



**ADDENDUM TO IMPINJ INC. TEST REPORT FC06-010A**

**FOR THE**

**RFID READER, IPJ-R1000**

**FCC PART 15 SUBPART C SECTIONS 15.209 AND 15.247**

**COMPLIANCE**

**DATE OF ISSUE: JUNE 13, 2006**

**PREPARED FOR:**

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

**PREPARED BY:**

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Date of test: June 8, 2006

**Report No.: FC06-010B**

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## ADMINISTRATIVE INFORMATION

**DATE OF TEST:** June 8, 2006

**DATE OF RECEIPT:** June 8, 2006

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

**REPRESENTATIVE:** William Ashley

**TEST LOCATION:** CKC Laboratories, Inc.  
22116 23rd Drive S.E., Suite A  
Bothell, WA 98021-4413

**TEST METHOD:** ANSI C63.4 (2003)

**PURPOSE OF TEST:** To demonstrate the compliance of the Speedway Reader, IPJ-R1000, with the requirements for FCC part 15 Subpart B sections 15.107 & 15.109 Class B, Subpart C Sections 15.207, 15.209 & 15.247 and RSS-210 devices.  
**Addendum A** is to clarify the plot on page 21.  
**Addendum B** is to demonstrate the compliance of the RFID Reader, IPJ-R1000, with partial re-testing for FCC Part 15 Subpart C Sections 15.209 and 15.247 after component changes in the EUT.

**CONDITIONS FOR COMPLIANCE**

No modifications to the EUT were necessary to comply.

**APPROVALS**

Steve Behm, Director of Engineering Services

**QUALITY ASSURANCE:**

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Joyce Walker, Quality Assurance Administrative  
Manager

**TEST PERSONNEL:**

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Ryan Rutledge, EMC Test Technologist

## **EQUIPMENT UNDER TEST (EUT) DESCRIPTION**

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

### **FCC 15.31(m) Number Of Channels**

This device was tested on three channels.

### **FCC 15.33(a) Frequency Ranges Tested**

15.209/15.247 Radiated Emissions: 1-10 GHz

<b>FCC SECTION 15.35: ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE</b>			
<b>TEST</b>	<b>BEGINNING FREQUENCY</b>	<b>ENDING FREQUENCY</b>	<b>BANDWIDTH SETTING</b>
<b>RADIATED EMISSIONS</b>	<b>1000 MHz</b>	<b>10 GHz</b>	<b>1 MHz</b>

### **EUT Operating Frequency**

The EUT was operating at 902-928 MHz.

## EQUIPMENT UNDER TEST

### RFID Reader

Manuf: Impinj Inc.  
Model: IPJ-R1000  
Serial: 40306200055  
FCC ID: TWYIPJR1000

## PERIPHERAL DEVICES

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

### Laptop

Manuf: Compaq  
Model: Presario V2000  
Serial: NA

### Power Supply

Manuf: CUI Inc  
Model: DSA-60W-20  
Serial: NA  
P/N: DTS240250UC-P11P-DB

### Antenna

Manuf: Cushcraft  
Model: S9028PCRJ  
Serial: NA

## REPORT OF MEASUREMENTS

The following tables report the six highest worst case levels recorded during the tests performed on the EUT. All readings taken are peak readings unless otherwise noted. The data sheets from which these tables were compiled are contained in Appendix C.

**Table 1: FCC 15.209/15.247(c) Six Highest Radiated Emission Levels: 1-10 GHz**

FREQUENCY MHz	METER READING dB $\mu$ V	CORRECTION FACTORS				CORRECTED READING dB $\mu$ V/m	SPEC LIMIT dB $\mu$ V/m	MARGIN dB	NOTES
		Ant dB	Amp dB	Cable dB	HPF dB				
2708.256	34.3	29.4	-33.7	6.5	12.6	49.1	54.0	-4.9	VA-L
2708.256	31.8	29.4	-33.7	6.5	12.6	46.6	54.0	-7.4	HA-L
2745.748	35.9	29.5	-33.6	6.5	9.1	47.4	54.0	-6.6	VA-M
5416.499	38.7	34.3	-33.1	9.6	0.2	49.7	54.0	-4.3	VA-L
5491.498	38.1	34.4	-33.1	9.5	0.2	49.1	54.0	-4.9	VA-M
7222.000	32.7	36.3	-33.8	11.6	0.1	46.9	54.0	-7.1	V-L

Test Method: ANSI C63.4 (2003)  
Spec Limit: FCC Part 15 Subpart C Section 15.209/15.247(c)  
Test Distance: 3 Meters

NOTES: H = Horizontal Polarization  
V = Vertical Polarization  
A = Average Reading  
L = Low Channel  
M = Mid Channel

COMMENTS: Device operating with modulation, measuring harmonics from 1 GHz to 10 GHz.  
Measuring harmonics from low, mid and high channels.



**Table 2: FCC 15.247(b)(1) Fundamental Emission Levels**

FREQUENCY MHz	METER READING dB $\mu$ V	CORRECTION FACTORS				CORRECTED READING dB $\mu$ V/m	SPEC LIMIT dB $\mu$ V/m	MARGIN dB	NOTES
		Att dB	Amp dB	Cable dB	Dist dB				
902.746	18.5	9.9		1.2		29.6	30.0	-0.4	R
915.250	18.6	9.9		1.2		29.7	30.0	-0.3	R
927.248	18.5	9.9		1.2		29.6	30.0	-0.4	R

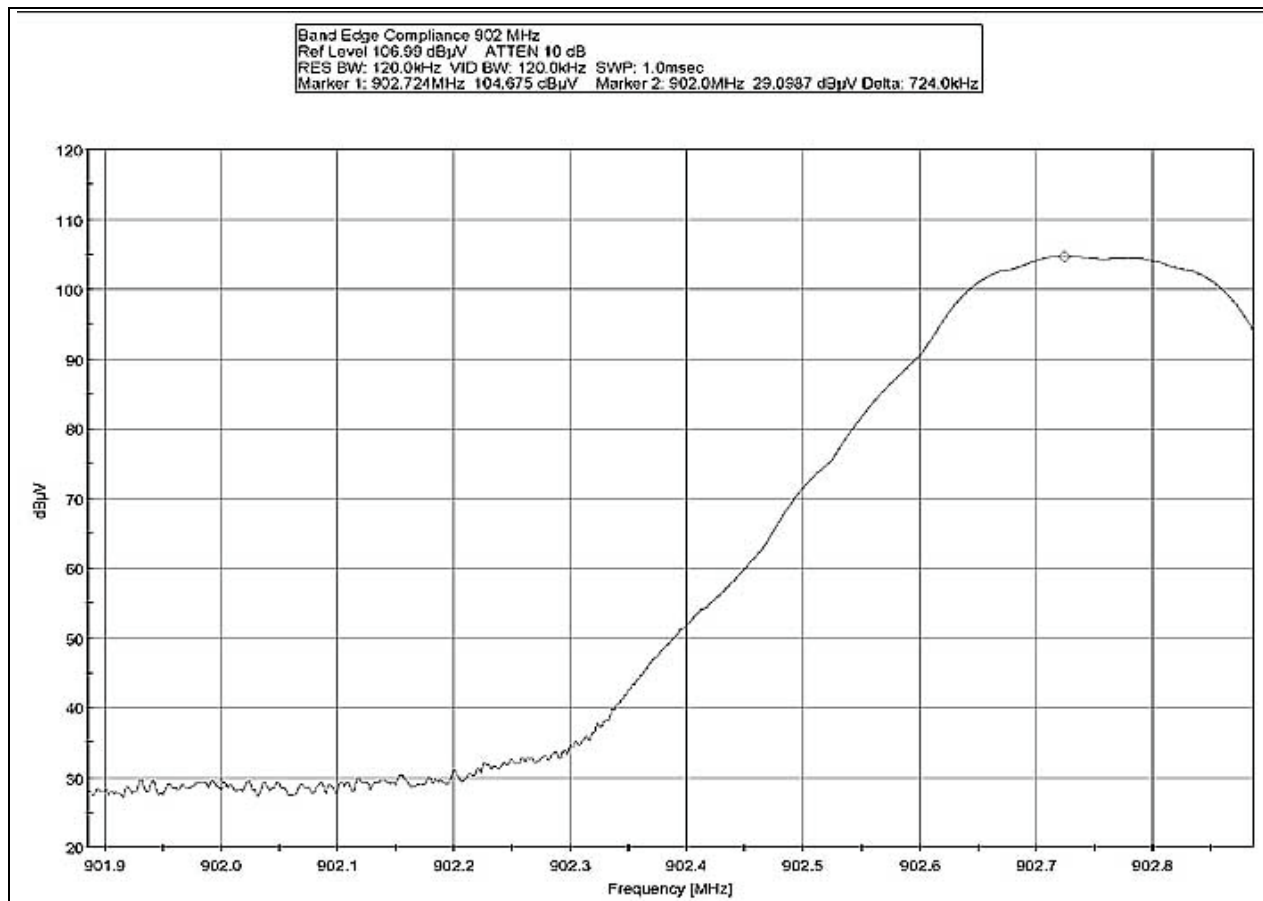
Test Method: ANSI C63.4 (2003)  
Spec Limit: FCC Part 15 Subpart C Section 15.247(b)(1)

NOTES: R = RF Output port

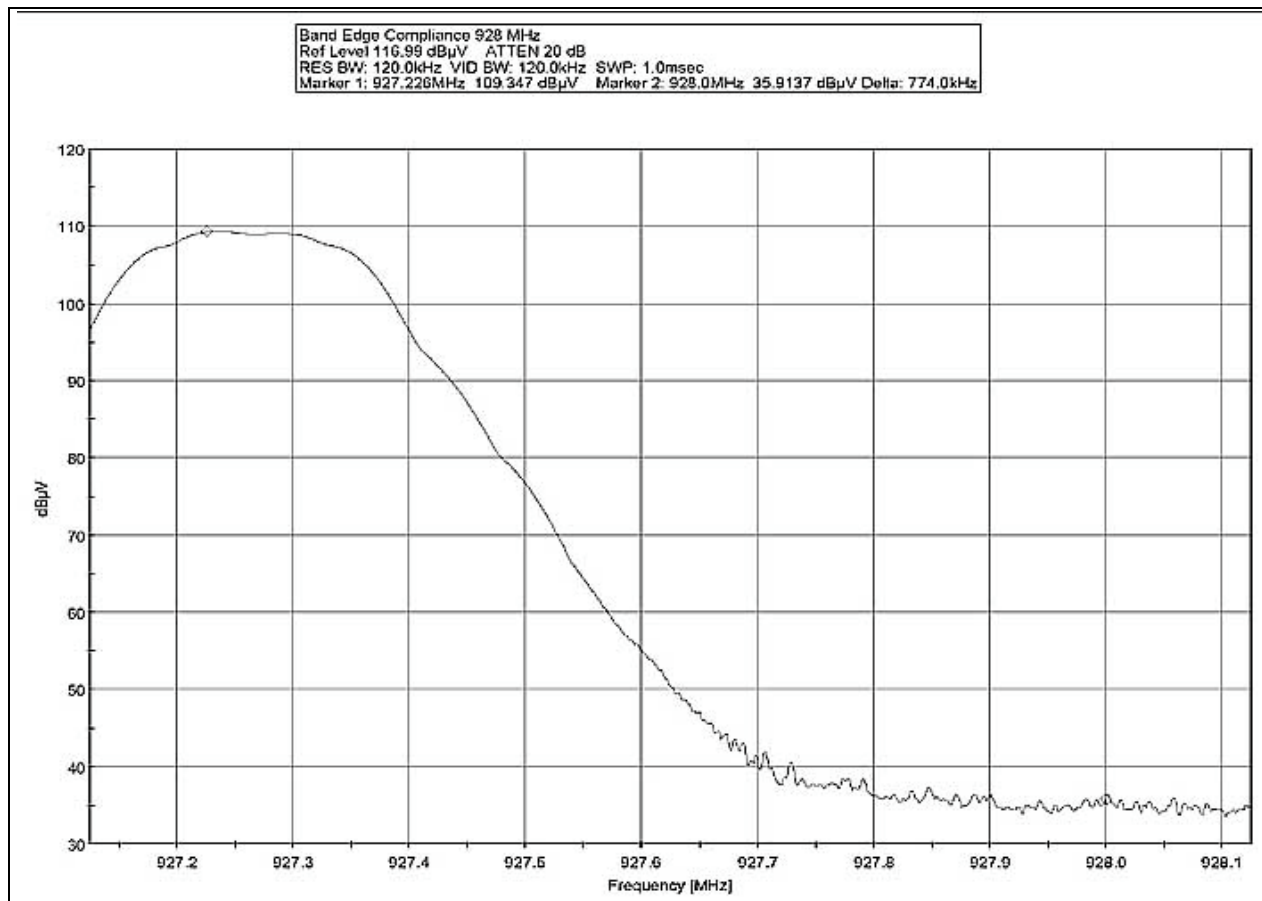
COMMENTS: Device operating without modulation, measuring carrier output power. Measuring conducted power output at low, mid and high channels. Measurements and spec in terms of dBm.



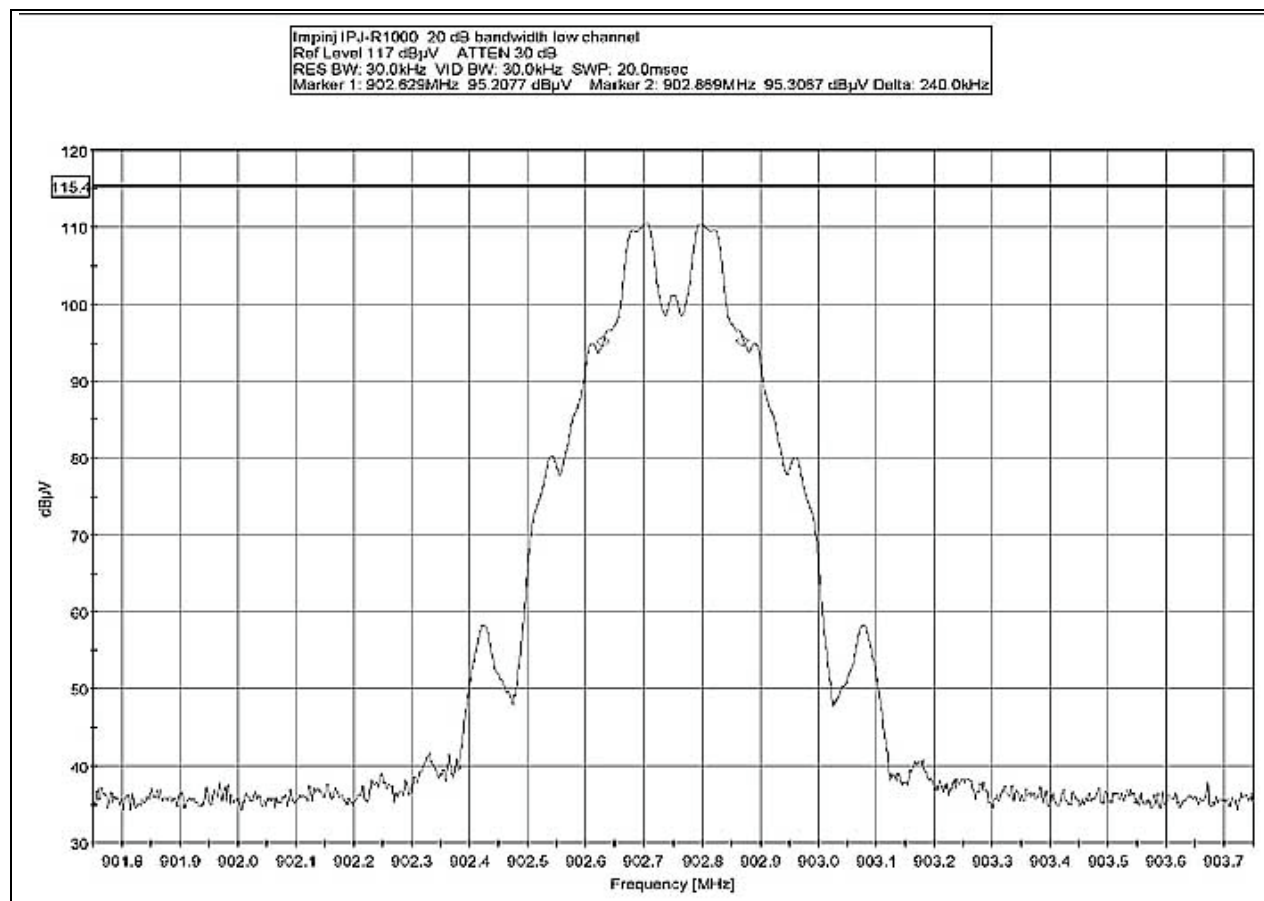
## BANDEDGE 902 MHz



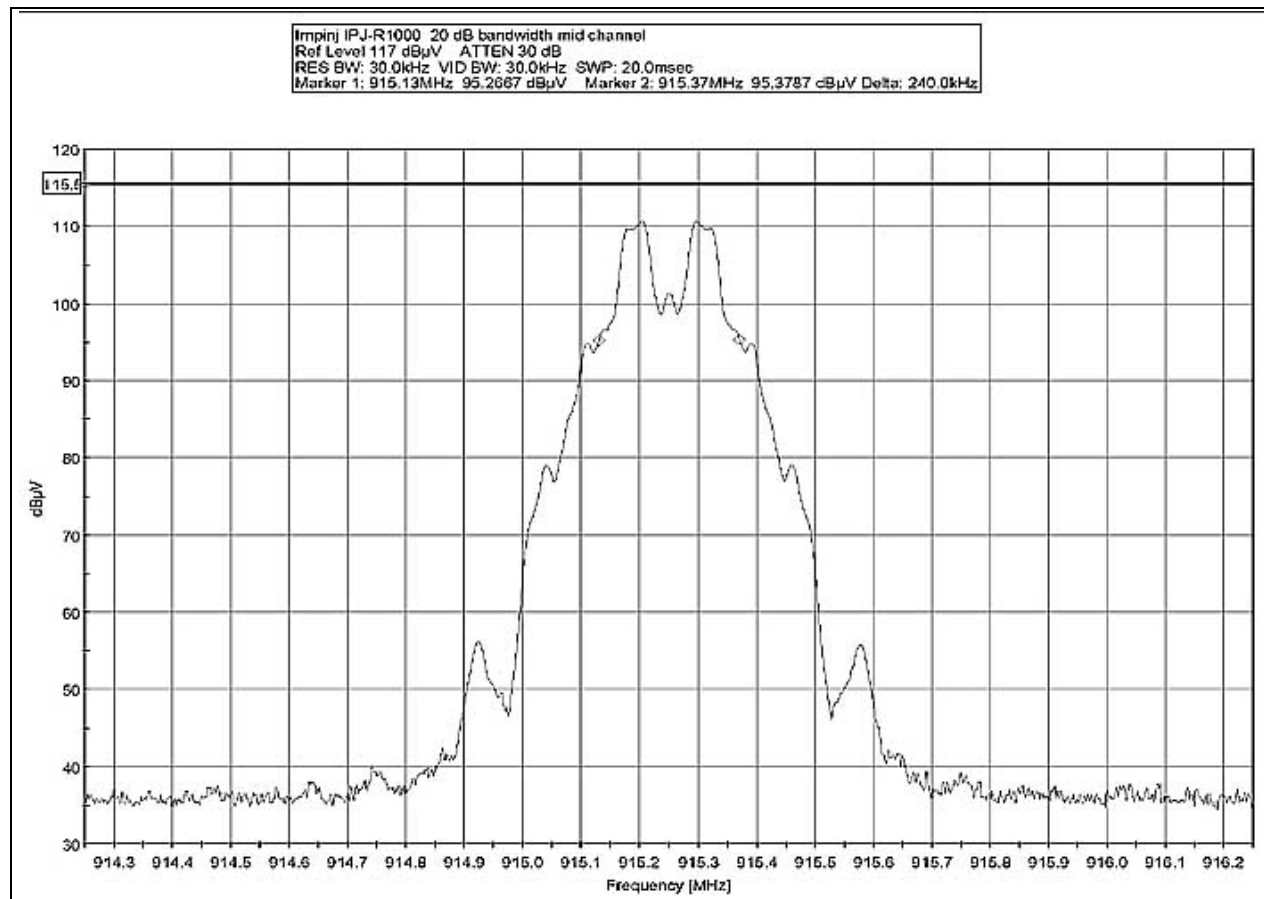
## BANDEDGE 928 MHz



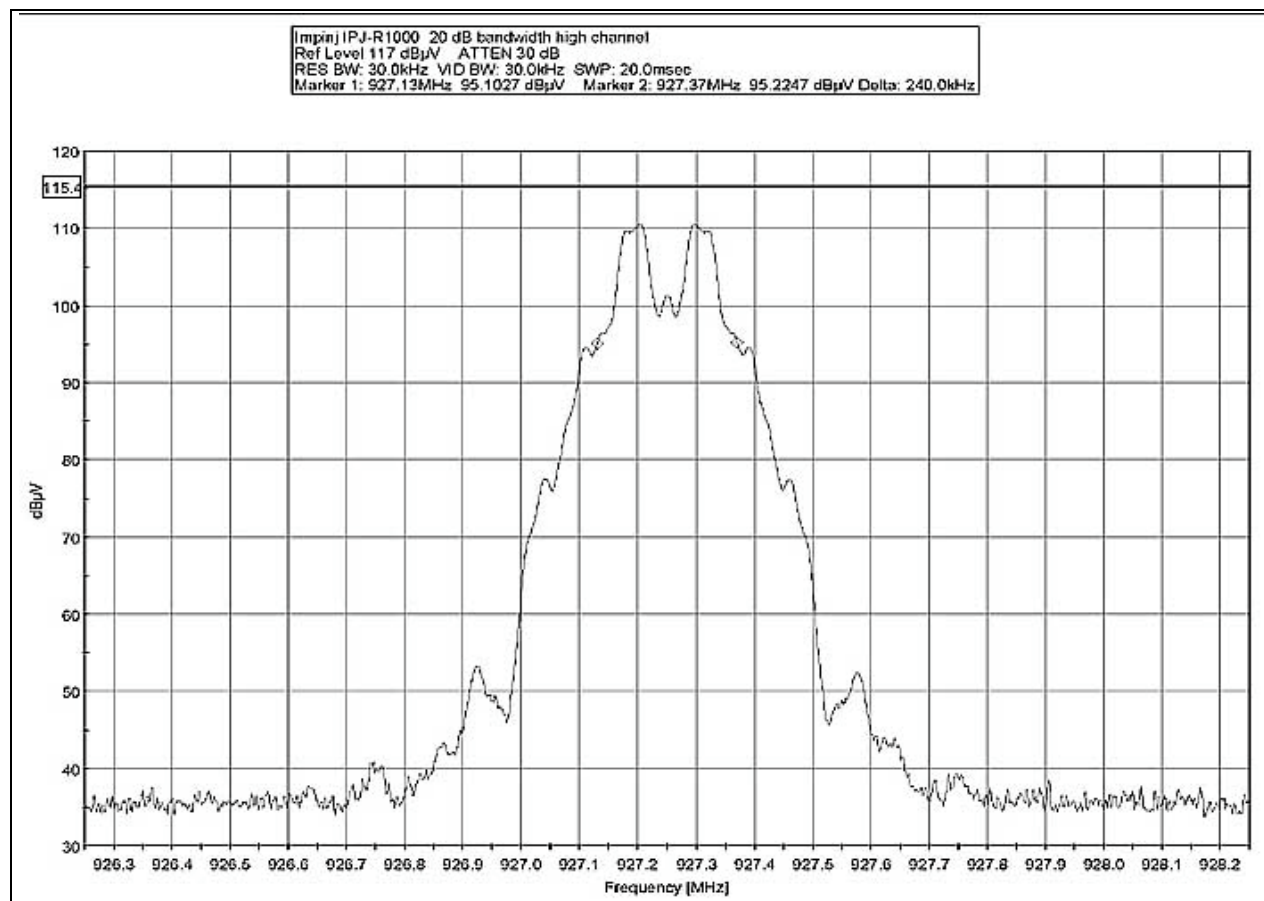
## 20dB BANDWIDTH - LOW CHANNEL



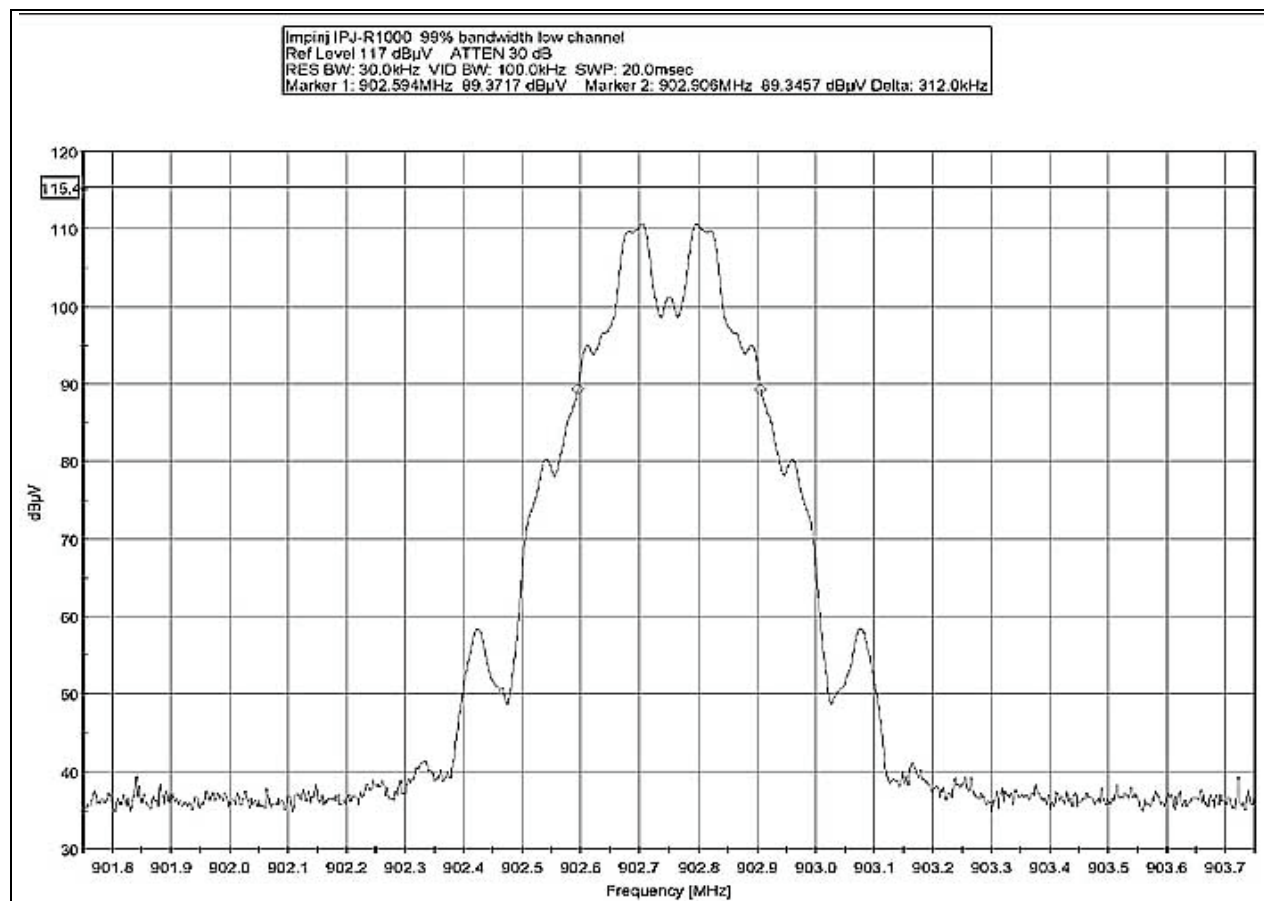
## 20dB BANDWIDTH - MID CHANNEL



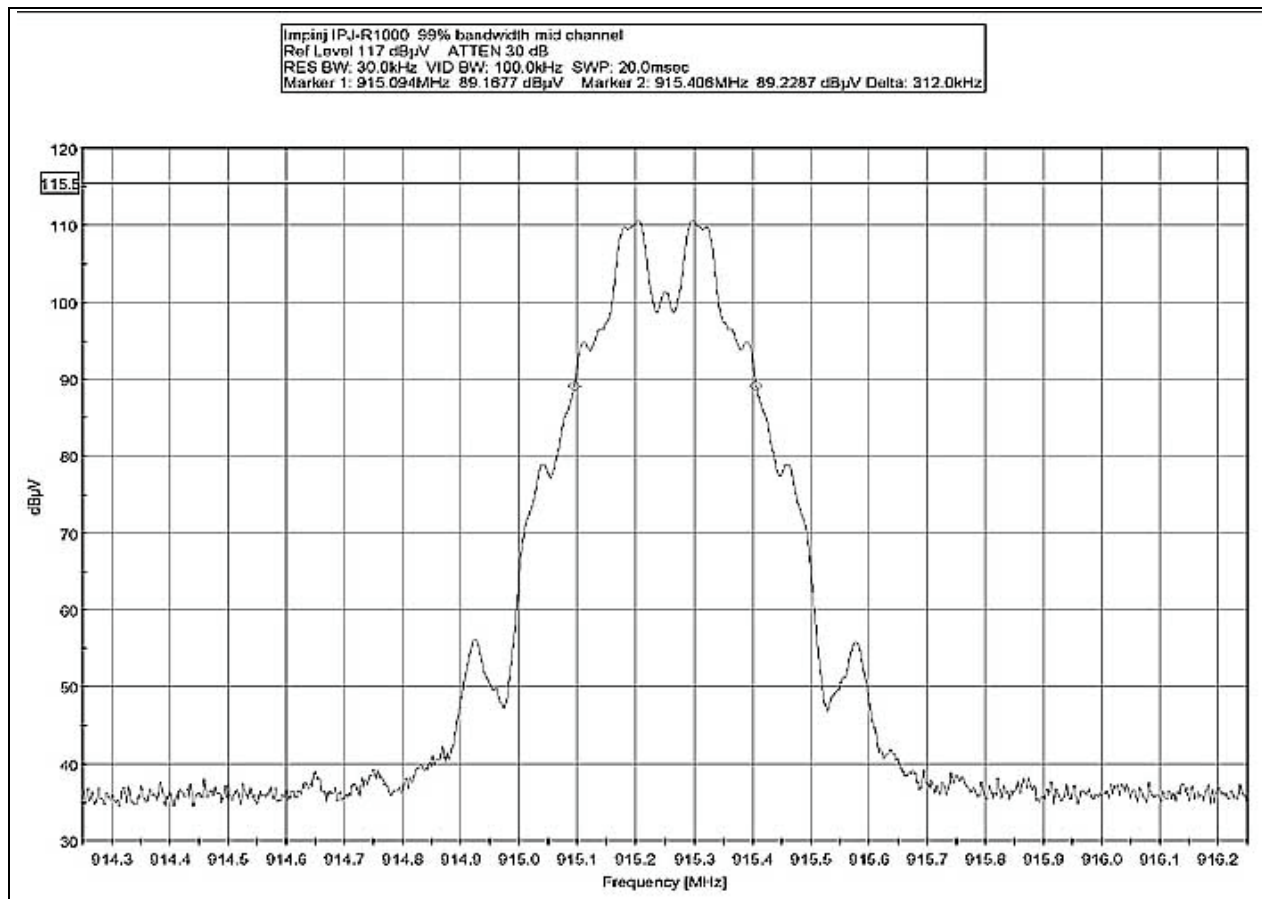
## 20dB BANDWIDTH - HIGH CHANNEL



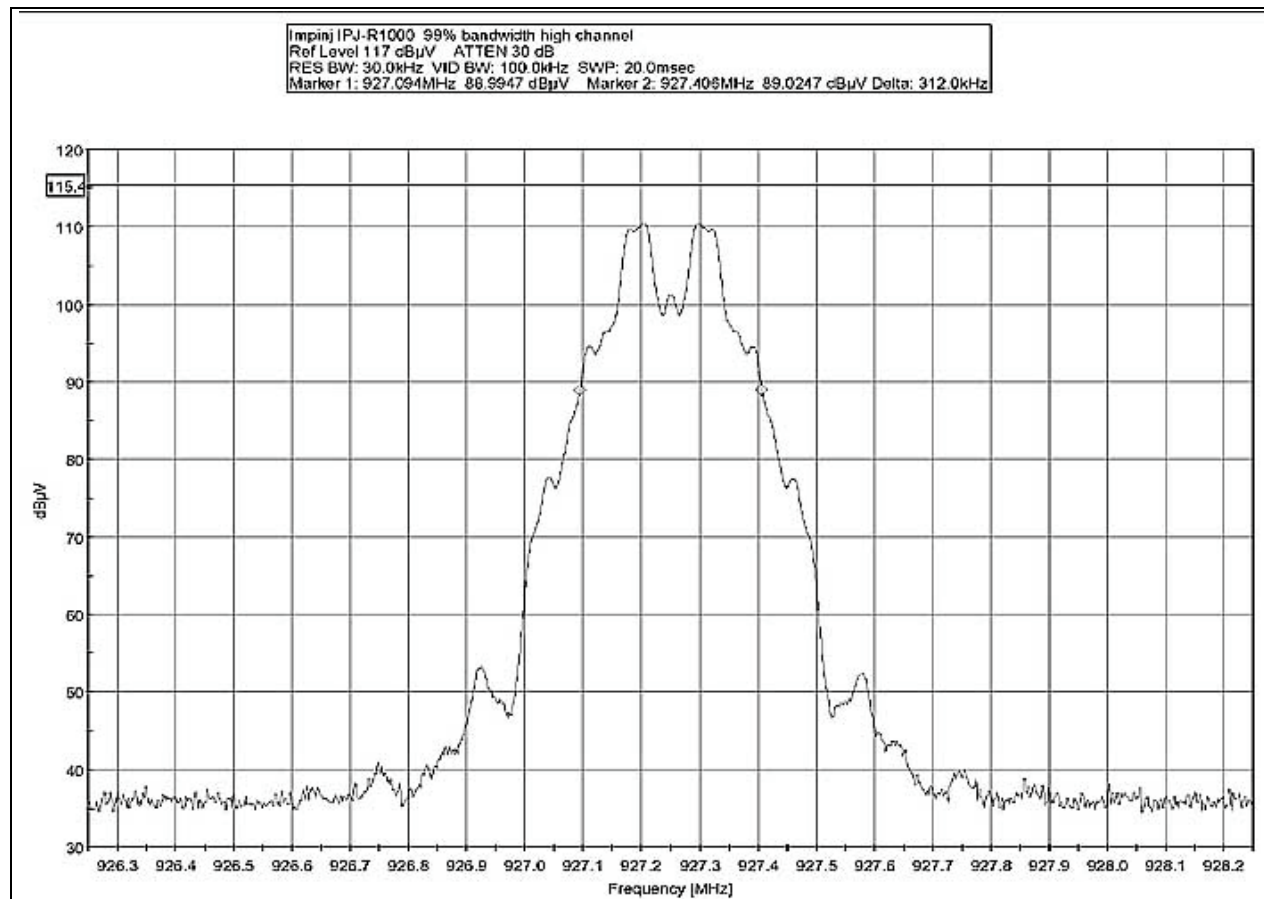
## 99% BANDWIDTH - LOW CHANNEL



## 99% BANDWIDTH - MID CHANNEL



## 99% BANDWIDTH - HIGH CHANNEL





## TEMPERATURE AND HUMIDITY DURING TESTING

The temperature during testing was within +15°C and + 35°C.

The relative humidity was between 20% and 75%.

## EUT SETUP

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the photographs in Appendix A. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables. The corrected data was then compared to the applicable emission limits to determine compliance.

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

The radiated emissions data of the EUT was taken with the HP Spectrum Analyzer. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in Table A.

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 in Table A. This reading was then compared to the applicable specification limit to determine compliance.

TABLE A: SAMPLE CALCULATIONS		
	Meter reading	(dB $\mu$ V)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dB $\mu$ V/m)

## **TEST INSTRUMENTATION AND ANALYZER SETTINGS**

The test instrumentation and equipment listed in Table A were used to collect both the radiated emissions data for the EUT. The horn antenna was used for frequencies above 1000 MHz.

The HP spectrum analyzer was used for all measurements. Table B shows the analyzer bandwidth settings that were used in designated frequency bands. During radiated testing, the measurements were made with 0 dB of attenuation, a reference level of 97 dB $\mu$ V, and a vertical scale of 10 dB per division.

## **SPECTRUM ANALYZER DETECTOR FUNCTIONS**

The notes that accompany the measurements contained in the 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 six highest readings, this is indicated as a "Q" or an "A" in the appropriate table. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

### **Peak**

In this mode, the Spectrum Analyzer or test engineer recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the analyzer called "peak hold," the analyzer had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the analyzer 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 HP Quasi-Peak Adapter for the HP Spectrum Analyzer. The detailed procedure for making quasi peak measurements contained in the HP Quasi-Peak Adapter manual were followed.

### **Average**

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

## **EUT TESTING**

### **Antenna Conducted Emissions**

For measuring the signal strength on the RF output port of the EUT, the spectrum analyzer was connected directly to the EUT. The sweep time of the analyzer was adjusted so that the spectrum analyzer readings were always in a calibrated range. All readings within 20 dB of the limit were recorded.

### **Radiated Emissions**

The EUT was mounted on a nonconductive, rotating table 80 cm above the conductive grid. The nonconductive table dimensions were 1 meter by 1.5 meters.

During the preliminary radiated scan, the EUT was powered up and operating in its defined FCC test mode. For frequencies exceeding 1000 MHz, the horn antenna was used. Care was taken to ensure that no frequencies were missed within the FM and TV bands.

A thorough scan of all frequencies was made manually using a small frequency span, rotating the turntable and raising and lowering the antenna from one to four meters as needed. The test engineer maximized the readings with respect to the table rotation, antenna height and configuration of EUT. Maximizing of the EUT was achieved by monitoring the spectrum analyzer on a closed circuit television monitor.

**APPENDIX A**

**TEST SETUP PHOTOGRAPHS**

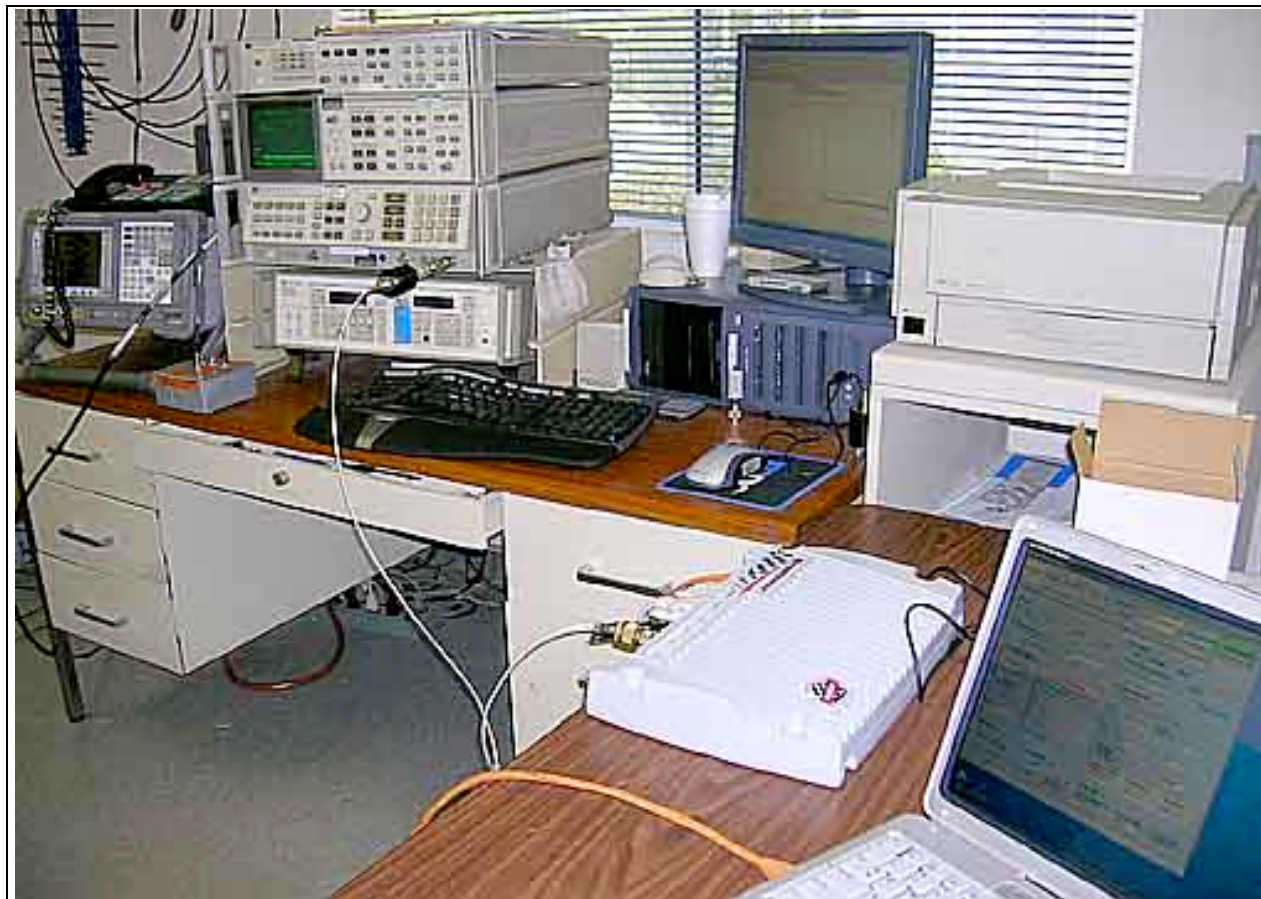
**PHOTOGRAPH SHOWING RADIATED EMISSIONS**



Radiated Emissions - Back View



**PHOTOGRAPH SHOWING DIRECT CONNECT POWER**



## APPENDIX B

### TEST EQUIPMENT LIST

#### Bandedge

Function	S/N	Calibration Date	Cal Due Date	Asset #
Agilent E4446A	S/N: US44300407	12/01/2005	12/01/2007	AN02660
Bothell 5m Cable Set	S/N: P05444	11/28/2005	11/28/2007	ANP05444
HP 8447D PreAmp	S/N: 2944A08601	07/13/2004	07/13/2006	AN01517
Chase BILOG	S/N: 2453	02/02/2005	02/02/2007	AN01994

#### FCC 15.247 (c) / 15.209 / 15.205

Function	S/N	Calibration Date	Cal Due Date	Asset #
Agilent E4446A	S/N: US44300407	12/01/2005	12/01/2007	AN02660
60" Pasternack 40 GHz Coax	S/N: N/A	05/11/2006	05/11/2008	AN05422
36" Pasternack 40 GHz Coax	S/N: N/A	05/11/2006	05/11/2008	AN05424
Heliac Cable	S/N: 13	03/15/2006	03/15/2008	ANP04085
EMCO 3115 Horn Ant	S/N: 9606-4854	12/13/2005	12/13/2007	AN01412
HP 83017A .5 - 26.5 GHz	S/N: 3123A00464	10/03/2005	10/03/2007	AN01271
Pre-amp				

#### FCC 15.247 (b)(1)

Function	S/N	Calibration Date	Cal Due Date	Asset #
Agilent E4446A	S/N: US44300407	12/01/2005	12/01/2007	AN02660
36" Pasternack 40 GHz Coax	S/N: N/A	05/11/2006	05/11/2008	AN05424
Coaxial Attenuator	S/N: C8593	10/03/2005	10/03/2007	AN02136

**APPENDIX C**  
**MEASUREMENT DATA SHEETS**



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

Customer: **Impinj Inc**  
 Specification: **FCC 15.247 (c) / 15.209 / 15.205**  
 Work Order #: **83127**  
 Test Type: **Radiated Scan**  
 Equipment: **RFID Reader**  
 Manufacturer: **Impinj**  
 Model: **IPJ-R1000**  
 S/N: **40306200055**

Date: 6/8/2006  
 Time: 15:06:11  
 Sequence#: 1  
 Tested By: Ryan Rutledge

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

Function	Manufacturer	Model #	S/N
RFID Reader*	Impinj	IPJ-R1000	40306200055

**Support Devices:**

Function	Manufacturer	Model #	S/N
Laptop	Compaq	Presario V2000	
Antenna	Cushcraft	S9028PCRJ	NA
Power Supply	CUI Inc	DSA-60W-20	P/N: DTS240250UC-P11P-DB

**Test Conditions / Notes:**

Device operating with modulation, measuring harmonics from 1 GHz to 10 GHz. Measuring harmonics from low, mid and high channels.

**Transducer Legend:**

T1=CAB-P04085-031506	T2=AMP 26GHz
T3=ANT-AN01412-121305 Model 3115	T4=Cable ANP05422 - 60"
T5=Cable ANP05424 - 36"	T6=Filter 3GHz HP AN02745

**Measurement Data:** Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	5416.499M	38.7	+3.0	-33.1	+34.3	+3.6	+0.0	49.7	54.0	-4.3	Vert
	Ave		+3.0	+0.2			182		Low Channel		175
^	5416.499M	39.7	+3.0	-33.1	+34.3	+3.6	+0.0	50.7	54.0	-3.3	Vert
			+3.0	+0.2			182		Low Channel		175
3	5491.498M	38.1	+2.9	-33.1	+34.4	+3.6	+0.0	49.1	54.0	-4.9	Vert
	Ave		+3.0	+0.2			185		Mid Channel		134
^	5491.498M	38.5	+2.9	-33.1	+34.4	+3.6	+0.0	49.5	54.0	-4.5	Vert
			+3.0	+0.2			185		Mid Channel		134
5	2708.256M	34.3	+2.0	-33.7	+29.4	+2.4	+0.0	49.1	54.0	-4.9	Vert
	Ave		+2.1	+12.6			218		Low Channel		129
^	2708.256M	37.3	+2.0	-33.7	+29.4	+2.4	+0.0	52.1	54.0	-1.9	Vert
			+2.1	+12.6			218		Low Channel		129
7	2745.748M	35.9	+2.0	-33.6	+29.5	+2.4	+0.0	47.4	54.0	-6.6	Vert
	Ave		+2.1	+9.1			167		Mid Channel		145
^	2745.748M	36.9	+2.0	-33.6	+29.5	+2.4	+0.0	48.4	54.0	-5.6	Vert
			+2.1	+9.1			167		Mid Channel		145
9	7222.000M	32.7	+4.0	-33.8	+36.3	+4.2	+0.0	46.9	54.0	-7.1	Vert
			+3.4	+0.1			139		Low Channel		108

10	2708.256M Ave	31.8	+2.0 +2.1	-33.7 +12.6	+29.4	+2.4	+0.0 218	46.6	54.0 Low Channel	-7.4	Horiz 196
^	2708.256M	35.3	+2.0 +2.1	-33.7 +12.6	+29.4	+2.4	+0.0 218	50.1	54.0 Low Channel	-3.9	Horiz 196
12	2781.750M Ave	37.7	+2.0 +2.1	-33.6 +5.9	+29.5	+2.5	+0.0 66	46.1	54.0 High Channel	-7.9	Vert 106
^	2781.750M	38.3	+2.0 +2.1	-33.6 +5.9	+29.5	+2.5	+0.0 66	46.7	54.0 High Channel	-7.3	Vert 106
14	7221.994M	31.4	+4.0 +3.4	-33.8 +0.1	+36.3	+4.2	+0.0 209	45.6	54.0 Low Channel	-8.4	Horiz 169
15	7321.998M Ave	30.5	+3.9 +3.5	-33.7 +0.1	+36.5	+4.2	+0.0 140	45.0	54.0 Mid Channel	-9.0	Vert 148
^	7321.998M	30.4	+3.9 +3.5	-33.7 +0.1	+36.5	+4.2	+0.0 140	44.9	54.0 Mid Channel	-9.1	Vert 148
17	7417.994M	30.1	+3.8 +3.5	-33.6 +0.1	+36.6	+4.2	+0.0 167	44.7	54.0 High Channel	-9.3	Vert 127
18	2745.748M Ave	33.0	+2.0 +2.1	-33.6 +9.1	+29.5	+2.4	+0.0 149	44.5	54.0 Mid Channel	-9.5	Horiz 145
^	2745.748M	33.6	+2.0 +2.1	-33.6 +9.1	+29.5	+2.4	+0.0 149	45.1	54.0 Mid Channel	-8.9	Horiz 145
20	3611.000M Ave	37.6	+2.4 +2.4	-33.2 +0.4	+31.3	+2.9	+0.0 200	43.8	54.0 Low Channel	-10.2	Vert 110
^	3611.000M	40.3	+2.4 +2.4	-33.2 +0.4	+31.3	+2.9	+0.0 200	46.5	54.0 Low Channel	-7.5	Vert 110
22	3708.994M Ave	36.4	+2.4 +2.4	-33.2 +0.3	+31.7	+2.9	+0.0 200	42.9	54.0 High Channel	-11.1	Vert 153
^	3708.994M	37.3	+2.4 +2.4	-33.2 +0.3	+31.7	+2.9	+0.0 200	43.8	54.0 High Channel	-10.2	Vert 153
24	5416.499M Ave	31.9	+3.0 +3.0	-33.1 +0.2	+34.3	+3.6	+0.0 216	42.9	54.0 Low Channel	-11.1	Horiz 116
^	5416.499M	33.0	+3.0 +3.0	-33.1 +0.2	+34.3	+3.6	+0.0 216	44.0	54.0 Low Channel	-10.0	Horiz 116
26	4576.250M Ave	34.3	+2.7 +2.7	-33.2 +0.3	+32.7	+3.3	+0.0 188	42.8	54.0 Mid Channel	-11.2	Vert 132
^	4576.250M	35.3	+2.7 +2.7	-33.2 +0.3	+32.7	+3.3	+0.0 188	43.8	54.0 Mid Channel	-10.2	Vert 132
28	5563.496M Ave	31.6	+2.9 +3.0	-33.2 +0.1	+34.4	+3.6	+0.0 172	42.4	54.0 High Channel	-11.6	Vert 175
^	5563.496M	32.6	+2.9 +3.0	-33.2 +0.1	+34.4	+3.6	+0.0 172	43.4	54.0 High Channel	-10.6	Vert 175
30	4513.749M Ave	33.8	+2.7 +2.7	-33.2 +0.3	+32.5	+3.2	+0.0 180	42.0	54.0 Low Channel	-12.0	Vert 200
^	4513.749M	35.3	+2.7 +2.7	-33.2 +0.3	+32.5	+3.2	+0.0 180	43.5	54.0 Low Channel	-10.5	Vert 200
32	3661.000M Ave	35.6	+2.4 +2.4	-33.2 +0.3	+31.5	+2.9	+0.0 167	41.9	54.0 Mid Channel	-12.1	Vert 121
^	3661.000M	36.5	+2.4 +2.4	-33.2 +0.3	+31.5	+2.9	+0.0 167	42.8	54.0 Mid Channel	-11.2	Vert 121

34	4636.244M	33.2	+2.7	-33.1	+32.8	+3.3	+0.0	41.9	54.0	-12.1	Vert
	Ave		+2.7	+0.3			175		High Channel		200
^	4636.244M	34.4	+2.7	-33.1	+32.8	+3.3	+0.0	43.1	54.0	-10.9	Vert
			+2.7	+0.3			175		High Channel		200
36	7417.992M	26.9	+3.8	-33.6	+36.6	+4.2	+0.0	41.5	54.0	-12.5	Horiz
			+3.5	+0.1			360		High Channel		132
37	2781.752M	33.0	+2.0	-33.6	+29.5	+2.5	+0.0	41.4	54.0	-12.6	Horiz
	Ave		+2.1	+5.9			130		High Channel		172
^	2781.752M	33.5	+2.0	-33.6	+29.5	+2.5	+0.0	41.9	54.0	-12.1	Horiz
			+2.1	+5.9			130		High Channel		172
39	3610.996M	35.2	+2.4	-33.2	+31.3	+2.9	+0.0	41.4	54.0	-12.6	Horiz
	Ave		+2.4	+0.4			250		Low Channel		185
^	3610.996M	36.4	+2.4	-33.2	+31.3	+2.9	+0.0	42.6	54.0	-11.4	Horiz
			+2.4	+0.4			250		Low Channel		185
41	4576.250M	32.0	+2.7	-33.2	+32.7	+3.3	+0.0	40.5	54.0	-13.5	Horiz
	Ave		+2.7	+0.3			120		Mid Channel		189
^	4576.250M	32.5	+2.7	-33.2	+32.7	+3.3	+0.0	41.0	54.0	-13.0	Horiz
			+2.7	+0.3			120		Mid Channel		189
43	4636.246M	31.4	+2.7	-33.1	+32.8	+3.3	+0.0	40.1	54.0	-13.9	Horiz
	Ave		+2.7	+0.3			180		High Channel		200
^	4636.246M	32.4	+2.7	-33.1	+32.8	+3.3	+0.0	41.1	54.0	-12.9	Horiz
			+2.7	+0.3			180		High Channel		200
45	4513.753M	31.9	+2.7	-33.2	+32.5	+3.2	+0.0	40.1	54.0	-13.9	Horiz
	Ave		+2.7	+0.3			130		Low Channel		196
^	4513.753M	34.2	+2.7	-33.2	+32.5	+3.2	+0.0	42.4	54.0	-11.6	Horiz
			+2.7	+0.3			130		Low Channel		196
47	3709.002M	33.5	+2.4	-33.2	+31.7	+2.9	+0.0	40.0	54.0	-14.0	Horiz
	Ave		+2.4	+0.3			263		High Channel		185
^	3709.002M	35.3	+2.4	-33.2	+31.7	+2.9	+0.0	41.8	54.0	-12.2	Horiz
			+2.4	+0.3			263		High Channel		185
49	5563.496M	27.7	+2.9	-33.2	+34.4	+3.6	+0.0	38.5	54.0	-15.5	Horiz
	Ave		+3.0	+0.1			180		High Channel		115
^	5563.496M	26.7	+2.9	-33.2	+34.4	+3.6	+0.0	37.5	54.0	-16.5	Horiz
			+3.0	+0.1			180		High Channel		115
51	3661.000M	31.8	+2.4	-33.2	+31.5	+2.9	+0.0	38.1	54.0	-15.9	Horiz
	Ave		+2.4	+0.3			153		Mid Channel		121
^	3661.000M	32.7	+2.4	-33.2	+31.5	+2.9	+0.0	39.0	54.0	-15.0	Horiz
			+2.4	+0.3			153		Mid Channel		121

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

Customer: **Impinj Inc**  
 Specification: **15.247(b)(1) 902-928 MHz**  
 Work Order #: **83127**  
 Test Type: **Conducted Emissions**  
 Equipment: **RFID Reader**  
 Manufacturer: **Impinj**  
 Model: **IPJ-R1000**  
 S/N: **40306200055**

Date: 6/8/2006  
 Time: 14:39:31  
 Sequence#: 2  
 Tested By: Ryan Rutledge  
 120V 60Hz

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

Function	Manufacturer	Model #	S/N
RFID Reader*	Impinj	IPJ-R1000	40306200055

***Support Devices:***

Function	Manufacturer	Model #	S/N
Laptop	Compaq	Presario V2000	
Antenna	Cushcraft	S9028PCRJ	NA
Power Supply	CUI Inc	DSA-60W-20	P/N: DTS240250UC-P11P-DB

***Test Conditions / Notes:***

Device operating without modulation, measuring carrier output power. Measuring conducted power output at low, mid and high channels. Measurements and spec in terms of dBm.

***Transducer Legend:***

T1=Atten 10 dB	T2=Cable ANP05424 - 36"
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***Measurement Data:***

Reading listed by margin.

Test Lead: RF Output port

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	Dist dB	Table	Corr dBm	Spec dBm	Margin dB	Polar Ant
1	915.250M	18.6	+9.9	+1.2		+0.0	29.7	30.0	-0.3	RF Ou
2	927.248M	18.5	+9.9	+1.2		+0.0	29.6	30.0	-0.4	RF Ou
3	902.746M	18.5	+9.9	+1.2		+0.0	29.6	30.0	-0.4	RF Ou