CKC LABORATORIES, INC. Testing the Future

ADDENDUM TO IMPINJ INC. TEST REPORT FC06-010C

FOR THE

RFID READER ANTENNA (BRICKYARD), IPJ-A0400-USA;
RFID READER ANTENNA (GUARDWALL), IPJ-A0401-USA AND
RFID READER ANTENNA (MINI-GUARDRAIL), IPJ-A0301-USA

FCC PART 15 SUBPART C SECTIONS 15.209 & 15.247

COMPLIANCE

DATE OF ISSUE: FEBRUARY 22, 2007

PREPARED FOR:

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

PREPARED BY:

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Mariposa, CA 95338

W.O. No.: 83127

Date of test: February 13-15, 2007

Report No.: FC06-010D

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ADMINISTRATIVE INFORMATION

DATE OF TEST: February 13-15, 2007

DATE OF RECEIPT: February 13, 2007

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

REPRESENTATIVE: Vince Moretti

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

TEST METHOD: ANSI C63.4 (2003)

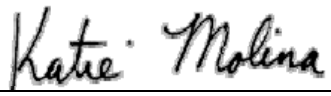
PURPOSE OF TEST: **Original Report:** To demonstrate the compliance of the Speedway Reader, IPJ-R1000, with the requirements for FCC part 15 Subpart B sections 15.107 & 15.109 Class B, Subpart C Sections 15.207, 15.209 &15.247 and RSS-210 devices.
Addendum A: To clarify the plot on page 21.
Addendum B: 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.
Addendum C is to add limit lines to the band edge plots and revise the frequency range on page 5.
Addendum D: To demonstrate the compliance of the RFID Reader Antenna (Brickyard), IPJ-A0400-USA; RFID Reader Antenna (Guardwall), IPJ-A0401-USA and RFID Reader Antenna (Mini-Guardrail), IPJ-A0301-USA with the requirements for FCC Part 15 Subpart C Sections 15.209 & 15.247 devices with testing of new antennas.

APPROVALS

Steve Behm, Director of Engineering Services

QUALITY ASSURANCE:

Joyce Walker, Quality Assurance Administrative Manager



Katie Molina, Senior EMC Engineer/Lab Manager

TEST PERSONNEL:

Ryan Rutledge, Test Technologist

CONDITIONS FOR COMPLIANCE

No modifications to the EUT were necessary to comply. Conducted emissions not required for this device.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

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

FCC 15.33(a) Frequency Ranges Tested
15.209/15.247 Radiated Emissions: 1-10 GHz.

EUT Operating Frequency
The EUT was operating at 902-928 MHz.

The following model was tested by CKC Laboratories: **IPJ-A0400-USA**

An additional model with a second manufacturer (OEM) is the same as the model tested. Any differences between the names does not affect their EMC characteristics and therefore complies to the level of testing equivalent to the tested model name shown on the data sheets: **Manufacturer CSL, Model CS-777-2**

EQUIPMENT UNDER TEST

RFID Reader Antenna (Brickyard)
Manuf: Impinj
Model: IPJ-A0400-USA
Serial:
FCC ID:

RFID Reader Antenna (Guardwall)
Manuf: Impinj
Model: IPJ-A0401-USA
Serial:
FCC ID:

RFID Reader Antenna (Mini-Guardrail)
Manuf: Impinj
Model: IPJ-A0301-USA
Serial:
FCC ID:

RFID Reader Antenna (Brickyard), IPJ-A0400-USA; RFID Reader Antenna (Guardwall), IPJ-A0401-USA and RFID Reader Antenna (Mini-Guardrail), IPJ-A0301-USA

PERIPHERAL DEVICES

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

Laptop PC
Manuf: Dell
Model: Latitude D505
Serial: CN-0H2049-48643-49E-0525

Crossover Ethernet Cable (UTP)
Manuf: NA
Model: NA
Serial: NA

Laptop AC Adapter
Manuf: Dell
Model: HP-OQ065B83
Serial: CN-0N2765-47890-45D-5387

AC Adapter
Manuf: CUI Inc
Model: DSA-60W-20 1 24060
Serial: DTS240250UC-P11P-DB

RFID Reader Core
Manuf: Impinj
Model: IPJ-R1000-USA-0-01-01
Serial: 40306280020

REPORT OF EMISSIONS MEASUREMENTS

TESTING PARAMETERS

TEMPERATURE AND HUMIDITY DURING TESTING

The temperature during testing was within +15°C and + 35°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 to determine compliance. 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 dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula. This reading was then compared to the applicable specification limit to determine compliance.

SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/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.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

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 "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/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.

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.

FCC 15.247(b)(3) – OATS RADIATED SPURIOUS EMISSIONS

Test Data Sheets

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

Customer: **Impinj Inc**
Specification: **15.247(b)(3)**
Work Order #: **83127** Date: 2/13/2007
Test Type: **Radiated Scan** Time: 13:51:41
Equipment: **RFID Reader Antenna (Brickyard)** Sequence#: 3
Manufacturer: Impinj Tested By: Ryan Rutledge
Model: IPJ-A0400-USA
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8596E	3346A00209	11/08/2006	11/08/2008	AN00784
Bothell 5m Cable Set	S/N: P05444	11/28/2005	11/28/2007	ANP05444
HP 8447D PreAmp	S/N: 2944A08601	07/10/2006	07/10/2008	AN01517
Chase BILOG	S/N: 2458	01/31/2007	01/31/2009	AN01993

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

Function	Manufacturer	Model #	S/N
RFID Reader Antenna (Brickyard)*	Impinj	IPJ-A0400-USA	

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop PC	Dell	Latitude D505	CN-0H2049-48643-49E-0525
Laptop AC Adapter	Dell	HP-OQ065B83	CN-0N2765-47890-45D-5387
Crossover Ethernet Cable (UTP)			
RFID Reader Core	Impinj	IPJ-R1000-USA-0-01-01	40305280513
AC Adapter	CUI Inc	DSA-60W-20 1 24060	DTS240250UC-P11P-DB

Test Conditions / Notes:

Transmitting modulated carrier at full output power. Low Channel: 902.75 MHz, High Channel: 927.25 MHz. Measuring radiated band edge compliance. RBW = 120 kHz; VBW = 300 kHz.

Transducer Legend:

T1=ANT AN01993 25-1000MHz T2=CAB-P05444-112805

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	927.250M	102.2	+23.7	+4.8			+0.0 25	130.7	137.0	-6.3	Vert 105
2	927.250M	101.8	+23.7	+4.8			+0.0 360	130.3	137.0	-6.7	Horiz 200
3	902.755M	101.4	+23.4	+4.6			+0.0 41	129.4	137.0	-7.6	Vert 105
4	902.755M	99.8	+23.4	+4.6			+0.0 360	127.8	137.0	-9.2	Horiz 188

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

Customer: **Impinj Inc**
Specification: **15.247(b)(3)**
Work Order #: **83127** Date: 2/13/2007
Test Type: **Radiated Scan** Time: 11:39:50
Equipment: **RFID Reader Antenna (Guardwall)** Sequence#: 1
Manufacturer: Impinj Tested By: Ryan Rutledge
Model: IPJ-A0401-USA
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8596E	3346A00209	11/08/2006	11/08/2008	AN00784
Bothell 5m Cable Set	S/N: P05444	11/28/2005	11/28/2007	ANP05444
HP 8447D PreAmp	S/N: 2944A08601	07/10/2006	07/10/2008	AN01517
Chase BILOG	S/N: 2458	01/31/2007	01/31/2009	AN01993

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

Function	Manufacturer	Model #	S/N
RFID Reader Antenna (Guardwall)*	Impinj	IPJ-A0401-USA	

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop PC	Dell	Latitude D505	CN-0H2049-48643-49E-0525
Laptop AC Adapter	Dell	HP-OQ065B83	CN-0N2765-47890-45D-5387
Crossover Ethernet Cable (UTP)			
RFID Reader Core	Impinj	IPJ-R1000-USA-0-01-01	40305280513
AC Adapter	CUI Inc	DSA-60W-20 1 24060	DTS240250UC-P11P-DB

Test Conditions / Notes:

Transmitting modulated carrier at full output power. Low Channel: 902.75 MHz, High Channel: 927.25 MHz. Measuring radiated band edge compliance. RBW = 120 kHz; VBW = 300 kHz.

Transducer Legend:

T1=ANT AN01993 25-1000MHz T2=CAB-P05444-112805

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	902.755M	108.0	+23.4	+4.6			+0.0 360	136.0	137.0	-1.0	Horiz 205
2	902.755M	107.2	+23.4	+4.6			+0.0 360	135.2	137.0	-1.8	Horiz 205
3	927.250M	106.0	+23.7	+4.8			+0.0 2	134.4	137.0	-2.6	Horiz 192
4	927.250M	94.4	+23.7	+4.8			+0.0 337	122.9	137.0	-14.1	Vert 185
5	902.755M	91.4	+23.4	+4.6			+0.0 35	119.4	137.0	-17.6	Vert 230

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

Customer: **Impinj Inc**
Specification: **15.247(b)(3)**
Work Order #: **83127** Date: 2/13/2007
Test Type: **Radiated Scan** Time: 12:19:31
Equipment: **RFID Reader Antenna (Mini-Guardrail)** Sequence#: 2
Manufacturer: Impinj Tested By: Ryan Rutledge
Model: IPJ-A0301-USA
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8596E	3346A00209	11/08/2006	11/08/2008	AN00784
Bothell 5m Cable Set	S/N: P05444	11/28/2005	11/28/2007	ANP05444
HP 8447D PreAmp	S/N: 2944A08601	07/10/2006	07/10/2008	AN01517
Chase BILOG	S/N: 2458	01/31/2007	01/31/2009	AN01993

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

Function	Manufacturer	Model #	S/N
RFID Reader Antenna (Mini-Guardrail)*	Impinj	IPJ-A0301-USA	

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop PC	Dell	Latitude D505	CN-0H2049-48643-49E-0525
Laptop AC Adapter	Dell	HP-OQ065B83	CN-0N2765-47890-45D-5387
Crossover Ethernet Cable (UTP)			
RFID Reader Core	Impinj	IPJ-R1000-USA-0-01-01	40305280513
AC Adapter	CUI Inc	DSA-60W-20 1 24060	DTS240250UC-P11P-DB

Test Conditions / Notes:

Transmitting modulated carrier at full output power. Low Channel: 902.75 MHz, High Channel: 927.25 MHz. Measuring radiated band edge compliance. RBW = 120 kHz; VBW = 300 kHz.

Transducer Legend:

T1=ANT AN01993 25-1000MHz T2=CAB-P05444-112805

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	902.755M	87.0	+23.4	+4.6			+0.05	115.0	137.0	-22.0	Horiz 100
2	927.255M	84.5	+23.7	+4.8			+0.0	113.0	137.0	-24.0	Horiz 100
3	902.760M	74.0	+23.4	+4.6			+0.0113	102.0	137.0	-35.0	Vert 173
4	927.255M	71.4	+23.7	+4.8			+0.0116	99.9	137.0	-37.1	Vert 169

FCC 15.247(d)/15.209/15.205 – BANDEDGE

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) / 15.209 / 15.205**
Work Order #: **83127** Date: 2/15/2007
Test Type: **Radiated Scan** Time: 17:30:43
Equipment: **RFID Reader Antenna (Brickyard)** Sequence#: 7
Manufacturer: Impinj Tested By: Ryan Rutledge
Model: IPJ-A0400-USA
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Agilent E4446A	S/N: US44300437	06/13/2005	06/13/2007	AN02673
120" Pasternack 40 GHz Coax	S/N: N/A	05/10/2006	05/10/2008	AN05425
30' Andrews Heliax 18 GHz	S/N: N/A	06/19/2006	06/19/2008	AN05545
60" Pasternack 40 GHz Coax	S/N: N/A	05/11/2006	05/11/2008	AN05423
HP 83017A .5 - 26.5 GHz Pre-amp	S/N: 3123A00464	10/03/2005	10/03/2007	AN01271
EMCO 3115 Horn Ant	S/N: 9606-4854	12/13/2005	12/13/2007	AN01412
1 GHz HP Filter	S/N: 2	03/07/2006	03/07/2008	AN02750

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

Function	Manufacturer	Model #	S/N
RFID Reader Antenna (Brickyard)*	Impinj	IPJ-A0400-USA	

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop PC	Dell	Latitude D505	CN-0H2049-48643-49E-0525
Laptop AC Adapter	Dell	HP-OQ065B83	CN-0N2765-47890-45D-5387
Crossover Ethernet Cable (UTP)			
RFID Reader Core	Impinj	IPJ-R1000-USA-0-01-01	40306280020
AC Adapter	CUI Inc	DSA-60W-20 1 24060	DTS240250UC-P11P-DB

Test Conditions / Notes:

EUT transmitting at maximum power in constant TX mode on each channel. Low Channel: 902.75 MHz, Mid Channel: 915.25 MHz, High Channel: 927.25 MHz. Measuring radiated spurious emissions 1 - 10 GHz RBW = 1 MHz.

Transducer Legend:

T1=ANT-AN01412-121305	T2=AMP-AN01271-100305 - .5-26.5 GHz
T3=CAB-ANP05545-061906	T4=CAB-ANP05425-051006
T5=CAB-ANP05423-051006	T6=Filter 3GHz HP AN02745

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

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	2708.126M	40.8	+29.4 +2.3	-33.7 +12.6	+2.5	+4.2	+0.0 182	58.1	54.0 Low Channel	+4.1	Vert 114
2	5416.605M	41.9	+34.3 +3.4	-33.1 +0.2	+3.9	+5.8	+0.0 187	56.4	54.0 Low Channel	+2.4	Vert 105

3	2708.461M	38.0	+29.4	-33.7	+2.5	+4.2	+0.0	55.3	54.0	+1.3	Horiz
			+2.3	+12.6			216		Low Channel		106
4	2745.922M	41.0	+29.5	-33.6	+2.5	+4.2	+0.0	55.0	54.0	+1.0	Vert
			+2.3	+9.1			167		Mid Channel		111
5	5563.509M	38.8	+34.4	-33.2	+4.1	+5.9	+0.0	53.5	54.0	-0.5	Vert
	Ave		+3.4	+0.1			178		High Channel		103
^	5563.450M	42.0	+34.4	-33.2	+4.1	+5.9	+0.0	56.7	54.0	+2.7	Vert
			+3.4	+0.1			178		High Channel		103
7	5416.503M	38.0	+34.3	-33.1	+3.9	+5.8	+0.0	52.5	54.0	-1.5	Vert
	Ave		+3.4	+0.2			187		Low Channel		105
8	5491.501M	37.3	+34.4	-33.1	+3.9	+5.8	+0.0	51.9	54.0	-2.1	Vert
	Ave		+3.4	+0.2			178		Mid Channel		117
^	5491.570M	41.3	+34.4	-33.1	+3.9	+5.8	+0.0	55.9	54.0	+1.9	Vert
			+3.4	+0.2			178		Mid Channel		117
10	2745.592M	37.8	+29.5	-33.6	+2.5	+4.2	+0.0	51.8	54.0	-2.2	Horiz
			+2.3	+9.1			234		Mid Channel		173
11	2781.511M	40.4	+29.5	-33.6	+2.6	+4.2	+0.0	51.4	54.0	-2.6	Vert
			+2.4	+5.9			152		High Channel		108
12	4576.255M	39.1	+32.7	-33.2	+3.6	+5.4	+0.0	51.0	54.0	-3.0	Vert
	Ave		+3.1	+0.3			191		Mid Channel		115
^	4576.317M	42.5	+32.7	-33.2	+3.6	+5.4	+0.0	54.4	54.0	+0.4	Vert
			+3.1	+0.3			191		Mid Channel		115
14	3660.772M	41.1	+31.5	-33.2	+3.0	+4.8	+0.0	50.2	54.0	-3.8	Vert
			+2.7	+0.3			36		Mid Channel		110
15	5416.307M	35.3	+34.3	-33.1	+3.9	+5.8	+0.0	49.8	54.0	-4.2	Horiz
			+3.4	+0.2			146		Low Channel		139
16	2708.263M	32.2	+29.4	-33.7	+2.5	+4.2	+0.0	49.5	54.0	-4.5	Vert
	Ave		+2.3	+12.6			182		Low Channel		114
17	3610.914M	40.2	+31.3	-33.2	+3.0	+4.8	+0.0	49.2	54.0	-4.8	Horiz
			+2.7	+0.4			227		Low Channel		136
18	4636.138M	36.9	+32.8	-33.1	+3.6	+5.4	+0.0	49.0	54.0	-5.0	Vert
			+3.1	+0.3			181		High Channel		133
19	2781.605M	37.9	+29.5	-33.6	+2.6	+4.2	+0.0	48.9	54.0	-5.1	Horiz
			+2.4	+5.9			235		High Channel		100
20	3709.011M	39.4	+31.7	-33.2	+3.0	+4.8	+0.0	48.7	54.0	-5.3	Vert
	Ave		+2.7	+0.3			170		High Channel		149
^	3708.963M	43.9	+31.7	-33.2	+3.0	+4.8	+0.0	53.2	54.0	-0.8	Vert
			+2.7	+0.3			170		High Channel		149
22	5491.371M	33.7	+34.4	-33.1	+3.9	+5.8	+0.0	48.3	54.0	-5.7	Horiz
			+3.4	+0.2			156		Mid Channel		123
23	3611.011M	39.2	+31.3	-33.2	+3.0	+4.8	+0.0	48.2	54.0	-5.8	Vert
	Ave		+2.7	+0.4			177		Low Channel		104
^	3610.949M	43.2	+31.3	-33.2	+3.0	+4.8	+0.0	52.2	54.0	-1.8	Vert
			+2.7	+0.4			177		Low Channel		104
25	2745.759M	34.0	+29.5	-33.6	+2.5	+4.2	+0.0	48.0	54.0	-6.0	Vert
	Ave		+2.3	+9.1			167		Mid Channel		111
26	3660.854M	38.5	+31.5	-33.2	+3.0	+4.8	+0.0	47.6	54.0	-6.4	Horiz
			+2.7	+0.3			133		Mid Channel		100
27	4513.651M	35.3	+32.5	-33.2	+3.6	+5.3	+0.0	46.8	54.0	-7.2	Horiz
			+3.0	+0.3			221		Low Channel		184

28	3709.001M	36.8	+31.7	-33.2	+3.0	+4.8	+0.0	46.1	54.0	-7.9	Horiz
	Ave		+2.7	+0.3			137		High Channel		197
^	3708.917M	41.1	+31.7	-33.2	+3.0	+4.8	+0.0	50.4	54.0	-3.6	Horiz
			+2.7	+0.3			137		High Channel		197
30	2708.282M	28.2	+29.4	-33.7	+2.5	+4.2	+0.0	45.5	54.0	-8.5	Horiz
	Ave		+2.3	+12.6			216		Low Channel		106
31	4513.758M	33.2	+32.5	-33.2	+3.6	+5.3	+0.0	44.7	54.0	-9.3	Vert
	Ave		+3.0	+0.3			182		Low Channel		110
^	4513.780M	39.7	+32.5	-33.2	+3.6	+5.3	+0.0	51.2	54.0	-2.8	Vert
			+3.0	+0.3			182		Low Channel		110
33	2781.747M	33.5	+29.5	-33.6	+2.6	+4.2	+0.0	44.5	54.0	-9.5	Vert
	Ave		+2.4	+5.9			152		High Channel		108
34	3661.007M	34.7	+31.5	-33.2	+3.0	+4.8	+0.0	43.8	54.0	-10.2	Vert
	Ave		+2.7	+0.3			36		Mid Channel		110
35	4576.262M	31.8	+32.7	-33.2	+3.6	+5.4	+0.0	43.7	54.0	-10.3	Horiz
	Ave		+3.1	+0.3			165		Mid Channel		124
^	4576.263M	38.0	+32.7	-33.2	+3.6	+5.4	+0.0	49.9	54.0	-4.1	Horiz
			+3.1	+0.3			165		Mid Channel		124
37	3611.015M	34.4	+31.3	-33.2	+3.0	+4.8	+0.0	43.4	54.0	-10.6	Horiz
	Ave		+2.7	+0.4			227		Low Channel		136
38	2745.765M	27.6	+29.5	-33.6	+2.5	+4.2	+0.0	41.6	54.0	-12.4	Horiz
	Ave		+2.3	+9.1			234		Mid Channel		173
39	5416.496M	27.1	+34.3	-33.1	+3.9	+5.8	+0.0	41.6	54.0	-12.4	Horiz
	Ave		+3.4	+0.2			146		Low Channel		139
40	5563.508M	26.3	+34.4	-33.2	+4.1	+5.9	+0.0	41.0	54.0	-13.0	Horiz
	Ave		+3.4	+0.1			220		High Channel		189
^	5563.577M	35.4	+34.4	-33.2	+4.1	+5.9	+0.0	50.1	54.0	-3.9	Horiz
			+3.4	+0.1			220		High Channel		189
42	2781.743M	29.6	+29.5	-33.6	+2.6	+4.2	+0.0	40.6	54.0	-13.4	Horiz
	Ave		+2.4	+5.9			235		High Channel		100
43	4636.250M	27.3	+32.8	-33.1	+3.6	+5.4	+0.0	39.4	54.0	-14.6	Vert
	Ave		+3.1	+0.3			181		High Channel		133
44	3661.009M	30.0	+31.5	-33.2	+3.0	+4.8	+0.0	39.1	54.0	-14.9	Horiz
	Ave		+2.7	+0.3			133		Mid Channel		100
45	5491.490M	23.0	+34.4	-33.1	+3.9	+5.8	+0.0	37.6	54.0	-16.4	Horiz
	Ave		+3.4	+0.2			156		Mid Channel		123
46	4513.767M	25.6	+32.5	-33.2	+3.6	+5.3	+0.0	37.1	54.0	-16.9	Horiz
	Ave		+3.0	+0.3			221		Low Channel		184

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

Customer: **Impinj Inc**
Specification: **FCC 15.247 (d) / 15.209 / 15.205**
Work Order #: **83127** Date: 2/15/2007
Test Type: **Radiated Scan** Time: 12:50:44
Equipment: **RFID Reader Antenna (Guardwall)** Sequence#: 5
Manufacturer: Impinj Tested By: Ryan Rutledge
Model: IPJ-A0401-USA
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Agilent E4446A	S/N: US44300437	06/13/2005	06/13/2007	AN02673
120" Pasternack 40 GHz Coax	S/N: N/A	05/10/2006	05/10/2008	AN05425
30' Andrews Heliax 18 GHz	S/N: N/A	06/19/2006	06/19/2008	AN05545
60" Pasternack 40 GHz Coax	S/N: N/A	05/11/2006	05/11/2008	AN05423
HP 83017A .5 - 26.5 GHz Pre-amp	S/N: 3123A00464	10/03/2005	10/03/2007	AN01271
EMCO 3115 Horn Ant	S/N: 9606-4854	12/13/2005	12/13/2007	AN01412
1 GHz HP Filter	S/N: 2	03/07/2006	03/07/2008	AN02750

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

Function	Manufacturer	Model #	S/N
RFID Reader Antenna (Guardwall)*	Impinj	IPJ-A0401-USA	

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop PC	Dell	Latitude D505	CN-0H2049-48643-49E-0525
Laptop AC Adapter	Dell	HP-OQ065B83	CN-0N2765-47890-45D-5387
Crossover Ethernet Cable (UTP)			
RFID Reader Core	Impinj	IPJ-R1000-USA-0-01-01	40306280020
AC Adapter	CUI Inc	DSA-60W-20 1 24060	DTS240250UC-P11P-DB

Test Conditions / Notes:

EUT transmitting at maximum power in constant TX mode on each channel. Low Channel: 902.75 MHz, Mid Channel: 915.25 MHz, High Channel: 927.25 MHz. Measuring radiated spurious emissions 1 - 10 GHz RBW = 1 MHz.

Transducer Legend:

T1=ANT-AN01412-121305	T2=AMP-AN01271-100305 - .5-26.5 GHz
T3=CAB-ANP05545-061906	T4=CAB-ANP05425-051006
T5=CAB-ANP05423-051006	T6=Filter 3GHz HP AN02745

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

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	5416.494M	39.1	+34.3	-33.1	+3.9	+5.8	+0.0	53.6	54.0	-0.4	Vert
	Ave		+3.4	+0.2			184		Low Channel		131
^	5416.464M	42.7	+34.3	-33.1	+3.9	+5.8	+0.0	57.2	54.0	+3.2	Vert
			+3.4	+0.2			184		Low Channel		131

3	3611.013M Ave	43.2	+31.3 +2.7	-33.2 +0.4	+3.0	+4.8	+0.0 181	52.2	54.0 Low Channel	-1.8	Vert 106
^	3611.002M	47.0	+31.3 +2.7	-33.2 +0.4	+3.0	+4.8	+0.0 181	56.0	54.0 Low Channel	+2.0	Vert 106
5	3610.864M	42.7	+31.3 +2.7	-33.2 +0.4	+3.0	+4.8	+0.0 148	51.7	54.0 Low Channel	-2.3	Horiz 131
6	4576.268M Ave	39.2	+32.7 +3.1	-33.2 +0.3	+3.6	+5.4	+0.0 188	51.1	54.0 Mid Channel	-2.9	Vert 100
^	4576.253M	43.2	+32.7 +3.1	-33.2 +0.3	+3.6	+5.4	+0.0 188	55.1	54.0 Mid Channel	+1.1	Vert 100
8	2781.644M	40.0	+29.5 +2.4	-33.6 +5.9	+2.6	+4.2	+0.0 234	51.0	54.0 High Channel	-3.0	Horiz 154
9	5491.506M Ave	36.4	+34.4 +3.4	-33.1 +0.2	+3.9	+5.8	+0.0 177	51.0	54.0 Mid Channel	-3.0	Vert 105
^	5491.503M	40.9	+34.4 +3.4	-33.1 +0.2	+3.9	+5.8	+0.0 177	55.5	54.0 Mid Channel	+1.5	Vert 105
11	4576.390M	38.7	+32.7 +3.1	-33.2 +0.3	+3.6	+5.4	+0.0 213	50.6	54.0 Mid Channel	-3.4	Horiz 104
12	2708.249M Ave	33.0	+29.4 +2.3	-33.7 +12.6	+2.5	+4.2	+0.0 198	50.3	54.0 Low Channel	-3.7	Vert 104
^	2708.249M	38.8	+29.4 +2.3	-33.7 +12.6	+2.5	+4.2	+0.0 198	56.1	54.0 Low Channel	+2.1	Vert 104
14	5563.525M Ave	35.1	+34.4 +3.4	-33.2 +0.1	+4.1	+5.9	+0.0 177	49.8	54.0 High Channel	-4.2	Vert 104
^	5563.542M	40.2	+34.4 +3.4	-33.2 +0.1	+4.1	+5.9	+0.0 177	54.9	54.0 High Channel	+0.9	Vert 104
16	2745.764M Ave	35.3	+29.5 +2.3	-33.6 +9.1	+2.5	+4.2	+0.0 292	49.3	54.0 Mid Channel	-4.7	Vert 118
^	2745.739M	40.7	+29.5 +2.3	-33.6 +9.1	+2.5	+4.2	+0.0 292	54.7	54.0 Mid Channel	+0.7	Vert 118
18	3709.006M Ave	38.0	+31.7 +2.7	-33.2 +0.3	+3.0	+4.8	+0.0 161	47.3	54.0 High Channel	-6.7	Vert 177
^	3709.036M	42.4	+31.7 +2.7	-33.2 +0.3	+3.0	+4.8	+0.0 161	51.7	54.0 High Channel	-2.3	Vert 177
20	2708.244M Ave	29.4	+29.4 +2.3	-33.7 +12.6	+2.5	+4.2	+0.0 142	46.7	54.0 Low Channel	-7.3	Horiz 125
^	2708.279M	40.3	+29.4 +2.3	-33.7 +12.6	+2.5	+4.2	+0.0 142	57.6	54.0 Low Channel	+3.6	Horiz 125
22	2781.749M Ave	35.6	+29.5 +2.4	-33.6 +5.9	+2.6	+4.2	+0.0 185	46.6	54.0 High Channel	-7.4	Vert 107
^	2781.804M	41.2	+29.5 +2.4	-33.6 +5.9	+2.6	+4.2	+0.0 185	52.2	54.0 High Channel	-1.8	Vert 107
24	2745.757M Ave	32.4	+29.5 +2.3	-33.6 +9.1	+2.5	+4.2	+0.0 143	46.4	54.0 Mid Channel	-7.6	Horiz 126
^	2745.856M	40.9	+29.5 +2.3	-33.6 +9.1	+2.5	+4.2	+0.0 143	54.9	54.0 Mid Channel	+0.9	Horiz 126
26	3611.003M Ave	37.3	+31.3 +2.7	-33.2 +0.4	+3.0	+4.8	+0.0 148	46.3	54.0 Low Channel	-7.7	Horiz 131

27	4513.758M	34.6	+32.5	-33.2	+3.6	+5.3	+0.0	46.1	54.0	-7.9	Vert
	Ave		+3.0	+0.3			191		Low Channel		116
^	4513.760M	39.4	+32.5	-33.2	+3.6	+5.3	+0.0	50.9	54.0	-3.1	Vert
			+3.0	+0.3			191		Low Channel		116
29	3661.021M	35.8	+31.5	-33.2	+3.0	+4.8	+0.0	44.9	54.0	-9.1	Vert
	Ave		+2.7	+0.3			176		Mid Channel		106
^	3661.021M	40.6	+31.5	-33.2	+3.0	+4.8	+0.0	49.7	54.0	-4.3	Vert
			+2.7	+0.3			176		Mid Channel		106
31	2781.750M	33.7	+29.5	-33.6	+2.6	+4.2	+0.0	44.7	54.0	-9.3	Horiz
	Ave		+2.4	+5.9			234		High Channel		154
32	3708.999M	35.2	+31.7	-33.2	+3.0	+4.8	+0.0	44.5	54.0	-9.5	Horiz
	Ave		+2.7	+0.3			118		High Channel		179
^	3709.083M	41.2	+31.7	-33.2	+3.0	+4.8	+0.0	50.5	54.0	-3.5	Horiz
			+2.7	+0.3			118		High Channel		179
34	4576.250M	31.2	+32.7	-33.2	+3.6	+5.4	+0.0	43.1	54.0	-10.9	Horiz
	Ave		+3.1	+0.3			213		Mid Channel		104
35	5416.488M	28.3	+34.3	-33.1	+3.9	+5.8	+0.0	42.8	54.0	-11.2	Horiz
	Ave		+3.4	+0.2			163		Low Channel		153
^	5416.508M	34.1	+34.3	-33.1	+3.9	+5.8	+0.0	48.6	54.0	-5.4	Horiz
			+3.4	+0.2			163		Low Channel		153
37	4513.750M	27.2	+32.5	-33.2	+3.6	+5.3	+0.0	38.7	54.0	-15.3	Horiz
	Ave		+3.0	+0.3			173		Low Channel		116
^	4513.751M	33.4	+32.5	-33.2	+3.6	+5.3	+0.0	44.9	54.0	-9.1	Horiz
			+3.0	+0.3			173		Low Channel		116
39	3661.009M	28.7	+31.5	-33.2	+3.0	+4.8	+0.0	37.8	54.0	-16.2	Horiz
	Ave		+2.7	+0.3			217		Mid Channel		198
^	3660.920M	39.0	+31.5	-33.2	+3.0	+4.8	+0.0	48.1	54.0	-5.9	Horiz
			+2.7	+0.3			217		Mid Channel		198
41	4636.256M	24.6	+32.8	-33.1	+3.6	+5.4	+0.0	36.7	54.0	-17.3	Vert
	Ave		+3.1	+0.3			174		High Channel		137
^	4636.285M	36.9	+32.8	-33.1	+3.6	+5.4	+0.0	49.0	54.0	-5.0	Vert
			+3.1	+0.3			174		High Channel		137
43	4636.272M	24.5	+32.8	-33.1	+3.6	+5.4	+0.0	36.6	54.0	-17.4	Horiz
	Ave		+3.1	+0.3			312		High Channel		102
^	4636.271M	35.3	+32.8	-33.1	+3.6	+5.4	+0.0	47.4	54.0	-6.6	Horiz
			+3.1	+0.3			312		High Channel		102

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

Customer: **Impinj Inc**
Specification: **FCC 15.247 (d) / 15.209 / 15.205**
Work Order #: **83127** Date: 2/15/2007
Test Type: **Radiated Scan** Time: 17:12:31
Equipment: **RFID Reader Antenna (Mini-Guardrail)** Sequence#: 6
Manufacturer: Impinj Tested By: Ryan Rutledge
Model: IPJ-A0301-USA
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Agilent E4446A	S/N: US44300437	06/13/2005	06/13/2007	AN02673
120" Pasternack 40 GHz Coax	S/N: N/A	05/10/2006	05/10/2008	AN05425
30' Andrews Heliax 18 GHz	S/N: N/A	06/19/2006	06/19/2008	AN05545
60" Pasternack 40 GHz Coax	S/N: N/A	05/11/2006	05/11/2008	AN05423
HP 83017A .5 - 26.5 GHz Pre-amp	S/N: 3123A00464	10/03/2005	10/03/2007	AN01271
EMCO 3115 Horn Ant	S/N: 9606-4854	12/13/2005	12/13/2007	AN01412
1 GHz HP Filter	S/N: 2	03/07/2006	03/07/2008	AN02750

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

Function	Manufacturer	Model #	S/N
RFID Reader Antenna (Mini-Guardrail)*	Impinj	IPJ-A0301-USA	

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop PC	Dell	Latitude D505	CN-0H2049-48643-49E-0525
Laptop AC Adapter	Dell	HP-OQ065B83	CN-0N2765-47890-45D-5387
Crossover Ethernet Cable (UTP)			
RFID Reader Core	Impinj	IPJ-R1000-USA-0-01-01	40306280020
AC Adapter	CUI Inc	DSA-60W-20 1 24060	DTS240250UC-P11P-DB

Test Conditions / Notes:

EUT transmitting at maximum power in constant TX mode on each channel. Low Channel: 902.75 MHz, Mid Channel: 915.25 MHz, High Channel: 927.25 MHz. Measuring radiated spurious emissions 1 - 10 GHz RBW = 1 MHz.

Transducer Legend:

T1=ANT-AN01412-121305	T2=AMP-AN01271-100305 - .5-26.5 GHz
T3=CAB-ANP05545-061906	T4=CAB-ANP05425-051006
T5=CAB-ANP05423-051006	T6=Filter 3GHz HP AN02745

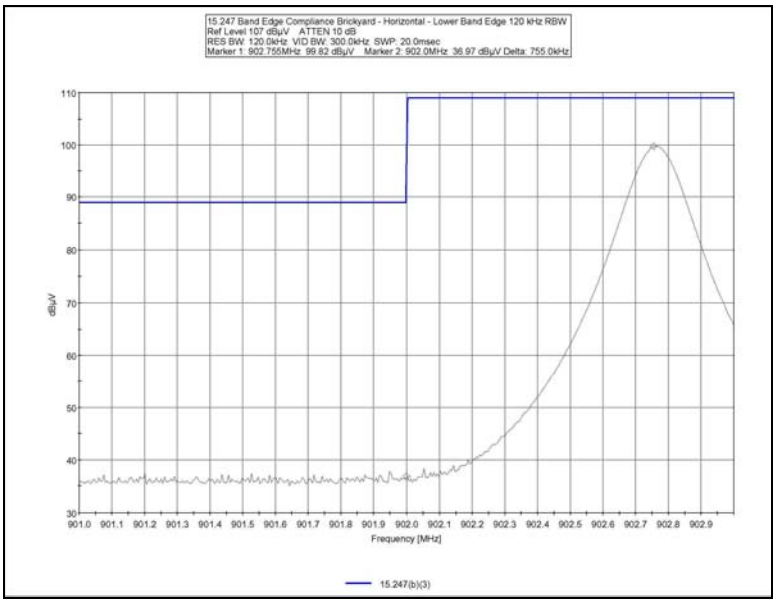
Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6							
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	2708.371M	41.1	+29.4	-33.7	+2.5	+4.2	+0.0	58.4	54.0	+4.4	Vert
			+2.3	+12.6			182		Low Channel		113
2	4576.116M	41.7	+32.7	-33.2	+3.6	+5.4	+0.0	53.6	54.0	-0.4	Vert
			+3.1	+0.3			188		Mid Channel		100

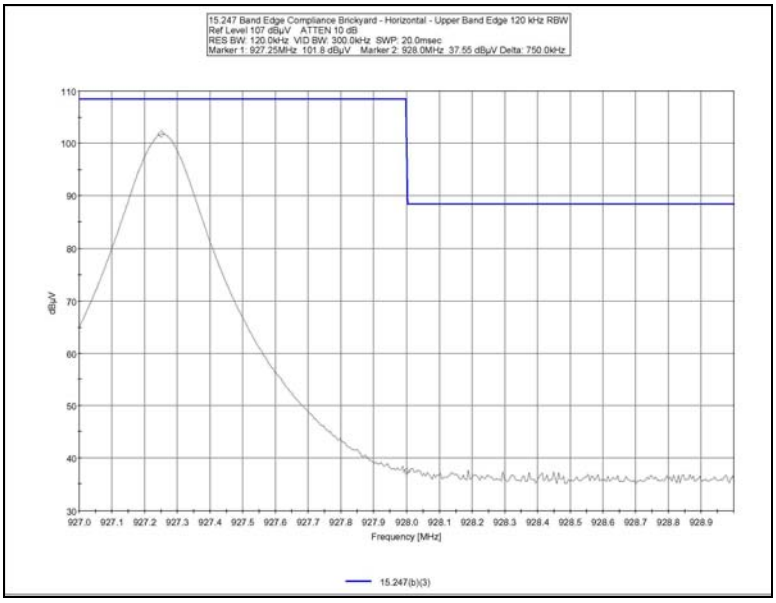
3	5416.498M	38.2	+34.3	-33.1	+3.9	+5.8	+0.0	52.7	54.0	-1.3	Vert
	Ave		+3.4	+0.2			181		Low Channel		131
^	5416.537M	41.8	+34.3	-33.1	+3.9	+5.8	+0.0	56.3	54.0	+2.3	Vert
			+3.4	+0.2			181		Low Channel		131
5	5491.506M	37.7	+34.4	-33.1	+3.9	+5.8	+0.0	52.3	54.0	-1.7	Vert
	Ave		+3.4	+0.2			177		Mid Channel		105
^	5491.506M	39.1	+34.4	-33.1	+3.9	+5.8	+0.0	53.7	54.0	-0.3	Vert
			+3.4	+0.2			177		Mid Channel		105
7	4636.078M	38.8	+32.8	-33.1	+3.6	+5.4	+0.0	50.9	54.0	-3.1	Vert
			+3.1	+0.3			191		High Channel		113
8	2708.249M	32.7	+29.4	-33.7	+2.5	+4.2	+0.0	50.0	54.0	-4.0	Vert
	Ave		+2.3	+12.6			182		Low Channel		113
9	4576.255M	37.6	+32.7	-33.2	+3.6	+5.4	+0.0	49.5	54.0	-4.5	Vert
	Ave		+3.1	+0.3			188		Mid Channel		100
10	4576.092M	37.4	+32.7	-33.2	+3.6	+5.4	+0.0	49.3	54.0	-4.7	Horiz
			+3.1	+0.3			157		Mid Channel		100
11	3611.003M	40.0	+31.3	-33.2	+3.0	+4.8	+0.0	49.0	54.0	-5.0	Vert
	Ave		+2.7	+0.4			182		Low Channel		104
^	3610.956M	44.1	+31.3	-33.2	+3.0	+4.8	+0.0	53.1	54.0	-0.9	Vert
			+2.7	+0.4			182		Low Channel		104
13	5563.506M	34.1	+34.4	-33.2	+4.1	+5.9	+0.0	48.8	54.0	-5.2	Vert
	Ave		+3.4	+0.1			177		High Channel		130
^	5563.585M	39.8	+34.4	-33.2	+4.1	+5.9	+0.0	54.5	54.0	+0.5	Vert
			+3.4	+0.1			177		High Channel		130
15	3661.126M	39.7	+31.5	-33.2	+3.0	+4.8	+0.0	48.8	54.0	-5.2	Horiz
			+2.7	+0.3			156		Mid Channel		108
16	2745.758M	33.8	+29.5	-33.6	+2.5	+4.2	+0.0	47.8	54.0	-6.2	Vert
	Ave		+2.3	+9.1			179		Mid Channel		111
^	2745.745M	41.4	+29.5	-33.6	+2.5	+4.2	+0.0	55.4	54.0	+1.4	Vert
			+2.3	+9.1			179		Mid Channel		111
18	3709.000M	38.3	+31.7	-33.2	+3.0	+4.8	+0.0	47.6	54.0	-6.4	Vert
	Ave		+2.7	+0.3			170		High Channel		174
^	3708.952M	42.9	+31.7	-33.2	+3.0	+4.8	+0.0	52.2	54.0	-1.8	Vert
			+2.7	+0.3			170		High Channel		174
20	5563.257M	32.7	+34.4	-33.2	+4.1	+5.9	+0.0	47.4	54.0	-6.6	Horiz
			+3.4	+0.1			219		High Channel		209
21	4513.751M	35.3	+32.5	-33.2	+3.6	+5.3	+0.0	46.8	54.0	-7.2	Vert
	Ave		+3.0	+0.3			191		Low Channel		114
^	4513.736M	40.3	+32.5	-33.2	+3.6	+5.3	+0.0	51.8	54.0	-2.2	Vert
			+3.0	+0.3			191		Low Channel		114
23	3611.006M	35.9	+31.3	-33.2	+3.0	+4.8	+0.0	44.9	54.0	-9.1	Horiz
	Ave		+2.7	+0.4			228		Low Channel		156
^	3611.101M	41.5	+31.3	-33.2	+3.0	+4.8	+0.0	50.5	54.0	-3.5	Horiz
			+2.7	+0.4			228		Low Channel		156
25	4636.254M	31.6	+32.8	-33.1	+3.6	+5.4	+0.0	43.7	54.0	-10.3	Vert
	Ave		+3.1	+0.3			191		High Channel		113
26	3709.011M	34.3	+31.7	-33.2	+3.0	+4.8	+0.0	43.6	54.0	-10.4	Horiz
	Ave		+2.7	+0.3			108		High Channel		158
^	3709.035M	40.9	+31.7	-33.2	+3.0	+4.8	+0.0	50.2	54.0	-3.8	Horiz
			+2.7	+0.3			108		High Channel		158

28	2781.765M	31.6	+29.5	-33.6	+2.6	+4.2	+0.0	42.6	54.0	-11.4	Vert
	Ave		+2.4	+5.9			171		High Channel		110
^	2781.773M	39.4	+29.5	-33.6	+2.6	+4.2	+0.0	50.4	54.0	-3.6	Vert
			+2.4	+5.9			171		High Channel		110
30	2745.744M	28.1	+29.5	-33.6	+2.5	+4.2	+0.0	42.1	54.0	-11.9	Horiz
	Ave		+2.3	+9.1			242		Mid Channel		172
^	2745.770M	39.0	+29.5	-33.6	+2.5	+4.2	+0.0	53.0	54.0	-1.0	Horiz
			+2.3	+9.1			242		Mid Channel		172
32	3661.013M	32.8	+31.5	-33.2	+3.0	+4.8	+0.0	41.9	54.0	-12.1	Vert
	Ave		+2.7	+0.3			33		Mid Channel		112
^	3661.011M	40.5	+31.5	-33.2	+3.0	+4.8	+0.0	49.6	54.0	-4.4	Vert
			+2.7	+0.3			33		Mid Channel		112
34	2781.744M	30.4	+29.5	-33.6	+2.6	+4.2	+0.0	41.4	54.0	-12.6	Horiz
	Ave		+2.4	+5.9			241		High Channel		176
^	2781.658M	39.5	+29.5	-33.6	+2.6	+4.2	+0.0	50.5	54.0	-3.5	Horiz
			+2.4	+5.9			241		High Channel		176
36	3661.010M	30.9	+31.5	-33.2	+3.0	+4.8	+0.0	40.0	54.0	-14.0	Horiz
	Ave		+2.7	+0.3			156		Mid Channel		108
37	4576.256M	27.6	+32.7	-33.2	+3.6	+5.4	+0.0	39.5	54.0	-14.5	Horiz
	Ave		+3.1	+0.3			157		Mid Channel		100
38	5563.517M	23.8	+34.4	-33.2	+4.1	+5.9	+0.0	38.5	54.0	-15.5	Horiz
	Ave		+3.4	+0.1			219		High Channel		209
39	5416.496M	23.8	+34.3	-33.1	+3.9	+5.8	+0.0	38.3	54.0	-15.7	Horiz
	Ave		+3.4	+0.2			152		Low Channel		141
^	5416.447M	35.5	+34.3	-33.1	+3.9	+5.8	+0.0	50.0	54.0	-4.0	Horiz
			+3.4	+0.2			152		Low Channel		141
41	4513.753M	26.2	+32.5	-33.2	+3.6	+5.3	+0.0	37.7	54.0	-16.3	Horiz
	Ave		+3.0	+0.3			218		Low Channel		114
^	4513.675M	36.9	+32.5	-33.2	+3.6	+5.3	+0.0	48.4	54.0	-5.6	Horiz
			+3.0	+0.3			218		Low Channel		114

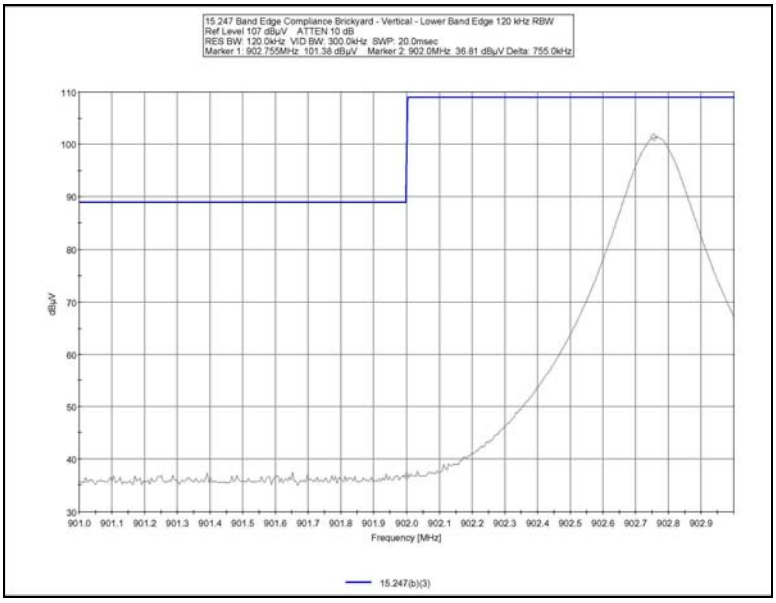
FCC 15.247 BANDEDGE BRICKYARD - HORIZONTAL LOWER



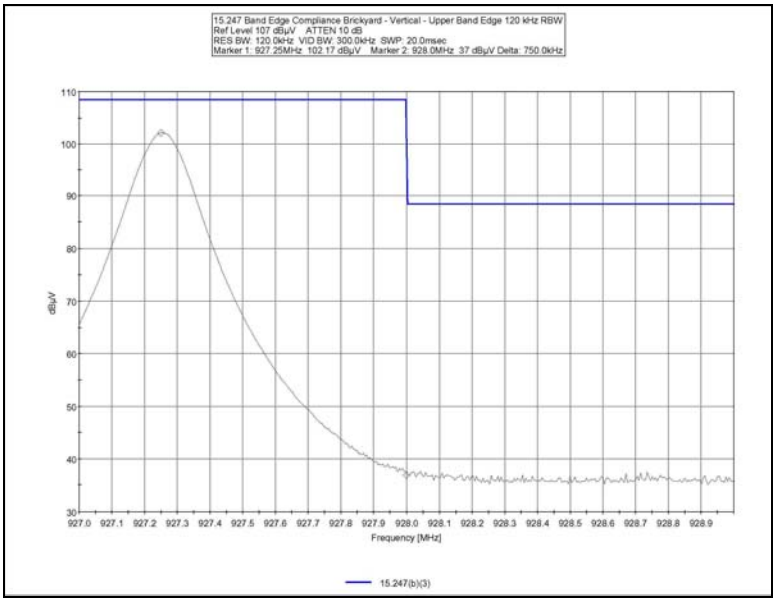
FCC 15.247 BANDEDGE BRICKYARD - HORIZONTAL UPPER



FCC 15.247 BANDEDGE BRICKYARD - VERTICAL LOWER



FCC 15.247 BANDEDGE BRICKYARD - VERTICAL UPPER



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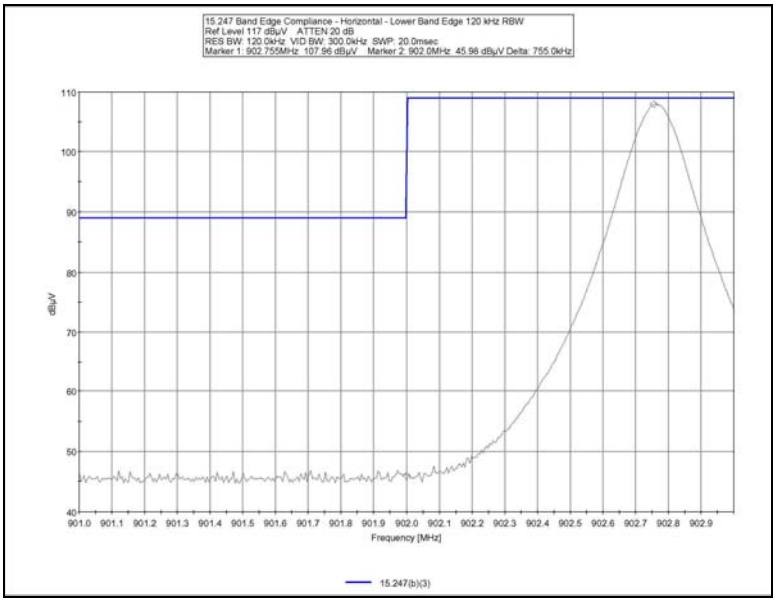
FCC 15.247 BANDEDGE GUARDWALL - HORIZONTAL LOWER



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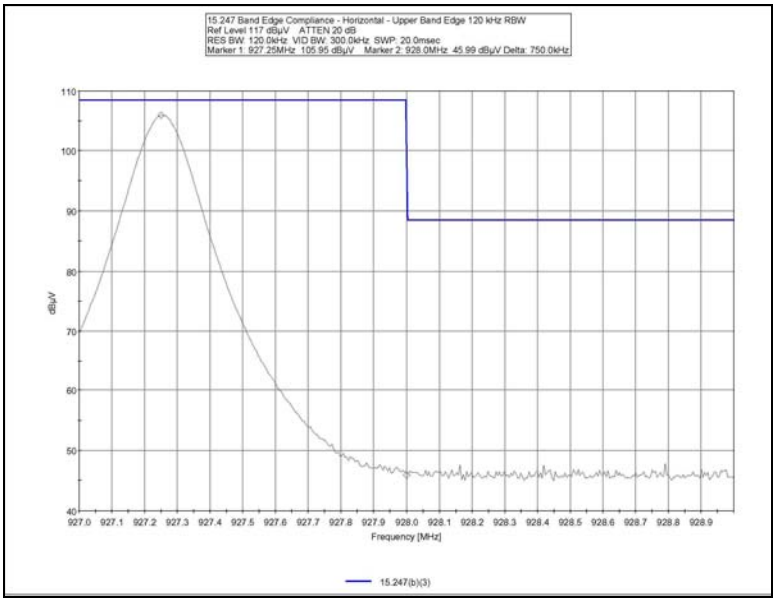
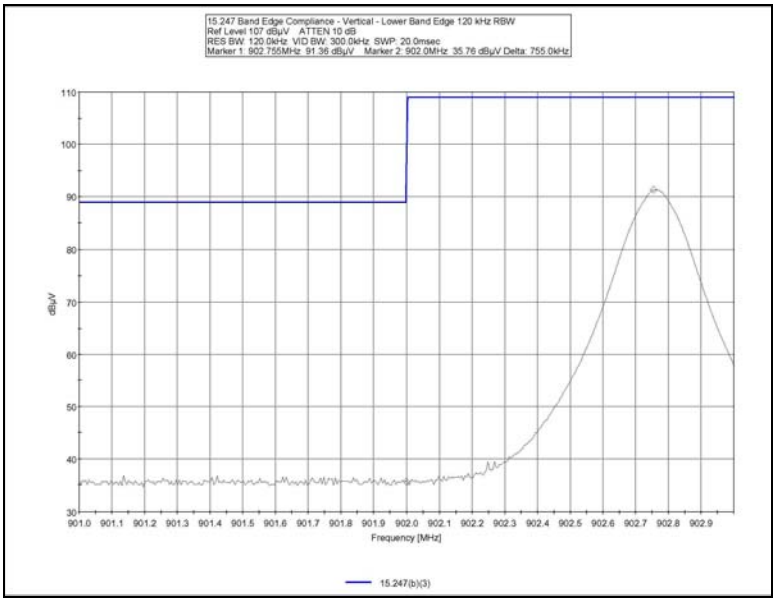
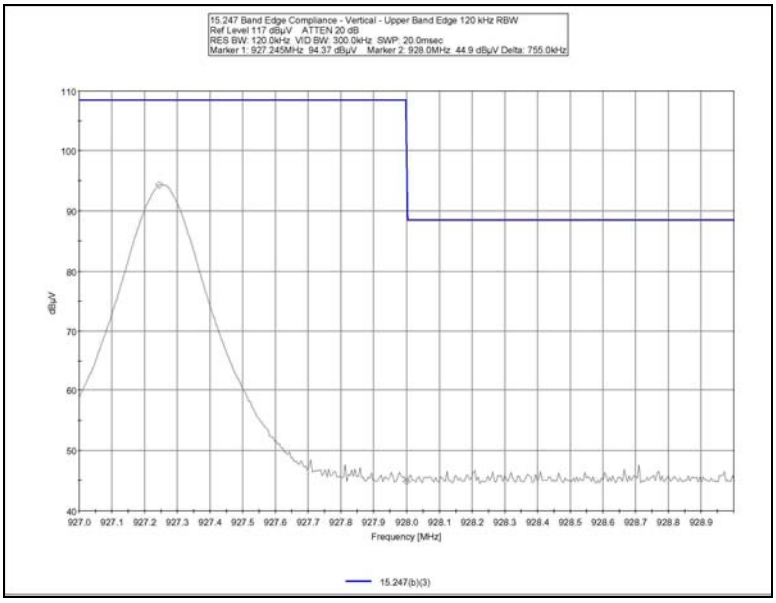


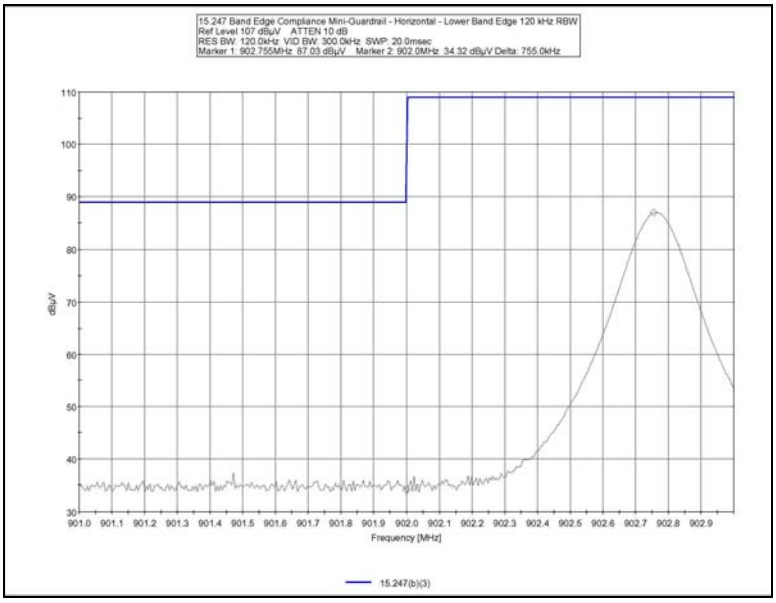
FCC 15.247 BANDEDGE GUARDWALL - VERTICAL LOWER



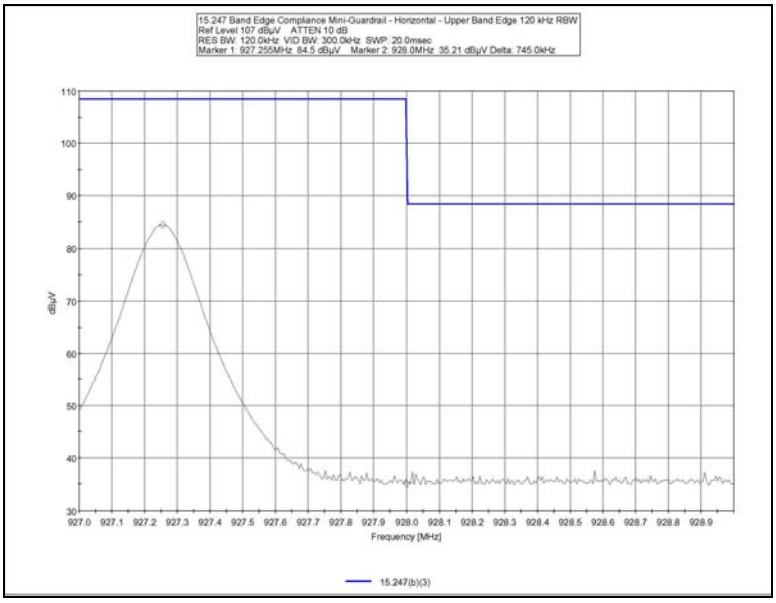
FCC 15.247 BANDEDGE GUARDWALL - VERTICAL UPPER



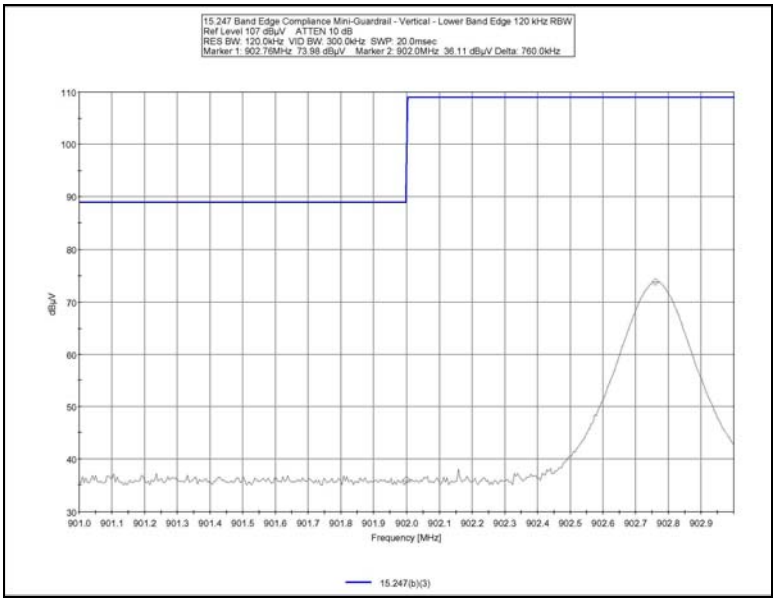
FCC 15.247 BANDEDGE MINI-GUARDRAIL - HORIZONTAL LOWER



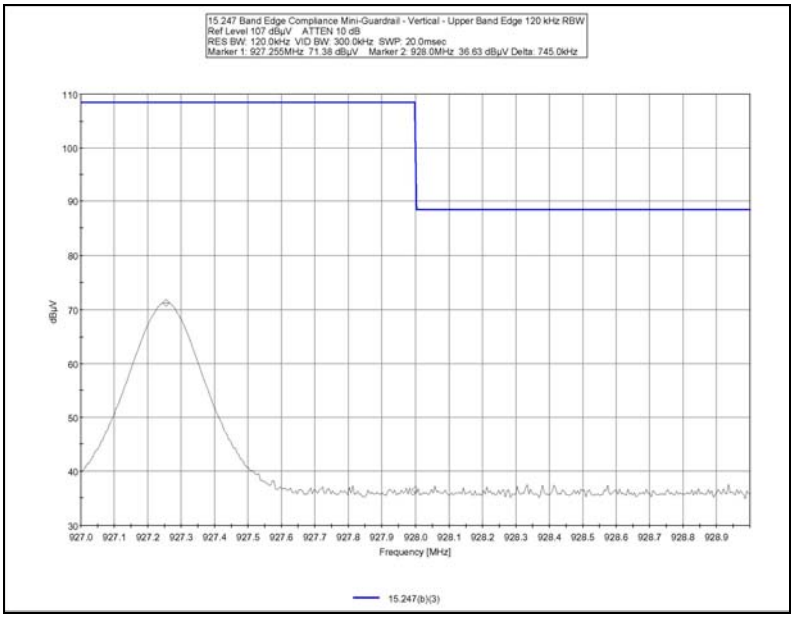
FCC 15.247 BANDEDGE MINI-GUARDRAIL - HORIZONTAL UPPER



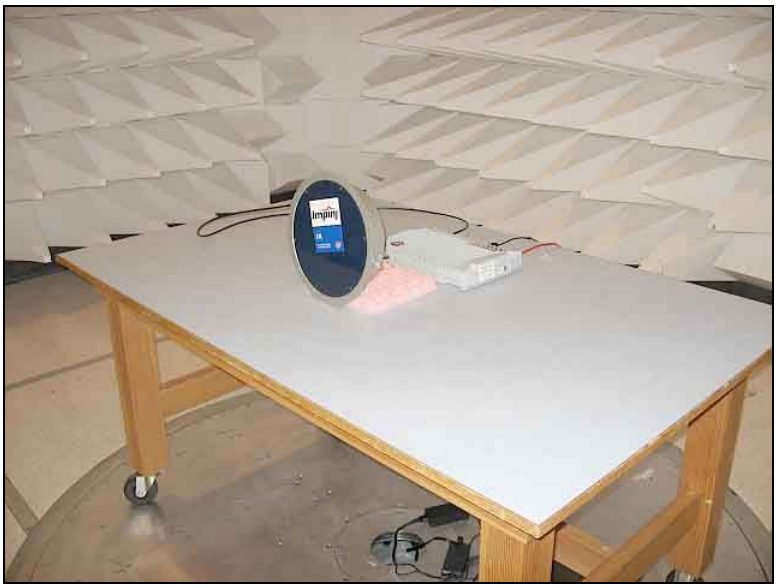
FCC 15.247 BANDEDGE MINI-GUARDRAIL - VERTICAL LOWER



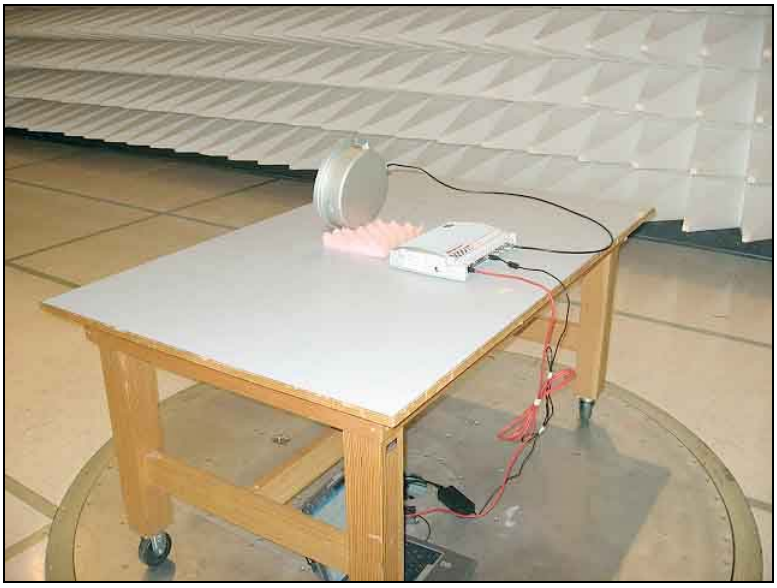
FCC 15.247 BANDEDGE MINI-GUARDRAIL - VERTICAL UPPER



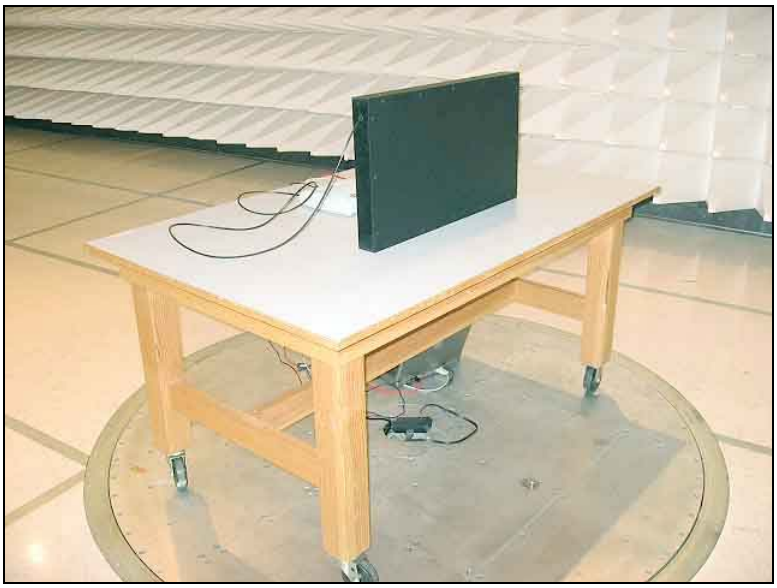
Test Setup Photos



Brickyard Setup Front

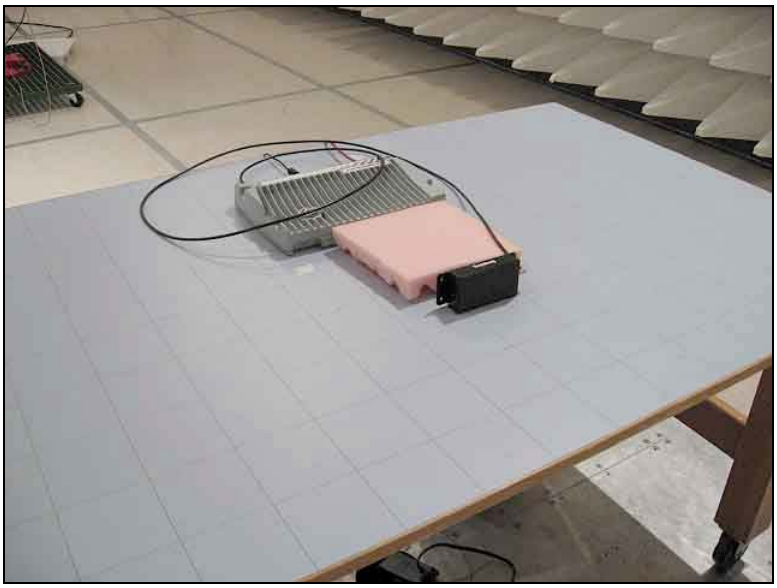


Brickyard Setup Back



Guardwell Setup Front

Guardwell Setup Back



Mini-Guardrail Setup Front

Mini-Guardrail Setup Back