	-63.1	Condu
							360				157
10	113.500M	23.4	+0.3	+0.0	+20.0	+10.1	+0.0	53.8	117.0	-63.2	Condu
							360				157
11	52.890M	23.2	+0.1	+0.0	+20.0	+10.0	+0.0	53.3	117.0	-63.7	Condu
							360				157
12	186.100k	18.4	+0.0	+0.0	+20.0	+10.1	+0.0	48.5	117.0	-68.5	Condu
							360				157
13	135.000k	18.2	+0.0	+0.0	+20.0	+10.1	+0.0	48.3	117.0	-68.7	Condu
							360				157
14	2.305M	13.5	+0.1	+0.0	+20.0	+10.1	+0.0	43.7	117.0	-73.3	Condu
							360				157
15	10.811k	6.6	+0.0	+0.0	+20.0	+10.1	+0.0	36.7	117.0	-80.3	Condu
							360				157
16	32.166k	-0.8	+0.0	+0.0	+20.0	+10.1	+0.0	29.3	117.0	-87.7	Condu
							360				157



Customer:	Impinj Inc		
Specification:	FCC 15.247(d) Conducted		
Work Order #:	89028	Date:	2/9/2009
Test Type:	Radiated Scan	Time:	17:08:28
Equipment:	RFID Reader	Sequence#:	4
Manufacturer:	Impinj	Tested By:	Armando Del Angel
Model:	IPJ-REV		
S/N:	940-08-21-0006		

## Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872
Attenuator		04/03/2008	04/03/2010	05747
Attenuator	9912	03/21/2008	03/21/2010	ANP05503
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03121

## Equipment Under Test (\* = EUT):

	===).		
Function	Manufacturer	Model #	S/N
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Support Devices:			
Function	Manufacturer	Model #	S/N

# FunctionManufacturerModel #S/NLaptop ComputerDellLatitude6497402833Wireless G RouterBelkinF5D7230-42028723009696

## Test Conditions / Notes:

20°C / 26% relative humidity / 102.3 kPa.

Testing Conducted Spurious Emissions per FCC 15.247(d).

The Unit is an RF reader. The measurements will be taken from the RF port. The EUT will be in transmitting mode throughout the test in the HIGH channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 30.0 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 927.25MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency: 9kHz - 150kHz RBW= 200Hz, VBW= 200Hz 150kHz-30MHz RBW= 9kHz, VBW= 9kHz 30MHz - 1GHz RBW= 120kHz, VBW=120kHz 1GHz-19GHz RBW= 1 MHz, VBW=1 MHz. CKC M Testing the Future

## Transducer Legend:

T1=CAB-ANP05371	T2=CAB-ANP03121-120208
T3=ATT-ANP05747-040308	T4=ATT-ANP5503-032108

Measu	rement Data:	Re	eading lis	ted by ma	argin.		Te	st Distanc	e: No Dist	ance	
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	927.250M	104.1	+0.5	+0.0	+20.0	+10.1	+0.0	134.7	137.0	-2.3	Condu
							360				157
2	2724.000M	53.6	+0.0	+1.4	+20.1	+10.1	+0.0	85.2	117.0	-31.8	Condu
							360				157
3	3156.000M	45.2	+0.0	+1.6	+20.1	+10.2	+0.0	77.1	117.0	-39.9	Condu
							360				157
4	14235.000	49.0	+0.0	+3.3	+20.1	+0.0	+0.0	72.4	117.0	-44.6	Condu
	Μ										
							360				157
5	16160.000	48.9	+0.0	+2.9	+20.3	+0.0	+0.0	72.1	117.0	-44.9	Condu
	М										
							360				157
6	7020.000M	46.7	+0.0	+2.2	+20.0	+0.0	+0.0	68.9	117.0	-48.1	Condu
							360				157
7	972.400M	34.0	+0.5	+0.0	+20.0	+10.0	+0.0	64.5	117.0	-52.5	Condu
							360				157
8	212.500M	33.9	+0.3	+0.0	+20.0	+10.1	+0.0	64.3	117.0	-52.7	Condu
							360				157
9	113.800M	33.4	+0.3	+0.0	+20.0	+10.1	+0.0	63.8	117.0	-53.2	Condu
							360				157
10	68.010M	32.5	+0.2	+0.0	+20.0	+10.0	+0.0	62.7	117.0	-54.3	Condu
							360				157
11	1.870M	23.0	+0.1	+0.0	+20.0	+10.1	+0.0	53.2	117.0	-63.8	Condu
							360				157
12	114.600k	17.9	+0.0	+0.0	+20.0	+10.1	+0.0	48.0	117.0	-69.0	Condu
							360				157
13	12.546k	8.3	+0.0	+0.0	+20.0	+10.1	+0.0	38.4	117.0	-78.6	Condu
							360				157
14	58.599k	1.5	+0.0	+0.0	+20.0	+10.1	+0.0	31.6	117.0	-85.4	Condu
							360				157



Test Location:	CKC Laboratories	•22116 23rd Dr SE	• Bothell, WA 98021-4413	• 425-402-1717
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Customer:	Impinj Inc		
Specification:	FCC 15.247(d) Conducted		
Work Order #:	89028	Date:	2/9/2009
Test Type:	Radiated Scan	Time:	16:36:30
Equipment:	RFID Reader	Sequence#:	1
Manufacturer:	Impinj	Tested By:	Armando Del Angel
Model:	IPJ-REV	-	-
S/N:	940-08-21-0006		

## Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872
Attenuator		04/03/2008	04/03/2010	05747
Attenuator	9912	03/21/2008	03/21/2010	ANP05503

## Equipment Under Test (\* = EUT):

Function	Manufacturer	Model #	S/N
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Antenna cable	Manhattan/CDT	M4213	1354 E12091
Support Devices:			
Franction	Manuelastanan	Madal #	C/NI

	lanulaciulti	MOUEL #	5/1N
Laptop Computer De	ell	Latitude	6497402833
Wireless G Router Be	elkin	F5D7230-4	2028723009696

Test Conditions / Notes:

20°C / 26% relative humidity / 102.3 kPa.

Testing Conducted Spurious Emissions per FCC 15.247(d).

The Unit is an RF reader. It will be connected to the PSA through a special cable provided by the customer. The EUT will be in transmitting mode throughout the test in the LOW channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 32.5 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 902.75MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency: 9kHz - 150kHz RBW= 200Hz, VBW= 200Hz 150kHz-30MHz RBW= 9kHz, VBW = 9kHz 30MHz - 1GHz RBW= 120kHz, VBW=120kHz 1GHz-19GHz RBW= 1 MHz, VBW=1 MHz.



# *Transducer Legend:* T1=ATT-ANP05747-040308

## T2=ATT-ANP5503-032108

Measu	rement Data:	Re	eading lis	ted by ma	argin.	Test Distance: No Distance					
#	Freq	Rdng	T1	T2			Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	903.000M	104.5	+20.0	+10.1			+0.0	134.6	137.0	-2.4	Condu
							360				157
2	1798.000M	39.3	+20.0	+10.2			+0.0	69.5	117.0	-47.5	Condu
			• • • •				360			40.4	157
3	2710.000M	37.4	+20.1	+10.1			+0.0	67.6	117.0	-49.4	Condu
4	10042 000	40.1	. 20. 1	.0.0			360	(2.2.2	117.0	54.0	15/
4	10842.000 M	42.1	+20.1	+0.0			+0.0	02.2	117.0	-54.8	Condu
	1 <b>V1</b>						360				157
5	15003.000	39.0	+20.3	+0.0			+0.0	59.3	117.0	-57.7	Condu
5	M	57.0	120.5	10.0			10.0	57.5	117.0	51.1	Condu
							360				157
6	13198.000	37.9	+20.1	+0.0			+0.0	58.0	117.0	-59.0	Condu
	М										
							360				157
7	7289.000M	36.9	+20.0	+0.0			+0.0	56.9	117.0	-60.1	Condu
							360				157
8	450.000M	25.6	+20.0	+10.1			+0.0	55.7	117.0	-61.3	Condu
							360				157
9	10348.000	35.4	+20.0	+0.0			+0.0	55.4	117.0	-61.6	Condu
	М						260				157
10	602 300M	24.2	+20.0	±10.1			<u> </u>	5/1 3	117.0	62.7	Condu
10	002.300101	24.2	$\pm 20.0$	+10.1			+0.0 360	54.5	117.0	-02.7	157
11	5313.000M	34.2	+20.0	+0.0			+0.0	54.2	117.0	-62.8	Condu
	00101000011	0.112		1010			360	0.112	11,10	02.0	157
12	82.400M	23.8	+20.0	+10.1			+0.0	53.9	117.0	-63.1	Condu
							360				157
13	129.900k	16.9	+20.0	+10.1			+0.0	47.0	117.0	-70.0	Condu
							360				157
14	1.002M	13.4	+20.0	+10.1			+0.0	43.5	117.0	-73.5	Condu
							360				157
15	17.562M	12.7	+20.0	+10.1			+0.0	42.8	117.0	-74.2	Condu
		10.1	20.0	10.1			360		1150		157
16	7.246M	12.1	+20.0	+10.1			+0.0	42.2	117.0	-74.8	Condu
17	1679414	10.0	. 20.0	. 10.1			360	41.0	117.0	76.0	15/
1/	16./84M	10.9	+20.0	+10.1			+0.0	41.0	117.0	-/6.0	
10	22 21 21-	2 0	120.0	+10.1			100	32.0	117.0	<b>Q2</b> 1	1J/ Condu
18	22.313K	5.0	+20.0	+10.1			+0.0	55.9	11/.0	-03.1	157
19	77 627k	27	+20.0	+10.1			+0.0	32.8	117.0	-84.2	Condu
13	//.U2/K	2.1	120.0	110.1			360	52.0	117.0	-04.2	157
20	9.076k	8.5	+0.0	+0.0			+0.0	8.5	117.0	-108.5	Condu
20	2.07 OK	0.5	10.0	10.0			360	0.0	11/10	100.0	157
L							2.50				-07



Test Location:	CKC Laboratories	•22116 23rd Dr SE •	• Bothell, V	WA 98021-4413	• 425-402-1717
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Customer:	Impinj Inc		
Specification:	FCC 15.247(d) Conducted		
Work Order #:	89028	Date:	2/9/2009
Test Type:	Radiated Scan	Time:	16:47:27
Equipment:	RFID Reader	Sequence#:	2
Manufacturer:	Impinj	Tested By:	Armando Del Angel
Model:	IPJ-REV		
S/N:	940-08-21-0006		

## Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872
Attenuator		04/03/2008	04/03/2010	05747
Attenuator	9912	03/21/2008	03/21/2010	ANP05503

## Equipment Under Test (\* = EUT):

Function	Manufacturer	Model #	S/N
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Antenna cable	Manhattan/CDT	M4213	1354 E12091
Support Devices:			
-	3.6	36 1 1 1	G 3 1

Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	Latitude	6497402833
Wireless G Router	Belkin	F5D7230-4	2028723009696

## Test Conditions / Notes:

20°C / 26% relative humidity / 102.3 kPa.

Testing Conducted Spurious Emissions per FCC 15.247(d).

The Unit is an RF reader. It will be connected to the PSA through a special cable provided by the customer. The EUT will be in transmitting mode throughout the test in the MID channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 32.5 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 915.25MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency: 9kHz - 150kHz RBW= 200Hz, VBW= 200Hz 150kHz-30MHz RBW= 9kHz, VBW = 9kHz 30MHz - 1GHz RBW= 120kHz, VBW=120kHz 1GHz-19GHz RBW= 1 MHz, VBW=1 MHz.



# *Transducer Legend:* T1=ATT-ANP05747-040308

## T2=ATT-ANP5503-032108

$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Measu	rement Data:	Re	eading lis	ted by ma	argin.	Test Distance: No Distance			ance		
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	#	Freq	Rdng	T1	T2			Dist	Corr	Spec	Margin	Polar
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	1	915.251M	104.9	+20.0	+10.1			+0.0	135.0	137.0	-2.0	Condu
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$								360				157
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	2	2744.000M	41.5	+20.1	+10.1			+0.0	71.7	117.0	-45.3	Condu
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$								360				157
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	3	1832.000M	39.5	+20.0	+10.2			+0.0	69.7	117.0	-47.3	Condu
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$								360				157
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	4	13665.000	38.9	+20.1	+0.0			+0.0	59.0	117.0	-58.0	Condu
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		Μ										
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$								360				157
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	5	17415.000	38.4	+20.3	+0.0			+0.0	58.7	117.0	-58.3	Condu
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		М										
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$								360				157
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	6	16220.000	38.3	+20.3	+0.0			+0.0	58.6	117.0	-58.4	Condu
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		М										
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$								360				157
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	7	7700.000M	36.9	+20.0	+0.0			+0.0	56.9	117.0	-60.1	Condu
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$								360				157
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	8	11895.000	35.9	+20.1	+0.0			+0.0	56.0	117.0	-61.0	Condu
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$		М						2.60				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				• • • •				360				157
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	9	837.800M	25.2	+20.0	+10.1			+0.0	55.3	117.0	-61.7	Condu
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	10	7005 00014	25.2	20.0	0.0			360		117.0	(1.0	15/
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	10	/005.000M	35.2	+20.0	+0.0			+0.0	55.2	117.0	-61.8	Condu
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	11	442 20014	24.6	120.0	+ 10.1			360	517	117.0	(2.2.2	15/
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	11	442.300M	24.0	+20.0	+10.1			+0.0	54.7	117.0	-02.3	157
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	12	241 200M	24.6	120.0	+10.1			300	547	117.0	62.2	Condu
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	12	241.200M	24.0	+20.0	+10.1			+0.0	54.7	117.0	-02.5	157
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	13	571 300M	24.2	+20.0	±10.1			<u> </u>	543	117.0	62.7	Condu
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	15	571.500101	27.2	120.0	110.1			360	54.5	117.0	-02.7	157
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	14	312 200M	23.9	+20.0	+10.1			+0.0	54.0	117.0	-63.0	Condu
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	11	512.200101	23.7	120.0	110.1			360	51.0	117.0	05.0	157
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	15	633.200M	23.4	+20.0	+10.1			+0.0	53.5	117.0	-63.5	Condu
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$								360				157
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	16	125.400M	23.0	+20.0	+10.1			+0.0	53.1	117.0	-63.9	Condu
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$								360				157
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	17	138.800k	17.1	+20.0	+10.1			+0.0	47.2	117.0	-69.8	Condu
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$								360				157
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	18	545.400k	14.9	+20.0	+10.1			+0.0	45.0	117.0	-72.0	Condu
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$								360				157
360         157           20         20.778M         11.3         +20.0         +10.1         +0.0         41.4         117.0         -75.6         Condu           360         157           21         11.267k         6.1         +20.0         +10.1         +0.0         36.2         117.0         -80.8         Condu           360         157         360         157         360         157	19	2.653M	13.1	+20.0	+10.1			+0.0	43.2	117.0	-73.8	Condu
20         20.778M         11.3         +20.0         +10.1         +0.0         41.4         117.0         -75.6         Condu           360         360         157           21         11.267k         6.1         +20.0         +10.1         +0.0         36.2         117.0         -80.8         Condu           360         360         157								360				157
360         157           21         11.267k         6.1         +20.0         +10.1         +0.0         36.2         117.0         -80.8         Condu           360         157	20	20.778M	11.3	+20.0	+10.1			+0.0	41.4	117.0	-75.6	Condu
21         11.267k         6.1         +20.0         +10.1         +0.0         36.2         117.0         -80.8         Condu           360         157								360				157
360 157	21	11.267k	6.1	+20.0	+10.1			+0.0	36.2	117.0	-80.8	Condu
								360				157



_										
	22	15.102k	5.8	+20.0	+10.1	+0.0	35.9	117.0	-81.1	Condu
						360				157
	23	73.714k	3.2	+20.0	+10.1	+0.0	33.3	117.0	-83.7	Condu
						360				157



Test Location:	CKC Laboratories	•22116 23rd Dr SE	• Bothell, WA 98021-4413	• 425-402-1717
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Customer:	Impinj Inc		
Specification:	FCC 15.247(d) Conducted		
Work Order #:	89028	Date:	2/9/2009
Test Type:	Radiated Scan	Time:	16:54:28
Equipment:	RFID Reader	Sequence#:	3
Manufacturer:	Impinj	Tested By:	Armando Del Angel
Model:	IPJ-REV		
S/N:	940-08-21-0006		

## Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872
Attenuator		04/03/2008	04/03/2010	05747
Attenuator	9912	03/21/2008	03/21/2010	ANP05503

## Equipment Under Test (\* = EUT):

Function	Manufacturer	Model #	S/N
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Antenna cable	Manhattan/CDT	M4213	1354 E12091
Support Devices:			
	2.6		6 B 7

Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	Latitude	6497402833
Wireless G Router	Belkin	F5D7230-4	2028723009696

## Test Conditions / Notes:

20°C / 26% relative humidity / 102.3 kPa.

Testing Conducted Spurious Emissions per FCC 15.247(d).

The Unit is an RF reader. It will be connected to the PSA through a special cable provided by the customer. The EUT will be in transmitting mode throughout the test in the HIGH channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 32.5 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 927.25MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency: 9kHz - 150kHz RBW= 200Hz, VBW= 200Hz 150kHz-30MHz RBW= 9kHz, VBW = 9kHz 30MHz - 1GHz RBW= 120kHz, VBW=120kHz 1GHz-19GHz RBW= 1 MHz, VBW=1 MHz.



# *Transducer Legend:* T1=ATT-ANP05747-040308

## T2=ATT-ANP5503-032108

Measu	rement Data:	Reading listed by margin.			Test Distance: No Distance						
#	Freq	Rdng	T1	T2			Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	927.249M	104.3	+20.0	+10.1			+0.0	134.4	137.0	-2.6	Condu
							360				157
2	3980.000M	55.5	+20.0	+10.2			+0.0	85.7	117.0	-31.3	Condu
							360				157
3	15728.000	58.6	+20.4	+0.0			+0.0	79.0	117.0	-38.0	Condu
	Μ										
							360				157
4	14155.000	58.8	+20.1	+0.0			+0.0	78.9	117.0	-38.1	Condu
	М										
							360				157
5	7155.000M	57.1	+20.0	+0.0			+0.0	77.1	117.0	-39.9	Condu
							360				157
6	432.700M	24.6	+20.0	+10.1			+0.0	54.7	117.0	-62.3	Condu
							360				157
7	130.700M	24.1	+20.0	+10.1			+0.0	54.2	117.0	-62.8	Condu
							360				157
8	226.000M	23.9	+20.0	+10.1			+0.0	54.0	117.0	-63.0	Condu
							360				157
9	78.090M	23.6	+20.0	+10.1			+0.0	53.7	117.0	-63.3	Condu
							360				157
10	124.800k	19.4	+20.0	+10.1			+0.0	49.5	117.0	-67.5	Condu
							360				157
11	2.566M	12.4	+20.0	+10.1			+0.0	42.5	117.0	-74.5	Condu
							360				157
12	21.010M	12.1	+20.0	+10.1			+0.0	42.2	117.0	-74.8	Condu
	10.000		<b>.</b>				360				157
13	12.272k	6.7	+20.0	+10.1			+0.0	36.8	117.0	-80.2	Condu
							360				157
14	43.929k	0.9	+20.0	+10.1			+0.0	31.0	117.0	-86.0	Condu
							360				157



# FCC 15.247(d) – OATS RADIATED SPURIOUS EMISSIONS

# **Test Setup Photos**





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## **Test Data Sheets**

Test Location:

on: CKC Laboratories •22116 23rd Dr SE • Bothell, WA 98021-4413 • 425-402-1717

Customer:	Impinj Inc
Specification:	FCC 15.247/15.209
Work Order #:	89028
Test Type:	Radiated Scan
Equipment:	<b>RFID Reader</b>
Manufacturer:	Impinj
Model:	IPJ-REV
S/N:	940-08-21-0006

Date: 2/11/2009 Time: 10:37:19 Sequence#: 1 Tested By: Armando Del Angel

## Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Mag Loop	2156	06/04/2008	06/04/2010	AN00052
Antenna	2453	12/22/2008	12/22/2010	AN01994
EMCO 3115 Horn	9606-4854	11/12/2007	11/12/2009	AN01412
Horn Antenna, Active	1114018	11/13/2008	11/13/2010	2742
18-26GHz				
Heliax cable	N/A	07/22/2008	07/22/2010	AN05545
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03123
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03122
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03121
Cable 30'	11	11/05/2008	11/05/2010	ANP05366
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Cable 20'	16	11/10/2008	11/10/2010	ANP05360
Cable 6'	51	12/30/2008	12/30/2010	ANP05361
Pasternack Coax		07/20/2007	07/20/2009	AN05425
HP 8447D Preamp	2944A08601	07/08/2008	07/08/2010	AN01517
HP 83017A Pre-amp	3123A00464	10/02/2007	10/02/2009	AN01271
Filter	2	05/01/2008	05/01/2010	2750
Filter	311SH10-	12/02/2008	12/02/2010	3116
	3000/T10000-0/0			
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872

## Equipment Under Test (\* = EUT):

Function	Manufacturer	Model #	S/N
Circular patch antenna	Cushcraft	S90289CLJ	092436
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Antenna cable	Manhattan/CDT	M4213	1354 E12091
Support Devices:			
Function	Manufacturer	Model #	S/N
Wireless G Router	Belkin	F5D7230-4	2028723009696
Laptop Computer	Dell	Latitude	6497402833



Test Conditions / Notes:

20°C / 26% relative humidity / 102.3 kPa.

Testing Radiated Spurious Emissions per FCC 15.247(d).

The Unit is an RF reader. It is located in the back edge of the test table. All its ports are being exercised. It is being powered by the AC/DC converter. It is connected to a laptop outside the chamber through a shielded ethernet cable. The antenna is suspended 10cm above the wooden table with styrofoam. The EUT will be in transmitting mode throughout the test in the LOW channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 32.5 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 902.75MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency:	9kHz - 150kHz	RBW= 200Hz,	VBW= 200Hz
	150kHz-30MHz	RBW= 9kHz,	VBW = 9kHz
	30MHz - 1GHz	RBW= 120kHz	VBW=120kHz
	1GHz-19GHz	RBW = 1 MHz,	VBW=1 MHz.

## Transducer Legend:

T1=ANT- AN00052-06042008 T3=ANT AN01994 25-1000MHz T5=CAB-ANP05361 T7=CAB-ANP05371 T9=CAB-ANP03123-120208 T11=Filter 1GHz HP AN02750 T13=AMP-AN01517-070808 T2=ANT-AN01412-111207 T4=CAB-ANP05360 T6=CAB-ANP05366 T8=CAB-ANP03121-120208 T10=CAB-ANP05545-072208 T12=FIL-AN03116-120208 T14=AMP-AN01271-100207 - .5-26.5 GHz

Meas	urement Data:	R	eading lis	ted by ma	argin.		Te	st Distan	ce: 3 Meters		
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
			T9	T10	T11	T12					
			T13	T14							
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	7222.023M	39.7	+0.0	+36.3	+0.0	+0.0	+0.0	49.8	54.0	-4.2	Vert
	Ave		+0.0	+0.0	+0.0	+2.3	337				109
			+1.1	+4.7	+0.0	+0.4					
			+0.0	-34.7							
/	↑ 7222.023M	47.4	+0.0	+36.3	+0.0	+0.0	+0.0	57.5	54.0	+3.5	Vert
			+0.0	+0.0	+0.0	+2.3	337				109
			+1.1	+4.7	+0.0	+0.4					
			+0.0	-34.7							
3	3 5.902M	15.3	+9.9	+0.0	+0.0	+0.2	+0.0	25.7	30.0	-4.3	90deg
	Ambient		+0.0	+0.2	+0.1	+0.0	175		Noisefloor		100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
2	4 15544.000	30.6	+0.0	+38.6	+0.0	+0.0	+0.0	49.6	54.0	-4.4	Vert
	Μ		+0.0	+0.0	+0.0	+3.4					
	Ambient		+1.4	+7.3	+0.0	+0.5	180		Noisefloor		112
			+0.0	-32.2							

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5 100.040M	55.6	+0.0	+0.0	+10.2	+0.6	+0.0	38.2	44.0	-5.8	Vert
		+0.1	+0.6	+0.2	+0.0	360				99
		+0.0	+0.0	+0.0	+0.0					
		-29.1	+0.0							
6 9027.462M	32.5	+0.0	+38.9	+0.0	+0.0	+0.0	48.1	54.0	-5.9	Vert
Ave		+0.0	+0.0	+0.0	+3.1	360				130
		+1.6	+5.3	+0.0	+0.5					
		+0.0	-33.8							
^ 9027.462M	38.8	+0.0	+38.9	+0.0	+0.0	+0.0	54.4	54.0	+0.4	Vert
		+0.0	+0.0	+0.0	+3.1	360				130
		+1.6	+5.3	+0.0	+0.5					
		+0.0	-33.8							
8 1805.493M	17.0	+0.0	+26.5	+0.0	+0.0	+0.0	47.7	54.0	-6.3	Vert
Ave		+0.0	+0.0	+0.0	+1.1	180				126
		+0.5	+2.2	+0.4	+0.0					
		+0.0	+0.0							
^ 1805.493M	22.7	+0.0	+26.5	+0.0	+0.0	+0.0	53.4	54.0	-0.6	Vert
		+0.0	+0.0	+0.0	+1.1	180				126
		+0.5	+2.2	+0.4	+0.0					
		+0.0	+0.0							
10 16.899M	12.6	+8.5	+0.0	+0.0	+0.3	+0.0	21.9	30.0	-8.1	180de
Ambient		+0.0	+0.3	+0.2	+0.0	287		Noisefloor		100
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
11 102.551M	53.0	+0.0	+0.0	+10.4	+0.6	+0.0	35.8	44.0	-8.2	Horiz
		+0.1	+0.6	+0.2	+0.0	308				150
		+0.0	+0.0	+0.0	+0.0					
		-29.1	+0.0							
12 802.640M	39.9	+0.0	+0.0	+22.5	+1.9	+0.0	37.7	46.0	-8.3	Vert
		+0.4	+2.0	+0.5	+0.0	248				150
		+0.0	+0.0	+0.0	+0.0					
		-29.5	+0.0							
13 918.890M	37.8	+0.0	+0.0	+23.4	+1.9	+0.0	36.7	46.0	-9.3	Vert
		+0.5	+2.0	+0.4	+0.0	180				150
		+0.0	+0.0	+0.0	+0.0					
14 404 4003 4	11.5	-29.3	+0.0	15.0			267	16.0		
14 481.100M	44.6	+0.0	+0.0	+17.8	+1.4	+0.0	36.5	46.0	-9.5	Horiz
		+0.3	+1.6	+0.3	+0.0	284				151
		+0.0	+0.0	+0.0	+0.0					
15 17500 000	20.0	-29.5	+0.0	.0.0	.0.0	.0.0	44.0	540	10.0	Maria
15 1/500.000 M	20.8	+0.0	+42.4	+0.0	+0.0	+0.0	44.0	54.0	-10.0	vert
M Ambient		+0.0	+0.0	+0.0	+5.4	250		Noisefleer		112
Ambient		$^{+1.0}_{\pm 0.0}$	+0.2 _33.0	$\pm 0.0$	+0.0	332		INDISCHOOF		112
16 800 200M	20.1		-55.0	122.5	+1.0		25.0	46.0	10.1	Uoria
10 000.200M	50.1	$\pm 0.0$	+0.0	+22.5	+1.9	+0.0 164	55.9	40.0	-10.1	151
		+0.4 ⊥0.0	+2.0 $\pm0.0$	+0.5 +0.0	+0.0	104				131
		-29.5	+0.0	10.0	10.0					
17 16 003M	07	<u></u> <u>85</u>	+0.0	±0.0	±0.3	+0.0	10.0	30.0	-11.0	90dag
Ambient	).1	+0.0	+0.0	+0.0	+0.5	199	19.0	Noisefloor	-11.0	100
7 molont		+0.0	+0.0	+0.2	+0.0	177		1015011001		100
		+0.0	+0.0	10.0	10.0					
		10.0	10.0							



18	5416.584M	32.7	+0.0	+34.5	+0.0	+0.0	+0.0	41.8	54.0	-12.2	Vert
1	Ave		+0.0	+0.0	+0.0	+2.3	352				112
			+1.0	+3.9	+0.0	+0.5					
			+0.0	-33.1							
^	5416.584M	39.9	+0.0	+34.5	+0.0	+0.0	+0.0	49.0	54.0	-5.0	Vert
			+0.0	+0.0	+0.0	+2.3	352				112
			+1.0	+3.9	+0.0	+0.5					
			+0.0	-33.1							
20	24.300M	9.4	+6.8	+0.0	+0.0	+0.3	+0.0	17.0	30.0	-13.0	180de
1	Ambient		+0.0	+0.3	+0.2	+0.0	200		Noisefloor		100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
21	11483.010	34.6	+0.0	+39.1	+0.0	+0.0	+0.0	41.0	54.0	-13.0	Horiz
	Μ		+0.0	+0.0	+0.0	+2.9					
1	Ambient		+1.5	+5.8	+0.0	+0.4	231		Noisefloor		99
			+0.0	-43.3							
22	5416.471M	31.0	+0.0	+34.5	+0.0	+0.0	+0.0	40.1	54.0	-13.9	Horiz
1	Ave		+0.0	+0.0	+0.0	+2.3	336				111
			+1.0	+3.9	+0.0	+0.5					
			+0.0	-33.1							
^	5416.471M	37.2	+0.0	+34.5	+0.0	+0.0	+0.0	46.3	54.0	-7.7	Horiz
			+0.0	+0.0	+0.0	+2.3	336				111
			+1.0	+3.9	+0.0	+0.5					
			+0.0	-33.1							
24	7222.100M	30.0	+0.0	+36.3	+0.0	+0.0	+0.0	40.1	54.0	-13.9	Horiz
1	Ave		+0.0	+0.0	+0.0	+2.3	352				99
			+1.1	+4.7	+0.0	+0.4					
			+0.0	-34.7							
^	7222.100M	40.3	+0.0	+36.3	+0.0	+0.0	+0.0	50.4	54.0	-3.6	Horiz
			+0.0	+0.0	+0.0	+2.3	352				99
			+1.1	+4.7	+0.0	+0.4					
			+0.0	-34.7							
26	9027.463M	24.4	+0.0	+38.9	+0.0	+0.0	+0.0	40.0	54.0	-14.0	Horiz
1	Ave		+0.0	+0.0	+0.0	+3.1					99
			+1.6	+5.3	+0.0	+0.5					
			+0.0	-33.8							
^	9027.463M	36.0	+0.0	+38.9	+0.0	+0.0	+0.0	51.6	54.0	-2.4	Horiz
			+0.0	+0.0	+0.0	+3.1					99
			+1.6	+5.3	+0.0	+0.5					
			+0.0	-33.8							
28	160.280k	73.3	+10.0	+0.0	+0.0	+0.0	-80.0	3.3	23.8	-20.5	180de
			+0.0	+0.0	+0.0	+0.0	199				100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
29	972.925M	31.6	+0.0	+0.0	+24.1	+1.8	+0.0	31.6	54.0	-22.4	Horiz
1	Ambient		+0.5	+2.2	+0.5	+0.0	360		Noisefloor		151
			+0.0	+0.0	+0.0	+0.0					
			-29.1	+0.0							
30	640.500k	38.1	+9.9	+0.0	+0.0	+0.1	-40.0	8.2	31.6	-23.4	180de
			+0.0	+0.0	+0.1	+0.0	200				100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							



31	319.370k	62.6	+9.9	+0.0	+0.0	+0.1	-80.0	-7.3	17.7	-25.0	90deg
			+0.0	+0.0	+0.1	+0.0	175				100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
32	101.900k	67.4	+10.0	+0.0	+0.0	+0.0	-80.0	-2.6	27.8	-30.4	90deg
			+0.0	+0.0	+0.0	+0.0	175				100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
33	15.755k	67.8	+14.2	+0.0	+0.0	+0.0	-80.0	2.0	44.1	-42.1	90deg
			+0.0	+0.0	+0.0	+0.0	174				100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
34	12.006k	65.7	+15.6	+0.0	+0.0	+0.0	-80.0	1.3	46.5	-45.2	90deg
			+0.0	+0.0	+0.0	+0.0	174				100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
35	23.030k	60.2	+12.4	+0.0	+0.0	+0.0	-80.0	-7.4	40.8	-48.2	180de
			+0.0	+0.0	+0.0	+0.0	199				100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
36	11.982k	59.5	+15.6	+0.0	+0.0	+0.0	-80.0	-4.9	46.5	-51.4	180de
			+0.0	+0.0	+0.0	+0.0	187				100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							



Customer:	Impinj Inc
Specification:	FCC 15.247/15.209
Work Order #:	89028
Test Type:	Radiated Scan
Equipment:	RFID Reader
Manufacturer:	Impinj
Model:	IPJ-REV
S/N:	940-08-21-0006

Date: 2/11/2009 Time: 13:36:09 Sequence#: 6 Tested By: Armando Del Angel

## Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Mag Loop	2156	06/04/2008	06/04/2010	AN00052
Antenna	2453	12/22/2008	12/22/2010	AN01994
EMCO 3115 Horn	9606-4854	11/12/2007	11/12/2009	AN01412
Horn Antenna, Active	1114018	11/13/2008	11/13/2010	2742
Heliax cable	N/A	07/22/2008	07/22/2010	AN05545
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03123
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03122
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03121
Cable 30'	11	11/05/2008	11/05/2010	ANP05366
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Cable 20'	16	11/10/2008	11/10/2010	ANP05360
Cable 6'	51	12/30/2008	12/30/2010	ANP05361
Pasternack Coax		07/20/2007	07/20/2009	AN05425
HP 8447D Preamp	2944A08601	07/08/2008	07/08/2010	AN01517
HP 83017A Pre-amp	3123A00464	10/02/2007	10/02/2009	AN01271
Filter	2	05/01/2008	05/01/2010	2750
Filter	311SH10-	12/02/2008	12/02/2010	3116
	3000/T10000-0/0			
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872

## Equipment Under Test (\* = EUT):

Function	Manufacturer	Model #	S/N
Circular patch antenna	Cushcraft	S90289CLJ	092436
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Support Devices			

Support Devices.			
Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	Latitude	6497402833
Wireless G Router	Belkin	F5D7230-4	2028723009696



Test Conditions / Notes:

20°C / 26% relative humidity / 102.3 kPa.

Testing Radiated Spurious Emissions per FCC 15.247(d)

The Unit is an RF reader. It is located in the back edge of the test table. All its ports are being exercised. It is being powered by the AC/DC converter It is connected to a laptop outside the chamber through a shielded ethernet cable. The antenna is suspended 10cm above the wooden table with styrofoam. The EUT will be in transmitting mode throughout the test in the LOW channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 30.0 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 902.75MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency:	9kHz - 150kHz	RBW= 200Hz,	VBW= 200Hz
	150kHz-30MHz	RBW= 9kHz,	VBW = 9kHz
	30MHz - 1GHz	RBW= 120kHz	VBW=120kHz
	1GHz-19GHz	RBW = 1 MHz,	VBW=1 MHz.

## Transducer Legend:

T1=ANT- AN00052-06042008 T3=ANT AN01994 25-1000MHz T5=CAB-ANP05361 T7=CAB-ANP05371 T9=CAB-ANP03123-120208 T11=Filter 1GHz HP AN02750 T13=AMP-AN01517-070808 T2=ANT-AN01412-111207 T4=CAB-ANP05360 T6=CAB-ANP05366 T8=CAB-ANP03121-120208 T10=CAB-ANP05545-072208 T12=FIL-AN03116-120208 T14=AMP-AN01271-100207 - .5-26.5 GHz

Meas	surement Data:	R	eading lis	ted by ma	argin.	Test Distance: 3 Meters					
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
			T9	T10	T11	T12					
			T13	T14							
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
	1 17152.010	32.0	+0.0	+40.8	+0.0	+0.0	+0.0	53.0	54.0	-1.0	Vert
	Μ		+0.0	+0.0	+0.0	+3.4					
	Ambient		+1.2	+8.0	+0.0	+0.4	42		NOISEFL	OOR	119
			+0.0	-32.8							
	2 1947.000M	20.7	+0.0	+27.2	+0.0	+0.0	+0.0	52.0	54.0	-2.0	Vert
	Ambient		+0.0	+0.0	+0.0	+1.1	205		NOISEFL	OOR	115
			+0.4	+2.3	+0.3	+0.0					
			+0.0	+0.0							
	3 1947.000M	20.1	+0.0	+27.2	+0.0	+0.0	+0.0	51.4	54.0	-2.6	Horiz
	Ambient		+0.0	+0.0	+0.0	+1.1	205		NOISEFL	OOR	115
			+0.4	+2.3	+0.3	+0.0					
			+0.0	+0.0							
	4 15346.530	31.6	+0.0	+39.1	+0.0	+0.0	+0.0	50.2	54.0	-3.8	Horiz
	Μ		+0.0	+0.0	+0.0	+3.2					
	Ambient		+1.2	+7.2	+0.0	+0.4	251		NOISEFL	OOR	125
			+0.0	-32.5							

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5	18.313M	15.8	+8.4	+0.0	+0.0	+0.3	+0.0	25.0	30.0	-5.0	180de
			+0.0	+0.3	+0.2	+0.0	205				160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
6	100.065M	56.0	+0.0	+0.0	+10.2	+0.6	+0.0	38.6	44.0	-5.4	Vert
-			+0.1	+0.6	+0.2	+0.0	360				111
			+0.0	+0.0	+0.0	+0.0					
			-29.1	+0.0		1010					
7	802.445M	42.2	+0.0	+0.0	+22.5	+1.9	+0.0	40.0	46.0	-6.0	Vert
	0021110111		+0.4	+2.0	+0.5	+0.0	360			010	111
			+0.0	+0.0	+0.0	+0.0	500				
			-29.5	+0.0		1010					
8	13.093M	14.2	+8.9	+0.0	+0.0	+0.2	+0.0	23.6	30.0	-6.4	180de
Ŭ	10.090101	1	+0.0	+0.2	+0.0	+0.0	205	25.0	2010	0.1	160
			+0.0	+0.0	+0.0	+0.0	200				100
			+0.0	+0.0	10.0	10.0					
9	102 660M	54.6	+0.0	+0.0	+10.4	+0.6	+0.0	37.4	44.0	-6.6	Horiz
	102.000101	51.0	+0.0	+0.6	+0.2	+0.0	360	57.1	11.0	0.0	160
			+0.1	+0.0	+0.2	+0.0	500				100
			-29.1	+0.0	10.0	10.0					
10	9027 590M	30.5	+0.0	+38.9	+0.0	+0.0	+0.0	46.1	54.0	-79	Vert
10	Ave	50.5	+0.0	+0.0	+0.0	+3.1	42	10.1	51.0	1.5	119
	1100		+1.6	+5.3	+0.0	+0.5	74				11)
			+0.0	-33.8	10.0	10.5					
^	9027 590M	38.2	+0.0	±38.9	+0.0	+0.0	+0.0	53.8	54.0	-0.2	Vert
	7027.570WI	50.2	+0.0	+0.0	+0.0	+3.0	42	55.0	54.0	-0.2	119
			+1.6	+5.3	+0.0	+0.5	72				11)
			+1.0	-33.8	10.0	10.5					
12	24 900M	1/1 5	+6.6	+0.0	±0.0	±0.3	+0.0	21.9	30.0	-8.1	90deg
12	Ambient	14.5	+0.0	+0.0	+0.0	+0.5	168	21.)	NOISEEL		160
	Amolent		+0.0	+0.5	+0.2	+0.0	100		NOISEI E	JOK	100
			+0.0	+0.0	10.0	10.0					
13	799.850M	39.2	+0.0	+0.0	±22.5	±1 9	+0.0	37.0	46.0	-9.0	Horiz
15	777.050141	57.2	+0.0	+2.0	+0.5	+1.9	360	57.0	+0.0	-9.0	160
			+0.4	+0.0	+0.5	+0.0	500				100
			-29.5	+0.0	10.0	10.0					
14	10832 880	31.6	+0.0	+38.6	+0.0	+0.0	+0.0	11.8	54.0	0.2	Horiz
14	M	51.0	+0.0	+38.0 +0.0	+0.0 +0.0	+0.0 +2.8	$\pm 0.0$	44.0	54.0	-9.2	TIONZ
	Ambient		+0.0	+0.0 +5.6	+0.0 ⊥0.0	$\pm 0.1$	251		NOISEEL	JUB	125
	Amblent		$^{+1.2}_{\pm 0.0}$	-35.0	$\pm 0.0$	$\pm 0.1$	231		NOISLILL	JOK	125
15	7222.001M	33.8	+0.0	-35.1	+0.0	+0.0	+0.0	/3.9	54.0	-10.1	Vert
15	7222.001101	55.0	+0.0	+30.5	+0.0 ⊥0.0	+0.0	+0.0 156	43.9	54.0	-10.1	110
			$\pm 1.1$	+0.0 ⊥/1 7	+0.0	+0.4	150				11)
			+0.0	-34.7	10.0	10.4					
16	455 580M	13.6	+0.0	<u>+0.0</u>	⊥17.3	<b>⊥</b> 1.6	+0.0	35.6	46.0	-10.4	Horiz
10	455.560141	+J.0	+0.0	+1.6	+17.5	+1.0	360	55.0	+0.0	-10.4	160
			+0.0	+1.0 $+0.0$	+0.0	+0.0	500				100
			_29.3	+0.0	10.0	10.0					
17	913 150M	35.6	±0.0	+0.0	±23.3	<u>⊥10</u>	+0.0	3/ /	16.0	-11.6	Vort
1/	Ambient	55.0	+0.0 +0.5	+0.0 +2.0	±0.5 ⊥0.4	+1.7 +0.0	+0.0 253	54.4	NOISEEL	-11.0 COR	111
'			-0.5 -0.0	+∠.0 ⊥0.0	+0.4 ⊥0.0	+0.0 +0.0	233		TODELD	JOK	111
			-70.0	+0.0 +0.0	$\pm 0.0$	$\pm 0.0$					
			-29.3	+0.0							

CKC AM Testing the Future

		+0.0	-33.1	10.0	10.5					
		+1.0	+3.0	+0.0	+0.5	1/1				120
2 110.19 111	21.0	+0.0	+0.0	+0.0	+2.3	191		21.0	10.5	125
^ 5416.494M	34.6	+0.0	+34.5	+0.0	+0.0	+0.0	43.7	54.0	-10.3	Horiz
		+0.0	-33.1							
		+1.0	+3.9	+0.0	+0.5					
2.10.01.101	2 0.7	+0.0	+0.0	+0.0	+2.3	156	.0.0	2	0.0	172
^ 5416.514M	36.9	+0.0	+34.5	+0.0	+0.0	+0.0	46.0	54.0	-8.0	Horiz
		+0.0	-33.1							
		+1.0	+3.9	+0.0	+0.5	100				
Ave		+0.0	+0.0	+0.0	+2.3	156	2211	2	20.7	172
28 5416.514M	24.0	+0.0	+34.5	+0.0	+0.0	+0.0	33.1	54.0	-20.9	Horiz
		-29.0	+0.0							
		+0.0	+0.0	+0.0	+0.0					100
Ambient	55.0	+0.5	+2.1	+0.3	+0.0	10.0	55.2	NOISEFL	OOR	160
27 990 100M	33.0	+0.0	+0.0	+24 3	+2.0	+0.0	33.2	54.0	-20.8	Horiz
		+0.0	-32.7	10.0	. 0. /					
		+0.0	+3.0	+0.0	+0.7	74				117
5011.05211	51.0	+0.0	+0.0	+0.0	+1.6	42	72.0	54.0	11.7	119
^ 3611.052M	37.6	+0.0	+31.8	+0.0	+0.0	+0.0	42.6	54.0	-114	Vert
		+0.0+0.0	-327	$\pm 0.0$	$\pm 0.7$					
AVC		+0.0 +0.6	+0.0	+0.0	+1.0 $\pm 0.7$	72				119
25 5011.0521VI Ave	20.0	+0.0	0.1CT +0.0	+0.0	+0.0	$^{+0.0}_{-42}$	55.0	54.0	-20.4	110
25_3611.052M	28.6	+0.0	+31.8	+0.0	+0.0	+0.0	33.6	54.0	_20.4	Vert
		+0.0	-327	10.0	10.7					
		+0.0	+3.0	+0.0	+0.7	234				123
5011.05514	-0.5	+0.0	+0.0	+0.0	+1.6	254	+J.J	J+.U	-0.7	125
^ 3611.033M	40.3	+0.0	+31.8	+0.0	+0.0	+0.0	45 3	54.0	_8 7	Horiz
		+0.0 +0.0	-327	$\pm 0.0$	$\pm 0.7$					
Ave		+0.0 ±0.6	+0.0	+0.0	+1.0 $\pm0.7$	234				123
25 5011.055M	33.5	+0.0	+31.8	+0.0	+0.0	+0.0 254	38.3	54.0	-13./	125
22 2611 02214	22.2	+0.0	-32.3				20.2	540	157	II.c:-
Ambient		+1.2	+1.2	+0.0	+0.4	251		NUISEFLO	OOK	125
M A mali i su t		+0.0	+0.0	+0.0	+3.2	251		NOIGERIA		105
22 15346.530	21.6	+0.0	+39.1	+0.0	+0.0	+0.0	40.2	54.0	-13.8	Horiz
00 15045 500	01.6	-28.8	+0.0	.0.0	. 0. 0	.0.0	40.0	<b>540</b>	12.0	
		+0.0	+0.0	+0.0	+0.0					
		+0.2	+0.9	+0.2	+0.0	360				160
21 169.265M	48.0	+0.0	+0.0	+9.8	+0.8	+0.0	31.1	44.0	-12.9	Horiz
		+0.0	-32.8							
Ambient		+1.2	+8.0	+0.0	+0.4	42		NOISEFL	OOR	119
М		+0.0	+0.0	+0.0	+3.4					
20 17152.010	20.9	+0.0	+40.8	+0.0	+0.0	+0.0	41.9	54.0	-12.1	Vert
		+0.0	-33.1							
		+1.0	+3.9	+0.0	+0.5					
		+0.0	+0.0	+0.0	+2.3	156				172
^ 5416.514M	39.8	+0.0	+34.5	+0.0	+0.0	+0.0	48.9	54.0	-5.1	Vert
		+0.0	-33.1							
		+1.0	+3.9	+0.0	+0.5					
Ave	0217	+0.0	+0.0	+0.0	+2.3	156		0.110	12.0	172
18 5416.514M	32.9	+0.0	+34.5	+0.0	+0.0	+0.0	42.0	54.0	-12.0	Vert



31	149.360k	72.9	+10.0	+0.0	+0.0	+0.0	-80.0	2.9	24.4	-21.5	90deg
			+0.0	+0.0	+0.0	+0.0	160				160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
32	159.890k	69.5	+10.0	+0.0	+0.0	+0.0	-80.0	-0.5	23.8	-24.3	180de
			+0.0	+0.0	+0.0	+0.0	30				160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
33	1.076M	28.7	+10.0	+0.0	+0.0	+0.1	-40.0	-1.1	27.1	-28.2	90deg
			+0.0	+0.1	+0.0	+0.0	160				160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
34	1.000M	27.2	+10.0	+0.0	+0.0	+0.1	-40.0	-2.6	27.7	-30.3	180de
			+0.0	+0.1	+0.0	+0.0	205				160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
35	320.700k	55.8	+9.9	+0.0	+0.0	+0.1	-80.0	-14.1	17.7	-31.8	90deg
			+0.0	+0.0	+0.1	+0.0	160				160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
36	480.240k	51.3	+9.9	+0.0	+0.0	+0.1	-80.0	-18.6	14.2	-32.8	180de
			+0.0	+0.0	+0.1	+0.0	205				160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
37	318.960k	53.4	+9.9	+0.0	+0.0	+0.1	-80.0	-16.5	17.8	-34.3	180de
			+0.0	+0.0	+0.1	+0.0	168				160
			+0.0	+0.0	+0.0	+0.0					
- 20	101 0001	(0.0	+0.0	+0.0	0.0	0.0	00.0	0.1	07.0	260	00.1
38	101.900k	60.9	+10.0	+0.0	+0.0	+0.0	-80.0	-9.1	27.8	-36.9	90deg
			+0.0	+0.0	+0.0	+0.0	152				160
			+0.0	+0.0	+0.0	+0.0					
20	15 7001	(2.0	+0.0	+0.0	.0.0	.0.0	00.0	2.0	4.4.1	47.0	00.1
39	15.790K	62.0	+14.2	+0.0	+0.0	+0.0	-80.0	-3.8	44.1	-47.9	90deg
			+0.0	+0.0	+0.0	+0.0	159				100
			+0.0	+0.0	$\pm 0.0$	$\pm 0.0$					
40	12 0061	60.8	+0.0	+0.0			80.0	2.6	16.5	50.1	OOdaa
40	12.000K	00.8	+13.0	+0.0	+0.0	+0.0	-60.0	-3.0	40.5	-30.1	900eg
			+0.0	+0.0	+0.0	+0.0	139				100
			+0.0	+0.0	10.0	10.0					
41	15 715k	58 7	+14.2	+0.0	+0.0	+0.0	-80.0	-71	44.1	-51.2	180de
71	15./15K	50.7	+0.0	+0.0	+0.0	+0.0	205	/.1	77.1	51.2	160
			+0.0	+0.0	+0.0	+0.0	205				100
			+0.0	+0.0	10.0	10.0					
42	12.024k	57.2	+15.6	+0.0	+0.0	+0.0	-80.0	-7 2	46.5	-537	180de
72	12.02TK	51.2	+0.0	+0.0	+0.0	+0.0	205	1.4	10.5	55.1	160
			+0.0	+0.0	+0.0	+0.0	200				100
			+0.0	+0.0		. 0.0					
<u> </u>											



Customer:	Impinj Inc
Specification:	FCC 15.247/15.209
Work Order #:	89028
Test Type:	Radiated Scan
Equipment:	RFID Reader
Manufacturer:	Impinj
Model:	IPJ-REV
S/N:	940-08-21-0006

Date: 2/11/2009 Time: 10:42:00 Sequence#: 2 Tested By: Armando Del Angel

## Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
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18-26GHz				
Heliax cable	N/A	07/22/2008	07/22/2010	AN05545
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03123
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03122
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03121
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Cable 6'	51	12/30/2008	12/30/2010	ANP05361
Pasternack Coax		07/20/2007	07/20/2009	AN05425
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HP 83017A Pre-amp	3123A00464	10/02/2007	10/02/2009	AN01271
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	3000/T10000-0/0			
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AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Antenna cable	Manhattan/CDT	M4213	1354 E12091
Support Devices:			

Function	Manufacturer	Model #	S/N
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Laptop Computer	Dell	Latitude	6497402833



Test Conditions / Notes:

20°C / 26% relative humidity / 102.3 kPa.

Testing Radiated Spurious Emissions per FCC 15.247(d)

The Unit is an RF reader. It is located in the back edge of the test table. All its ports are being exercised. It is being powered by the AC/DC converter It is connected to a laptop outside the chamber through a shielded ethernet cable. The antenna is suspended 10cm above the wooden table with styrofoam. The EUT will be in transmitting mode throughout the test in the MID channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 32.5 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 915.25MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency:	9kHz - 150kHz	RBW= 200Hz,	VBW= 200Hz
	150kHz-30MHz	RBW= 9kHz,	VBW = 9kHz
	30MHz - 1GHz	RBW= 120kHz	VBW=120kHz
	1GHz-19GHz	RBW = 1 MHz,	VBW=1 MHz.

## Transducer Legend:

T1=ANT- AN00052-06042008 T3=ANT AN01994 25-1000MHz T5=CAB-ANP05361 T7=CAB-ANP05371 T9=CAB-ANP03123-120208 T11=Filter 1GHz HP AN02750 T13=AMP-AN01517-070808 T2=ANT-AN01412-111207 T4=CAB-ANP05360 T6=CAB-ANP05366 T8=CAB-ANP03121-120208 T10=CAB-ANP05545-072208 T12=FIL-AN03116-120208 T14=AMP-AN01271-100207 - .5-26.5 GHz

Measu	urement Data:	R	eading lis	ted by ma	argin.	n. Test Distance: 3 Meters					
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
			T9	T10	T11	T12					
			T13	T14							
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	13885.000	32.5	+0.0	+40.9	+0.0	+0.0	+0.0	52.6	54.0	-1.4	Horiz
	Μ		+0.0	+0.0	+0.0	+3.3					
	Ambient		+1.3	+6.9	+0.0	+0.5			Noisefloor		130
			+0.0	-32.8							
2	1830.468M	20.9	+0.0	+26.6	+0.0	+0.0	+0.0	51.7	54.0	-2.3	Vert
	Ave		+0.0	+0.0	+0.0	+1.1	195				125
			+0.5	+2.2	+0.4	+0.0					
			+0.0	+0.0							
^	1830.468M	28.4	+0.0	+26.6	+0.0	+0.0	+0.0	59.2	54.0	+5.2	Vert
			+0.0	+0.0	+0.0	+1.1	195				125
			+0.5	+2.2	+0.4	+0.0					
			+0.0	+0.0							
4	16932.000	30.7	+0.0	+40.0	+0.0	+0.0	+0.0	50.5	54.0	-3.5	Horiz
	Μ		+0.0	+0.0	+0.0	+3.4					
	Ambient		+0.9	+7.9	+0.0	+0.4	299		Noisefloor		130
			+0.0	-32.8							

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5	12500.000	31.2	+0.0	+38.8	+0.0	+0.0	+0.0	48.0	54.0	-6.0	Vert
	Μ		+0.0	+0.0	+0.0	+3.1					
	Ambient		+1.7	+6.5	+0.0	+0.3	312		Noisefloor		130
			+0.0	-33.6							
6	99.500M	54.6	+0.0	+0.0	+10.1	+0.6	+0.0	37.1	44.0	-6.9	Vert
			+0.1	+0.6	+0.2	+0.0					99
			+0.0	+0.0	+0.0	+0.0					
			-29.1	+0.0							
7	9030.984M	31.4	+0.0	+38.9	+0.0	+0.0	+0.0	47.0	54.0	-7.0	Vert
	Ambient		+0.0	+0.0	+0.0	+3.1			Noisefloor		130
			+1.6	+5.3	+0.0	+0.5					
			+0.0	-33.8							
8	18.244M	12.7	+8.4	+0.0	+0.0	+0.3	+0.0	21.9	30.0	-8.1	90deg
	Ambient		+0.0	+0.3	+0.2	+0.0	75		Noisefloor		100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
9	102.200M	52.8	+0.0	+0.0	+10.4	+0.6	+0.0	35.6	44.0	-8.4	Horiz
			+0.1	+0.6	+0.2	+0.0	282				151
			+0.0	+0.0	+0.0	+0.0					
10	470.00014	15.0	-29.1	+0.0	12.2	1.5	0.0	07.0	16.0	0.7	
10	478.800M	45.2	+0.0	+0.0	+17.7	+1.5	+0.0	37.3	46.0	-8.7	Horiz
			+0.3	+1.6	+0.4	+0.0	282				151
			+0.0	+0.0	+0.0	+0.0					
11	7222 00514	22.1	-29.4	+0.0	0.0	0.0	0.0	10.0	54.0	10.0	<b>X</b> 7
11	7322.005M	33.1	+0.0	+36.4	+0.0	+0.0	+0.0	43.2	54.0	-10.8	Vert
	Ave		+0.0	+0.0	+0.0	+2.3	15				200
			+1.1	+4.7	+0.0	+0.3					
	7222 00514	41.7	+0.0	-34.7				<b>5</b> 1 0	54.0	2.2	Vart
~	7322.005IM	41./	+0.0	+30.4	+0.0	+0.0	+0.0	51.8	54.0	-2.2	vert 200
			+0.0	+0.0	+0.0	+2.5	15				200
			+1.1 $\pm 0.0$	+4.7	$\pm 0.0$	+0.3					
13	67.000M	50.7		+0.0	+5.0	+0.4		28.4	40.0	11.6	Vort
15	07.000101	50.7	+0.0	+0.0	+3.9	+0.4	$\pm 0.0$	20.4	40.0	-11.0	00
			+0.1	+0.4	+0.1	+0.0					
			-29.2	+0.0	10.0	10.0					
14	17395 000	19.6	+0.0	+41.9	+0.0	+0.0	+0.0	41.9	54.0	-12.1	Vert
14	M	17.0	+0.0	+0.0	+0.0	+3.3	10.0	41.7	54.0	12.1	Vert
	Ambient		+1.3	+8.1	+0.0	+0.6	360		Noisefloor		130
			+0.0	-32.9			200		1 (015011001		100
15	167.300M	46.8	+0.0	+0.0	+10.0	+0.8	+0.0	30.1	44.0	-13.9	Horiz
_			+0.2	+0.9	+0.2	+0.0	282				151
			+0.0	+0.0	+0.0	+0.0					
			-28.8	+0.0							
16	23.550M	7.9	+7.1	+0.0	+0.0	+0.3	+0.0	15.8	30.0	-14.2	180de
	Ambient		+0.0	+0.3	+0.2	+0.0	179		Noisefloor		100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
17	16.900M	4.9	+8.5	+0.0	+0.0	+0.3	+0.0	14.2	30.0	-15.8	180de
	Ave		+0.0	+0.3	+0.2	+0.0	1				100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							



^	16.900M	15.8	+8.5	+0.0	+0.0	+0.3	+0.0	25.1	30.0	-4.9	180de
			+0.0	+0.3	+0.2	+0.0	1				100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
19	5491.440M	29.6	+0.0	+34.7	+0.0	+0.0	+0.0	38.2	54.0	-15.8	Vert
	Ave		+0.0	+0.0	+0.0	+2.0	6				111
			+0.8	+3.9	+0.0	+0.5					
			+0.0	-33.3							
^	5491.440M	37.7	+0.0	+34.7	+0.0	+0.0	+0.0	46.3	54.0	-7.7	Vert
			+0.0	+0.0	+0.0	+2.0	6				111
			+0.8	+3.9	+0.0	+0.5					
			+0.0	-33.3							
21	5491.612M	28.3	+0.0	+34.7	+0.0	+0.0	+0.0	36.9	54.0	-17.1	Horiz
	Ave	2010	+0.0	+0.0	+0.0	+2.0	339	000	0.110	1,11	122
			+0.8	+3.9	+0.0	+0.5					
			+0.0	-33.3							
^	5491 612M	38.3	+0.0	+34.7	+0.0	+0.0	+0.0	46.9	54.0	-71	Horiz
	0 19 1101211	0010	+0.0	+0.0	+0.0	+2.0	339		0.110	/11	122
			+0.8	+3.9	+0.0	+0.5	557				122
			+0.0	-33.3	10.0	10.5					
23	25.000M	51	+6.6	+0.0	+0.0	+0.3	+0.0	12.5	30.0	-17 5	90deg
20	Ambient	0.1	+0.0	+0.3	+0.2	+0.0	310	12.0	Noisefloor	17.0	100
	1 millionent		+0.0	+0.0	+0.0	+0.0	510		11015011001		100
			+0.0	+0.0							
24	7321 941M	25.7	+0.0	+36.4	+0.0	+0.0	+0.0	35.8	54.0	-18.2	Horiz
21	Ave	20.1	+0.0	+0.0	+0.0	+2.3	89	55.0	51.0	10.2	200
	11,0		+1.1	+4.7	+0.0	+0.3	07				200
			+0.0	-34.7	10.0	10.5					
^	7321 941M	37.5	+0.0	+36.4	+0.0	+0.0	+0.0	47.6	54.0	-64	Horiz
	7521.91111	57.5	+0.0	+0.0	+0.0	+2.3	89	17.0	51.0	0.1	200
			+1.1	+4.7	+0.0	+0.3	07				200
			+0.0	-34.7	10.0	10.5					
26	960 880M	30.4	+0.0	+0.0	+23.9	+1.8	+0.0	30.1	54.0	-23.9	Vert
20	200.000M	50.4	+0.5	+2.2	+0.5	+0.0	10.0	50.1	54.0	23.7	99
			+0.0	+0.0	+0.0	+0.0					
			-29.2	+0.0	10.0	10.0					
27	960 800M	29.6	+0.0	+0.0	+23.9	+1.8	+0.0	29.3	54.0	-24.7	Horiz
27	200.000M	27.0	+0.5	+2.2	$\pm 0.5$	+0.0	282	27.5	54.0	27.7	151
			+0.0	+0.0	+0.0	+0.0	202				101
			-29.2	+0.0	10.0	10.0					
28	159 477k	54.8	+10.0	+0.0	+0.0	+0.0	-80.0	-15.2	23.8	-39.0	90deg
20	157.477K	54.0	+0.0	+0.0	+0.0	+0.0	171	13.2	23.0	57.0	100
			+0.0	+0.0	+0.0	+0.0	1/1				100
			+0.0	+0.0	10.0	10.0					
29	141 450k	483	+9.9	+0.0	+0.0	+0.0	-80.0	-21.8	24.9	-467	90deg
29	Ambient	-0.5	+0.0	+0.0	+0.0	+0.0	209	21.0	Noisefloor	т <b>0</b> .7	100
	mount		+0.0	+0.0	+0.0	+0.0	207		1015011001		100
			+0.0	+0.0	10.0	10.0					
30	159 0101	A7 1	+10.0	+0.0	+0.0	+0.0	-80.0	_22.0	23.0	-/68	180da
50	139.010K	+/.1	+10.0	+0.0 +0.0	+0.0 +0.0	+0.0 +0.0	-60.0 169	-22.7	23.7	-+0.0	10000
			10.0	10.0	+0.0	+0.0	102				100
			+0.0	+0.0	$\pm 0.0$	$\pm 0.0$					
L			+0.0	$\pm 0.0$							



31	12.288k	44.1	+15.5	+0.0	+0.0	+0.0	-80.0	-20.4	46.3	-66.7	180de
			+0.0	+0.0	+0.0	+0.0	360				100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
32	11.862k	44.0	+15.7	+0.0	+0.0	+0.0	-80.0	-20.3	46.6	-66.9	90deg
	Ambient		+0.0	+0.0	+0.0	+0.0	360		Noisefloor		100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
33	119.153k	28.7	+10.1	+0.0	+0.0	+0.0	-80.0	-41.2	26.4	-67.6	90deg
	Ambient		+0.0	+0.0	+0.0	+0.0	360		Noisefloor		100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							



Customer:	Impinj Inc
Specification:	FCC 15.247/15.209
Work Order #:	89028
Test Type:	Radiated Scan
Equipment:	RFID Reader
Manufacturer:	Impinj
Model:	IPJ-REV
S/N:	940-08-21-0006

Date: 2/11/2009 Time: 13:48:54 Sequence#: 5 Tested By: Armando Del Angel

## Test Equipment:

Errentian	CAL	Calibratian Data	Cal Dea Data	A seat #
Function	S/IN	Calibration Date	Cal Due Date	Asset #
Mag Loop	2156	06/04/2008	06/04/2010	AN00052
Antenna	2453	12/22/2008	12/22/2010	AN01994
EMCO 3115 Horn	9606-4854	11/12/2007	11/12/2009	AN01412
Horn Antenna, Active	1114018	11/13/2008	11/13/2010	2742
18-26GHz				
Heliax cable	N/A	07/22/2008	07/22/2010	AN05545
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03123
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03122
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03121
Cable 30'	11	11/05/2008	11/05/2010	ANP05366
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Cable 20'	16	11/10/2008	11/10/2010	ANP05360
Cable 6'	51	12/30/2008	12/30/2010	ANP05361
Pasternack Coax		07/20/2007	07/20/2009	AN05425
HP 8447D Preamp	2944A08601	07/08/2008	07/08/2010	AN01517
HP 83017A Pre-amp	3123A00464	10/02/2007	10/02/2009	AN01271
Filter	2	05/01/2008	05/01/2010	2750
Filter	311SH10-	12/02/2008	12/02/2010	3116
	3000/T10000-0/0			
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872

## Equipment Under Test (\* = EUT):

Function	Manufacturer	Model #	S/N
Circular patch antenna	Cushcraft	S90289CLJ	092436
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Support Devices			

Support Devices:			
Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	Latitude	6497402833
Wireless G Router	Belkin	F5D7230-4	2028723009696



Test Conditions / Notes:

20°C / 26% relative humidity / 102.3 kPa.

Testing Radiated Spurious Emissions per FCC 15.247(d).

The Unit is an RF reader. It is located in the back edge of the test table. All its ports are being exercised. It is being powered by the AC/DC converter. It is connected to a laptop outside the chamber through a shielded ethernet cable. The antenna is suspended 10cm above the wooden table with styrofoam. The EUT will be in transmitting mode throughout the test in the MID channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 30.0 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 915.25MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency:	9kHz - 150kHz	RBW= 200Hz,	VBW= 200Hz
	150kHz-30MHz	RBW= 9kHz,	VBW = 9kHz
	30MHz - 1GHz	RBW= 120kHz	VBW=120kHz
	1GHz-19GHz	RBW = 1 MHz,	VBW=1 MHz.

## Transducer Legend:

T1=ANT- AN00052-06042008 T3=ANT AN01994 25-1000MHz T5=CAB-ANP05361 T7=CAB-ANP05371 T9=CAB-ANP03123-120208 T11=Filter 1GHz HP AN02750 T13=AMP-AN01517-070808 T2=ANT-AN01412-111207 T4=CAB-ANP05360 T6=CAB-ANP05366 T8=CAB-ANP03121-120208 T10=CAB-ANP05545-072208 T12=FIL-AN03116-120208 T14=AMP-AN01271-100207 - .5-26.5 GHz

Measurement Data:         Reading listed by margin.         Test Distance: 3 Meters											
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
			T9	T10	T11	T12					
			T13	T14							
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	14.623M	14.9	+8.7	+0.0	+0.0	+0.2	+0.0	24.1	30.0	-5.9	90deg
	Ambient		+0.0	+0.2	+0.1	+0.0			NOISEFL	OOR	160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
2	9152.437M	32.0	+0.0	+38.8	+0.0	+0.0	+0.0	47.8	54.0	-6.2	Vert
	Ave		+0.0	+0.0	+0.0	+3.1	27				115
			+1.7	+5.3	+0.0	+0.5					
			+0.0	-33.6							
^	9152.437M	38.5	+0.0	+38.8	+0.0	+0.0	+0.0	54.3	54.0	+0.3	Vert
			+0.0	+0.0	+0.0	+3.1	27				115
			+1.7	+5.3	+0.0	+0.5					
			+0.0	-33.6							
4	100.400M	55.2	+0.0	+0.0	+10.2	+0.6	+0.0	37.8	44.0	-6.2	Vert
			+0.1	+0.6	+0.2	+0.0	360				111
			+0.0	+0.0	+0.0	+0.0					
			-29.1	+0.0							

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5 8	315.000M	41.7	+0.0	+0.0	+22.6	+1.9	+0.0	39.7	46.0	-6.3	Vert
			+0.4	+2.0	+0.5	+0.0	360				111
			+0.0	+0.0	+0.0	+0.0					
			-29.4	+0.0							
6	18.252M	14.2	+8.4	+0.0	+0.0	+0.3	+0.0	23.4	30.0	-6.6	180de
			+0.0	+0.3	+0.2	+0.0	360				160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
74	478.900M	47.3	+0.0	+0.0	+17.7	+1.5	+0.0	39.4	46.0	-6.6	Horiz
			+0.3	+1.6	+0.4	+0.0					160
			+0.0	+0.0	+0.0	+0.0					
			-29.4	+0.0							
8	25.880M	14.5	+6.7	+0.0	+0.0	+0.3	+0.0	22.0	30.0	-8.0	90deg
An	nbient		+0.0	+0.3	+0.2	+0.0	360		NOISEFL	OOR	160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
9 18	830.497M	15.1	+0.0	+26.6	+0.0	+0.0	+0.0	45.9	54.0	-8.1	Vert
Av	ve		+0.0	+0.0	+0.0	+1.1	205				115
			+0.5	+2.2	+0.4	+0.0					
			+0.0	+0.0							
^ 18	830.497M	25.7	+0.0	+26.6	+0.0	+0.0	+0.0	56.5	54.0	+2.5	Vert
			+0.0	+0.0	+0.0	+1.1	205				115
			+0.5	+2.2	+0.4	+0.0					
			+0.0	+0.0							
11 1	102.200M	53.1	+0.0	+0.0	+10.4	+0.6	+0.0	35.9	44.0	-8.1	Horiz
			+0.1	+0.6	+0.2	+0.0	39				160
			+0.0	+0.0	+0.0	+0.0					
			-29.1	+0.0							
12	12.019M	11.5	+9.0	+0.0	+0.0	+0.2	+0.0	21.0	30.0	-9.0	180de
Ar	nbient		+0.0	+0.2	+0.1	+0.0			NOISEFL	OOR	160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
13 9	941.040M	37.5	+0.0	+0.0	+23.7	+1.9	+0.0	37.0	46.0	-9.0	Horiz
Ar	nbient		+0.5	+2.1	+0.5	+0.0	360		NOISEFL	OOR	160
			+0.0	+0.0	+0.0	+0.0					
			-29.2	+0.0							
14 1'	7390.140	21.5	+0.0	+41.9	+0.0	+0.0	+0.0	43.8	54.0	-10.2	Horiz
	Μ		+0.0	+0.0	+0.0	+3.3					
Ar	nbient		+1.3	+8.1	+0.0	+0.6	360		NOISEFL	OOR	115
			+0.0	-32.9							
15 1	169.200M	47.9	+0.0	+0.0	+9.8	+0.8	+0.0	31.0	44.0	-13.0	Horiz
			+0.2	+0.9	+0.2	+0.0					160
			+0.0	+0.0	+0.0	+0.0					
			-28.8	+0.0							
16 18	830.497M	10.0	+0.0	+26.6	+0.0	+0.0	+0.0	40.8	54.0	-13.2	Horiz
Av	ve		+0.0	+0.0	+0.0	+1.1	205				115
			+0.5	+2.2	+0.4	+0.0					
			+0.0	+0.0							
^ 18	830.497M	22.5	+0.0	+26.6	+0.0	+0.0	+0.0	53.3	54.0	-0.7	Horiz
			+0.0	+0.0	+0.0	+1.1	205				115
			+0.5	+2.2	+0.4	+0.0					
			+0.0	+0.0							



10 131.700101	46.1	+0.0	+0.0	+11.7	+0.7	+0.0	30.7	44.0	-13.3	Vert
		+0.2	+0.7	+0.3	+0.0	360				111
		+0.0	+0.0	+0.0	+0.0					
		-29.0	+0.0							
19 7321.991M	28.8	+0.0	+36.4	+0.0	+0.0	+0.0	38.9	54.0	-15.1	Vert
Ave		+0.0	+0.0	+0.0	+2.3	342				114
		+1.1	+4.7	+0.0	+0.3					
		+0.0	-34.7							
^ 7321.991M	37.3	+0.0	+36.4	+0.0	+0.0	+0.0	47.4	54.0	-6.6	Vert
		+0.0	+0.0	+0.0	+2.3	342				114
		+1.1	+4.7	+0.0	+0.3					
		+0.0	-34.7							
21 3661.005M	32.7	+0.0	+31.9	+0.0	+0.0	+0.0	37.9	54.0	-16.1	Horiz
Ave		+0.0	+0.0	+0.0	+1.7	253				125
		+0.6	+3.0	+0.0	+0.7					
		+0.0	-32.7							
^ 3661.005M	41.2	+0.0	+31.9	+0.0	+0.0	+0.0	46.4	54.0	-7.6	Horiz
		+0.0	+0.0	+0.0	+1.7	253				125
		+0.6	+3.0	+0.0	+0.7					
		+0.0	-32.7							
23 3661.005M	32.3	+0.0	+31.9	+0.0	+0.0	+0.0	37.5	54.0	-16.5	Vert
Ave		+0.0	+0.0	+0.0	+1.7	249				125
		+0.6	+3.0	+0.0	+0.7					
		+0.0	-32.7							
^ 3661.005M	39.8	+0.0	+31.9	+0.0	+0.0	+0.0	45.0	54.0	-9.0	Vert
		+0.0	+0.0	+0.0	+1.7	249				125
		+0.6	+3.0	+0.0	+0.7					
		+0.0	-32.7							
25 982.480M	35.8	+0.0	+0.0	+24.2	+1.9	+0.0	35.9	54.0	-18.1	Vert
			10.0				55.7	6	10.1	
Ambient		+0.5	+2.2	+0.4	+0.0	247	5517	NOISEFL	OOR	111
Ambient		+0.5 +0.0	+2.2 +0.0	+0.4 +0.0	$^{+0.0}_{+0.0}$	247	55.7	NOISEFL	OOR	111
Ambient		+0.5 +0.0 -29.1	+2.2 +0.0 +0.0	+0.4 +0.0	+0.0 +0.0	247	5017	NOISEFL	OOR	111
Ambient 26 7321.991M	25.2	+0.5 +0.0 -29.1 +0.0	+2.2 +0.0 +0.0 +36.4	+0.4 +0.0 +0.0	+0.0 +0.0 +0.0	247 +0.0	35.3	NOISEFLO	-18.7	111 Horiz
Ambient 26 7321.991M Ave	25.2	+0.5 +0.0 -29.1 +0.0 +0.0	+2.2 +0.0 +0.0 +36.4 +0.0	+0.4 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +2.3	247 +0.0 24	35.3	NOISEFLO	-18.7	111 Horiz 114
Ambient 26 7321.991M Ave	25.2	+0.5 +0.0 -29.1 +0.0 +0.0 +1.1	+2.2 +0.0 +0.0 +36.4 +0.0 +4.7	+0.4 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +2.3 +0.3	247 +0.0 24	35.3	NOISEFLO	-18.7	111 Horiz 114
Ambient 26 7321.991M Ave	25.2	+0.5 +0.0 -29.1 +0.0 +0.0 +1.1 +0.0	+2.2 +0.0 +0.0 +36.4 +0.0 +4.7 -34.7	+0.4 +0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +2.3 +0.3	247 +0.0 24	35.3	NOISEFLO	-18.7	111 Horiz 114
Ambient 26 7321.991M Ave ^ 7321.991M	25.2	$ \begin{array}{r} +0.5 \\ +0.0 \\ -29.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +0.0 \\ \end{array} $	+2.2 +0.0 +0.0 +36.4 +0.0 +4.7 -34.7 +36.4	+0.4 +0.0 +0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +2.3 +0.3 +0.0	247 +0.0 24 +0.0	35.3	NOISEFL0 54.0 54.0	-18.7 -7.9	111 Horiz 114 Horiz
Ambient 26 7321.991M Ave ^ 7321.991M	25.2 36.0	$ \begin{array}{r} +0.5 \\ +0.0 \\ -29.1 \\ +0.0 \\ +1.1 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ \end{array} $	+2.2 +0.0 +0.0 +36.4 +0.0 +4.7 -34.7 +36.4 +0.0	+0.4 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +2.3 +0.3 +0.3 +0.0 +2.3	247 +0.0 24 +0.0 24	35.3	NOISEFL0 54.0 54.0	-18.7 -7.9	111 Horiz 114 Horiz 114
Ambient 26 7321.991M Ave ^ 7321.991M	25.2	$\begin{array}{r} +0.5 \\ +0.0 \\ -29.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +0.0 \\ +0.0 \\ +1.1 \end{array}$	+2.2 +0.0 +0.0 +36.4 +0.0 +4.7 -34.7 +36.4 +0.0 +4.7	$ \begin{array}{r} +0.4 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ \end{array} $	+0.0 +0.0 +2.3 +0.3 +0.0 +2.3 +0.0 +2.3 +0.3	247 +0.0 24 +0.0 24	35.3	NOISEFL 54.0 54.0	-18.7 -7.9	111 Horiz 114 Horiz 114
Ambient 26 7321.991M Ave ^ 7321.991M	25.2	$\begin{array}{r} +0.5 \\ +0.0 \\ -29.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +1.1 \\ +0.0 \end{array}$	+2.2 +0.0 +0.0 +36.4 +0.0 +4.7 -34.7 +36.4 +0.0 +4.7 -34.7	+0.4 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +2.3 +0.3 +0.0 +2.3 +0.3	247 +0.0 24 +0.0 24	35.3	54.0	-18.7 -7.9	111 Horiz 114 Horiz 114
Ambient 26 7321.991M Ave ^ 7321.991M 28 5491.545M	25.2 36.0 26.3	$\begin{array}{r} +0.5 \\ +0.0 \\ -29.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +0.0 \\ +0.0 \end{array}$	$\begin{array}{r} +2.2 \\ +0.0 \\ +0.0 \\ +36.4 \\ +0.0 \\ +4.7 \\ -34.7 \\ +36.4 \\ +0.0 \\ +4.7 \\ -34.7 \\ +34.7 \end{array}$	$ \begin{array}{r} +0.4 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ \end{array} $	$ \begin{array}{r} +0.0 \\ +0.0 \\ +2.3 \\ +0.3 \\ \hline +0.0 \\ +2.3 \\ +0.3 \\ \hline +0.0 \\ +0.0 \\ \end{array} $	247 +0.0 24 +0.0 24 +0.0	35.3 46.1 34.9	NOISEFL4 54.0 54.0 54.0	-18.7 -7.9 -19.1	111 Horiz 114 Horiz 114 Horiz
Ambient 26 7321.991M Ave ^ 7321.991M 28 5491.545M Ave	25.2 36.0 26.3	$\begin{array}{r} +0.5 \\ +0.0 \\ -29.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +1.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ -$	+2.2 +0.0 +0.0 +36.4 +0.0 +4.7 -34.7 +36.4 +0.0 +4.7 -34.7 +34.7 +0.0	$ \begin{array}{r} +0.4 \\ +0.0 \\ +$	+0.0 +0.0 +2.3 +0.3 +0.0 +2.3 +0.3 +0.3 +0.0 +2.0	247 +0.0 24 +0.0 24 +0.0 325	35.3 46.1 34.9	NOISEFL0 54.0 54.0	-18.7 -7.9 -19.1	111 Horiz 114 Horiz 114 Horiz 152
Ambient 26 7321.991M Ave ^ 7321.991M 28 5491.545M Ave	25.2 36.0 26.3	$\begin{array}{c} +0.5 \\ +0.0 \\ -29.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.8 \\ -0.0 \\ -0.8 \\ -0.0 \end{array}$	+2.2 +0.0 +0.0 +36.4 +0.0 +4.7 -34.7 +36.4 +0.0 +4.7 -34.7 +34.7 +34.7 +0.0 +3.9 22.2	$ \begin{array}{r} +0.4 \\ +0.0 \\ +$	$ \begin{array}{r} +0.0 \\ +0.0 \\ +0.0 \\ +2.3 \\ +0.3 \\ \hline +0.0 \\ +2.3 \\ +0.3 \\ \hline +0.0 \\ +2.0 \\ +0.5 \end{array} $	247 +0.0 24 +0.0 24 +0.0 325	35.3 46.1 34.9	NOISEFL0 54.0 54.0 54.0	-18.7 -7.9 -19.1	111 Horiz 114 Horiz 114 Horiz 152
Ambient 26 7321.991M Ave ^ 7321.991M 28 5491.545M Ave	25.2 36.0 26.3	$\begin{array}{r} +0.5 \\ +0.0 \\ -29.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.8 \\ +0.0 \\ \hline \end{array}$	$\begin{array}{r} +2.2 \\ +0.0 \\ +0.0 \\ +36.4 \\ +0.0 \\ +4.7 \\ -34.7 \\ +36.4 \\ +0.0 \\ +4.7 \\ -34.7 \\ +34.7 \\ +34.7 \\ +0.0 \\ +3.9 \\ -33.3 \end{array}$	$ \begin{array}{c} +0.4 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ \end{array} $	$ \begin{array}{r} +0.0 \\ +0.0 \\ +0.0 \\ +2.3 \\ +0.3 \\ +0.3 \\ +0.0 \\ +2.3 \\ +0.3 \\ +0.0 \\ +2.0 \\ +0.5 \\ \end{array} $	247 +0.0 24 +0.0 24 +0.0 325	35.3 46.1 34.9	NOISEFL0 54.0 54.0 54.0	-18.7 -7.9 -19.1	111 Horiz 114 Horiz 114 Horiz 152
Ambient 26 7321.991M Ave ^ 7321.991M 28 5491.545M Ave ^ 5491.545M	25.2 36.0 26.3 37.5	$\begin{array}{c} +0.5 \\ +0.0 \\ -29.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.8 \\ +0.0 \\ +0.0 \\ +0.0 \\ \end{array}$	$\begin{array}{r} +2.2 \\ +0.0 \\ +0.0 \\ +36.4 \\ +0.0 \\ +4.7 \\ -34.7 \\ +36.4 \\ +0.0 \\ +4.7 \\ -34.7 \\ +34.7 \\ +0.0 \\ +3.9 \\ -33.3 \\ +34.7 \end{array}$	$ \begin{array}{c} +0.4 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ \end{array} $	$ \begin{array}{r} +0.0 \\ +0.0 \\ +0.0 \\ +2.3 \\ +0.3 \\ +0.3 \\ +0.3 \\ +0.0 \\ +2.0 \\ +0.5 \\ +0.0 \\ +0.5 \end{array} $	247 +0.0 24 +0.0 24 +0.0 325 +0.0	35.3 46.1 34.9 46.1	NOISEFL0 54.0 54.0 54.0 54.0	-18.7 -7.9 -19.1 -7.9	111 Horiz 114 Horiz 114 Horiz 152 Horiz
Ambient 26 7321.991M Ave ^ 7321.991M 28 5491.545M Ave ^ 5491.545M	25.2 36.0 26.3 37.5	$\begin{array}{c} +0.5 \\ +0.0 \\ -29.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +$	$\begin{array}{r} +2.2 \\ +0.0 \\ +0.0 \\ +36.4 \\ +0.0 \\ +4.7 \\ -34.7 \\ +36.4 \\ +0.0 \\ +4.7 \\ -34.7 \\ +34.7 \\ +0.0 \\ +3.9 \\ -33.3 \\ +34.7 \\ +0.0 \end{array}$	$\begin{array}{c} +0.4 \\ +0.0 \\ +0$	$ \begin{array}{r} +0.0 \\ +0.0 \\ +0.0 \\ +2.3 \\ +0.3 \\ +0.3 \\ +0.3 \\ +0.0 \\ +2.0 \\ +0.5 \\ +0.0 \\ +2.0 \\ +0.5 \end{array} $	$ \begin{array}{c} +0.0 \\ 24 \\ +0.0 \\ 24 \\ +0.0 \\ 325 \\ +0.0 \\ 325 \\ \end{array} $	35.3 46.1 34.9 46.1	NOISEFL0 54.0 54.0 54.0 54.0	-18.7 -7.9 -7.9 -7.9	111 Horiz 114 Horiz 152 Horiz 152
Ambient 26 7321.991M Ave ^ 7321.991M 28 5491.545M Ave ^ 5491.545M	25.2 36.0 26.3 37.5	$\begin{array}{c} +0.5 \\ +0.0 \\ -29.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +$	$\begin{array}{r} +2.2 \\ +0.0 \\ +0.0 \\ +36.4 \\ +0.0 \\ +4.7 \\ -34.7 \\ +36.4 \\ +0.0 \\ +4.7 \\ -34.7 \\ +36.4 \\ +0.0 \\ +3.9 \\ -33.3 \\ +34.7 \\ +0.0 \\ +3.9 \\ -33.3 \end{array}$	$\begin{array}{c} +0.4 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \end{array}$	$\begin{array}{r} +0.0 \\ +0.0 \\ +0.0 \\ +2.3 \\ +0.3 \\ +0.3 \\ +0.3 \\ +0.0 \\ +2.0 \\ +0.5 \\ +0.0 \\ +2.0 \\ +0.5 \end{array}$	$ \begin{array}{r}     247 \\     +0.0 \\     24 \\     +0.0 \\     325 \\     +0.0 \\     325 \\   \end{array} $	35.3 46.1 34.9 46.1	NOISEFL0 54.0 54.0 54.0 54.0	-18.7 -7.9 -19.1	111 Horiz 114 Horiz 152 Horiz 152
Ambient 26 7321.991M Ave ^ 7321.991M 28 5491.545M Ave ^ 5491.545M	25.2 36.0 26.3 37.5	$\begin{array}{c} +0.5 \\ +0.0 \\ -29.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +$	$\begin{array}{r} +2.2 \\ +0.0 \\ +0.0 \\ +36.4 \\ +0.0 \\ +4.7 \\ -34.7 \\ +36.4 \\ +0.0 \\ +4.7 \\ -34.7 \\ +36.4 \\ +0.0 \\ +3.9 \\ -33.3 \\ +34.7 \\ +0.0 \\ +3.9 \\ -33.3 \\ \hline \end{array}$	$ \begin{array}{c} +0.4 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ -0.0 \\ \end{array} $	$\begin{array}{r} +0.0 \\ +0.0 \\ +0.0 \\ +2.3 \\ +0.3 \\ +0.3 \\ +0.0 \\ +2.3 \\ +0.3 \\ +0.0 \\ +2.0 \\ +0.5 \\ \hline +0.0 \\ +2.0 \\ +0.5 \\ \hline \end{array}$	247 +0.0 24 +0.0 24 +0.0 325 +0.0 325	35.3 46.1 34.9 46.1	NOISEFL4 54.0 54.0 54.0	-18.7 -7.9 -19.1 -7.9	111 Horiz 114 Horiz 152 Horiz 152
Ambient 26 7321.991M Ave ^ 7321.991M 28 5491.545M Ave ^ 5491.545M 30 5491.545M	25.2 36.0 26.3 37.5 25.8	$\begin{array}{c} +0.5 \\ +0.0 \\ -29.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +$	$\begin{array}{r} +2.2 \\ +0.0 \\ +0.0 \\ +36.4 \\ +0.0 \\ +4.7 \\ -34.7 \\ +36.4 \\ +0.0 \\ +4.7 \\ -34.7 \\ +0.0 \\ +3.9 \\ -33.3 \\ +34.7 \\ +0.0 \\ +3.9 \\ -33.3 \\ +34.7 \\ +0.0 \\ +3.9 \\ -33.3 \\ +34.7 \end{array}$	$\begin{array}{c} +0.4 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \end{array}$	$\begin{array}{r} +0.0 \\ +0.0 \\ +0.0 \\ +2.3 \\ +0.3 \\ +0.3 \\ +0.0 \\ +2.3 \\ +0.0 \\ +2.0 \\ +0.5 \\ +0.0 \\ +2.0 \\ +0.5 \\ +0.0 \\ +0.5 \end{array}$	$ \begin{array}{c} 247 \\ +0.0 \\ 24 \\ +0.0 \\ 325 \\ +0.0 \\ 325 \\ +0.0 \\ 325 \\ \end{array} $	35.3 46.1 34.9 34.4	NOISEFL0 54.0 54.0 54.0 54.0 54.0	-18.7 -7.9 -19.1 -19.6	111 Horiz 114 Horiz 114 Horiz 152 Horiz 152
Ambient 26 7321.991M Ave ^ 7321.991M 28 5491.545M Ave ^ 5491.545M 30 5491.545M Ave	25.2 36.0 26.3 37.5 25.8	$\begin{array}{c} +0.5 \\ +0.0 \\ -29.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +$	$\begin{array}{r} +2.2 \\ +0.0 \\ +0.0 \\ +36.4 \\ +0.0 \\ +4.7 \\ -34.7 \\ +36.4 \\ +0.0 \\ +4.7 \\ -34.7 \\ +0.0 \\ +3.9 \\ -33.3 \\ +34.7 \\ +0.0 \\ +3.9 \\ -33.3 \\ +34.7 \\ +0.0 \\ +3.9 \\ -33.3 \end{array}$	$\begin{array}{c} +0.4 \\ +0.0 \\ +0$	$\begin{array}{c} +0.0 \\ +0.0 \\ +0.0 \\ +2.3 \\ +0.3 \\ +0.0 \\ +2.3 \\ +0.3 \\ +0.0 \\ +2.0 \\ +0.5 \\ +0.0 \\ +2.0 \\ +0.5 \\ +0.0 \\ +2.0 \\ +0.5 \end{array}$	247 +0.0 24 +0.0 24 +0.0 325 +0.0 325 +0.0 234	35.3 46.1 34.9 46.1 34.4	NOISEFL0 54.0 54.0 54.0 54.0 54.0	-18.7 -7.9 -19.1 -7.9 -19.6	111 Horiz 114 Horiz 114 Horiz 152 Horiz 152 Vert 125
Ambient 26 7321.991M Ave ^ 7321.991M 28 5491.545M Ave ^ 5491.545M 30 5491.545M Ave	25.2 36.0 26.3 37.5 25.8	$\begin{array}{c} +0.5 \\ +0.0 \\ -29.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +0.0 \\ +1.1 \\ +0.0 \\ +$	$\begin{array}{r} +2.2\\ +0.0\\ +2.2\\ +0.0\\ +36.4\\ +0.0\\ +4.7\\ -34.7\\ +36.4\\ +0.0\\ +4.7\\ -34.7\\ +36.4\\ +0.0\\ +3.9\\ -33.3\\ +34.7\\ +0.0\\ +3.9\\ -33.3\\ +34.7\\ +0.0\\ +3.9\\ -33.3\end{array}$	$\begin{array}{c} +0.4 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \end{array}$	$\begin{array}{c} +0.0 \\ +0.0 \\ +0.0 \\ +2.3 \\ +0.3 \\ +0.0 \\ +2.3 \\ +0.3 \\ +0.0 \\ +2.0 \\ +0.5 \\ \hline +0.0 \\ +2.0 \\ +0.5 \\ \hline +0.0 \\ +2.0 \\ +0.5 \end{array}$	$ \begin{array}{r}     247 \\     +0.0 \\     24 \\     +0.0 \\     325 \\     +0.0 \\     325 \\     +0.0 \\     234 \\ \end{array} $	35.3 46.1 34.9 46.1 34.4	NOISEFL0 54.0 54.0 54.0 54.0 54.0	-18.7 -7.9 -19.1 -7.9 -19.6	111 Horiz 114 Horiz 114 Horiz 152 Horiz 152 Vert 125



^	5491.545M	36.6	+0.0	+34.7	+0.0	+0.0	+0.0	45.2	54.0	-8.8	Vert
			+0.0	+0.0	+0.0	+2.0	234				125
			+0.8	+3.9	+0.0	+0.5					
			+0.0	-33.3							
32	935.160k	32.7	+9.9	+0.0	+0.0	+0.1	-40.0	2.8	28.3	-25.5	90deg
			+0.0	+0.1	+0.0	+0.0	150				160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
33	172.170k	51.5	+10.0	+0.0	+0.0	+0.0	-80.0	-18.5	23.2	-41.7	90deg
			+0.0	+0.0	+0.0	+0.0	150				160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
34	150.000k	46.5	+10.0	+0.0	+0.0	+0.0	-80.0	-23.5	24.4	-47.9	180de
	Ambient		+0.0	+0.0	+0.0	+0.0	360		NOISEFL	OOR	160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
35	61.600k	38.8	+10.1	+0.0	+0.0	+0.0	-80.0	-31.1	32.2	-63.3	90deg
			+0.0	+0.0	+0.0	+0.0	244				160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
36	14.508k	45.6	+14.6	+0.0	+0.0	+0.0	-80.0	-19.8	44.8	-64.6	90deg
			+0.0	+0.0	+0.0	+0.0	144				160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
37	17.753k	44.6	+13.5	+0.0	+0.0	+0.0	-80.0	-21.9	43.1	-65.0	90deg
			+0.0	+0.0	+0.0	+0.0	160				160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
38	18.313k	43.5	+13.4	+0.0	+0.0	+0.0	-80.0	-23.1	42.8	-65.9	180de
	Ambient		+0.0	+0.0	+0.0	+0.0	159	HOISEFLOOR		OOR	160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							


Customer:	Impinj Inc
Specification:	FCC 15.247/15.209
Work Order #:	89028
Test Type:	<b>Radiated Scan</b>
Equipment:	<b>RFID Reader</b>
Manufacturer:	Impinj
Model:	IPJ-REV
S/N:	940-08-21-0006

Date: 2/11/2009 Time: 10:47:00 Sequence#: 3 Tested By: Armando Del Angel

### Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Mag Loop	2156	06/04/2008	06/04/2010	AN00052
Antenna	2453	12/22/2008	12/22/2010	AN01994
EMCO 3115 Horn	9606-4854	11/12/2007	11/12/2009	AN01412
Horn Antenna, Active	1114018	11/13/2008	11/13/2010	2742
18-26GHz				
Heliax cable	N/A	07/22/2008	07/22/2010	AN05545
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03123
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03122
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03121
Cable 30'	11	11/05/2008	11/05/2010	ANP05366
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Cable 20'	16	11/10/2008	11/10/2010	ANP05360
Cable 6'	51	12/30/2008	12/30/2010	ANP05361
Pasternack Coax		07/20/2007	07/20/2009	AN05425
HP 8447D Preamp	2944A08601	07/08/2008	07/08/2010	AN01517
HP 83017A Pre-amp	3123A00464	10/02/2007	10/02/2009	AN01271
Filter	2	05/01/2008	05/01/2010	2750
Filter	311SH10-	12/02/2008	12/02/2010	3116
	3000/T10000-0/0			
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872

Function	Manufacturer	Model #	S/N
Circular patch antenna	Cushcraft	S90289CLJ	092436
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Antenna cable	Manhattan/CDT	M4213	1354 E12091
Support Devices:			

Function	Manufacturer	Model #	S/N
Wireless G Router	Belkin	F5D7230-4	2028723009696
Laptop Computer	Dell	Latitude	6497402833



20°C / 26% relative humidity / 102.3 kPa.

Testing Radiated Spurious Emissions per FCC 15.247(d)

The Unit is an RF reader. It is located in the back edge of the test table. All its ports are being exercised. It is being powered by the AC/DC converter. It is connected to a laptop outside the chamber through a shielded ethernet cable. The antenna is suspended 10cm above the wooden table with styrofoam. The EUT will be in transmitting mode throughout the test in the High channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 32.5 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 927.25MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency:	9kHz - 150kHz	RBW= 200Hz,	VBW= 200Hz
	150kHz-30MHz	RBW= 9kHz,	VBW = 9kHz
	30MHz - 1GHz	RBW= 120kHz	VBW=120kHz
	1GHz-19GHz	RBW = 1 MHz,	VBW=1 MHz.

#### Transducer Legend:

T1=ANT- AN00052-06042008 T3=ANT AN01994 25-1000MHz T5=CAB-ANP05361 T7=CAB-ANP05371 T9=CAB-ANP03123-120208 T11=Filter 1GHz HP AN02750 T13=AMP-AN01517-070808

Meası	irement Data:	R	eading lis	ted by ma	argin.	Test Distance: 3 Meters					
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
			T9	T10	T11	T12					
			T13	T14							
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	17707.000	28.5	+0.0	+43.4	+0.0	+0.0	+0.0	52.8	54.0	-1.2	Horiz
	Μ		+0.0	+0.0	+0.0	+3.6					
	Ambient		+1.4	+8.1	+0.0	+0.9	360		Noisefloor		118
			+0.0	-33.1							
2	11959.810	35.6	+0.0	+39.4	+0.0	+0.0	+0.0	51.3	54.0	-2.7	Horiz
	Μ		+0.0	+0.0	+0.0	+3.2					
	Ambient		+1.9	+6.2	+0.0	+0.5	83		Noisefloor		99
			+0.0	-35.5							
3	1855.000M	18.7	+0.0	+26.8	+0.0	+0.0	+0.0	49.7	54.0	-4.3	Vert
			+0.0	+0.0	+0.0	+1.1	195				126
			+0.5	+2.2	+0.4	+0.0					
			+0.0	+0.0							
4	102.090M	54.8	+0.0	+0.0	+10.4	+0.6	+0.0	37.6	44.0	-6.4	Vert
			+0.1	+0.6	+0.2	+0.0	360				99
			+0.0	+0.0	+0.0	+0.0					
			-29.1	+0.0							



5	15584.450	28.7	+0.0	+38.6	+0.0	+0.0	+0.0	46.9	54.0	-7.1	Vert
	М		+0.0	+0.0	+0.0	+3.2					
	Ambient		+0.9	+7.3	+0.0	+0.5	236		Noisefloor		118
			+0.0	-32.3							
6	7418.061M	36.4	+0.0	+36.5	+0.0	+0.0	+0.0	46.8	54.0	-7.2	Horiz
			+0.0	+0.0	+0.0	+2.3	180				113
			+1.1	+4.7	+0.0	+0.3					
			+0.0	-34.5							
7	826.550M	40.7	+0.0	+0.0	+22.7	+1.8	+0.0	38.6	46.0	-7.4	Vert
			+0.4	+2.0	+0.4	+0.0	360				99
			+0.0	+0.0	+0.0	+0.0					
			-29.4	+0.0							
8	5563.488M	37.6	+0.0	+34.7	+0.0	+0.0	+0.0	46.0	54.0	-8.0	Horiz
			+0.0	+0.0	+0.0	+1.9	23				112
			+0.8	+4.0	+0.0	+0.4					
			+0.0	-33.4							
9	102.090M	52.9	+0.0	+0.0	+10.4	+0.6	+0.0	35.7	44.0	-8.3	Horiz
			+0.1	+0.6	+0.2	+0.0					160
			+0.0	+0.0	+0.0	+0.0					
			-29.1	+0.0							
10	27.070M	13.5	+6.9	+0.0	+0.0	+0.3	+0.0	21.2	30.0	-8.8	180de
	Ave		+0.0	+0.3	+0.2	+0.0	111				100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
^	27.070M	22.9	+6.9	+0.0	+0.0	+0.3	+0.0	30.6	30.0	+0.6	180de
			+0.0	+0.3	+0.2	+0.0	111				100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
12	8386.000M	31.7	+0.0	+37.7	+0.0	+0.0	+0.0	45.2	54.0	-8.8	Vert
	Ambient		+0.0	+0.0	+0.0	+2.8			Noisefloor		123
			+1.4	+5.2	+0.0	+0.5					
			+0.0	-34.1							
13	1855.000M	14.0	+0.0	+26.8	+0.0	+0.0	+0.0	45.0	54.0	-9.0	Horiz
			+0.0	+0.0	+0.0	+1.1	195				126
			+0.5	+2.2	+0.4	+0.0					
			+0.0	+0.0							
14	2781.750M	8.7	+0.0	+30.0	+0.0	+0.0	+0.0	43.9	54.0	-10.1	Vert
			+0.0	+0.0	+0.0	+1.4	195				126
			+0.5	+2.7	+0.6	+0.0					
			+0.0	+0.0							
15	22.840M	10.9	+7.3	+0.0	+0.0	+0.3	+0.0	19.0	30.0	-11.0	180de
	Ave		+0.0	+0.3	+0.2	+0.0					100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
^	22.840M	18.0	+7.3	+0.0	+0.0	+0.3	+0.0	26.1	30.0	-3.9	180de
			+0.0	+0.3	+0.2	+0.0					100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
17	466.100M	43.0	+0.0	+0.0	+17.5	+1.5	+0.0	34.9	46.0	-11.1	Horiz
			+0.3	+1.6	+0.4	+0.0					160
			+0.0	+0.0	+0.0	+0.0					



18 68.270M	50.0	+0.0	+0.0	+6.1	+0.5	+0.0	28.2	40.0	-11.8	Vert
		+0.1	+0.5	+0.2	+0.0	360				99
		+0.0	+0.0	+0.0	+0.0					
		-29.2	+0.0							
19 2781.750M	7.0	+0.0	+30.0	+0.0	+0.0	+0.0	42.2	54.0	-11.8	Horiz
		+0.0	+0.0	+0.0	+1.4	195				126
		+0.5	+2.7	+0.6	+0.0					
		+0.0	+0.0							
20 956.180M	33.6	+0.0	+0.0	+23.8	+1.9	+0.0	33.2	46.0	-12.8	Horiz
		+0.5	+2.1	+0.5	+0.0	321				160
		+0.0	+0.0	+0.0	+0.0					
		-29.2	+0.0							
21 5563.473M	31.4	+0.0	+34.7	+0.0	+0.0	+0.0	39.8	54.0	-14.2	Vert
Ave		+0.0	+0.0	+0.0	+1.9	344				133
		+0.8	+4.0	+0.0	+0.4					
		+0.0	-33.4							
^ 5563.473M	39.5	+0.0	+34.7	+0.0	+0.0	+0.0	47.9	54.0	-6.1	Vert
		+0.0	+0.0	+0.0	+1.9	344				133
		+0.8	+4.0	+0.0	+0.4					
		+0.0	-33.4							
23 167.060M	46.0	+0.0	+0.0	+10.0	+0.8	+0.0	29.3	44.0	-14.7	Horiz
		+0.2	+0.9	+0.2	+0.0					160
		+0.0	+0.0	+0.0	+0.0					
		-28.8	+0.0							
24 7417.934M	28.3	+0.0	+36.5	+0.0	+0.0	+0.0	38.7	54.0	-15.3	Vert
Ave		+0.0	+0.0	+0.0	+2.3	180				123
		+1.1	+4.7	+0.0	+0.3					
		+0.0	-34.5							
^ 7417.934M	38.8	+0.0	+36.5	+0.0	+0.0	+0.0	49.2	54.0	-4.8	Vert
		+0.0	+0.0	+0.0	+2.3	180				123
		+1.1	+4.7	+0.0	+0.3					
		+0.0	-34.5							
26 18.244M	3.2	+8.4	+0.0	+0.0	+0.3	+0.0	12.4	30.0	-17.6	90deg
Ave		+0.0	+0.3	+0.2	+0.0	360				100
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
^ 18.244M	14.5	+8.4	+0.0	+0.0	+0.3	+0.0	23.7	30.0	-6.3	90deg
		+0.0	+0.3	+0.2	+0.0	360				100
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
28 23.131M	0.7	+7.2	+0.0	+0.0	+0.3	+0.0	8.7	30.0	-21.3	90deg
Ave		+0.0	+0.3	+0.2	+0.0	360				100
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
^ 23.131M	10.8	+7.2	+0.0	+0.0	+0.3	+0.0	18.8	30.0	-11.2	90deg
		+0.0	+0.3	+0.2	+0.0	355				100
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
30 992.650M	30.7	+0.0	+0.0	+24.3	+2.0	+0.0	30.9	54.0	-23.1	Vert
		+0.5	+2.1	+0.3	+0.0	360				99
		+0.0	+0.0	+0.0	+0.0					
		-29.0	+0.0							



31	146.720k	46.9	+10.0	+0.0	+0.0	+0.0	-80.0	-23.1	24.6	-47.7	90deg
			+0.0	+0.0	+0.0	+0.0	337				100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
32	150.000k	46.1	+10.0	+0.0	+0.0	+0.0	-80.0	-23.9	24.4	-48.3	180de
			+0.0	+0.0	+0.0	+0.0	81				100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
33	35.120k	42.4	+11.0	+0.0	+0.0	+0.0	-80.0	-26.6	37.1	-63.7	180de
			+0.0	+0.0	+0.0	+0.0					100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
34	13.988k	43.5	+14.8	+0.0	+0.0	+0.0	-80.0	-21.7	45.1	-66.8	90deg
			+0.0	+0.0	+0.0	+0.0	111				100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
35	9.550k	43.2	+0.0	+0.0	+0.0	+0.0	-80.0	-36.8	48.5	-85.3	180de
			+0.0	+0.0	+0.0	+0.0	39				100
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							



Customer:	Impinj Inc
Specification:	FCC 15.247/15.209
Work Order #:	89028
Test Type:	Radiated Scan
Equipment:	RFID Reader
Manufacturer:	Impinj
Model:	IPJ-REV
S/N:	940-08-21-0006

Date: 2/11/2009 Time: 14:00:00 Sequence#: 4 Tested By: Armando Del Angel

### Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Mag Loop	2156	06/04/2008	06/04/2010	AN00052
Antenna	2453	12/22/2008	12/22/2010	AN01994
EMCO 3115 Horn	9606-4854	11/12/2007	11/12/2009	AN01412
Horn Antenna, Active	1114018	11/13/2008	11/13/2010	2742
Heliax cable	N/A	07/22/2008	07/22/2010	AN05545
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03123
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03122
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03121
Cable 30'	11	11/05/2008	11/05/2010	ANP05366
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Cable 20'	16	11/10/2008	11/10/2010	ANP05360
Cable 6'	51	12/30/2008	12/30/2010	ANP05361
Pasternack Coax		07/20/2007	07/20/2009	AN05425
HP 8447D Preamp	2944A08601	07/08/2008	07/08/2010	AN01517
HP 83017A Pre-amp	3123A00464	10/02/2007	10/02/2009	AN01271
Filter	2	05/01/2008	05/01/2010	2750
Filter	311SH10-	12/02/2008	12/02/2010	3116
	3000/T10000-0/0			
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872

Function	Manufacturer	Model #	S/N
Circular patch antenna	Cushcraft	S90289CLJ	092436
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Sunnart Devices			

Support Devices.			
Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	Latitude	6497402833
Wireless G Router	Belkin	F5D7230-4	2028723009696



20°C / 26% relative humidity / 102.3 kPa.

Testing Radiated Spurious Emissions per FCC 15.247(d)

The Unit is an RF reader. It is located in the back edge of the test table. All its ports are being exercised. It is being powered by the AC/DC converter. It is connected to a laptop outside the chamber through a shielded ethernet cable. The antenna is suspended 10cm above the wooden table with styrofoam. The EUT will be in transmitting mode throughout the test in the HIGH channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 30.0 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 927.25MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency:	9kHz - 150kHz	RBW= 200Hz,	VBW= 200Hz
	150kHz-30MHz	RBW= 9kHz,	VBW = 9kHz
	30MHz - 1GHz	RBW= 120kHz	VBW=120kHz
	1GHz-19GHz	RBW = 1 MHz,	VBW=1 MHz.

#### Transducer Legend:

T1=ANT- AN00052-06042008 T3=ANT AN01994 25-1000MHz T5=CAB-ANP05361 T7=CAB-ANP05371 T9=CAB-ANP03123-120208 T11=Filter 1GHz HP AN02750 T13=AMP-AN01517-070808

Me	asu	rement Data:	R	eading lis	ted by ma	argin.	Test Distance: 3 Meters					
#		Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
				T5	T6	T7	T8					
				T9	T10	T11	T12					
				T13	T14							
		MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
	1	1854.500M	18.1	+0.0	+26.8	+0.0	+0.0	+0.0	49.1	54.0	-4.9	Vert
		Ave		+0.0	+0.0	+0.0	+1.1	204				119
				+0.5	+2.2	+0.4	+0.0					
				+0.0	+0.0							
	۸	1854.500M	27.2	+0.0	+26.8	+0.0	+0.0	+0.0	58.2	54.0	+4.2	Vert
				+0.0	+0.0	+0.0	+1.1	204				119
				+0.5	+2.2	+0.4	+0.0					
				+0.0	+0.0							
	3	827.440M	42.0	+0.0	+0.0	+22.7	+1.8	+0.0	39.9	46.0	-6.1	Vert
				+0.4	+2.0	+0.4	+0.0					125
				+0.0	+0.0	+0.0	+0.0					
				-29.4	+0.0							
	4	100.310M	55.0	+0.0	+0.0	+10.2	+0.6	+0.0	37.6	44.0	-6.4	Vert
				+0.1	+0.6	+0.2	+0.0	47				125
				+0.0	+0.0	+0.0	+0.0					
				-29.1	+0.0							



5	23.130M	14.5	+7.2	+0.0	+0.0	+0.3	+0.0	22.5	30.0	-7.5	180de
			+0.0	+0.3	+0.2	+0.0	241				160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
6	100.310M	53.8	+0.0	+0.0	+10.2	+0.6	+0.0	36.4	44.0	-7.6	Horiz
			+0.1	+0.6	+0.2	+0.0					160
			+0.0	+0.0	+0.0	+0.0					
			-29.1	+0.0							
7	15.345M	13.0	+8.7	+0.0	+0.0	+0.2	+0.0	22.2	30.0	-7.8	180de
			+0.0	+0.2	+0.1	+0.0	185				160
			+0.0	+0.0	+0.0	+0.0	100				100
			+0.0	+0.0							
8	453.640M	45.6	+0.0	+0.0	+17.3	+1.6	+0.0	37.6	46.0	-8.4	Horiz
Ũ	1001010111	1010	+0.3	+1.6	+0.5	+0.0		0,10		011	160
			+0.0	+0.0	+0.0	+0.0					
			-29.3	+0.0							
9	15.877M	12.1	+8.6	+0.0	+0.0	+0.3	+0.0	21.5	30.0	-8.5	90deg
_	101077111		+0.0	+0.3	+0.2	+0.0	185	2110	2010	0.0	160
			+0.0	+0.0	+0.0	+0.0	100				100
			+0.0	+0.0	10.0	10.0					
10	25 880M	13.2	+6.7	+0.0	+0.0	+0.3	+0.0	20.7	30.0	-93	90deg
10	20.000111	10.2	+0.0	+0.3	+0.2	+0.0	185	20.7	20.0	7.5	160
			+0.0	+0.0	+0.0	+0.0	100				100
			+0.0	+0.0							
11	17617 760	19.9	+0.0	+42.9	+0.0	+0.0	+0.0	43.8	54.0	-10.2	Vert
11	M	17.7	+0.0	+0.0	+0.0	+3.6	10.0	15.0	51.0	10.2	ven
	111		+1.5	+8.2	+0.0	+0.7	215				113
			+0.0	-33.0	10.0	10.7	215				115
12	5563 505M	34.5	+0.0	+34.7	+0.0	+0.0	+0.0	42.9	54.0	-11.1	Vert
12	5505.50514	51.5	+0.0	+0.0	+0.0	+1.9	211	12.9	51.0	11.1	113
			+0.8	+4.0	+0.0	+0.4	211				115
			+0.0	-33.4	10.0	10.1					
13	3709.000M	35.6	+0.0	+32.1	+0.0	+0.0	+0.0	41.1	54.0	-12.9	Horiz
15	5709.0000	55.0	+0.0	+0.0	+0.0	+1.8	169	71.1	54.0	12.7	118
			+0.7	+2.9	+0.0	+0.7	107				110
			+0.0	-32.7	10.0	10.7					
14	1854 191M	10.1	+0.0	+26.8	+0.0	+0.0	+0.0	41.1	54.0	-12.9	Horiz
14	Ave	10.1	+0.0	+0.0	+0.0	+1.1	204	71.1	54.0	12.7	119
	1100		+0.5	+2.2	+0.0	+0.0	201				11)
			+0.0	+0.0	10.1	10.0					
^	1854 191M	22.6	+0.0	+26.8	+0.0	+0.0	+0.0	53.6	54.0	-0.4	Horiz
	1054.171101	22.0	+0.0	+0.0	+0.0	+0.0	204	55.0	54.0	0.4	110112
			+0.5	+2.2	+0.0	+0.0	204				11)
			+0.0	+0.0	10.4	10.0					
16	67 380M	48.8	+0.0	+0.0	+6.0	+0.5	+0.0	26.9	40.0	-13.1	Vert
10	07.500141	40.0	+0.0	+0.0	+0.2	+0.0	10.0	20.7	40.0	15.1	125
			+0.1	+0.0	+0.2	+0.0					123
			-29.2	+0.0	10.0	10.0					
17	169 730M	<i>4</i> 7 6	+0.0	+0.0	±0.8	+0.8	+0.0	30.7	44.0	-133	Horiz
1/	107.750101	т/.U	+0.0	+0.0	+0.2	+0.0	10.0	50.7	- <b>--</b> .0	10.0	160
			+0.2	+0.0	+0.2	+0.0					100
			-28.8	10.0	10.0	10.0					
L			-20.0	10.0							



18	9272.503M	23.9	+0.0	+38.8	+0.0	+0.0	+0.0	39.8	54.0	-14.2	Vert
	Ave		+0.0	+0.0	+0.0	+3.2	215				113
			+1.7	+5.3	+0.0	+0.4					
			+0.0	-33.5							
^	9272.503M	32.5	+0.0	+38.8	+0.0	+0.0	+0.0	48.4	54.0	-5.6	Vert
			+0.0	+0.0	+0.0	+3.2	215				113
			+1.7	+5.3	+0.0	+0.4					
			+0.0	-33.5							
20	3709.000M	31.3	+0.0	+32.1	+0.0	+0.0	+0.0	36.8	54.0	-17.2	Vert
	Ave		+0.0	+0.0	+0.0	+1.8	169				118
			+0.7	+2.9	+0.0	+0.7					
			+0.0	-32.7							
^	3709.000M	39.1	+0.0	+32.1	+0.0	+0.0	+0.0	44.6	54.0	-9.4	Vert
			+0.0	+0.0	+0.0	+1.8	169				118
			+0.7	+2.9	+0.0	+0.7					
			+0.0	-32.7							
22	992.720M	34.7	+0.0	+0.0	+24.3	+2.0	+0.0	34.9	54.0	-19.1	Vert
			+0.5	+2.1	+0.3	+0.0	360				125
			+0.0	+0.0	+0.0	+0.0					
			-29.0	+0.0							
23	962.200M	33.2	+0.0	+0.0	+23.9	+1.8	+0.0	32.9	54.0	-21.1	Horiz
			+0.5	+2.2	+0.5	+0.0	360				160
			+0.0	+0.0	+0.0	+0.0					
			-29.2	+0.0							
24	650.480k	36.7	+10.0	+0.0	+0.0	+0.1	-40.0	6.9	31.5	-24.6	180de
			+0.0	+0.0	+0.1	+0.0	185				160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
25	835.090k	33.2	+10.0	+0.0	+0.0	+0.1	-40.0	3.4	29.3	-25.9	90deg
			+0.0	+0.1	+0.0	+0.0	185				160
			+0.0	+0.0	+0.0	+0.0					
	4 4 5 4 3 4		+0.0	+0.0	0.0	0.1	40.0				1001
26	1.171M	28.2	+10.1	+0.0	+0.0	+0.1	-40.0	-1.5	26.3	-27.8	180de
			+0.0	+0.1	+0.0	+0.0	185				160
			+0.0	+0.0	+0.0	+0.0					
27	1.0001	27.4	+0.0	+0.0	.0.0	0.1	40.0	2.4	27.7	20.1	00.1.
27	1.000M	27.4	+10.0	+0.0	+0.0	+0.1	-40.0	-2.4	21.1	-30.1	90deg
			+0.0	+0.1	+0.0	+0.0	185				100
			+0.0	+0.0	$\pm 0.0$	$\pm 0.0$					
28	30 220k	54.5	+0.0	+0.0	+0.0		80.0	1/1 8	36.1	50.0	Oldag
20	39.220K	54.5	+10.7	+0.0	+0.0	+0.0	-80.0	-14.0	50.1	-30.9	160
			+0.0 +0.0	+0.0 +0.0	+0.0	+0.0	165				100
			+0.0	+0.0	10.0	10.0					
29	141 200k	34.0	+0.0	+0.0	+0.0	+0.0	-80.0	-36.1	24.9	-61.0	180de
	111.200K	54.0	+0.0	+0.0	+0.0	+0.0	185	50.1	<i>⊥</i> т.∕	01.0	160
			+0.0	+0.0	+0.0	+0.0	105				100
			+0.0	+0.0	10.0	10.0					
30	15 545k	45.0	+14.2	+0.0	+0.0	+0.0	-80.0	-20.8	44.2	-65.0	180de
50	10.0 10 10	12.0	+0.0	+0.0	+0.0	+0.0	185	20.0		00.0	160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	. 0.0	. 0.0					
L											



31	11.172k	46.0	+16.0	+0.0	+0.0	+0.0	-80.0	-18.0	47.1	-65.1	180de
			+0.0	+0.0	+0.0	+0.0	111				160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
32	58.600k	37.3	+10.1	+0.0	+0.0	+0.0	-80.0	-32.6	32.6	-65.2	180de
			+0.0	+0.0	+0.0	+0.0	185				160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
33	16.526k	43.3	+13.9	+0.0	+0.0	+0.0	-80.0	-22.8	43.7	-66.5	90deg
			+0.0	+0.0	+0.0	+0.0	185				160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
34	11.916k	44.2	+15.7	+0.0	+0.0	+0.0	-80.0	-20.1	46.5	-66.6	90deg
			+0.0	+0.0	+0.0	+0.0					160
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							



Customer:	Impinj Inc
Specification:	FCC 15.247/15.209
Work Order #:	89028
Test Type:	Radiated Scan
Equipment:	RFID Reader
Manufacturer:	Impinj
Model:	IPJ-REV
S/N:	940-08-21-0006

Date: 2/12/2009 Time: 09:09:29 Sequence#: 11 Tested By: Armando Del Angel

### Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Mag Loop	2156	06/04/2008	06/04/2010	AN00052
Antenna	2453	12/22/2008	12/22/2010	AN01994
EMCO 3115 Horn	9606-4854	11/12/2007	11/12/2009	AN01412
Horn Antenna, Active 18-26GHz	1114018	11/13/2008	11/13/2010	2742
Heliax cable	N/A	07/22/2008	07/22/2010	AN05545
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03123
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03122
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03121
Cable 30'	11	11/05/2008	11/05/2010	ANP05366
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Cable 20'	16	11/10/2008	11/10/2010	ANP05360
Cable 6'	51	12/30/2008	12/30/2010	ANP05361
Pasternack Coax		07/20/2007	07/20/2009	AN05425
HP 8447D Preamp	2944A08601	07/08/2008	07/08/2010	AN01517
HP 83017A Pre-amp	3123A00464	10/02/2007	10/02/2009	AN01271
Filter	2	05/01/2008	05/01/2010	2750
Filter	311SH10-	12/02/2008	12/02/2010	3116
	3000/T10000-0/0			
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872

Function	Manufacturer	Model #	S/N
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Brickyard Antenna	CSL	CS777-2	V25078 EP00090
Support Devices			

Support Devices.			
Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	Latitude	6497402833
Wireless G Router	Belkin	F5D7230-4	2028723009696



20°C / 26% relative humidity / 102.3 kPa.

Testing Radiated Spurious Emissions per FCC 15.247(d)

The Unit is an RF reader. It is located in the back edge of the test table. All its ports are being exercised. It is being powered by the AC/DC converter It is connected to a laptop outside the chamber through a shielded ethernet cable. The antenna is suspended 10cm above the wooden table with styrofoam. The EUT will be in transmitting mode throughout the test in the MID channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 30.0 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 915.25MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency:	9kHz - 150kHz	RBW= 200Hz,	VBW= 200Hz
	150kHz-30MHz	RBW= 9kHz,	VBW = 9kHz
	30MHz - 1GHz	RBW= 120kHz	VBW=120kHz
	1GHz-19GHz	RBW = 1 MHz,	VBW=1 MHz.

#### Transducer Legend:

T1=ANT- AN00052-06042008 T3=ANT AN01994 25-1000MHz T5=CAB-ANP05361 T7=CAB-ANP05371 T9=CAB-ANP03123-120208 T11=Filter 1GHz HP AN02750 T13=AMP-AN01517-070808

Meas	surement Data: Reading listed by margin.			argin.	argin. Test Distance: 3 Meters						
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
			T9	T10	T11	T12					
			T13	T14							
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	14190.000	33.4	+0.0	+41.2	+0.0	+0.0	+0.0	54.1	54.0	+0.1	Vert
	Μ		+0.0	+0.0	+0.0	+3.4					
	Ambient		+1.2	+6.8	+0.0	+1.0	360		NOISEFL	OOR	141
			+0.0	-32.9							
2	2570.000M	16.3	+0.0	+29.3	+0.0	+0.0	+0.0	50.5	54.0	-3.5	Horiz
	Ambient		+0.0	+0.0	+0.0	+1.3			NOISEFL	OOR	116
			+0.5	+2.6	+0.5	+0.0					
			+0.0	+0.0							
3	904.700M	43.2	+0.0	+0.0	+23.2	+1.9	+0.0	41.8	46.0	-4.2	Vert
			+0.5	+2.0	+0.3	+0.0	360				100
			+0.0	+0.0	+0.0	+0.0					
			-29.3	+0.0							
4	100.400M	56.4	+0.0	+0.0	+10.2	+0.6	+0.0	39.0	44.0	-5.0	Vert
			+0.1	+0.6	+0.2	+0.0	360				100
			+0.0	+0.0	+0.0	+0.0					
			-29.1	+0.0							



5 12.077M	14.6	+9.0	+0.0	+0.0	+0.2	+0.0	24.1	30.0	-5.9	180de
		+0.0	+0.2	+0.1	+0.0	360				101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
6 904.700M	41.5	+0.0	+0.0	+23.2	+1.9	+0.0	40.1	46.0	-5.9	Horiz
		+0.5	+2.0	+0.3	+0.0					175
		+0.0	+0.0	+0.0	+0.0					
		-29.3	+0.0							
7 99.500M	54.8	+0.0	+0.0	+10.1	+0.6	+0.0	37.3	44.0	-6.7	Horiz
		+0.1	+0.6	+0.2	+0.0					175
		+0.0	+0.0	+0.0	+0.0					
		-29.1	+0.0							
8 11.507M	13.6	+9.1	+0.0	+0.0	+0.2	+0.0	23.2	30.0	-6.8	90deg
Ambient		+0.0	+0.2	+0.1	+0.0	360		NOISEFL	OOR	101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
9 7322.003M	36.6	+0.0	+36.4	+0.0	+0.0	+0.0	46.7	54.0	-7.3	Horiz
		+0.0	+0.0	+0.0	+2.3	360				141
		+1.1	+4.7	+0.0	+0.3					
		+0.0	-34.7							
10 7322.004M	36.2	+0.0	+36.4	+0.0	+0.0	+0.0	46.3	54.0	-7.7	Vert
		+0.0	+0.0	+0.0	+2.3					140
		+1.1	+4.7	+0.0	+0.3					
		+0.0	-34.7							
11 10760.000	32.1	+0.0	+38.5	+0.0	+0.0	+0.0	45.5	54.0	-8.5	Vert
М		+0.0	+0.0	+0.0	+2.8					
Ambient		+1.2	+5.6	+0.0	+0.0	360		NOISEFL	OOR	141
		+0.0	-34.7							
12 5491.494M	36.3	+0.0	+34.7	+0.0	+0.0	+0.0	44.9	54.0	-9.1	Horiz
		+0.0	+0.0	+0.0	+2.0	339				137
		+0.8	+3.9	+0.0	+0.5					
		+0.0	-33.3							
13 167.300M	50.9	+0.0	+0.0	+10.0	+0.8	+0.0	34.2	44.0	-9.8	Horiz
		+0.2	+0.9	+0.2	+0.0					175
		+0.0	+0.0	+0.0	+0.0					
	15.0	-28.8	+0.0			0.0				
14 1506.000M	15.3	+0.0	+24.7	+0.0	+0.0	+0.0	44.2	54.0	-9.8	Horiz
Ambient		+0.0	+0.0	+0.0	+1.1			NOISEFLO	JOR	116
		+0.0	+2.0	+0.5	+0.0					
15 5401 40CM	25.2	+0.0	+0.0	.0.0	10.0		42.0	54.0	10.1	Vert
15 5491.490M	35.5	+0.0	+34.7	+0.0	+0.0	+0.0	43.9	54.0	-10.1	125
		+0.0	+0.0	+0.0	+2.0	100				123
		+0.0	+3.9	+0.0	+0.3					
16 1/100 000	21.2		-33.5				42.0	54.0	12.0	Vort
10 14190.000 M	21.3	+0.0	+41.2	+0.0	+0.0	$\pm 0.0$	42.0	54.0	-12.0	ven
A mbient		+0.0	+0.0 +6.8	+0.0	+3.4	360		NOISEEL	OOP	1/1
Anount		+1.2 +0.0	_32 Q	10.0	11.0	500		NOIDELL		141
17 3661 005M	33.1			+0.0	±0.0	+0.0	38.3	54.0	-157	Vert
Ave	55.1	+0.0	+0.0	+0.0	+1.7	191	50.5	J+.U	-13.7	140
1110		+0.6	+3.0	+0.0	+0.7	171				140
		+0.0	-327	10.0	10.7					
i i		10.0	54.1							



^ 3661.005M	40.1	+0.0	+31.9	+0.0	+0.0	+0.0	45.3	54.0	-8.7	Vert
		+0.0	+0.0	+0.0	+1.7	191				140
		+0.6	+3.0	+0.0	+0.7					
		+0.0	-32.7							
19 3660.996M	32.9	+0.0	+31.9	+0.0	+0.0	+0.0	38.1	54.0	-15.9	Horiz
Ave		+0.0	+0.0	+0.0	+1.7	358				140
		+0.6	+3.0	+0.0	+0.7					
		+0.0	-32.7							
^ 3660.996M	39.9	+0.0	+31.9	+0.0	+0.0	+0.0	45.1	54.0	-8.9	Horiz
		+0.0	+0.0	+0.0	+1.7	358				140
		+0.6	+3.0	+0.0	+0.7					
		+0.0	-32.7							
21 162.000M	44.3	+0.0	+0.0	+10.5	+0.8	+0.0	28.0	44.0	-16.0	Vert
		+0.2	+0.9	+0.2	+0.0	360				100
		+0.0	+0.0	+0.0	+0.0					
		-28.9	+0.0							
22 437.541k	41.6	+9.8	+0.0	+0.0	+0.1	-80.0	-28.4	15.0	-43.4	180de
		+0.0	+0.0	+0.1	+0.0					101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
23 16.281k	47.6	+14.0	+0.0	+0.0	+0.0	-80.0	-18.4	43.8	-62.2	90deg
Ambient		+0.0	+0.0	+0.0	+0.0	14		NOISEFLO	OOR	101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
24 10.884k	45.9	+16.1	+0.0	+0.0	+0.0	-80.0	-18.0	47.3	-65.3	180de
Ambient		+0.0	+0.0	+0.0	+0.0			NOISEFLO	OOR	101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
25 11.940k	45.0	+15.7	+0.0	+0.0	+0.0	-80.0	-19.3	46.5	-65.8	90deg
Ambient		+0.0	+0.0	+0.0	+0.0	360		NOISEFLO	OOR	101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							



Customer:	Impinj Inc
Specification:	FCC 15.247/15.209
Work Order #:	89028
Test Type:	Radiated Scan
Equipment:	RFID Reader
Manufacturer:	Impinj
Model:	IPJ-REV
S/N:	940-08-21-0006

Date: 2/12/2009 Time: 08:59:35 Sequence#: 12 Tested By: Armando Del Angel

### Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Mag Loop	2156	06/04/2008	06/04/2010	AN00052
Antenna	2453	12/22/2008	12/22/2010	AN01994
EMCO 3115 Horn	9606-4854	11/12/2007	11/12/2009	AN01412
Horn Antenna, Active 18-26GHz	1114018	11/13/2008	11/13/2010	2742
Heliax cable	N/A	07/22/2008	07/22/2010	AN05545
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03123
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03122
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03121
Cable 30'	11	11/05/2008	11/05/2010	ANP05366
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Cable 20'	16	11/10/2008	11/10/2010	ANP05360
Cable 6'	51	12/30/2008	12/30/2010	ANP05361
Pasternack Coax		07/20/2007	07/20/2009	AN05425
HP 8447D Preamp	2944A08601	07/08/2008	07/08/2010	AN01517
HP 83017A Pre-amp	3123A00464	10/02/2007	10/02/2009	AN01271
Filter	2	05/01/2008	05/01/2010	2750
Filter	311SH10-	12/02/2008	12/02/2010	3116
	3000/T10000-0/0			
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872

Function	Manufacturer	Model #	S/N
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Brickyard Antenna	CSL	CS777-2	V25078 EP00090
Saura and Davis and			

Support Devices:			
Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	Latitude	6497402833
Wireless G Router	Belkin	F5D7230-4	2028723009696



20°C / 26% relative humidity / 102.3 kPa.

Testing Radiated Spurious Emissions per FCC 15.247(d)

The Unit is an RF reader. It is located in the back edge of the test table. All its ports are being exercised. It is being powered by the AC/DC converter. It is connected to a laptop outside the chamber through a shielded ethernet cable. The antenna is suspended 10cm above the wooden table with styrofoam. The EUT will be in transmitting mode throughout the test in the HIGH channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 30.0 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 927.25MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency:	9kHz - 150kHz	RBW= 200Hz,	VBW= 200Hz
	150kHz-30MHz	RBW= 9kHz,	VBW = 9kHz
	30MHz - 1GHz	RBW= 120kHz	VBW=120kHz
	1GHz-19GHz	RBW = 1 MHz,	VBW=1 MHz.

#### Transducer Legend:

T1=ANT- AN00052-06042008 T3=ANT AN01994 25-1000MHz T5=CAB-ANP05361 T7=CAB-ANP05371 T9=CAB-ANP03123-120208 T11=Filter 1GHz HP AN02750 T13=AMP-AN01517-070808

Meas	urement Data:	R	eading lis	ted by ma	argin.	Test Distance: 3 Meters					
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
			T9	T10	T11	T12					
			T13	T14							
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	1854.495M	20.3	+0.0	+26.8	+0.0	+0.0	+0.0	51.3	54.0	-2.7	Vert
	Ambient		+0.0	+0.0	+0.0	+1.1	112		NOISEFL	OOR	116
			+0.5	+2.2	+0.4	+0.0					
			+0.0	+0.0							
2	2 916.440M	42.8	+0.0	+0.0	+23.3	+1.9	+0.0	41.6	46.0	-4.4	Vert
			+0.5	+2.0	+0.4	+0.0					100
			+0.0	+0.0	+0.0	+0.0					
			-29.3	+0.0							
~~~	3 100.310M	56.9	+0.0	+0.0	+10.2	+0.6	+0.0	39.5	44.0	-4.5	Vert
			+0.1	+0.6	+0.2	+0.0					100
			+0.0	+0.0	+0.0	+0.0					
			-29.1	+0.0							
4	100.310M	55.1	+0.0	+0.0	+10.2	+0.6	+0.0	37.7	44.0	-6.3	Horiz
			+0.1	+0.6	+0.2	+0.0	360				175
			+0.0	+0.0	+0.0	+0.0					
			-29.1	+0.0							



5	26.490M	15.3	+6.8	+0.0	+0.0	+0.3	+0.0	22.9	30.0	-7.1	180de
			+0.0	+0.3	+0.2	+0.0					101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
6	11.811M	13.2	+9.1	+0.0	+0.0	+0.2	+0.0	22.8	30.0	-7.2	180de
			+0.0	+0.2	+0.1	+0.0	357				101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
7	853.250M	40.5	+0.0	+0.0	+22.8	+1.7	+0.0	38.5	46.0	-7.5	Horiz
			+0.5	+2.0	+0.3	+0.0	360				175
			+0.0	+0.0	+0.0	+0.0					
			-29.3	+0.0							
8	25.690M	14.3	+6.7	+0.0	+0.0	+0.3	+0.0	21.8	30.0	-8.2	90deg
I	Ambient		+0.0	+0.3	+0.2	+0.0	360		NOISEFLO	OOR	101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
9	17752.000	20.1	+0.0	+43.6	+0.0	+0.0	+0.0	44.9	54.0	-9.1	Horiz
	Μ		+0.0	+0.0	+0.0	+3.6					
I	Ambient		+1.7	+8.1	+0.0	+0.9	209		NOISEFLO	OOR	109
			+0.0	-33.1							
10	5563.505M	35.7	+0.0	+34.7	+0.0	+0.0	+0.0	44.1	54.0	-9.9	Horiz
			+0.0	+0.0	+0.0	+1.9	360				151
			+0.8	+4.0	+0.0	+0.4					
			+0.0	-33.4							
11	5563.505M	35.5	+0.0	+34.7	+0.0	+0.0	+0.0	43.9	54.0	-10.1	Vert
			+0.0	+0.0	+0.0	+1.9	159				113
			+0.8	+4.0	+0.0	+0.4					
			+0.0	-33.4							
12	3709.000M	38.1	+0.0	+32.1	+0.0	+0.0	+0.0	43.6	54.0	-10.4	Vert
			+0.0	+0.0	+0.0	+1.8	197				113
			+0.7	+2.9	+0.0	+0.7					
			+0.0	-32.7							
13	167.060M	49.8	+0.0	+0.0	+10.0	+0.8	+0.0	33.1	44.0	-10.9	Horiz
			+0.2	+0.9	+0.2	+0.0	360				175
			+0.0	+0.0	+0.0	+0.0					
			-28.8	+0.0							
14	3709.000M	36.4	+0.0	+32.1	+0.0	+0.0	+0.0	41.9	54.0	-12.1	Horiz
			+0.0	+0.0	+0.0	+1.8	290				109
			+0.7	+2.9	+0.0	+0.7					
			+0.0	-32.7							
15	9272.500M	24.1	+0.0	+38.8	+0.0	+0.0	+0.0	40.0	54.0	-14.0	Horiz
I	Ave		+0.0	+0.0	+0.0	+3.2	209				109
			+1.7	+5.3	+0.0	+0.4					
			+0.0	-33.5							
^	9272.500M	33.3	+0.0	+38.8	+0.0	+0.0	+0.0	49.2	54.0	-4.8	Horiz
			+0.0	+0.0	+0.0	+3.2	209				109
			+1.7	+5.3	+0.0	+0.4					
			+0.0	-33.5							
17	136.800M	44.9	+0.0	+0.0	+11.7	+0.7	+0.0	29.5	44.0	-14.5	Vert
			+0.2	+0.7	+0.3	+0.0					100
			10.2								
			+0.0	+0.0	+0.0	+0.0					



18 438.510M	37.4	+0.0	+0.0	+17.0	+1.5	+0.0	29.0	46.0	-17.0	Horiz
		+0.3	+1.6	+0.5	+0.0	360				175
		+0.0	+0.0	+0.0	+0.0					
		-29.3	+0.0							
19 173.920k	46.5	+10.0	+0.0	+0.0	+0.0	-80.0	-23.5	23.1	-46.6	90deg
Ambient		+0.0	+0.0	+0.0	+0.0			NOISEFLO	OOR	101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
20 14.460k	45.2	+14.6	+0.0	+0.0	+0.0	-80.0	-20.2	44.8	-65.0	90deg
Ambient		+0.0	+0.0	+0.0	+0.0			NOISEFLO	OOR	101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
21 11.526k	45.4	+15.8	+0.0	+0.0	+0.0	-80.0	-18.8	46.8	-65.6	180de
Ambient		+0.0	+0.0	+0.0	+0.0	360		NOISEFLO	OOR	101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							



Customer:	Impinj Inc
Specification:	FCC 15.247/15.209
Work Order #:	89028
Test Type:	Radiated Scan
Equipment:	RFID Reader
Manufacturer:	Impinj
Model:	IPJ-REV
S/N:	940-08-21-0006

Date: 2/12/2009 Time: 09:29:27 Sequence#: 10 Tested By: Armando Del Angel

#### Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Mag Loop	2156	06/04/2008	06/04/2010	AN00052
Antenna	2453	12/22/2008	12/22/2010	AN01994
EMCO 3115 Horn	9606-4854	11/12/2007	11/12/2009	AN01412
Horn Antenna, Active 18-26GHz	1114018	11/13/2008	11/13/2010	2742
Heliax cable	N/A	07/22/2008	07/22/2010	AN05545
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03123
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03122
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03121
Cable 30'	11	11/05/2008	11/05/2010	ANP05366
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Cable 20'	16	11/10/2008	11/10/2010	ANP05360
Cable 6'	51	12/30/2008	12/30/2010	ANP05361
Pasternack Coax		07/20/2007	07/20/2009	AN05425
HP 8447D Preamp	2944A08601	07/08/2008	07/08/2010	AN01517
HP 83017A Pre-amp	3123A00464	10/02/2007	10/02/2009	AN01271
Filter	2	05/01/2008	05/01/2010	2750
Filter	311SH10-	12/02/2008	12/02/2010	3116
	3000/T10000-0/0			
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872

Function	Manufacturer	Model #	S/N
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Brickyard Antenna	CSL	CS777-2	V25078 EP00090

Support Devices:			
Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	Latitude	6497402833
Wireless G Router	Belkin	F5D7230-4	2028723009696



20°C / 26% relative humidity / 102.3 kPa.

Testing Radiated Spurious Emissions per FCC 15.247(d)

The Unit is an RF reader. It is located in the back edge of the test table. All its ports are being exercised. It is being powered by the AC/DC converter. It is connected to a laptop outside the chamber through a shielded ethernet cable. The antenna is suspended 10cm above the wooden table with styrofoam. The EUT will be in transmitting mode throughout the test in the LOW channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 30.0 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 902.75MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency:	9kHz - 150kHz	RBW= 200Hz,	VBW= 200Hz
	150kHz-30MHz	RBW= 9kHz,	VBW = 9kHz
	30MHz - 1GHz	RBW= 120kHz	VBW=120kHz
	1GHz-19GHz	RBW = 1 MHz,	VBW=1 MHz.

#### Transducer Legend:

T1=ANT- AN00052-06042008 T3=ANT AN01994 25-1000MHz T5=CAB-ANP05361 T7=CAB-ANP05371 T9=CAB-ANP03123-120208 T11=Filter 1GHz HP AN02750 T13=AMP-AN01517-070808

Measu	urement Data:	R	eading lis	ted by ma	argin.	Test Distance: 3 Meters					
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
			T9	T10	T11	T12					
			T13	T14							
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	14070.000	32.2	+0.0	+41.1	+0.0	+0.0	+0.0	52.4	54.0	-1.6	Horiz
	М		+0.0	+0.0	+0.0	+3.4					
	Ambient		+1.3	+6.8	+0.0	+0.6	312		NOISEFL	OOR	116
			+0.0	-33.0							
2	2518.000M	16.9	+0.0	+29.2	+0.0	+0.0	+0.0	51.0	54.0	-3.0	Horiz
	Ambient		+0.0	+0.0	+0.0	+1.3	360		NOISEFL	OOR	116
			+0.5	+2.6	+0.5	+0.0					
			+0.0	+0.0							
3	892.405M	44.4	+0.0	+0.0	+23.1	+1.8	+0.0	42.7	46.0	-3.3	Vert
			+0.5	+2.0	+0.2	+0.0					99
			+0.0	+0.0	+0.0	+0.0					
			-29.3	+0.0							
4	100.065M	56.5	+0.0	+0.0	+10.2	+0.6	+0.0	39.1	44.0	-4.9	Vert
			+0.1	+0.6	+0.2	+0.0	4				99
			+0.0	+0.0	+0.0	+0.0					
			-29.1	+0.0							



5	100.065M	55.6	+0.0	+0.0	+10.2	+0.6	+0.0	38.2	44.0	-5.8	Horiz
			+0.1	+0.6	+0.2	+0.0	360				175
			+0.0	+0.0	+0.0	+0.0					
			-29.1	+0.0							
6	10635.000	34.7	+0.0	+38.4	+0.0	+0.0	+0.0	48.2	54.0	-5.8	Horiz
	Μ		+0.0	+0.0	+0.0	+2.9					
	Ambient		+1.1	+5.6	+0.0	+0.0	312		NOISEFLO	OOR	116
			+0.0	-34.5							
7	802.445M	42.3	+0.0	+0.0	+22.5	+1.9	+0.0	40.1	46.0	-5.9	Horiz
			+0.4	+2.0	+0.5	+0.0	360				175
			+0.0	+0.0	+0.0	+0.0					
			-29.5	+0.0							
8	26.610M	15.7	+6.8	+0.0	+0.0	+0.3	+0.0	23.3	30.0	-6.7	90deg
	Ambient		+0.0	+0.3	+0.2	+0.0	103		NOISEFLO	OOR	101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
9	24.350M	15.5	+6.8	+0.0	+0.0	+0.3	+0.0	23.1	30.0	-6.9	180de
			+0.0	+0.3	+0.2	+0.0	352				101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
10	9087.282M	31.0	+0.0	+38.9	+0.0	+0.0	+0.0	46.7	54.0	-7.3	Vert
	Ambient		+0.0	+0.0	+0.0	+3.1	312		NOISEFLO	OOR	116
			+1.6	+5.3	+0.0	+0.5					
			+0.0	-33.7							
11	1832.000M	14.7	+0.0	+26.6	+0.0	+0.0	+0.0	45.5	54.0	-8.5	Vert
	Ambient		+0.0	+0.0	+0.0	+1.1	360		NOISEFLO	OOR	116
			+0.5	+2.2	+0.4	+0.0					
			+0.0	+0.0							
12	166.670M	51.0	+0.0	+0.0	+10.1	+0.8	+0.0	34.4	44.0	-9.6	Horiz
			+0.2	+0.9	+0.2	+0.0	360				175
			+0.0	+0.0	+0.0	+0.0					
			-28.8	+0.0							
13	3610.990M	39.0	+0.0	+31.8	+0.0	+0.0	+0.0	44.0	54.0	-10.0	Vert
			+0.0	+0.0	+0.0	+1.6	224				147
			+0.6	+3.0	+0.0	+0.7					
			+0.0	-32.7							
14	3610.990M	37.1	+0.0	+31.8	+0.0	+0.0	+0.0	42.1	54.0	-11.9	Horiz
			+0.0	+0.0	+0.0	+1.6	184				147
			+0.6	+3.0	+0.0	+0.7					
			+0.0	-32.7							
15	5416.494M	32.8	+0.0	+34.5	+0.0	+0.0	+0.0	41.9	54.0	-12.1	Horiz
			+0.0	+0.0	+0.0	+2.3	128				116
			+1.0	+3.9	+0.0	+0.5					
	F 4 1 6 40 40 5	22.1	+0.0	-33.1	0.0	0.0	0.0	44.0		12.0	<b>X</b> 7
16	5416.494M	32.1	+0.0	+34.5	+0.0	+0.0	+0.0	41.2	54.0	-12.8	Vert
	Ave		+0.0	+0.0	+0.0	+2.3	155				116
			+1.0	+3.9	+0.0	+0.5					
-			+0.0	-33.1			0.0				
^	5416.494M	37.3	+0.0	+34.5	+0.0	+0.0	+0.0	46.4	54.0	-7.6	Vert
			+0.0	+0.0	+0.0	+2.3	155				116
			+1.0	+3.9	+0.0	+0.5					
			+0.0	-33.1							



+0.2 $+0.7$ $+0.3$ $+0.0$	99
+0.0 $+0.0$ $+0.0$ $+0.0$	
-29.0 +0.0	
19 1.114M 32.0 +10.1 +0.0 +0.0 +0.1 -40.0 2.3 26.8 -24	5 90deg
Ambient +0.0 +0.1 +0.0 +0.0 360 NOISEFLOOR	101
+0.0 $+0.0$ $+0.0$ $+0.0$	
+0.0 +0.0	
20 149.360k 64.5 +10.0 +0.0 +0.0 +0.0 -80.0 -5.5 24.4 -29	9 180de
+0.0 $+0.0$ $+0.0$ $+0.0$ $156$	101
+0.0 $+0.0$ $+0.0$ $+0.0$	
+0.0 +0.0	
21 119.850k 62.9 +10.1 +0.0 +0.0 +0.0 -80.0 -7.0 26.3 -33	3 90deg
+0.0 $+0.0$ $+0.0$ $+0.0$ $110$	101
+0.0 $+0.0$ $+0.0$ $+0.0$	
+0.0 +0.0	
22 319.830k 48.1 +9.9 +0.0 +0.0 +0.1 -80.0 -21.8 17.7 -39	5 180de
+0.0 $+0.0$ $+0.1$ $+0.0$ $156$	101
+0.0 $+0.0$ $+0.0$ $+0.0$	
+0.0 +0.0	
23 111.700k 52.5 +9.9 +0.0 +0.0 +0.0 -80.0 -17.6 26.9 -44	5 180de
+0.0 $+0.0$ $+0.0$ $+0.0$ $185$	101
+0.0 $+0.0$ $+0.0$ $+0.0$	
+0.0 +0.0	
24 15.790k 54.3 +14.2 +0.0 +0.0 +0.0 -80.0 -11.5 44.1 -55	6 180de
+0.0 $+0.0$ $+0.0$ $+0.0$ $60$	101
+0.0 $+0.0$ $+0.0$ $+0.0$	
+0.0 +0.0	
25 12.024k 52.8 +15.6 +0.0 +0.0 +0.0 -80.0 -11.6 46.5 -58	1 180de
+0.0 $+0.0$ $+0.0$ $+0.0$ $185$	101
+0.0 $+0.0$ $+0.0$ $+0.0$	
+0.0 +0.0	
26 17.823k 50.6 +13.5 +0.0 +0.0 +0.0 -80.0 -15.9 43.0 -58	9 90deg
+0.0 $+0.0$ $+0.0$ $+0.0$ $360$	101
+0.0 $+0.0$ $+0.0$ $+0.0$	
+0.0 +0.0	
27 31.309k 47.0 +11.3 +0.0 +0.0 +0.0 -80.0 -21.7 38.1 -59	8 90deg
+0.0 +0.0 +0.0 +0.0 360	101
+0.0 +0.0 +0.0 +0.0	
+0.0 +0.0	
28 9.792k 50.3 +0.0 +0.0 +0.0 +0.0 -80.0 -29.7 48.3 -78	0 90deg
+0.0 +0.0 +0.0 +0.0	101
+0.0 +0.0 +0.0 +0.0	
+0.0 +0.0	



Customer:	Impinj Inc
Specification:	FCC 15.247/15.209
Work Order #:	89028
Test Type:	Radiated Scan
Equipment:	RFID Reader
Manufacturer:	Impinj
Model:	IPJ-REV
S/N:	940-08-21-0006

Date: 2/12/2009 Time: 08:35:48 Sequence#: 14 Tested By: Armando Del Angel

### Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Mag Loop	2156	06/04/2008	06/04/2010	AN00052
Antenna	2453	12/22/2008	12/22/2010	AN01994
EMCO 3115 Horn	9606-4854	11/12/2007	11/12/2009	AN01412
Horn Antenna, Active 18-26GHz	1114018	11/13/2008	11/13/2010	2742
Heliax cable	N/A	07/22/2008	07/22/2010	AN05545
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03123
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03122
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03121
Cable 30'	11	11/05/2008	11/05/2010	ANP05366
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Cable 20'	16	11/10/2008	11/10/2010	ANP05360
Cable 6'	51	12/30/2008	12/30/2010	ANP05361
Pasternack Coax		07/20/2007	07/20/2009	AN05425
HP 8447D Preamp	2944A08601	07/08/2008	07/08/2010	AN01517
HP 83017A Pre-amp	3123A00464	10/02/2007	10/02/2009	AN01271
Filter	2	05/01/2008	05/01/2010	2750
Filter	311SH10-	12/02/2008	12/02/2010	3116
	3000/T10000-0/0			
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872

# Equipment Under Test (\* = EUT):

Function	Manufacturer	Model #	S/N
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Mini-Guardrail	Impinj	IPJ-A0303-0000E	0069

# Support Devices:FunctionManufacturerModel #S/NLaptop ComputerDellLatitude6497402833Wireless G RouterBelkinF5D7230-42028723009696



20°C / 26% relative humidity / 102.3 kPa.

Testing Radiated Spurious Emissions per FCC 15.247(d)

The Unit is an RF reader. It is located in the back edge of the test table. All its ports are being exercised. It is being powered by the AC/DC converter It is connected to a laptop outside the chamber through a shielded ethernet cable. The antenna is suspended 10cm above the wooden table with styrofoam. The EUT will be in transmitting mode throughout the test in the LOW channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 30.0 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 902.75MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency:	9kHz - 150kHz	RBW= 200Hz,	VBW= 200Hz
	150kHz-30MHz	RBW= 9kHz,	VBW = 9kHz
	30MHz - 1GHz	RBW= 120kHz	VBW=120kHz
	1GHz-19GHz	RBW = 1 MHz,	VBW=1 MHz.

#### Transducer Legend:

T1=ANT- AN00052-06042008 T3=ANT AN01994 25-1000MHz T5=CAB-ANP05361 T7=CAB-ANP05371 T9=CAB-ANP03123-120208 T11=Filter 1GHz HP AN02750 T13=AMP-AN01517-070808 T2=ANT-AN01412-111207 T4=CAB-ANP05360 T6=CAB-ANP05366 T8=CAB-ANP03121-120208 T10=CAB-ANP05545-072208 T12=FIL-AN03116-120208 T14=AMP-AN01271-100207 - .5-26.5 GHz

Mea	surement Data:	R	eading lis	ted by ma	argin.	Test Distance: 3 Meters					
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
			T9	T10	T11	T12					
			T13	T14							
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
	1 13016.000	33.1	+0.0	+39.4	+0.0	+0.0	+0.0	52.1	54.0	-1.9	Vert
	Μ		+0.0	+0.0	+0.0	+3.2					
	Ambient		+1.5	+6.9	+0.0	+0.4	155		NOISEFL	OOR	116
			+0.0	-32.4							
	2 2817.000M	15.7	+0.0	+30.1	+0.0	+0.0	+0.0	51.1	54.0	-2.9	Horiz
	Ambient		+0.0	+0.0	+0.0	+1.4	360		NOISEFL	OOR	116
			+0.5	+2.7	+0.7	+0.0					
			+0.0	+0.0							
	3 1786.000M	19.5	+0.0	+26.4	+0.0	+0.0	+0.0	50.2	54.0	-3.8	Vert
	Ambient		+0.0	+0.0	+0.0	+1.1			NOISEFL	OOR	116
			+0.5	+2.2	+0.5	+0.0					
			+0.0	+0.0							
	4 16288.000	31.1	+0.0	+38.9	+0.0	+0.0	+0.0	49.3	54.0	-4.7	Horiz
	Μ		+0.0	+0.0	+0.0	+3.0					
	Ambient		+0.9	+7.6	+0.0	+0.5	155		NOISEFL	OOR	116
			+0.0	-32.7							

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5	100.065M	56.2	+0.0	+0.0	+10.2	+0.6	+0.0	38.8	44.0	-5.2	Vert
			+0.1	+0.6	+0.2	+0.0	360				101
			+0.0	+0.0	+0.0	+0.0					
			-29.1	+0.0							
6	3610.986M	41.0	+0.0	+31.8	+0.0	+0.0	+0.0	46.0	54.0	-8.0	Vert
			+0.0	+0.0	+0.0	+1.6	224				147
			+0.6	+3.0	+0.0	+0.7					
			+0.0	-32.7							
7	100.065M	52.2	+0.0	+0.0	+10.2	+0.6	+0.0	34.8	44.0	-9.2	Horiz
			+0.1	+0.6	+0.2	+0.0					175
			+0.0	+0.0	+0.0	+0.0					
			-29.1	+0.0							
8	5416.606M	35.4	+0.0	+34.5	+0.0	+0.0	+0.0	44.5	54.0	-9.5	Horiz
			+0.0	+0.0	+0.0	+2.3	127				116
			+1.0	+3.9	+0.0	+0.5					
			+0.0	-33.1							
9	3611.134M	38.5	+0.0	+31.8	+0.0	+0.0	+0.0	43.5	54.0	-10.5	Horiz
			+0.0	+0.0	+0.0	+1.6	184				147
			+0.6	+3.0	+0.0	+0.7					
			+0.0	-32.7							
10	67.195M	50.2	+0.0	+0.0	+5.9	+0.5	+0.0	28.2	40.0	-11.8	Vert
			+0.1	+0.5	+0.2	+0.0	360				101
			+0.0	+0.0	+0.0	+0.0					
			-29.2	+0.0							
11	169.265M	48.7	+0.0	+0.0	+9.8	+0.8	+0.0	31.8	44.0	-12.2	Horiz
			+0.2	+0.9	+0.2	+0.0					175
			+0.0	+0.0	+0.0	+0.0					
			-28.8	+0.0							
12	18.305M	6.8	+8.4	+0.0	+0.0	+0.3	+0.0	16.0	30.0	-14.0	180de
	Ave		+0.0	+0.3	+0.2	+0.0	111				101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
^	18.305M	17.8	+8.4	+0.0	+0.0	+0.3	+0.0	27.0	30.0	-3.0	180de
			+0.0	+0.3	+0.2	+0.0	111				101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
14	169.265M	46.5	+0.0	+0.0	+9.8	+0.8	+0.0	29.6	44.0	-14.4	Vert
			+0.2	+0.9	+0.2	+0.0	360				101
			+0.0	+0.0	+0.0	+0.0					
1.7	F 11 C 10 F) F	20.4	-28.8	+0.0	0.0		0.0	20 5			**
15	5416.435M	30.4	+0.0	+34.5	+0.0	+0.0	+0.0	39.5	54.0	-14.5	Vert
	Ave		+0.0	+0.0	+0.0	+2.3	155				116
			+1.0	+3.9	+0.0	+0.5					
	541642516	20.1	+0.0	-33.1	0.0	0.0	0.0	47.0	54.0	<u> </u>	<b>X</b> 7 .
~	5416.435M	38.1	+0.0	+34.5	+0.0	+0.0	+0.0	47.2	54.0	-6.8	Vert
			+0.0	+0.0	+0.0	+2.3	155				116
			+1.0	+5.9	+0.0	+0.5					
17	24 2523 4	<i>(</i> <b>)</b>	+0.0	-33.1	.0.0	.0.2	.0.0	12.0	20.0	160	00.1
1/	24.552M	6.2	+6.8	+0.0	+0.0	+0.5	+0.0	13.8	50.0	-16.2	90deg
	Ave		+0.0	+0.3	+0.2	+0.0	300				101
			+0.0	+0.0	+0.0	+0.0					
L			+0.0	+0.0							



^	24.352M	17.4	+6.8	+0.0	+0.0	+0.3	+0.0	25.0	30.0	-5.0	90deg
			+0.0	+0.3	+0.2	+0.0	360				101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
19	790.335M	27.6	+0.0	+0.0	+22.3	+1.8	+0.0	25.1	46.0	-20.9	Vert
			+0.4	+2.0	+0.5	+0.0	360				101
			+0.0	+0.0	+0.0	+0.0					
			-29.5	+0.0							
20	794.660M	25.5	+0.0	+0.0	+22.4	+1.8	+0.0	23.1	46.0	-22.9	Horiz
			+0.4	+2.0	+0.5	+0.0					175
			+0.0	+0.0	+0.0	+0.0					
			-29.5	+0.0							
21	1.114M	29.1	+10.1	+0.0	+0.0	+0.1	-40.0	-0.6	26.8	-27.4	180de
			+0.0	+0.1	+0.0	+0.0					101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
22	154.620k	48.5	+10.0	+0.0	+0.0	+0.0	-80.0	-21.5	24.1	-45.6	180de
	Ambient		+0.0	+0.0	+0.0	+0.0	360		NOISEFL	OOR	101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
23	50.900k	38.4	+10.4	+0.0	+0.0	+0.0	-80.0	-31.2	33.8	-65.0	180de
	Ambient		+0.0	+0.0	+0.0	+0.0			NOISEFL	OOR	101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
24	11.544k	45.6	+15.8	+0.0	+0.0	+0.0	-80.0	-18.6	46.8	-65.4	90deg
	Ambient		+0.0	+0.0	+0.0	+0.0	360		NOISEFL	OOR	101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
25	21.607k	43.2	+12.6	+0.0	+0.0	+0.0	-80.0	-24.2	41.3	-65.5	180de
	Ambient		+0.0	+0.0	+0.0	+0.0			NOISEFL	OOR	101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
26	9.624k	45.3	+0.0	+0.0	+0.0	+0.0	-80.0	-34.7	48.4	-83.1	180de
	Ambient		+0.0	+0.0	+0.0	+0.0	-16		NOISEFL	OOR	101
			+0.0	+0.0	+0.0	+0.0					
1			+0.0	+0.0							



Customer:	Impinj Inc
Specification:	FCC 15.247/15.209
Work Order #:	89028
Test Type:	Radiated Scan
Equipment:	RFID Reader
Manufacturer:	Impinj
Model:	IPJ-REV
S/N:	940-08-21-0006

Date: 2/12/2009 Time: 08:46:50 Sequence#: 14 Tested By: Armando Del Angel

### Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Mag Loop	2156	06/04/2008	06/04/2010	AN00052
Antenna	2453	12/22/2008	12/22/2010	AN01994
EMCO 3115 Horn	9606-4854	11/12/2007	11/12/2009	AN01412
Horn Antenna, Active 18-26GHz	1114018	11/13/2008	11/13/2010	2742
Heliax cable	N/A	07/22/2008	07/22/2010	AN05545
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03123
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03122
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03121
Cable 30'	11	11/05/2008	11/05/2010	ANP05366
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Cable 20'	16	11/10/2008	11/10/2010	ANP05360
Cable 6'	51	12/30/2008	12/30/2010	ANP05361
Pasternack Coax		07/20/2007	07/20/2009	AN05425
HP 8447D Preamp	2944A08601	07/08/2008	07/08/2010	AN01517
HP 83017A Pre-amp	3123A00464	10/02/2007	10/02/2009	AN01271
Filter	2	05/01/2008	05/01/2010	2750
Filter	311SH10-	12/02/2008	12/02/2010	3116
	3000/T10000-0/0			
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872

## Equipment Under Test (\* = EUT):

Function	Manufacturer	Model #	S/N
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Mini-Guardrail	Impinj	IPJ-A0303-0000E	0069

# Support Devices:FunctionManufacturerModel #S/NLaptop ComputerDellLatitude6497402833Wireless G RouterBelkinF5D7230-42028723009696



20°C / 26% relative humidity / 102.3 kPa.

Testing Radiated Spurious Emissions per FCC 15.247(d)

The Unit is an RF reader. It is located in the back edge of the test table. All its ports are being exercised. It is being powered by the AC/DC converter. It is connected to a laptop outside the chamber through a shielded ethernet cable. The antenna is suspended 10cm above the wooden table with styrofoam. The EUT will be in transmitting mode throughout the test in the MID channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 30.0 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 915.25MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency:	9kHz - 150kHz	RBW= 200Hz,	VBW= 200Hz
	150kHz-30MHz	z RBW= 9kHz,	VBW = 9kHz
	30MHz - 1GHz	RBW= 120kHz	, VBW=120kHz
	1GHz-19GHz	RBW=1 MHz,	VBW=1 MHz.

Transducer Legend:

T1=ANT- AN00052-06042008 T3=ANT AN01994 25-1000MHz T5=CAB-ANP05361 T7=CAB-ANP05371 T9=CAB-ANP03123-120208 T11=Filter 1GHz HP AN02750 T13=AMP-AN01517-070808

Meas	surement Data:	Re	eading lis	ted by ma	argin.	Test Distance: 3 Meters					
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
			T9	T10	T11	T12					
			T13	T14							
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
	1 11976.000	33.9	+0.0	+39.4	+0.0	+0.0	+0.0	49.7	54.0	-4.3	Vert
	Μ		+0.0	+0.0	+0.0	+3.2					
	Ambient		+1.9	+6.2	+0.0	+0.5	360		NOISEFL	OOR	100
			+0.0	-35.4							
	2 16112.000	31.1	+0.0	+38.6	+0.0	+0.0	+0.0	49.0	54.0	-5.0	Vert
	М		+0.0	+0.0	+0.0	+3.1					
	Ambient		+0.9	+7.5	+0.0	+0.4	360		NOISEFL	OOR	100
			+0.0	-32.6							
	3 99.500M	55.8	+0.0	+0.0	+10.1	+0.6	+0.0	38.3	44.0	-5.7	Vert
			+0.1	+0.6	+0.2	+0.0					100
			+0.0	+0.0	+0.0	+0.0					
			-29.1	+0.0							



$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	4 1864.000M	16.7	+0.0	+26.8	+0.0	+0.0	+0.0	47.7	54.0	-6.3	Vert
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			+0.0	+0.0	+0.0	+1.1	311				116
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			+0.5	+2.2	+0.4	+0.0					
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			+0.0	+0.0							
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	5 7322.002M	35.8	+0.0	+36.4	+0.0	+0.0	+0.0	45.9	54.0	-8.1	Horiz
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			+0.0	+0.0	+0.0	+2.3	359				140
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			+1.1	+4.7	+0.0	+0.3					
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			+0.0	-34.7							
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	6 99.500M	53.3	+0.0	+0.0	+10.1	+0.6	+0.0	35.8	44.0	-8.2	Horiz
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			+0.1	+0.6	+0.2	+0.0	360				175
$\begin{array}{cccccccccccccccccccccccccccccccccccc$			+0.0	+0.0	+0.0	+0.0					
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			-29.1	+0.0							
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	7 24.540M	14.0	+6.7	+0.0	+0.0	+0.3	+0.0	21.5	30.0	-8.5	90deg
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Ambient		+0.0	+0.3	+0.2	+0.0	24		NOISEFL	OOR	101
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			+0.0	+0.0	+0.0	+0.0					
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			+0.0	+0.0							
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	8 5491.467M	36.4	+0.0	+34.7	+0.0	+0.0	+0.0	45.0	54.0	-9.0	Horiz
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			+0.0	+0.0	+0.0	+2.0	339				136
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			+0.8	+3.9	+0.0	+0.5					
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			+0.0	-33.3							
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	9 17624.000	20.2	+0.0	+43.0	+0.0	+0.0	+0.0	44.2	54.0	-9.8	Horiz
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	М		+0.0	+0.0	+0.0	+3.6					
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Ave		+1.5	+8.2	+0.0	+0.7	360				100
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			+0.0	-33.0							
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	10 5491.675M	35.6	+0.0	+34.7	+0.0	+0.0	+0.0	44.2	54.0	-9.8	Vert
$\begin{array}{cccccccccccccccccccccccccccccccccccc$			+0.0	+0.0	+0.0	+2.0	160				125
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			+0.8	+3.9	+0.0	+0.5					
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			+0.0	-33.3							
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	11 3.337M	8.3	+10.5	+0.0	+0.0	+0.2	+0.0	19.3	30.0	-10.7	180de
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ambient		+0.0	+0.2	+0.1	+0.0	360		NOISEFL	OOR	101
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			+0.0	+0.0	+0.0	+0.0					
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			+0.0	+0.0							
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	12 67.000M	51.0	+0.0	+0.0	+5.9	+0.4	+0.0	28.7	40.0	-11.3	Vert
$\begin{array}{cccccccccccccccccccccccccccccccccccc$			+0.1	+0.4	+0.1	+0.0					100
$\begin{array}{cccccccccccccccccccccccccccccccccccc$			+0.0	+0.0	+0.0	+0.0					
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			-29.2	+0.0							
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	13 167.300M	48.6	+0.0	+0.0	+10.0	+0.8	+0.0	31.9	44.0	-12.1	Horiz
$\begin{array}{cccccccccccccccccccccccccccccccccccc$			+0.2	+0.9	+0.2	+0.0	360				175
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			+0.0	+0.0	+0.0	+0.0					
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			-28.8	+0.0							
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	14 169.000M	46.2	+0.0	+0.0	+9.8	+0.8	+0.0	29.3	44.0	-14.7	Vert
$\begin{array}{cccccccccccccccccccccccccccccccccccc$			+0.2	+0.9	+0.2	+0.0					100
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			+0.0	+0.0	+0.0	+0.0					
$\begin{array}{cccccccccccccccccccccccccccccccccccc$			-28.8	+0.0							
Ave $+0.0$ $+0.0$ $+1.7$ $190$ $140$ $+0.6$ $+3.0$ $+0.0$ $+0.7$ $+0.7$ $140$ $+0.0$ $-32.7$ $-3660.930M$ $42.3$ $+0.0$ $+31.9$ $+0.0$ $+0.0$ $47.5$ $54.0$ $-6.5$ Vert $+0.0$ $+0.0$ $+0.0$ $+1.7$ $201$ $140$ $+0.6$ $+3.0$ $+0.0$ $+1.7$ $201$ $140$ $+0.6$ $+3.0$ $+0.0$ $+0.7$ $140$ $+0.0$ $-32.7$ $-32.7$ $-32.7$ $-32.7$	15 3660.930M	32.8	+0.0	+31.9	+0.0	+0.0	+0.0	38.0	54.0	-16.0	Vert
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ave		+0.0	+0.0	+0.0	+1.7	190				140
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			+0.6	+3.0	+0.0	+0.7					
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			+0.0	-32.7							
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	^ 3660.930M	42.3	+0.0	+31.9	+0.0	+0.0	+0.0	47.5	54.0	-6.5	Vert
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$			+0.0	+0.0	+0.0	+1.7	201				140
+0.0 -32.7			+0.6	+3.0	+0.0	+0.7					
			+0.0	-32.7							



17 7321.995M	26.5	+0.0	+36.4	+0.0	+0.0	+0.0	36.6	54.0	-17.4	Vert
Ave		+0.0	+0.0	+0.0	+2.3	359				140
		+1.1	+4.7	+0.0	+0.3					
		+0.0	-34.7							
^ 7321.995M	36.8	+0.0	+36.4	+0.0	+0.0	+0.0	46.9	54.0	-7.1	Vert
		+0.0	+0.0	+0.0	+2.3	359				140
		+1.1	+4.7	+0.0	+0.3					
		+0.0	-34.7							
19 3661.011M	31.1	+0.0	+31.9	+0.0	+0.0	+0.0	36.3	54.0	-17.7	Horiz
Ave		+0.0	+0.0	+0.0	+1.7	360				140
		+0.6	+3.0	+0.0	+0.7					
		+0.0	-32.7							
^ 3661.011M	40.8	+0.0	+31.9	+0.0	+0.0	+0.0	46.0	54.0	-8.0	Horiz
		+0.0	+0.0	+0.0	+1.7	360				140
		+0.6	+3.0	+0.0	+0.7					
		+0.0	-32.7							
21 828.200M	27.0	+0.0	+0.0	+22.7	+1.8	+0.0	24.9	46.0	-21.1	Horiz
		+0.4	+2.0	+0.4	+0.0	360				175
		+0.0	+0.0	+0.0	+0.0					
		-29.4	+0.0							
22 807.900M	26.4	+0.0	+0.0	+22.6	+1.9	+0.0	24.3	46.0	-21.7	Vert
		+0.4	+2.0	+0.5	+0.0					100
		+0.0	+0.0	+0.0	+0.0					
		-29.5	+0.0							
23 68.700k	38.2	+10.1	+0.0	+0.0	+0.0	-80.0	-31.7	31.2	-62.9	180de
Ambient		+0.0	+0.0	+0.0	+0.0	360		NOISEFL	OOR	101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
24 29.769k	41.9	+11.4	+0.0	+0.0	+0.0	-80.0	-26.7	38.5	-65.2	180de
Ambient		+0.0	+0.0	+0.0	+0.0			NOISEFL	OOR	101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
25 10.740k	46.0	+16.2	+0.0	+0.0	+0.0	-80.0	-17.8	47.5	-65.3	90deg
Ambient		+0.0	+0.0	+0.0	+0.0			NOISEFL	OOR	101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
26 15.440k	43.9	+14.3	+0.0	+0.0	+0.0	-80.0	-21.8	44.3	-66.1	90deg
Ambient		+0.0	+0.0	+0.0	+0.0	174		NOISEFL	JOR	101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0			0.5 -	a			105.5
27 9.186k	44.6	+0.0	+0.0	+0.0	+0.0	-80.0	-35.4	48.8	-84.2	180de
Ambient		+0.0	+0.0	+0.0	+0.0	336		NOISEFL	JOR	101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							



Customer:	Impinj Inc
Specification:	FCC 15.247/15.209
Work Order #:	89028
Test Type:	<b>Radiated Scan</b>
Equipment:	<b>RFID Reader</b>
Manufacturer:	Impinj
Model:	IPJ-REV
S/N:	940-08-21-0006

Date: 2/12/2009 Time: 08:51:33 Sequence#: 13 Tested By: Armando Del Angel

### Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Mag Loop	2156	06/04/2008	06/04/2010	AN00052
Antenna	2453	12/22/2008	12/22/2010	AN01994
EMCO 3115 Horn	9606-4854	11/12/2007	11/12/2009	AN01412
Horn Antenna, Active 18-26GHz	1114018	11/13/2008	11/13/2010	2742
Heliax cable	N/A	07/22/2008	07/22/2010	AN05545
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03123
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03122
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03121
Cable 30'	11	11/05/2008	11/05/2010	ANP05366
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Cable 20'	16	11/10/2008	11/10/2010	ANP05360
Cable 6'	51	12/30/2008	12/30/2010	ANP05361
Pasternack Coax		07/20/2007	07/20/2009	AN05425
HP 8447D Preamp	2944A08601	07/08/2008	07/08/2010	AN01517
HP 83017A Pre-amp	3123A00464	10/02/2007	10/02/2009	AN01271
Filter	2	05/01/2008	05/01/2010	2750
Filter	311SH10-	12/02/2008	12/02/2010	3116
	3000/T10000-0/0			
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872

Function	Manufacturer	Model #	S/N
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Mini-Guardrail	Impinj	IPJ-A0303-0000E	0069
Sunnart Devices:			

Support Devices.			
Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	Latitude	6497402833
Wireless G Router	Belkin	F5D7230-4	2028723009696



20°C / 26% relative humidity / 102.3 kPa.

Testing Radiated Spurious Emissions per FCC 15.247(d)

The Unit is an RF reader. It is located in the back edge of the test table. All its ports are being exercised. It is being powered by the AC/DC converter. It is connected to a laptop outside the chamber through a shielded ethernet cable. The antenna is suspended 10cm above the wooden table with styrofoam. The EUT will be in transmitting mode throughout the test in the HIGH channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 30.0 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 927.25MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency: 9kHz - 150kHz RBW= 200Hz, VBW= 200Hz 150kHz-30MHz RBW= 9kHz, VBW = 9kHz 30MHz - 1GHz RBW= 120kHz, VBW=120kHz 1GHz-19GHz RBW= 1 MHz, VBW=1 MHz.

#### Transducer Legend:

T1=ANT- AN00052-06042008 T3=ANT AN01994 25-1000MHz T5=CAB-ANP05361 T7=CAB-ANP05371 T9=CAB-ANP03123-120208 T11=Filter 1GHz HP AN02750 T13=AMP-AN01517-070808

Measu	rement Data:	R	eading lis	ted by ma	argin.		Те	st Distan	ce: 3 Meters	8	
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
			T9	T10	T11	T12					
			T13	T14							
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	2704.000M	17.2	+0.0	+29.7	+0.0	+0.0	+0.0	52.1	54.0	-1.9	Horiz
	Ambient		+0.0	+0.0	+0.0	+1.4	360		NOISEFL	OOR	116
			+0.5	+2.7	+0.6	+0.0					
			+0.0	+0.0							
2	16232.000	33.1	+0.0	+38.8	+0.0	+0.0	+0.0	51.1	54.0	-2.9	Vert
	Μ		+0.0	+0.0	+0.0	+2.9					
	Ambient		+0.8	+7.6	+0.0	+0.5	209		NOISEFL	OOR	109
			+0.0	-32.6							
3	100.310M	55.8	+0.0	+0.0	+10.2	+0.6	+0.0	38.4	44.0	-5.6	Vert
			+0.1	+0.6	+0.2	+0.0	360				100
			+0.0	+0.0	+0.0	+0.0					
			-29.1	+0.0							
4	25.700M	16.1	+6.7	+0.0	+0.0	+0.3	+0.0	23.6	30.0	-6.4	90deg
			+0.0	+0.3	+0.2	+0.0	360				101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							



5 24.350M	16.0	+6.8	+0.0	+0.0	+0.3	+0.0	23.6	30.0	-6.4	180de
Ambient		+0.0	+0.3	+0.2	+0.0	242		NOISEFLO	OOR	101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
6 1868.000M	16.5	+0.0	+26.8	+0.0	+0.0	+0.0	47.5	54.0	-6.5	Vert
Ambient		+0.0	+0.0	+0.0	+1.1			NOISEFLO	OOR	116
		+0.5	+2.2	+0.4	+0.0					
		+0.0	+0.0							
7 17922.000	20.0	+0.0	+44.3	+0.0	+0.0	+0.0	45.7	54.0	-8.3	Horiz
M		+0.0	+0.0	+0.0	+3.7	•		MOREER		100
Ambient		+1.6	+8.1	+0.0	+1.1	209		NOISEFLO	JOR	109
		+0.0	-33.1							
8 100.310M	52.4	+0.0	+0.0	+10.2	+0.6	+0.0	35.0	44.0	-9.0	Horiz
		+0.1	+0.6	+0.2	+0.0					175
		+0.0	+0.0	+0.0	+0.0					
0.55(2.7(0))	26.6	-29.1	+0.0	.0.0	.0.0	. 0. 0	15.0	54.0	0.0	
9 5563.769M	36.6	+0.0	+34.7	+0.0	+0.0	+0.0	45.0	54.0	-9.0	Horiz
		+0.0	+0.0	+0.0	+1.9	360				151
		+0.8	+4.0	+0.0	+0.4					
10 55(2(10M	26.6	+0.0	-33.4	.0.0	.0.0	.0.0	15.0	540	0.0	V
10 5563.619M	36.6	+0.0	+34.7	+0.0	+0.0	+0.0	45.0	54.0	-9.0	vert
		+0.0	+0.0	+0.0	+1.9	158				114
		+0.8	+4.0	+0.0	+0.4					
11 2700 00 AM	27.0	+0.0	-33.4	.0.0	.0.0	.0.0	10.5	540	11.5	Mart
11 3708.994M	37.0	+0.0	+32.1	+0.0	+0.0	+0.0	42.5	54.0	-11.5	vert
		+0.0	+0.0	+0.0	+1.8	197				115
		+0.7	+2.9	+0.0	+0.7					
12 67 290M	50.0	+0.0	-52.7	16.0	10.5		20.1	40.0	11.0	Vort
12 07.380W	30.0	+0.0	+0.0	+0.0	+0.3	+0.0	20.1	40.0	-11.9	100
		+0.1	+0.3	+0.2	+0.0	300				100
		+0.0	+0.0	$\pm 0.0$	$\pm 0.0$					
13 167 060M	187	-29.2		+ 10.0	10.8		32.0	44.0	12.0	Uoriz
15 107.000101	40.7	+0.0	+0.0 +0.0	+10.0	+0.8	$\pm 0.0$	52.0	44.0	-12.0	175
		+0.2	+0.0	+0.2	+0.0					175
		-28.8	+0.0	10.0	10.0					
14 3709 000M	35.5	+0.0	+32.1	+0.0	+0.0	±0.0	41.0	54.0	-13.0	Horiz
14 3707.000141	55.5	+0.0	+0.0	+0.0	+1.8	290	41.0	54.0	-15.0	107
		+0.7	+2.9	+0.0	+0.7	270				107
		+0.0	-32.7							
15 16232.000	21.3	+0.0	+38.8	+0.0	+0.0	+0.0	39.3	54.0	-14.7	Vert
M	21.5	+0.0	+0.0	+0.0	+2.9	10.0	57.5	2 110	11.7	, ert
Ambient		+0.8	+7.6	+0.0	+0.5	209		NOISEFLO	OOR	109
		+0.0	-32.6			_ • •				- • /
16 9272.394M	23.4	+0.0	+38.8	+0.0	+0.0	+0.0	39.3	54.0	-14.7	Vert
Ave		+0.0	+0.0	+0.0	+3.2	209				109
		+1.7	+5.3	+0.0	+0.4					
		+0.0	-33.5							
^ 9272.394M	35.5	+0.0	+38.8	+0.0	+0.0	+0.0	51.4	54.0	-2.6	Vert
		+0.0	+0.0	+0.0	+3.2	209				109
		+1.7	+5.3	+0.0	+0.4					
		+0.0	-33.5							



18	168.840M	45.3	+0.0	+0.0	+9.9	+0.8	+0.0	28.5	44.0	-15.5	Vert
			+0.2	+0.9	+0.2	+0.0	360				100
			+0.0	+0.0	+0.0	+0.0					
			-28.8	+0.0							
19	799.850M	27.4	+0.0	+0.0	+22.5	+1.9	+0.0	25.2	46.0	-20.8	Vert
			+0.4	+2.0	+0.5	+0.0	360				100
			+0.0	+0.0	+0.0	+0.0					
			-29.5	+0.0							
20	37.227k	40.1	+10.8	+0.0	+0.0	+0.0	-80.0	-29.1	36.6	-65.7	180de
	Ambient		+0.0	+0.0	+0.0	+0.0	360		NOISEFLOOR		101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
21	11.922k	44.5	+15.7	+0.0	+0.0	+0.0	-80.0	-19.8	46.5	-66.3	180de
	Ambient		+0.0	+0.0	+0.0	+0.0			NOISEFL	OOR	101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							



Customer:	Impinj Inc
Specification:	FCC 15.247/15.209
Work Order #:	89028
Test Type:	Radiated Scan
Equipment:	RFID Reader
Manufacturer:	Impinj
Model:	IPJ-REV
S/N:	940-08-21-0006

Date: 2/12/2009 Time: 09:43:21 Sequence#: 9 Tested By: Armando Del Angel

### Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Mag Loop	2156	06/04/2008	06/04/2010	AN00052
Antenna	2453	12/22/2008	12/22/2010	AN01994
EMCO 3115 Horn	9606-4854	11/12/2007	11/12/2009	AN01412
Horn Antenna, Active 18-26GHz	1114018	11/13/2008	11/13/2010	2742
Heliax cable	N/A	07/22/2008	07/22/2010	AN05545
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03123
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03122
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03121
Cable 30'	11	11/05/2008	11/05/2010	ANP05366
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Cable 20'	16	11/10/2008	11/10/2010	ANP05360
Cable 6'	51	12/30/2008	12/30/2010	ANP05361
Pasternack Coax		07/20/2007	07/20/2009	AN05425
HP 8447D Preamp	2944A08601	07/08/2008	07/08/2010	AN01517
HP 83017A Pre-amp	3123A00464	10/02/2007	10/02/2009	AN01271
Filter	2	05/01/2008	05/01/2010	2750
Filter	311SH10-	12/02/2008	12/02/2010	3116
	3000/T10000-0/0			
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872

## Equipment Under Test (\* = EUT):

Function	Manufacturer	Model #	S/N
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Guardwall antenna	Impinj	IPJ-A0402-USA	0116

# Support Devices:FunctionManufacturerModel #S/NLaptop ComputerDellLatitude6497402833Wireless G RouterBelkinF5D7230-42028723009696



20°C / 26% relative humidity / 102.3 kPa.

Testing Radiated Spurious Emissions per FCC 15.247(d)

The Unit is an RF reader. It is located in the back edge of the test table. All its ports are being exercised. It is being powered by the AC/DC converter. It is connected to a laptop outside the chamber through a shielded ethernet cable. The antenna is suspended 10cm above the wooden table with styrofoam. The EUT will be in transmitting mode throughout the test in the LOW channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 30.0 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 902.75MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency:	9kHz - 150kHz	RBW= 200Hz,	VBW= 200Hz
	150kHz-30MHz	RBW= 9kHz,	VBW = 9kHz
	30MHz - 1GHz	RBW= 120kHz	VBW=120kHz
	1GHz-19GHz	RBW = 1 MHz,	VBW=1 MHz.

#### Transducer Legend:

T1=ANT- AN00052-06042008 T3=ANT AN01994 25-1000MHz T5=CAB-ANP05361 T7=CAB-ANP05371 T9=CAB-ANP03123-120208 T11=Filter 1GHz HP AN02750 T13=AMP-AN01517-070808

Mea	surement Data:	R	eading lis	ted by ma	argin.	n. Test Distance: 3 Meters					
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
			T9	T10	T11	T12					
			T13	T14							
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
	1 14145.000	32.3	+0.0	+41.1	+0.0	+0.0	+0.0	52.7	54.0	-1.3	Horiz
	М		+0.0	+0.0	+0.0	+3.4					
	Ambient		+1.2	+6.8	+0.0	+0.8			NOISEFLOOR		147
			+0.0	-32.9							
	2 2743.600M	16.2	+0.0	+29.9	+0.0	+0.0	+0.0	51.3	54.0	-2.7	Horiz
	Ambient		+0.0	+0.0	+0.0	+1.4	360		NOISEFL	OOR	116
			+0.5	+2.7	+0.6	+0.0					
			+0.0	+0.0							
	3 16500.000	32.3	+0.0	+39.3	+0.0	+0.0	+0.0	50.9	54.0	-3.1	Vert
	М		+0.0	+0.0	+0.0	+3.3					
	Ambient		+1.0	+7.7	+0.0	+0.4	34		NOISEFL	OOR	147
			+0.0	-33.1							
	4 892.405M	43.8	+0.0	+0.0	+23.1	+1.8	+0.0	42.1	46.0	-3.9	Vert
			+0.5	+2.0	+0.2	+0.0	360				99
			+0.0	+0.0	+0.0	+0.0					
			-29.3	+0.0							


5 892.405M	42.9	+0.0	+0.0	+23.1	+1.8	+0.0	41.2	46.0	-4.8	Horiz
		+0.5	+2.0	+0.2	+0.0					175
		+0.0	+0.0	+0.0	+0.0					
		-29.3	+0.0							
6 100.065M	54.4	+0.0	+0.0	+10.2	+0.6	+0.0	37.0	44.0	-7.0	Vert
		+0.1	+0.6	+0.2	+0.0	360				99
		+0.0	+0.0	+0.0	+0.0					
		-29.1	+0.0							
7 1817.200M	14.8	+0.0	+26.6	+0.0	+0.0	+0.0	45.6	54.0	-8.4	Vert
Ambient		+0.0	+0.0	+0.0	+1.1	360		NOISEFL	OOR	116
		+0.5	+2.2	+0.4	+0.0					
		+0.0	+0.0							
8 10480.000	31.6	+0.0	+38.2	+0.0	+0.0	+0.0	44.9	54.0	-9.1	Vert
М		+0.0	+0.0	+0.0	+2.8					
Ambient		+1.1	+5.5	+0.0	+0.0	360		NOISEFL	OOR	147
		+0.0	-34.3							
9 5416.504M	35.4	+0.0	+34.5	+0.0	+0.0	+0.0	44.5	54.0	-9.5	Vert
		+0.0	+0.0	+0.0	+2.3	199				123
		+1.0	+3.9	+0.0	+0.5					
		+0.0	-33.1							
10 166.670M	50.4	+0.0	+0.0	+10.1	+0.8	+0.0	33.8	44.0	-10.2	Horiz
		+0.2	+0.9	+0.2	+0.0					175
		+0.0	+0.0	+0.0	+0.0					
		-28.8	+0.0							
11 11310.000	31.9	+0.0	+39.0	+0.0	+0.0	+0.0	42.2	54.0	-11.8	Horiz
М		+0.0	+0.0	+0.0	+2.9					
Ambient		+1.6	+5.8	+0.0	+0.2			NOISEFL	OOR	147
		+0.0	-39.2							
12 100.930M	49.2	+0.0	+0.0	+10.3	+0.6	+0.0	31.9	44.0	-12.1	Horiz
		+0.1	+0.6	+0.2	+0.0					175
		+0.0	+0.0	+0.0	+0.0					
		-29.1	+0.0							
13 14790.000	21.2	+0.0	+40.8	+0.0	+0.0	+0.0	41.5	54.0	-12.5	Vert
М		+0.0	+0.0	+0.0	+3.2	2.60				1.47
Ave		+1.4	+7.2	+0.0	+0.5	360				147
A 14700.000	22.2	+0.0	-32.8	0.0	0.0	0.0	50.6	54.0	1.4	<b>X</b> 7 .
^ 14790.000	32.3	+0.0	+40.8	+0.0	+0.0	+0.0	52.6	54.0	-1.4	Vert
М		+0.0	+0.0	+0.0	+3.2	260				1 477
		+1.4	+1.2	+0.0	+0.5	360				147
15 14145 000	21.1	+0.0	-32.8	0.0	10.0		41.5	54.0	12.5	Hanin
15 14145.000 M	21.1	+0.0	+41.1	+0.0	+0.0	+0.0	41.5	54.0	-12.5	HOLIZ
IVI Ambient		+0.0	+0.0	+0.0	+5.4			NOISEEL		147
Ambient		+1.2	+0.0	$\pm 0.0$	+0.8			NOISEFL	JOK	147
16 3610 080M	36.4		-32.7	+0.0	±0.0	+0.0	<u> </u>	54.0	12.6	Horiz
10 3010.909101	50.4	+0.0	0.1CT	+0.0	+0.0 +1.6	+0.0 2/7	41.4	34.0	-12.0	00
		+0.0 ⊥0.6	+0.0	+0.0 +0.0	+1.0	241				フフ
		+0.0 ⊥0.0	-327	$\pm 0.0$	+0.7					
17 0007 50014	22 5		-32.7			±0.0	20.1	54.0	1/ 0	Vort
$\frac{17}{\Delta ve}$	23.3	+0.0 ±0.0	+J0.9 _L0.0	+0.0 +0.0	+0.0 $\pm 2.1$	+0.0 180	37.1	34.0	-14.7	122
Αντ		+0.0 ⊥1.6	+0.0 ⊥5 3	+0.0 ⊥0.0	+3.1 ±0.5	100				123
		+1.0 ±0.0	-33.8	$\pm 0.0$	$\pm 0.5$					
		$\pm 0.0$	-33.0							



^	9027.500M	32.8	+0.0	+38.9	+0.0	+0.0	+0.0	48.4	54.0	-5.6	Vert
			+0.0	+0.0	+0.0	+3.1	180				123
			+1.6	+5.3	+0.0	+0.5					
			+0.0	-33.8							
19	9027.502M	22.9	+0.0	+38.9	+0.0	+0.0	+0.0	38.5	54.0	-15.5	Horiz
	Ave		+0.0	+0.0	+0.0	+3.1	209				124
			+1.6	+5.3	+0.0	+0.5					
			+0.0	-33.8							
^	9027.502M	32.4	+0.0	+38.9	+0.0	+0.0	+0.0	48.0	54.0	-6.0	Horiz
			+0.0	+0.0	+0.0	+3.1	209				124
			+1.6	+5.3	+0.0	+0.5					
			+0.0	-33.8							
21	3610.989M	33.5	+0.0	+31.8	+0.0	+0.0	+0.0	38.5	54.0	-15.5	Vert
	Ave		+0.0	+0.0	+0.0	+1.6	170				99
			+0.6	+3.0	+0.0	+0.7					
			+0.0	-32.7							
^	3610.989M	39.5	+0.0	+31.8	+0.0	+0.0	+0.0	44.5	54.0	-9.5	Vert
			+0.0	+0.0	+0.0	+1.6	170				99
			+0.6	+3.0	+0.0	+0.7					
			+0.0	-32.7							
23	169.265M	44.8	+0.0	+0.0	+9.8	+0.8	+0.0	27.9	44.0	-16.1	Vert
			+0.2	+0.9	+0.2	+0.0	360				99
			+0.0	+0.0	+0.0	+0.0					
			-28.8	+0.0							
24	5416.492M	28.5	+0.0	+34.5	+0.0	+0.0	+0.0	37.6	54.0	-16.4	Horiz
			+0.0	+0.0	+0.0	+2.3	196				123
			+1.0	+3.9	+0.0	+0.5					
			+0.0	-33.1							
25	452.985M	37.3	+0.0	+0.0	+17.3	+1.6	+0.0	29.3	46.0	-16.7	Horiz
			+0.3	+1.6	+0.5	+0.0					175
			+0.0	+0.0	+0.0	+0.0					
			-29.3	+0.0							
26	16.162M	2.8	+8.6	+0.0	+0.0	+0.3	+0.0	12.2	30.0	-17.8	90deg
	Ave		+0.0	+0.3	+0.2	+0.0	190				101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
^	16.162M	15.5	+8.6	+0.0	+0.0	+0.3	+0.0	24.9	30.0	-5.1	90deg
			+0.0	+0.3	+0.2	+0.0	190				101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
28	119.850k	77.7	+10.1	+0.0	+0.0	+0.0	-80.0	7.8	26.3	-18.5	90deg
			+0.0	+0.0	+0.0	+0.0	190				101
			+0.0	+0.0	+0.0	+0.0					
-	210.0001	<b>F</b> O <b>O</b>	+0.0	+0.0	0.0	0.4	00.0	11 -	15.0	<b>0</b> 0 4	001
29	319.080k	58.3	+9.9	+0.0	+0.0	+0.1	-80.0	-11.6	17.8	-29.4	90deg
			+0.0	+0.0	+0.1	+0.0	190				101
			+0.0	+0.0	+0.0	+0.0					
	100 5001		+0.0	+0.0			00.0				1001
30	123.780k	63.4	+10.1	+0.0	+0.0	+0.0	-80.0	-6.5	26.0	-32.5	180de
			+0.0	+0.0	+0.0	+0.0	1/9				101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							



31	319.080k	47.7	+9.9	+0.0	+0.0	+0.1	-80.0	-22.2	17.8	-40.0	180de
			+0.0	+0.0	+0.1	+0.0	179				101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
32	15.755k	64.1	+14.2	+0.0	+0.0	+0.0	-80.0	-1.7	44.1	-45.8	90deg
			+0.0	+0.0	+0.0	+0.0	190				101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
33	26.021k	61.5	+11.9	+0.0	+0.0	+0.0	-80.0	-6.6	39.7	-46.3	90deg
			+0.0	+0.0	+0.0	+0.0	190				101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
34	12.018k	62.6	+15.6	+0.0	+0.0	+0.0	-80.0	-1.8	46.5	-48.3	90deg
			+0.0	+0.0	+0.0	+0.0	190				101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
35	15.790k	52.6	+14.2	+0.0	+0.0	+0.0	-80.0	-13.2	44.1	-57.3	180de
			+0.0	+0.0	+0.0	+0.0	180				101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							
36	12.030k	51.7	+15.6	+0.0	+0.0	+0.0	-80.0	-12.7	46.5	-59.2	180de
			+0.0	+0.0	+0.0	+0.0	180				101
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0							



Test Location: CKC Laboratories •22116 23rd Dr SE • Bothell, WA 98021-4413 • 425-402-1717

Customer:	Impinj Inc
Specification:	FCC 15.247/15.209
Work Order #:	89028
Test Type:	Radiated Scan
Equipment:	RFID Reader
Manufacturer:	Impinj
Model:	IPJ-REV
S/N:	940-08-21-0006

Date: 2/12/2009 Time: 09:50:20 Sequence#: 8 Tested By: Armando Del Angel

### Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Mag Loop	2156	06/04/2008	06/04/2010	AN00052
Antenna	2453	12/22/2008	12/22/2010	AN01994
EMCO 3115 Horn	9606-4854	11/12/2007	11/12/2009	AN01412
Horn Antenna, Active 18-26GHz	1114018	11/13/2008	11/13/2010	2742
Heliax cable	N/A	07/22/2008	07/22/2010	AN05545
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03123
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03122
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03121
Cable 30'	11	11/05/2008	11/05/2010	ANP05366
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Cable 20'	16	11/10/2008	11/10/2010	ANP05360
Cable 6'	51	12/30/2008	12/30/2010	ANP05361
Pasternack Coax		07/20/2007	07/20/2009	AN05425
HP 8447D Preamp	2944A08601	07/08/2008	07/08/2010	AN01517
HP 83017A Pre-amp	3123A00464	10/02/2007	10/02/2009	AN01271
Filter	2	05/01/2008	05/01/2010	2750
Filter	311SH10-	12/02/2008	12/02/2010	3116
	3000/T10000-0/0			
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872

## Equipment Under Test (\* = EUT):

Function	Manufacturer	Model #	S/N
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Guardwall antenna	Impinj	IPJ-A0402-USA	0116

# Support Devices:FunctionManufacturerModel #S/NLaptop ComputerDellLatitude6497402833Wireless G RouterBelkinF5D7230-42028723009696



Test Conditions / Notes:

20°C / 26% relative humidity / 102.3 kPa.

Testing Radiated Spurious Emissions per FCC 15.247(d)

The Unit is an RF reader. It is located in the back edge of the test table. All its ports are being exercised. It is being powered by the AC/DC converter. It is connected to a laptop outside the chamber through a shielded ethernet cable. The antenna is suspended 10cm above the wooden table with styrofoam. The EUT will be in transmitting mode throughout the test in the MID channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 30.0 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 915.25MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency:	9kHz - 150kHz	RBW= 200Hz,	VBW= 200Hz
	150kHz-30MHz	RBW= 9kHz,	VBW = 9kHz
	30MHz - 1GHz	RBW= 120kHz	VBW=120kHz
	1GHz-19GHz	RBW = 1 MHz,	VBW=1 MHz.

#### Transducer Legend:

T1=ANT- AN00052-06042008 T3=ANT AN01994 25-1000MHz T5=CAB-ANP05361 T7=CAB-ANP05371 T9=CAB-ANP03123-120208 T11=Filter 1GHz HP AN02750 T13=AMP-AN01517-070808 T2=ANT-AN01412-111207 T4=CAB-ANP05360 T6=CAB-ANP05366 T8=CAB-ANP03121-120208 T10=CAB-ANP05545-072208 T12=FIL-AN03116-120208 T14=AMP-AN01271-100207 - .5-26.5 GHz

Measu	rement Data:	R	eading lis	ted by ma	argin.	Test Distance: 3 Meters					
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
			T9	T10	T11	T12					
			T13	T14							
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	15414.000	31.6	+0.0	+38.9	+0.0	+0.0	+0.0	50.0	54.0	-4.0	Horiz
	Μ		+0.0	+0.0	+0.0	+3.1					
	Ambient		+1.1	+7.2	+0.0	+0.4	375		Noisefloor		115
			+0.0	-32.3							
2	904.700M	43.1	+0.0	+0.0	+23.2	+1.9	+0.0	41.7	46.0	-4.3	Horiz
			+0.5	+2.0	+0.3	+0.0	360				175
			+0.0	+0.0	+0.0	+0.0					
			-29.3	+0.0							
3	904.700M	42.8	+0.0	+0.0	+23.2	+1.9	+0.0	41.4	46.0	-4.6	Vert
			+0.5	+2.0	+0.3	+0.0					139
			+0.0	+0.0	+0.0	+0.0					
			-29.3	+0.0							
4	9248.500M	30.9	+0.0	+38.8	+0.0	+0.0	+0.0	46.8	54.0	-7.2	Vert
	Ambient		+0.0	+0.0	+0.0	+3.2	134		Noisefloor		115
			+1.7	+5.3	+0.0	+0.4					
			+0.0	-33.5							



5 1817.200M	15.1	+0.0	+26.6	+0.0	+0.0	+0.0	45.9	54.0	-8.1	Vert
		+0.0	+0.0	+0.0	+1.1					128
		+0.5	+2.2	+0.4	+0.0					
		+0.0	+0.0							
6 100.400M	53.0	+0.0	+0.0	+10.2	+0.6	+0.0	35.6	44.0	-8.4	Vert
		+0.1	+0.6	+0.2	+0.0	3				139
		+0.0	+0.0	+0.0	+0.0					
		-29.1	+0.0							
7 24.880M	13.5	+6.6	+0.0	+0.0	+0.3	+0.0	20.9	30.0	-9.1	180de
Ambient		+0.0	+0.3	+0.2	+0.0	162		Noisefloor		101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
8 21.220M	12.3	+7.8	+0.0	+0.0	+0.3	+0.0	20.9	30.0	-9.1	90deg
Ambient		+0.0	+0.3	+0.2	+0.0	189		Noisefloor		101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
9 16.466M	11.0	+8.6	+0.0	+0.0	+0.3	+0.0	20.4	30.0	-9.6	180de
Ambient		+0.0	+0.3	+0.2	+0.0	226		Noisefloor		101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
10 17655.000	20.0	+0.0	+43.1	+0.0	+0.0	+0.0	43.8	54.0	-10.2	Vert
М		+0.0	+0.0	+0.0	+3.5					
Ave		+1.3	+8.2	+0.0	+0.8	-11				115
		+0.0	-33.1							
11 169.000M	50.5	+0.0	+0.0	+9.8	+0.8	+0.0	33.6	44.0	-10.4	Horiz
		+0.2	+0.9	+0.2	+0.0	360				175
		+0.0	+0.0	+0.0	+0.0					
		-28.8	+0.0							
12 11103.000	30.8	+0.0	+38.9	+0.0	+0.0	+0.0	43.4	54.0	-10.6	Horiz
М		+0.0	+0.0	+0.0	+2.9					
Ambient		+1.5	+5.7	+0.0	+0.2	134		Noisefloor		115
		+0.0	-36.6			-				-
13 99.500M	48.5	+0.0	+0.0	+10.1	+0.6	+0.0	31.0	44.0	-13.0	Horiz
	1010	+0.1	+0.6	+0.2	+0.0	360	0110		1010	175
		+0.0	+0.0	+0.0	+0.0					
		-29.1	+0.0							
14 3660.996M	33.1	+0.0	+31.9	+0.0	+0.0	+0.0	38.3	54.0	-15.7	Vert
Ave	55.1	+0.0	+0.0	+0.0	+1.7	217	50.5	2110	10.7	109
		+0.6	+3.0	+0.0	+0.7					
		+0.0	-32.7							
^ 3660.996M	40.5	+0.0	+31.9	+0.0	+0.0	+0.0	45.7	54.0	-8.3	Vert
200000000000		+0.0	+0.0	+0.0	+1.7	217	1017	0.110	0.0	109
		+0.6	+3.0	+0.0	+0.7					107
		+0.0	-32.7							
16 452 400M	37.9	+0.0	+0.0	+17.2	+1.6	+0.0	29.8	46.0	-16.2	Horiz
10 102.100101	5115	+0.3	+1.6	+0.5	+0.0	360	27.0	10.0	10.2	175
		+0.0	+0.0	+0.0	+0.0	500				115
		-293	+0.0	10.0	10.0					
17 3661 001M	28.2	+0.0	+31.9	+0.0	+0.0	+0.0	33.4	54.0	-20.6	Horiz
Ave	20.2	+0.0	+0.0	+0.0	+1.7	202	55.4	5 7.0	20.0	115
		+0.6	+3.0	+0.0	+0.7	202				115
		+0.0	-327	10.0	10.7					
		10.0	-54.1							



^ 3661.001M	39.4	+0.0	+31.9	+0.0	+0.0	+0.0	44.6	54.0	-9.4	Horiz
		+0.0	+0.0	+0.0	+1.7	202				115
		+0.6	+3.0	+0.0	+0.7					
		+0.0	-32.7							
19 1.038M	28.2	+10.0	+0.0	+0.0	+0.1	-40.0	-1.6	27.4	-29.0	180de
Ambient		+0.0	+0.1	+0.0	+0.0	226		Noisefloor		101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
20 17.507k	44.5	+13.6	+0.0	+0.0	+0.0	-80.0	-21.9	43.2	-65.1	90deg
Ambient		+0.0	+0.0	+0.0	+0.0	189		Noisefloor		101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
21 9.834k	46.3	+0.0	+0.0	+0.0	+0.0	-80.0	-33.7	48.2	-81.9	180de
Ambient		+0.0	+0.0	+0.0	+0.0	226		Noisefloor		101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
22 9.540k	45.8	+0.0	+0.0	+0.0	+0.0	-80.0	-34.2	48.5	-82.7	90deg
Ambient		+0.0	+0.0	+0.0	+0.0	298		Noisefloor		101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							



Test Location: CKC Laboratories •22116 23rd Dr SE • Bothell, WA 98021-4413 • 425-402-1717

Customer:	Impinj Inc
Specification:	FCC 15.247/15.209
Work Order #:	89028
Test Type:	Radiated Scan
Equipment:	<b>RFID Reader</b>
Manufacturer:	Impinj
Model:	IPJ-REV
S/N:	940-08-21-0006

Date: 2/12/2009 Time: 09:57:54 Sequence#: 7 Tested By: Armando Del Angel

### Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Mag Loop	2156	06/04/2008	06/04/2010	AN00052
Antenna	2453	12/22/2008	12/22/2010	AN01994
EMCO 3115 Horn	9606-4854	11/12/2007	11/12/2009	AN01412
Horn Antenna, Active 18-26GHz	1114018	11/13/2008	11/13/2010	2742
Heliax cable	N/A	07/22/2008	07/22/2010	AN05545
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03123
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03122
High freq. Cable	N/A	12/02/2008	12/02/2010	AN03121
Cable 30'	11	11/05/2008	11/05/2010	ANP05366
Cable 6'	49	11/10/2008	11/10/2010	ANP05371
Cable 20'	16	11/10/2008	11/10/2010	ANP05360
Cable 6'	51	12/30/2008	12/30/2010	ANP05361
Pasternack Coax		07/20/2007	07/20/2009	AN05425
HP 8447D Preamp	2944A08601	07/08/2008	07/08/2010	AN01517
HP 83017A Pre-amp	3123A00464	10/02/2007	10/02/2009	AN01271
Filter	2	05/01/2008	05/01/2010	2750
Filter	311SH10-	12/02/2008	12/02/2010	3116
	3000/T10000-0/0			
Spectrum Analyzer	MY46186330	03/10/2007	03/10/2009	2872

## Equipment Under Test (\* = EUT):

Function	Manufacturer	Model #	S/N
RFID Reader*	Impinj	IPJ-REV	940-08-21-0006
AC/DC adaptor	CUI	DSA-60W-20	ETS240250UC-P11P-DB
Guardwall antenna	Impinj	IPJ-A0402-USA	0116

# Support Devices:FunctionManufacturerModel #S/NLaptop ComputerDellLatitude6497402833Wireless G RouterBelkinF5D7230-42028723009696



Test Conditions / Notes:

20°C / 26% relative humidity / 102.3 kPa.

Testing Radiated Spurious Emissions per FCC 15.247(d).

The Unit is an RF reader. It is located in the back edge of the test table. All its ports are being exercised. It is being powered by the AC/DC converter. It is connected to a laptop outside the chamber through a shielded ethernet cable. The antenna is suspended 10cm above the wooden table with styrofoam. The EUT will be in transmitting mode throughout the test in the HIGH channel.

Remote support computer sends commands to the EUT to exercise the intended functionalities.

Power setting = 30.0 dBm Operating Frequency range = 902 - 928MHz Frequency under test = 927.25MHz

Frequency range of measurement = 9kHz - 19GHz.

Frequency:	9kHz - 150kHz	RBW= 200Hz,	VBW= 200Hz
	150kHz-30MHz	RBW=9kHz,	VBW = 9kHz
	30MHz - 1GHz	RBW= 120kHz	, VBW=120kHz
	1GHz-19GHz	RBW=1 MHz,	VBW=1 MHz.

#### Transducer Legend:

T1=ANT- AN00052-06042008 T3=ANT AN01994 25-1000MHz T5=CAB-ANP05361 T7=CAB-ANP05371 T9=CAB-ANP03123-120208 T11=Filter 1GHz HP AN02750 T13=AMP-AN01517-070808 T2=ANT-AN01412-111207 T4=CAB-ANP05360 T6=CAB-ANP05366 T8=CAB-ANP03121-120208 T10=CAB-ANP05545-072208 T12=FIL-AN03116-120208 T14=AMP-AN01271-100207 - .5-26.5 GHz

Measu	urement Data:	R	eading lis	ted by ma	argin.	Test Distance: 3 Meters					
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
			T9	T10	T11	T12					
			T13	T14							
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	9272.507M	34.2	+0.0	+38.8	+0.0	+0.0	+0.0	50.1	54.0	-3.9	Horiz
	Ambient		+0.0	+0.0	+0.0	+3.2	212		NOISEFL	OOR	109
			+1.7	+5.3	+0.0	+0.4					
			+0.0	-33.5							
2	916.440M	43.2	+0.0	+0.0	+23.3	+1.9	+0.0	42.0	46.0	-4.0	Vert
			+0.5	+2.0	+0.4	+0.0					100
			+0.0	+0.0	+0.0	+0.0					
			-29.3	+0.0							
3	15936.000	30.8	+0.0	+38.4	+0.0	+0.0	+0.0	48.7	54.0	-5.3	Vert
	Μ		+0.0	+0.0	+0.0	+3.2					
	Ambient		+1.0	+7.4	+0.0	+0.5	212		NOISEFL	OOR	109
			+0.0	-32.6							
4	916.440M	41.3	+0.0	+0.0	+23.3	+1.9	+0.0	40.1	46.0	-5.9	Horiz
			+0.5	+2.0	+0.4	+0.0	360				159
			+0.0	+0.0	+0.0	+0.0					
			-29.3	+0.0							

CKC AM Testing the Future

5 1854.499M	17.0	+0.0	+26.8	+0.0	+0.0	+0.0	48.0	54.0	-6.0	Horiz
Ave		+0.0	+0.0	+0.0	+1.1	209				144
		+0.5	+2.2	+0.4	+0.0					
		+0.0	+0.0							
^ 1854.499M	22.4	+0.0	+26.8	+0.0	+0.0	+0.0	53.4	54.0	-0.6	Horiz
		+0.0	+0.0	+0.0	+1.1	209				144
		+0.5	+2.2	+0.4	+0.0					
		+0.0	+0.0							
7 100.310M	54.9	+0.0	+0.0	+10.2	+0.6	+0.0	37.5	44.0	-6.5	Vert
		+0.1	+0.6	+0.2	+0.0	37				100
		+0.0	+0.0	+0.0	+0.0					
		-29.1	+0.0							
8 1854.516M	13.7	+0.0	+26.8	+0.0	+0.0	+0.0	44.7	54.0	-9.3	Vert
Ave		+0.0	+0.0	+0.0	+1.1	170				128
		+0.5	+2.2	+0.4	+0.0					
		+0.0	+0.0							
^ 1854.516M	20.3	+0.0	+26.8	+0.0	+0.0	+0.0	51.3	54.0	-2.7	Vert
		+0.0	+0.0	+0.0	+1.1	170				128
		+0.5	+2.2	+0.4	+0.0					
		+0.0	+0.0							
10 168.840M	50.8	+0.0	+0.0	+9.9	+0.8	+0.0	34.0	44.0	-10.0	Horiz
		+0.2	+0.9	+0.2	+0.0	360				159
		+0.0	+0.0	+0.0	+0.0					
		-28.8	+0.0							
11 17688.000	19.9	+0.0	+43.3	+0.0	+0.0	+0.0	43.9	54.0	-10.1	Horiz
М		+0.0	+0.0	+0.0	+3.5					
A1. *		1.0			0.0	010		NOICEEL		100
Ambient		+1.3	+8.2	+0.0	+0.8	212		NOISEFLU	JUK	109
Ambient		$^{+1.3}_{+0.0}$	+8.2 -33.1	+0.0	+0.8	212		NOISEFLU	JOR	109
12 451.860M	40.0	+1.3 +0.0 +0.0	+8.2 -33.1 +0.0	+0.0	+0.8	+0.0	31.9	46.0	-14.1	Horiz
12 451.860M	40.0	+1.3 +0.0 +0.0 +0.3	+8.2 -33.1 +0.0 +1.6	+0.0 +17.2 +0.5	+0.8 +1.6 +0.0	+0.0 360	31.9	46.0	-14.1	Horiz 159
12 451.860M	40.0	+1.3 +0.0 +0.0 +0.3 +0.0	+8.2 -33.1 +0.0 +1.6 +0.0	+0.0 +17.2 +0.5 +0.0	+0.8 +1.6 +0.0 +0.0	+0.0 360	31.9	46.0	-14.1	Horiz 159
12 451.860M	40.0	+1.3 +0.0 +0.0 +0.3 +0.0 -29.3	+8.2 -33.1 +0.0 +1.6 +0.0 +0.0	+0.0 +17.2 +0.5 +0.0	+0.8 +1.6 +0.0 +0.0	+0.0 360	31.9	46.0	-14.1	Horiz 159
Ambient 12 451.860M 13 9272.507M	40.0	+1.3 +0.0 +0.0 +0.3 +0.0 -29.3 +0.0	+8.2 -33.1 +0.0 +1.6 +0.0 +0.0 +38.8	+0.0 +17.2 +0.5 +0.0 +0.0	+0.8 +1.6 +0.0 +0.0 +0.0	+0.0 360 +0.0	31.9	46.0 54.0	-14.1 -14.2	Horiz 159 Vert
Ambient 12 451.860M 13 9272.507M Ave	40.0	+1.3 +0.0 +0.0 +0.3 +0.0 -29.3 +0.0 +0.0	+8.2 -33.1 +0.0 +1.6 +0.0 +38.8 +0.0	+0.0 +17.2 +0.5 +0.0 +0.0 +0.0	+0.8 +1.6 +0.0 +0.0 +0.0 +0.0 +3.2	+0.0 360 +0.0 212	31.9 39.8	46.0 54.0	-14.1 -14.2	Horiz 159 Vert 109
Ambient 12 451.860M 13 9272.507M Ave	40.0	+1.3 +0.0 +0.0 +0.3 +0.0 -29.3 +0.0 +0.0 +1.7	+8.2 -33.1 +0.0 +1.6 +0.0 +38.8 +0.0 +5.3	+0.0 +17.2 +0.5 +0.0 +0.0 +0.0 +0.0	+0.8 +1.6 +0.0 +0.0 +0.0 +0.0 +3.2 +0.4	+0.0 360 +0.0 212	31.9 39.8	46.0 54.0	-14.1 -14.2	Horiz 159 Vert 109
Ambient 12 451.860M 13 9272.507M Ave	40.0	$ \begin{array}{r} +1.3 \\ +0.0 \\ +0.0 \\ +0.3 \\ +0.0 \\ -29.3 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \end{array} $	+8.2 -33.1 +0.0 +1.6 +0.0 +38.8 +0.0 +5.3 -33.5	+0.0 +17.2 +0.5 +0.0 +0.0 +0.0 +0.0	+0.8 +1.6 +0.0 +0.0 +0.0 +3.2 +0.4	+0.0 360 +0.0 212	31.9 39.8	46.0 54.0	-14.1 -14.2	Horiz 159 Vert 109
Ambient 12 451.860M 13 9272.507M Ave ^ 9272.507M	40.0 23.9 34.4	$ \begin{array}{r} +1.3 \\ +0.0 \\ +0.0 \\ +0.3 \\ +0.0 \\ -29.3 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \\ +0.0 \\ \end{array} $	+8.2 -33.1 +0.0 +1.6 +0.0 +38.8 +0.0 +5.3 -33.5 +38.8	+0.0 +17.2 +0.5 +0.0 +0.0 +0.0 +0.0 +0.0	+0.8 +1.6 +0.0 +0.0 +0.0 +3.2 +0.4 +0.0	+0.0 360 +0.0 212 +0.0	31.9 39.8 50.3	46.0 54.0 54.0	-14.1 -14.2 -3.7	Horiz 159 Vert 109 Vert
Ambient 12 451.860M 13 9272.507M Ave ^ 9272.507M	40.0 23.9 34.4	+1.3 +0.0 +0.0 +0.3 +0.0 -29.3 +0.0 +0.0 +1.7 +0.0 +0.0 +1.7 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0 +0	+8.2 -33.1 +0.0 +1.6 +0.0 +38.8 +0.0 +5.3 -33.5 +38.8 +0.0	+0.0 +17.2 +0.5 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0	+0.8 +1.6 +0.0 +0.0 +0.0 +3.2 +0.4 +0.0 +3.2	+0.0 360 +0.0 212 +0.0 212	31.9 39.8 50.3	46.0 54.0 54.0	-14.1 -14.2 -3.7	Horiz 159 Vert 109 Vert 109
Ambient 12 451.860M 13 9272.507M Ave ^ 9272.507M	40.0 23.9 34.4	$\begin{array}{r} +1.3 \\ +0.0 \\ +0.0 \\ +0.3 \\ +0.0 \\ -29.3 \\ +0.0 \\ +1.7 \\ +0.0 \\ +0.0 \\ +0.0 \\ +1.7 \end{array}$	+8.2 -33.1 +0.0 +1.6 +0.0 +38.8 +0.0 +5.3 +38.8 +0.0 +5.3	+0.0 +17.2 +0.5 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0	+0.8 +1.6 +0.0 +0.0 +0.0 +3.2 +0.4 +0.0 +3.2 +0.4	+0.0 360 +0.0 212 +0.0 212	31.9 39.8 50.3	46.0 54.0 54.0	-14.1 -14.2 -3.7	Horiz 159 Vert 109 Vert 109
Ambient 12 451.860M 13 9272.507M Ave ^ 9272.507M	40.0 23.9 34.4	$\begin{array}{r} +1.3 \\ +0.0 \\ +0.0 \\ +0.3 \\ +0.0 \\ -29.3 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \\ +1.7 \\ +0.0 \end{array}$	+8.2 -33.1 +0.0 +1.6 +0.0 +38.8 +0.0 +5.3 -33.5 +38.8 +0.0 +5.3 -33.5	+0.0 +17.2 +0.5 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0	+0.8 +1.6 +0.0 +0.0 +0.0 +0.0 +3.2 +0.4 +0.0 +3.2 +0.4 +0.0 +3.2 +0.4	+0.0 360 +0.0 212 +0.0 212	31.9 39.8 50.3	46.0 54.0 54.0	-14.1 -14.2 -3.7	Horiz 159 Vert 109 Vert 109
Ambient 12 451.860M 13 9272.507M Ave ^ 9272.507M 15 162.610M	40.0 23.9 34.4 45.3	$\begin{array}{r} +1.3 \\ +0.0 \\ +0.0 \\ +0.3 \\ +0.0 \\ -29.3 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \\ +1.7 \\ +0.0 \\ +0.0 \\ +0.0 \end{array}$	$\begin{array}{r} +8.2 \\ -33.1 \\ +0.0 \\ +1.6 \\ +0.0 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +0.0 \\ +5.3 \\ -33.5 \\ +0.0 \end{array}$	+0.0 +17.2 +0.5 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0	+0.8 +1.6 +0.0 +0.0 +3.2 +0.4 +0.0 +3.2 +0.4 +0.0 +3.2 +0.4	+0.0 360 +0.0 212 +0.0 212 +0.0 +0.0	31.9 39.8 50.3 29.0	46.0 54.0 54.0 44.0	-14.1 -14.2 -3.7 -15.0	Horiz 159 Vert 109 Vert 109 Vert
Ambient 12 451.860M 13 9272.507M Ave ^ 9272.507M 15 162.610M	40.0 23.9 34.4 45.3	$\begin{array}{r} +1.3 \\ +0.0 \\ +0.0 \\ +0.3 \\ +0.0 \\ -29.3 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \\ +0.0 \\ +0.2 \\ \end{array}$	$\begin{array}{r} +8.2 \\ -33.1 \\ +0.0 \\ +1.6 \\ +0.0 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +0.0 \\ +5.3 \\ -33.5 \\ +0.0 \\ +0.9 \end{array}$	+0.0 +17.2 +0.5 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0	+0.8 +1.6 +0.0 +0.0 +0.0 +0.0 +3.2 +0.4 +0.0 +3.2 +0.4 +0.0 +3.2 +0.4 +0.8 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0	+0.0 360 +0.0 212 +0.0 212 +0.0	31.9 39.8 50.3 29.0	46.0 54.0 54.0 44.0	-14.1 -14.2 -3.7 -15.0	Horiz 159 Vert 109 Vert 109 Vert 109
Ambient 12 451.860M 13 9272.507M Ave ^ 9272.507M 15 162.610M	40.0 23.9 34.4 45.3	$\begin{array}{r} +1.3 \\ +0.0 \\ +0.0 \\ +0.3 \\ +0.0 \\ -29.3 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \\ +0.0 \\ +0.2 \\ +0.0 \\ +0.2 \\ +0.0 \end{array}$	$\begin{array}{r} +8.2 \\ -33.1 \\ +0.0 \\ +1.6 \\ +0.0 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +0.0 \\ +0.9 \\ +0.0 \\ +0.9 \\ +0.0 \end{array}$	+0.0 +17.2 +0.5 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0	+0.8 +1.6 +0.0 +0.0 +0.0 +3.2 +0.4 +0.0 +3.2 +0.4 +0.0 +3.2 +0.4 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0	+0.0 360 +0.0 212 +0.0 212 +0.0	31.9 39.8 50.3 29.0	46.0 54.0 54.0 44.0	-14.1 -14.2 -3.7 -15.0	Horiz 159 Vert 109 Vert 109 Vert 100
Ambient 12 451.860M 13 9272.507M Ave ^ 9272.507M 15 162.610M	40.0 23.9 34.4 45.3	$\begin{array}{r} +1.3 \\ +0.0 \\ +0.0 \\ +0.3 \\ +0.0 \\ -29.3 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \\ +0.0 \\ +0.2 \\ +0.0 \\ +0.2 \\ +0.0 \\ -28.8 \end{array}$	$\begin{array}{r} +8.2 \\ -33.1 \\ +0.0 \\ +1.6 \\ +0.0 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +0.0 \\ +0.0 \\ +0.9 \\ +0.0 \\ +0.0 \\ +0.0 \end{array}$	+0.0 +17.2 +0.5 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0	+0.8 +1.6 +0.0 +0.0 +0.0 +0.0 +3.2 +0.4 +0.0 +3.2 +0.4 +0.0 +3.2 +0.4 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0	+0.0 360 +0.0 212 +0.0 212 +0.0	31.9 39.8 50.3 29.0	46.0 54.0 54.0 44.0	-14.1 -14.2 -3.7 -15.0	Horiz 159 Vert 109 Vert 109 Vert 100
Ambient 12 451.860M 13 9272.507M Ave ^ 9272.507M 15 162.610M 16 3708.999M	40.0 23.9 34.4 45.3 30.4	$\begin{array}{r} +1.3 \\ +0.0 \\ +0.0 \\ +0.3 \\ +0.0 \\ -29.3 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \\ +0.0 \\ +0.2 \\ +0.0 \\ -28.8 \\ +0.0 \end{array}$	$\begin{array}{r} +8.2 \\ -33.1 \\ +0.0 \\ +1.6 \\ +0.0 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +0.0 \\ +0.0 \\ +0.9 \\ +0.0 \\ +0.0 \\ +0.0 \\ +32.1 \end{array}$	+0.0 +17.2 +0.5 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0 +10.4 +0.2 +0.0 +0.0 +10.4	+0.8 $+1.6$ $+0.0$ $+0.0$ $+3.2$ $+0.4$ $+0.0$ $+3.2$ $+0.4$ $+0.8$ $+0.0$ $+0.0$ $+0.0$ $+0.0$	+0.0 360 +0.0 212 +0.0 212 +0.0 +0.0	31.9 39.8 50.3 29.0 35.9	46.0 54.0 54.0 44.0 54.0	-14.1 -14.2 -3.7 -15.0 -18.1	Horiz 159 Vert 109 Vert 109 Vert 100 Vert
Ambient 12 451.860M 13 9272.507M Ave ^ 9272.507M 15 162.610M 16 3708.999M Ave	40.0 23.9 34.4 45.3 30.4	$\begin{array}{r} +1.3 \\ +0.0 \\ +0.0 \\ +0.3 \\ +0.0 \\ -29.3 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \\ +0.0 \\ +0.2 \\ +0.0 \\ +0.2 \\ +0.0 \\ -28.8 \\ +0.0 \\ +0.0 \\ +0.0 \end{array}$	$\begin{array}{r} +8.2 \\ -33.1 \\ +0.0 \\ +1.6 \\ +0.0 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0$	$\begin{array}{r} +0.0\\ +17.2\\ +0.5\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +10.4\\ +0.2\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ \end{array}$	+0.8 +1.6 +0.0 +0.0 +0.0 +0.0 +3.2 +0.4 +0.0 +3.2 +0.4 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0 +0.0	$ \begin{array}{r} 212 \\ +0.0 \\ 360 \\ +0.0 \\ 212 \\ +0.0 \\ 212 \\ +0.0 \\ 197 \\ \end{array} $	31.9 39.8 50.3 29.0 35.9	46.0 54.0 54.0 44.0 54.0	-14.1 -14.2 -3.7 -15.0 -18.1	Horiz 159 Vert 109 Vert 109 Vert 100 Vert 113
Ambient         12       451.860M         13       9272.507M         Ave         ^       9272.507M         15       162.610M         16       3708.999M         Ave	40.0 23.9 34.4 45.3 30.4	$\begin{array}{r} +1.3 \\ +0.0 \\ +0.0 \\ +0.3 \\ +0.0 \\ -29.3 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \\ +0.2 \\ +0.0 \\ +0.2 \\ +0.0 \\ -28.8 \\ +0.0 \\ +0.0 \\ +0.7 \\ \end{array}$	$\begin{array}{r} +8.2 \\ -33.1 \\ +0.0 \\ +1.6 \\ +0.0 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +0.0 \\ +0.0 \\ +0.9 \\ +0.0 \\ +0.0 \\ +0.0 \\ +32.1 \\ +0.0 \\ +2.9 \end{array}$	$\begin{array}{c} +0.0 \\ +17.2 \\ +0.5 \\ +0.0 \\ \hline +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +10.4 \\ +0.2 \\ +0.0 \\ \hline +10.4 \\ +0.2 \\ +0.0 \\ \hline +0.0 \\ +0.0 \\ +0.0 \end{array}$	$\begin{array}{r} +0.8\\ +1.6\\ +0.0\\ +0.0\\ +0.0\\ +3.2\\ +0.4\\ \hline +0.0\\ +3.2\\ +0.4\\ \hline +0.8\\ +0.0\\ +0.0\\ \hline +1.8\\ +0.7\\ \end{array}$	+0.0 360 +0.0 212 +0.0 212 +0.0 212 +0.0 197	31.9 39.8 50.3 29.0 35.9	46.0 54.0 54.0 44.0 54.0	-14.1 -14.2 -3.7 -15.0 -18.1	I09Horiz159Vert109Vert109Vert100Vert113
Ambient         12       451.860M         13       9272.507M         Ave         ^       9272.507M         15       162.610M         16       3708.999M         Ave	40.0 23.9 34.4 45.3 30.4	$\begin{array}{r} +1.3\\ +0.0\\ +0.0\\ +0.3\\ +0.0\\ -29.3\\ +0.0\\ +0.0\\ +1.7\\ +0.0\\ +0.0\\ +1.7\\ +0.0\\ +0.0\\ +0.2\\ +0.0\\ +0.2\\ +0.0\\ -28.8\\ +0.0\\ +0.0\\ +0.7\\ +0.0\\ +0.7\\ +0.0\end{array}$	$\begin{array}{r} +8.2 \\ -33.1 \\ +0.0 \\ +1.6 \\ +0.0 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.21 \\ +0.0 \\ +32.1 \\ +0.0 \\ +2.9 \\ -32.7 \end{array}$	$\begin{array}{r} +0.0\\ +17.2\\ +0.5\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +10.4\\ +0.2\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ \end{array}$	+0.8 $+1.6$ $+0.0$ $+0.0$ $+3.2$ $+0.4$ $+0.0$ $+3.2$ $+0.4$ $+0.0$ $+3.2$ $+0.4$ $+0.0$ $+1.8$ $+0.7$	212 +0.0 360 +0.0 212 +0.0 212 +0.0 197	31.9 39.8 50.3 29.0 35.9	46.0 54.0 54.0 44.0 54.0	-14.1 -14.2 -3.7 -15.0 -18.1	Horiz 159 Vert 109 Vert 109 Vert 100 Vert 113
Ambient 12 451.860M 13 9272.507M Ave ^ 9272.507M 15 162.610M 16 3708.999M Ave ^ 3708.999M	40.0 23.9 34.4 45.3 30.4 38.2	$\begin{array}{r} +1.3 \\ +0.0 \\ +0.0 \\ +0.3 \\ +0.0 \\ -29.3 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.2 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +$	$\begin{array}{r} +8.2 \\ -33.1 \\ +0.0 \\ +1.6 \\ +0.0 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +0.0 \\ +5.3 \\ -33.5 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +2.9 \\ -32.7 \\ +32.1 \\ +32.1 \\ \end{array}$	$\begin{array}{r} +0.0\\ +17.2\\ +0.5\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +10.4\\ +0.2\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ \end{array}$	+0.8 $+1.6$ $+0.0$ $+0.0$ $+3.2$ $+0.4$ $+0.0$ $+3.2$ $+0.4$ $+0.8$ $+0.0$ $+0.0$ $+1.8$ $+0.7$ $+0.0$	212 +0.0 360 +0.0 212 +0.0 212 +0.0 197 +0.0	31.9 39.8 50.3 29.0 35.9 43.7	46.0 54.0 54.0 44.0 54.0 54.0	-14.1 -14.2 -3.7 -15.0 -18.1 -10.3	Horiz 159 Vert 109 Vert 109 Vert 100 Vert 113 Vert
Ambient         12       451.860M         13       9272.507M         Ave         ^       9272.507M         15       162.610M         16       3708.999M         Ave         ^       3708.999M	40.0 23.9 34.4 45.3 30.4 38.2	$\begin{array}{r} +1.3 \\ +0.0 \\ +0.0 \\ +0.3 \\ +0.0 \\ -29.3 \\ +0.0 \\ +0.0 \\ +1.7 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +$	$\begin{array}{r} +8.2\\ -33.1\\ +0.0\\ +1.6\\ +0.0\\ +0.0\\ +38.8\\ +0.0\\ +5.3\\ -33.5\\ +38.8\\ +0.0\\ +5.3\\ -33.5\\ +0.0\\ +5.3\\ -33.5\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.2.1\\ +0.0\\ +2.9\\ -32.7\\ +32.1\\ +0.0\end{array}$	$\begin{array}{r} +0.0\\ +17.2\\ +0.5\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +10.4\\ +0.2\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ \end{array}$	$\begin{array}{c} +0.8 \\ +1.6 \\ +0.0 \\ +0.0 \\ +0.0 \\ +3.2 \\ +0.4 \\ \hline +0.0 \\ +3.2 \\ +0.4 \\ \hline +0.8 \\ +0.0 \\ +0.0 \\ +1.8 \\ +0.7 \\ \hline +0.0 \\ +1.8 \\ +0.7 \\ \hline \end{array}$	+0.0 360 +0.0 212 +0.0 212 +0.0 197 +0.0 197	31.9 39.8 50.3 29.0 35.9 43.7	46.0 54.0 54.0 54.0 54.0 54.0	-14.1 -14.2 -3.7 -15.0 -18.1 -10.3	109           Horiz           159           Vert           109           Vert           109           Vert           100           Vert           113           Vert           113
Ambient         12       451.860M         13       9272.507M         Ave         ^       9272.507M         15       162.610M         16       3708.999M         Ave         ^       3708.999M	40.0 23.9 34.4 45.3 30.4 38.2	$\begin{array}{r} +1.3\\ +0.0\\ +0.0\\ +0.3\\ +0.0\\ -29.3\\ +0.0\\ +0.0\\ +1.7\\ +0.0\\ +0.0\\ +1.7\\ +0.0\\ +0.0\\ +0.2\\ +0.0\\ +0.2\\ +0.0\\ +0.2\\ +0.0\\ +0.0\\ +0.7\\ +0.0\\ +0.7\\ +0.0\\ +0.7\\ +0.0\\ +0.7\\ +0.0\\ +0.7\\ +0.7\\ +0.0\\ +0.7\\ +0.7\\ +0.0\\ +0.7\\ +0.7\\ +0.0\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7\\ +0.7$	$\begin{array}{r} +8.2 \\ -33.1 \\ +0.0 \\ +1.6 \\ +0.0 \\ +0.0 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +0.0 \\ +32.1 \\ +0.0 \\ +2.9 \\ -32.7 \\ +32.1 \\ +0.0 \\ +2.9 \end{array}$	$\begin{array}{r} +0.0\\ +17.2\\ +0.5\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ \end{array}$	$\begin{array}{r} +0.8\\ +1.6\\ +0.0\\ +0.0\\ +0.0\\ +3.2\\ +0.4\\ +0.0\\ +3.2\\ +0.4\\ \hline +0.8\\ +0.0\\ +0.0\\ +1.8\\ +0.7\\ \hline +0.0\\ +1.8\\ +0.7\\ \hline \end{array}$	212 +0.0 360 +0.0 212 +0.0 212 +0.0 197 +0.0 197	31.9 39.8 50.3 29.0 35.9 43.7	46.0 54.0 54.0 54.0 54.0 54.0	-14.1 -14.2 -3.7 -15.0 -18.1 -10.3	109           Horiz           159           Vert           109           Vert           109           Vert           100           Vert           113           Vert           113
Ambient         12       451.860M         13       9272.507M         Ave         ^       9272.507M         15       162.610M         16       3708.999M         Ave         ^       3708.999M	40.0 23.9 34.4 45.3 30.4 38.2	$\begin{array}{r} +1.3\\ +0.0\\ +0.0\\ +0.3\\ +0.0\\ -29.3\\ +0.0\\ +0.0\\ +1.7\\ +0.0\\ +0.0\\ +1.7\\ +0.0\\ +0.0\\ +1.7\\ +0.0\\ +0.2\\ +0.0\\ +0.2\\ +0.0\\ +0.7\\ +0.0\\ +0.7\\ +0.0\\ +0.7\\ +0.0\\ +0.7\\ +0.0\\ +0.7\\ +0.0\\ \end{array}$	$\begin{array}{r} +8.2 \\ -33.1 \\ +0.0 \\ +1.6 \\ +0.0 \\ +0.0 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +38.8 \\ +0.0 \\ +5.3 \\ -33.5 \\ +0.0 \\ +0.9 \\ +0.0 \\ +0.0 \\ +0.0 \\ +2.9 \\ -32.7 \\ +32.1 \\ +0.0 \\ +2.9 \\ -32.7 \end{array}$	$\begin{array}{r} +0.0\\ +17.2\\ +0.5\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ +0.0\\ \end{array}$	$\begin{array}{c} +0.8 \\ +1.6 \\ +0.0 \\ +0.0 \\ +0.0 \\ +3.2 \\ +0.4 \\ +0.0 \\ +3.2 \\ +0.4 \\ +0.0 \\ +1.8 \\ +0.7 \\ +0.0 \\ +1.8 \\ +0.7 \\ +0.0 \\ +1.8 \\ +0.7 \end{array}$	212 +0.0 360 +0.0 212 +0.0 212 +0.0 197 +0.0 197	31.9 39.8 50.3 29.0 35.9 43.7	46.0 54.0 54.0 54.0 54.0	-14.1 -14.2 -3.7 -15.0 -18.1 -10.3	IO9Horiz159Vert109Vert109Vert100Vert113Vert113



18 5563.495M	27.0	+0.0	+34.7	+0.0	+0.0	+0.0	35.4	54.0	-18.6	Vert
		+0.0	+0.0	+0.0	+1.9	197				114
		+0.8	+4.0	+0.0	+0.4					
		+0.0	-33.4							
19 1.087M	29.4	+10.0	+0.0	+0.0	+0.1	-40.0	-0.4	27.0	-27.4	180de
Ambient		+0.0	+0.1	+0.0	+0.0			NOISEFLO	OOR	101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
20 135.550k	46.7	+9.9	+0.0	+0.0	+0.0	-80.0	-23.4	25.3	-48.7	180de
Ambient		+0.0	+0.0	+0.0	+0.0	190		NOISEFLO	OOR	101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
21 11.862k	45.2	+15.7	+0.0	+0.0	+0.0	-80.0	-19.1	46.6	-65.7	90deg
Ambient		+0.0	+0.0	+0.0	+0.0	352		NOISEFLO	OOR	101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
22 18.454k	42.6	+13.3	+0.0	+0.0	+0.0	-80.0	-24.1	42.7	-66.8	180de
Ambient		+0.0	+0.0	+0.0	+0.0			NOISEFLO	OOR	101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							
23 11.928k	40.8	+15.7	+0.0	+0.0	+0.0	-80.0	-23.5	46.5	-70.0	180de
Ambient		+0.0	+0.0	+0.0	+0.0	328		NOISEFLO	OOR	101
		+0.0	+0.0	+0.0	+0.0					
		+0.0	+0.0							



## RSS-210 – 99% BANDWIDTH

## **Test Equipment**

Asset #	Name	Manufacturer	Model	Serial	Cal date	Cal Due
P05747	Attenuator	Pasternack	PE7004-20	NA	4/3/2008	4/3/2010
P05748	Attenuator	Pasternack	PE7004-20	NA	4/3/2008	4/3/2010
P05371	Cable 6'	Belden	RG-214	RG214 49	11/10/2008	11/10/2010
	Spectrum					
2872	Analyzer	Agilent	E4440A	MY46186330	1/31/2008	1/31/2010

## **Test Conditions**

EUT is transmitting at maximum rate. PSA is on max hold, Agilent procedure is used where the Occupied Bandwidth option is used in three channels (LOW, MID, HIGH), and the span is set to 1MHz and the RBW to 1 kHz.

**Result:** Less than 500 kHz

# **Test Setup Photos**





**Test Plots** 

# **RSS-210 – LOW CHANNEL**



# **RSS-210 – MID CHANNEL**





## **RSS-210 – HIGH CHANNEL**

