Impinj Inc.

REVISED TEST REPORT TO 103052-2

Impinj R700 RAIN RFID Reader
Model: IPJ-R700

Tested to The Following Standards:

FCC Part 15 Subpart C Section(s)
15.207 & 15.247
(FHSS 902-928 MHz)

Report No.: 103052-2A

Date of issue: December 20, 2019

Test Certificate # 803.01

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

TABLE OF CONTENTS

ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Impinj Inc.
400 Fairview Ave N, Suite 1200
Seattle WA 98109

Representative: Greg Robinson
Customer Reference Number: 702429

REPORT PREPARED BY:

Darcy Thompson
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 103052

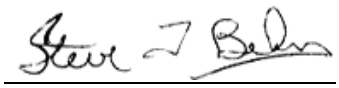
DATE OF EQUIPMENT RECEIPT: September 19, 2019
DATE(S) OF TESTING: September 19-30, 2019

Revision History

Original: Testing of the Impinj R700 RAIN RFID Reader, Model: IPJ-R700 to FCC Part 15 Subpart C Section(s) 15.207 & 15.247 (FHSS 902-928 MHz).
Revision A: Corrected Firmware power setting and added statement to the test setup on pages 27, 39, 42, 45, 57 and 59.

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the equipment provided by the client, tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.



Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information

Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
22116 23rd Drive S.E., Suite A
Canyon Park Bothell WA 98021

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.12

Site Registration & Accreditation Information

Location	*NIST CB #	FCC	Japan
Canyon Park, Bothell, WA	US0081	US1022	A-0136
Brea, CA	US0060	US1025	A-0136
Fremont, CA	US0082	US1023	A-0136
Mariposa, CA	US0103	US1024	A-0136

*CKC's list of NIST designated countries can be found at: https://standards.gov/cabs/designations.html

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C - 15.247 (FHSS 902-928MHz)

Test Procedure	Description	Modifications	Results
15.247(a)(1)(i)	Occupied Bandwidth	NA	Pass
15.247(a)(1)	Carrier Separation	NA	Pass
15.247(a)(1)(i)	Number of Hopping Channels	NA	Pass
15.247(a)(1)(i)	Average Time of Occupancy	NA	Pass
15.247(b)(2)	Output Power	NA	Pass
15.247(d)	RF Conducted Emissions & Band Edge	NA	Pass
15.247(d)	Radiated Emissions & Band Edge	NA	Pass
15.207	AC Conducted Emissions	NA	Pass

NA = Not Applicable

ISO/IEC 17025 Decision Rule
The declaration of pass or fail herein is based upon assessment to the specification(s) listed above, including where applicable, assessment of measurement uncertainties. For performance related tests, equipment was monitored for specified criteria identified in that section of testing.

Modifications During Testing

This list is a summary of the modifications made to the equipment during testing.

Summary of Conditions
No modifications were made during testing.

Modifications listed above must be incorporated into all production units.

Conditions During Testing

This list is a summary of the conditions noted to the equipment during testing.

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

During testing, numerous configurations may have been utilized. The configurations listed below support compliance to the standard(s) listed in the Summary of Results section.

Configuration 1

Equipment Tested:

Device	Manufacturer	Model #	S/N
Impinj R700 RAIN RFID Reader	Impinj, Inc.	IPJ-R700	02

Support Equipment:

Device	Manufacturer	Model #	S/N
Wireless Router	Belkin	F5D7230-4	20828723009696
Laptop	Dell	Latitude E7240	2SWQVZ1
Laptop PSU	Dell	HA65NM130	CN-06TFFF-75661-44N-0FTA-A00
POE Injector	Phihoung	POE29U-1AT Rev A	P184003652A1
Mouse	Dell	M056UC	F0V006T5

Configuration 2

Equipment Tested:

Device	Manufacturer	Model #	S/N
Impinj R700 RAIN RFID Reader	Impinj, Inc.	IPJ-R700	02
Antenna 1 (Mini-Guardrail Antenna)	Impinj, Inc.	A0303 (PN: IPJ-A0303-000)	Lot 1708

Support Equipment:

Device	Manufacturer	Model #	S/N
Wireless Router	Belkin	F5D7230-4	20828723009696
Laptop	Dell	Latitude E7240	2SWQVZ1
Laptop PSU	Dell	HA65NM130	CN-06TFFF-75661-44N-0FTA-A00
POE Injector	Phihoung	POE29U-1AT Rev A	P184003652A1
Mouse	Dell	M056UC	F0V006T5

Configuration 3

Equipment Tested:

Device	Manufacturer	Model #	S/N
Impinj R700 RAIN RFID Reader	Impinj, Inc.	IPJ-R700	02
Antenna 2 (High Gain CP Antenna)	Times-7	A5010 (PN: 60001)	0016388

Support Equipment:

Device	Manufacturer	Model #	S/N
Wireless Router	Belkin	F5D7230-4	20828723009696
Laptop	Dell	Latitude E7240	2SWQVZ1
Laptop PSU	Dell	HA65NM130	CN-06TFFF-75661-44N-0FTA-A00
POE Injector	Phihoung	POE29U-1AT Rev A	P184003652A1
Mouse	Dell	M056UC	F0V006T5

Configuration 4

Equipment Tested:

Device	Manufacturer	Model #	S/N
Impinj R700 RAIN RFID Reader	Impinj, Inc.	IPJ-R700	02
Antenna 3 (Slimline CP Antenna)	Times-7	A5020 (PN: 60010-FG)	180823086

Support Equipment:

Device	Manufacturer	Model #	S/N
Wireless Router	Belkin	F5D7230-4	20828723009696
Laptop	Dell	Latitude E7240	2SWQVZ1
Laptop PSU	Dell	HA65NM130	CN-06TFFF-75661-44N-0FTA-A00
POE Injector	Phihoung	POE29U-1AT Rev A	P184003652A1
Mouse	Dell	M056UC	F0V006T5

Configuration 5

Equipment Tested:

Device	Manufacturer	Model #	S/N
Impinj R700 RAIN RFID Reader	Impinj, Inc.	IPJ-R700	02
Antenna 4 (Brickyard Antenna)	Convergence System Limited	CS777-2	V251452001505

Support Equipment:

Device	Manufacturer	Model #	S/N
Wireless Router	Belkin	F5D7230-4	20828723009696
Laptop	Dell	Latitude E7240	2SWQVZ1
Laptop PSU	Dell	HA65NM130	CN-06TFFF-75661-44N-0FTA-A00
POE Injector	Phihoung	POE29U-1AT Rev A	P184003652A1
Mouse	Dell	M056UC	F0V006T5

Configuration 6

Equipment Tested:

Device	Manufacturer	Model #	S/N
Impinj R700 RAIN RFID Reader	Impinj, Inc.	IPJ-R700	02
Antenna 5 (Matchbox Antenna)	Impinj, Inc.	A0404 (PN IPJ-A0404-000)	Lot 1709

Support Equipment:

Device	Manufacturer	Model #	S/N
Wireless Router	Belkin	F5D7230-4	20828723009696
Laptop	Dell	Latitude E7240	2SWQVZ1
Laptop PSU	Dell	HA65NM130	CN-06TFFF-75661-44N-0FTA-A00
POE Injector	Phihoung	POE29U-1AT Rev A	P184003652A1
Mouse	Dell	M056UC	F0V006T5

Configuration 7

Equipment Tested:

Device	Manufacturer	Model #	S/N
Impinj R700 RAIN RFID Reader	Impinj, Inc.	IPJ-R700	02
Antenna 6 (Threshold Antenna)	Impinj, Inc.	A0311 USA (PN: IPJ-A0311-USA)	Lot 1712

Support Equipment:

Device	Manufacturer	Model #	S/N
Wireless Router	Belkin	F5D7230-4	20828723009696
Laptop	Dell	Latitude E7240	2SWQVZ1
Laptop PSU	Dell	HA65NM130	CN-06TFFF-75661-44N-0FTA-A00
POE Injector	Phihoung	POE29U-1AT Rev A	P184003652A1
Mouse	Dell	M056UC	F0V006T5

Configuration 8

Equipment Tested:

Device	Manufacturer	Model #	S/N
Impinj R700 RAIN RFID Reader	Impinj, Inc.	IPJ-R700	02
Antenna 7 (Guardwall Antenna)	Impinj, Inc.	A0402USA (PN: IPJ-A0402-USA	Lot 1709

Support Equipment:

Device	Manufacturer	Model #	S/N
Wireless Router	Belkin	F5D7230-4	20828723009696
Laptop	Dell	Latitude E7240	2SWQVZ1
Laptop PSU	Dell	HA65NM130	CN-06TFFF-75661-44N-0FTA-A00
POE Injector	Phihoung	POE29U-1AT Rev A	P184003652A1
Mouse	Dell	M056UC	F0V006T5

Configuration 9

Equipment Tested:

Device	Manufacturer	Model #	S/N
Impinj R700 RAIN RFID Reader	Impinj, Inc.	IPJ-R700	02
Declared Cable	Beldin	RG-58 A/U (4.8m)	NA

Support Equipment:

Device	Manufacturer	Model #	S/N
Wireless Router	Belkin	F5D7230-4	20828723009696
Laptop	Dell	Latitude E7240	2SWQVZ1
Laptop PSU	Dell	HA65NM130	CN-06TFFF-75661-44N-0FTA-A00
POE Injector	Phihoung	POE29U-1AT Rev A	P184003652A1
Mouse	Dell	M056UC	F0V006T5

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Wideband System:	FHSS
Operating Frequency Range:	902.75-927.25 MHz
Number of Hopping Channels:	50
Receiver Bandwidth and Synchronization:	The manufacturer declares the receiver input bandwidth matches the transmit channel bandwidth and shifts frequencies in synchronization with the transmitter.
Modulation Type(s):	ASK
Maximum Duty Cycle:	Tested 100% as worst case
Number of TX Chains:	1
Antenna Type(s) and Gain:	Mini-Guardrail Antenna/ -20dBi High Gain CP Antenna / +8.5dBiC Slimline CP Antenna / +5.5dBiC Brickyard Antenna / +2dBi Matchbox Antenna / -20dBi Threshold Antenna / +6dBi Guardwall Antenna / +6dBi
Beamforming Type:	NA
Antenna Connection Type:	External Connector
Nominal Input Voltage:	48VDC
Firmware / Software used for Test:	Sky Rocket 1.0.0-DEV-96D37371

FCC Part 15 Subpart C

15.247(a) Transmitter Characteristics

Test Setup/Conditions			
Test Location:	Bothell Lab C3	Test Engineer:	M. Harrison
Test Method:	ANSI C63.10 (2013)	Test Date(s):	9/19/2019
Configuration:	1		
Test Setup:	Duty Cycle: 100% (Test Mode) Test Mode: Continuously transmitting Test Setup: The EUT is transmitting through the antenna port connector and is attached to the spectrum analyzer. Insertion loss of other equipment is accounted for and programmed into the spectrum analyzer.		

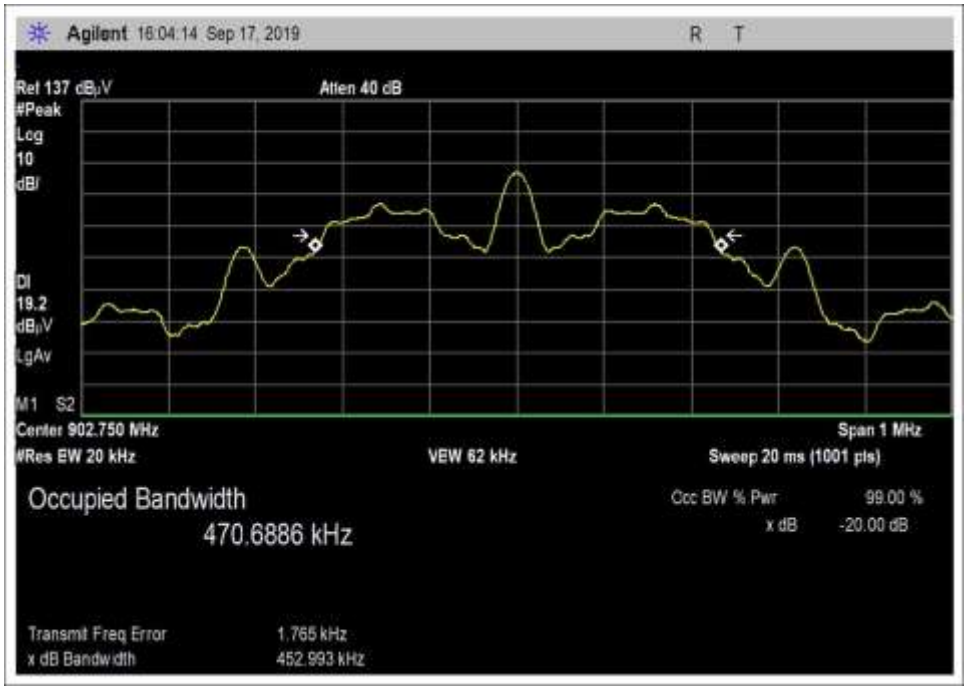
Environmental Conditions			
Temperature (ºC)	24	Relative Humidity (%):	41

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
AN02673	Spectrum Analyzer	Agilent	E4446A	2/22/2019	2/22/2021
P05748	Attenuator	Pasternack	PE7004-20	4/24/2018	4/24/2020
P07212	Cable	H & S	32026-29801-29801-18	8/7/2019	8/7/2021

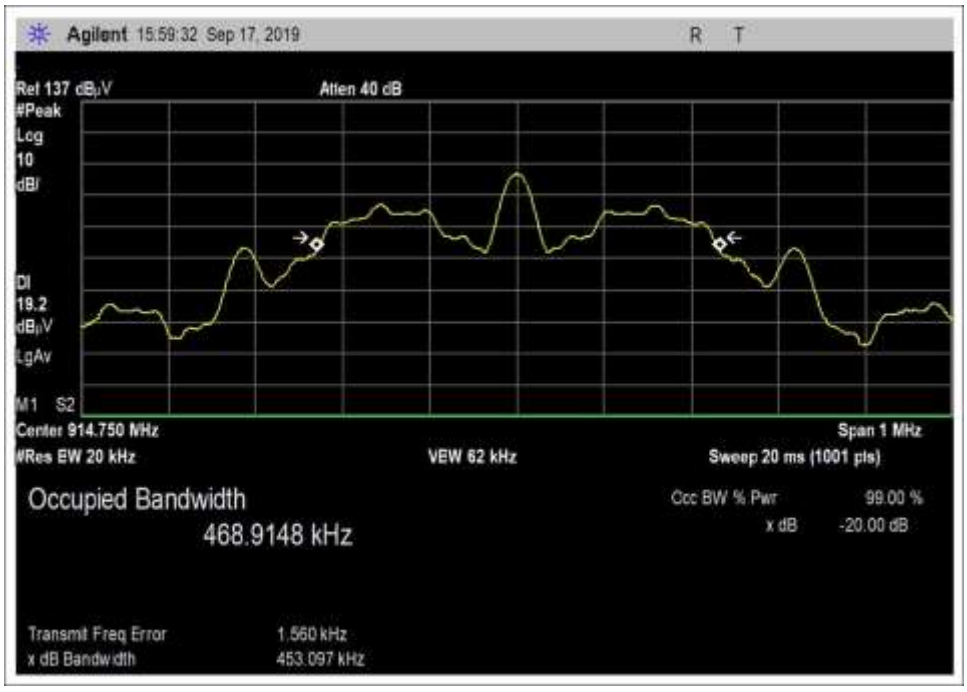
15.247(a)(1) 20 dB Bandwidth

Test Data Summary					
Frequency (MHz)	**Antenna Port**	**Modulation**	**Measured (kHz)**	**Limit (kHz)**	**Results**
902.75	1	ASK	453	≤500	Pass
914.75	1	ASK	453	≤500	Pass
927.25	1	ASK	453	≤500	Pass

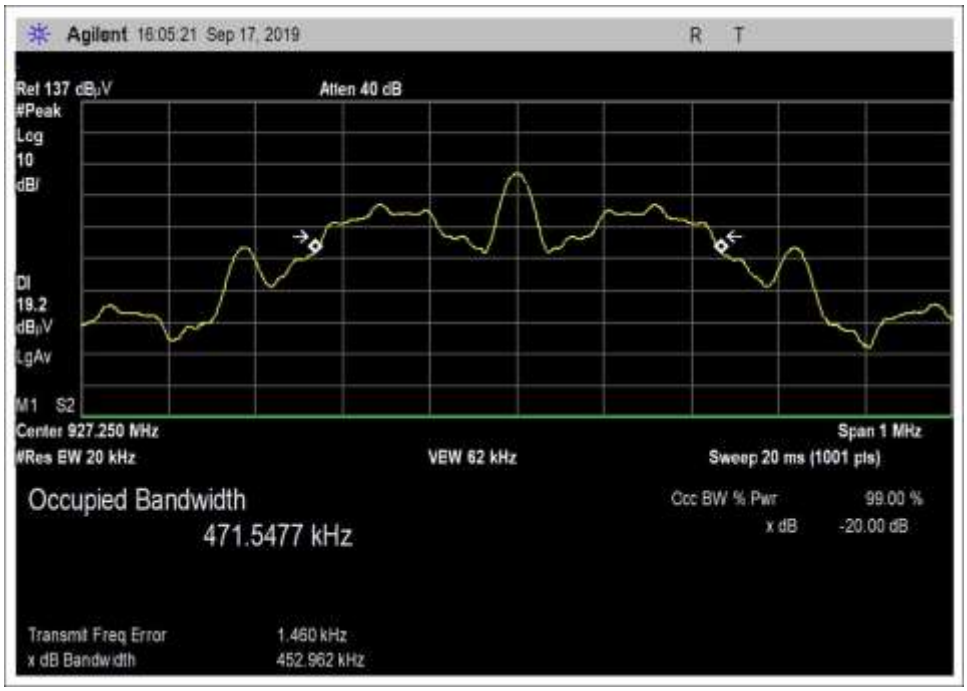
Plot(s)



Low Channel



Middle Channel

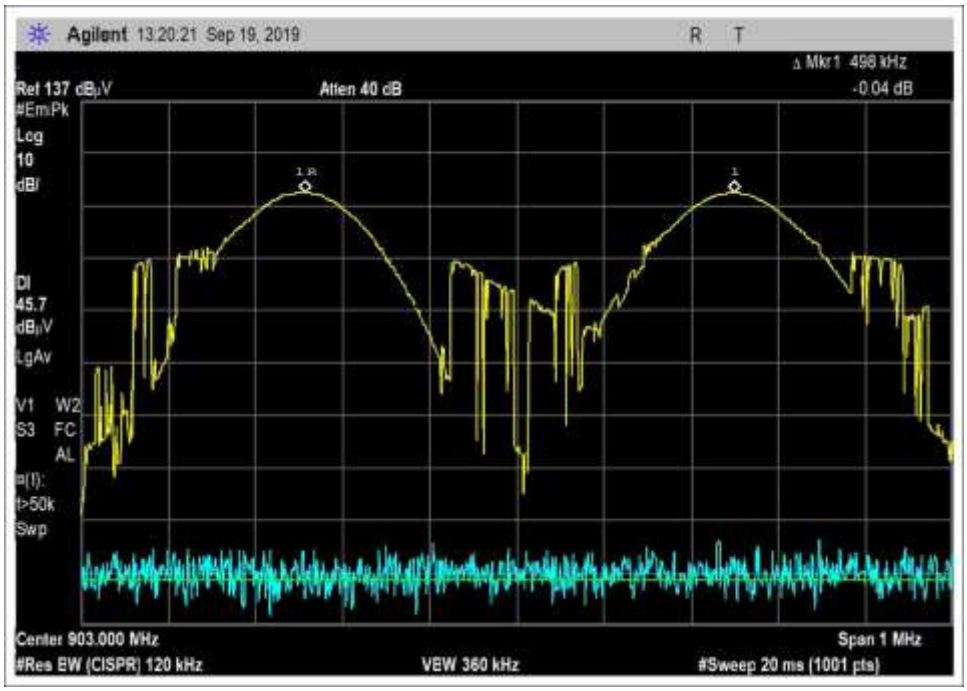


High Channel

15.247(a)(1) Carrier Separation

Test Data Summary				
Limit applied: minimum 25kHz.				
Antenna Port	**Operational Mode**	**Measured (kHz)**	**Limit (kHz)**	**Results**
1	Hopping	498	>25	Pass

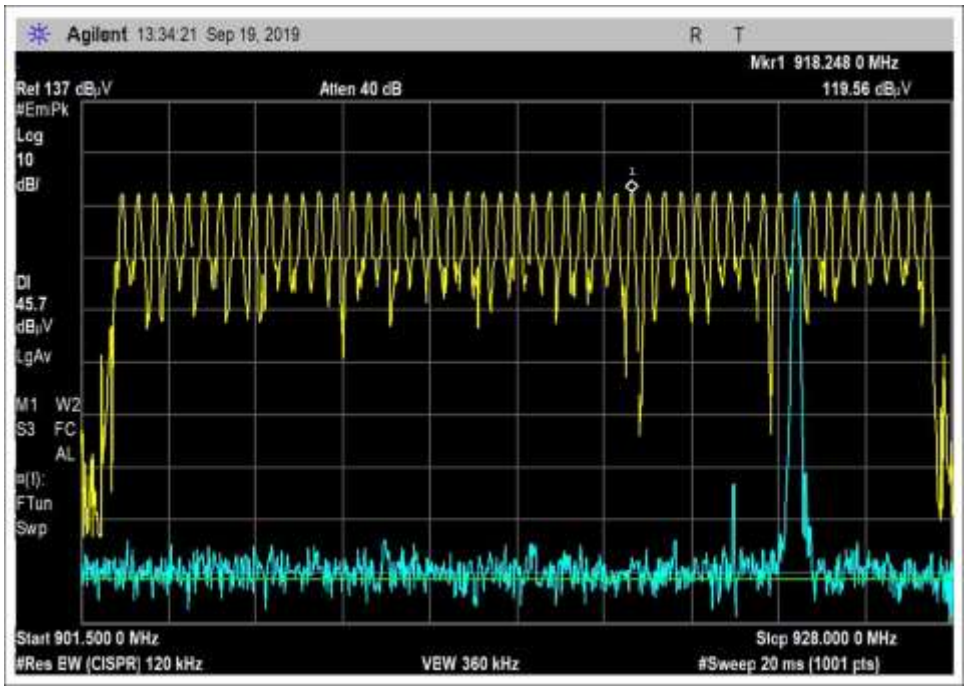
Plot(s)



15.247(a)(1)(i) Number of Hopping Channels

Test Data Summary				
$Limit = \begin{cases} 50\ Channels \mid 20\ dB\ BW < 250kHz \\ 25\ Channels \mid 20\ dB\ BW \geq 250kHz \end{cases}$				
Antenna Port	**Operational Mode**	**Measured (Channels)**	**Limit (Channels)**	**Results**
1	Hopping	50	≥25	Pass

Plot(s)



15.247(a)(1)(i) Time of Occupancy

Test Data Summary				
Observation Period, P_{obs} is derived from the following: $P_{Obs} = \begin{cases} 20\ Seconds & 20\ dB\ BW < 250kHz \\ 10\ Seconds & 20\ dB\ BW \geq 250kHz \end{cases}$				
Antenna Port	**Operational Mode**	**Measured (ms)**	**Limit (ms/P_{obs})**	**Results**
1	Hopping	391.8	≤400	Pass

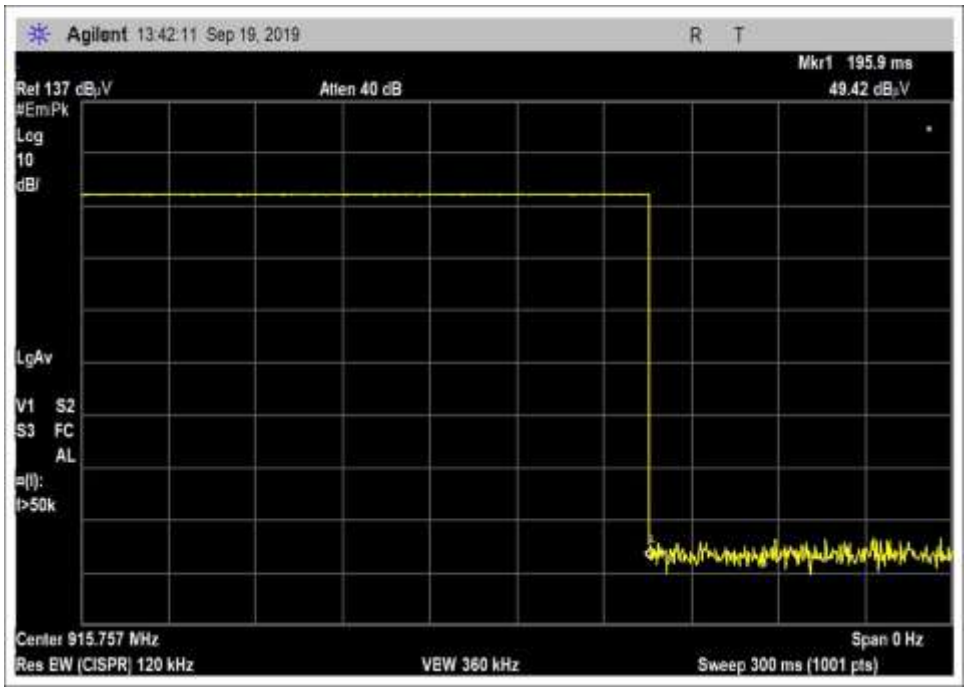
Measured results are calculated as follows:

$$Dwell\ time = \left(\sum_{Bursts} RF\ Burst\ On\ Time + \sum_{Control} Control\ Signal\ On\ time \right) \Big|_{P_{obs}}$$

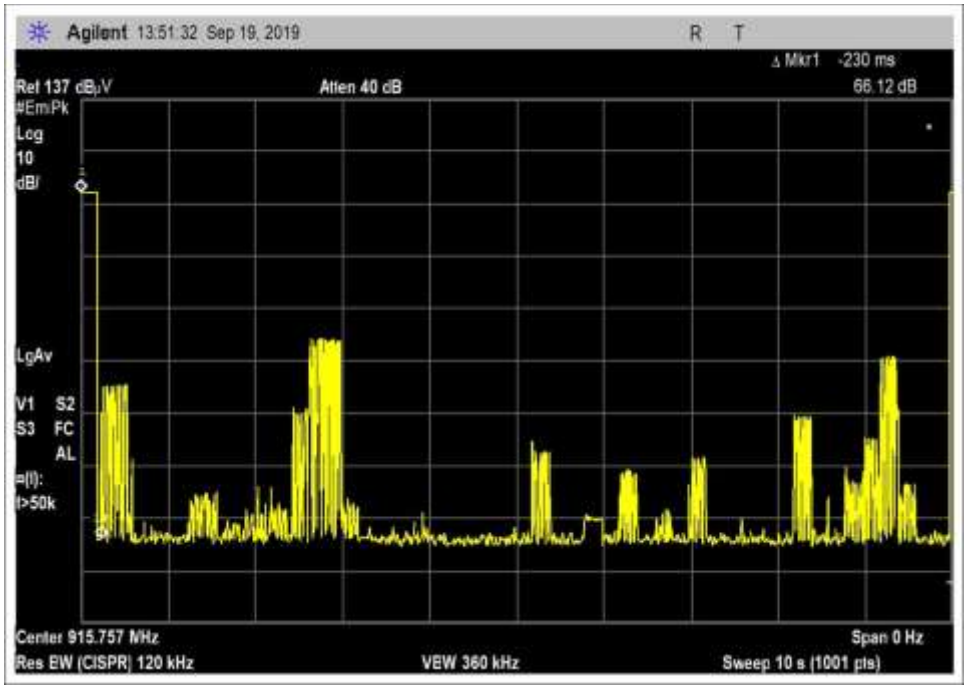
Actual Calculated Values:

Parameter	Value
Observation Period (P_{obs}):	10s
Number of RF Bursts / P_{obs}:	2
On time of RF Burst:	195.9mS
Number of Control or other signals / P_{obs}:	0
On time of Control or other Signals:	0
Total Measured On Time:	391.8mS

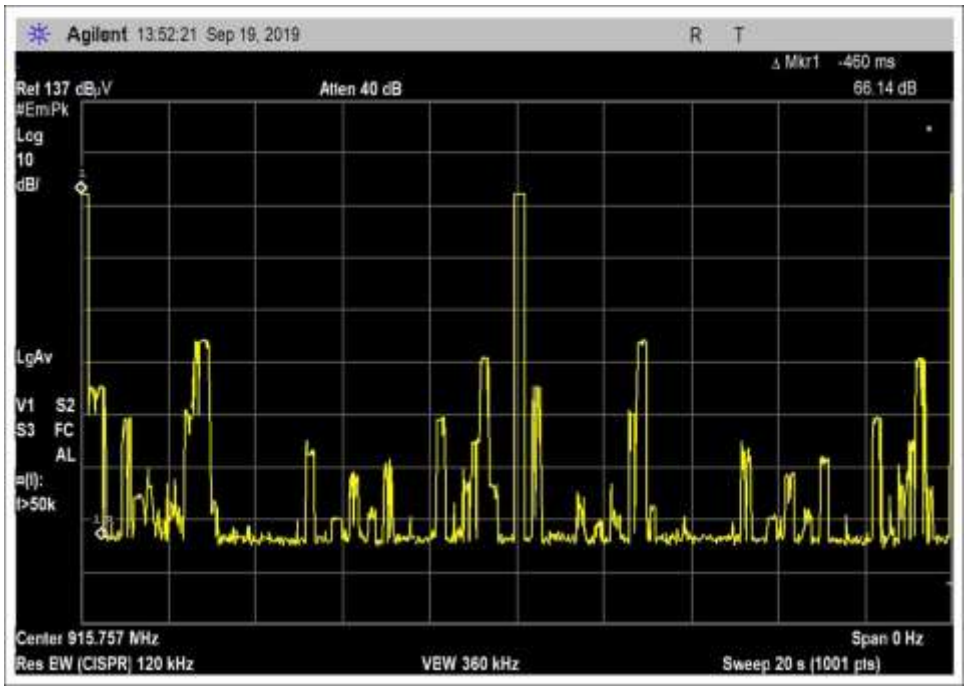
Plot(s)



Dwell Time



Dwell Time 10s



Dwell Time 20s

Test Setup Photo(s)

15.247(b)(2) Output Power

Test Data Summary - Voltage Variations					
Frequency (MHz)	Modulation / Ant Port	$V_{Minimum}$ (dBm)	$V_{Nominal}$ (dBm)	$V_{Maximum}$ (dBm)	Max Deviation from $V_{Nominal}$ (dB)
902.75	ASK / 1	29.4	29.6	29.5	0.2
914.75	ASK / 1	29.5	29.6	29.5	0.1
927.25	ASK / 1	29.6	29.6	29.6	0.0

Test performed using operational mode with the highest output power, representing worst case.

Parameter Definitions:

Measurements performed at input voltage Vnominal ± 15%.

Parameter	Value
$V_{Nominal}$:	115
$V_{Minimum}$:	97
$V_{Maximum}$:	132

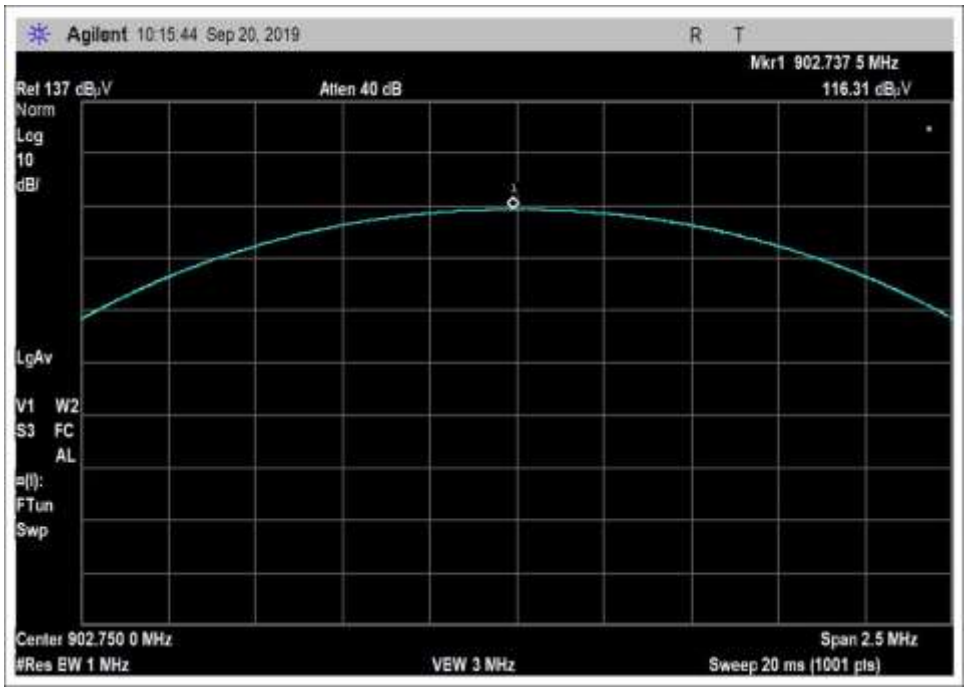
Test Data Summary - Voltage Variations

The unit is power by POE (power over Ethernet) and does not have a battery.
Voltage variations could not be performed on POE output.

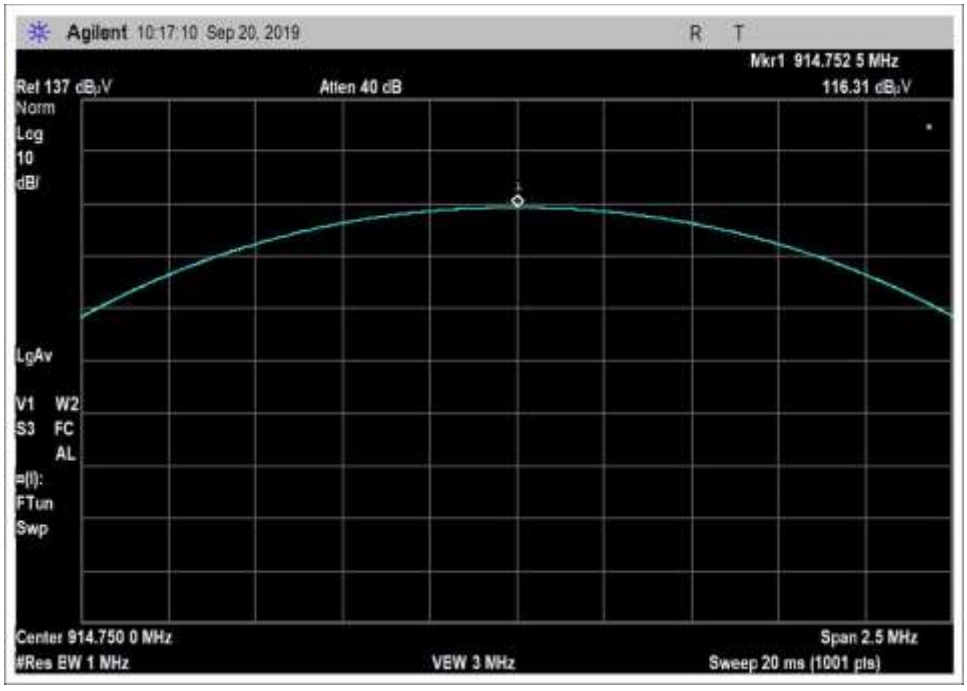
Test Data Summary - RF Conducted Measurement					
$Limit = \begin{cases} 30dBm\ Conducted/36dBm\ EIRP \mid \geq 50\ Channels \\ 24dBm\ Conducted/30dBm\ EIRP \mid < 50\ Channels\ (\min 25) \end{cases}$					
Frequency (MHz)	**Modulation**	**Ant. Type / Gain (dBi)**	**Measured (dBm)**	**Limit (dBm)**	**Results**
902.75	ASK	Mini-Guardrail / -20dBi	29.4	≤30	Pass
914.75	ASK	Mini-Guardrail / -20dBi	29.6	≤30	Pass
927.25	ASK	Mini-Guardrail / -20dBi	29.5	≤30	Pass
902.75	ASK	High Gain CP / +8.5dBiC*	29.4	≤30	Pass
914.75	ASK	High Gain CP / +8.5dBiC*	29.6	≤30	Pass
927.25	ASK	High Gain CP / +8.5dBiC*	29.5	≤30	Pass
902.75	ASK	Slimline CP/ +5.5dBiC	29.4	≤30	Pass
914.75	ASK	Slimline CP/ +5.5dBiC	29.6	≤30	Pass
927.25	ASK	Slimline CP/ +5.5dBiC	29.5	≤30	Pass
902.75	ASK	Brickyard / +2 dBi	29.6	≤30	Pass
914.75	ASK	Brickyard / +2 dBi	29.6	≤30	Pass
927.25	ASK	Brickyard / +2 dBi	29.6	≤30	Pass
902.75	ASK	Matchbox / -20dBi	29.6	≤30	Pass
914.75	ASK	Matchbox / -20 dBi	29.6	≤30	Pass
927.25	ASK	Matchbox / -20 dBi	29.6	≤30	Pass
902.75	ASK	Threshold / +6 dBi	29.6	≤30	Pass
914.75	ASK	Threshold / +6 dBi	29.6	≤30	Pass
927.25	ASK	Threshold / +6 dBi	29.6	≤30	Pass
902.75	ASK	Guardwall / +6 dBi	29.6	≤30	Pass
914.75	ASK	Guardwall / +6 dBi	29.6	≤30	Pass
927.25	ASK	Guardwall / +6 dBi	29.6	≤30	Pass

*The manufacturer declares maximum linear gain is 5.7dBi based on the assumed relationship between circularly and linearly polarized gains with uncertainty

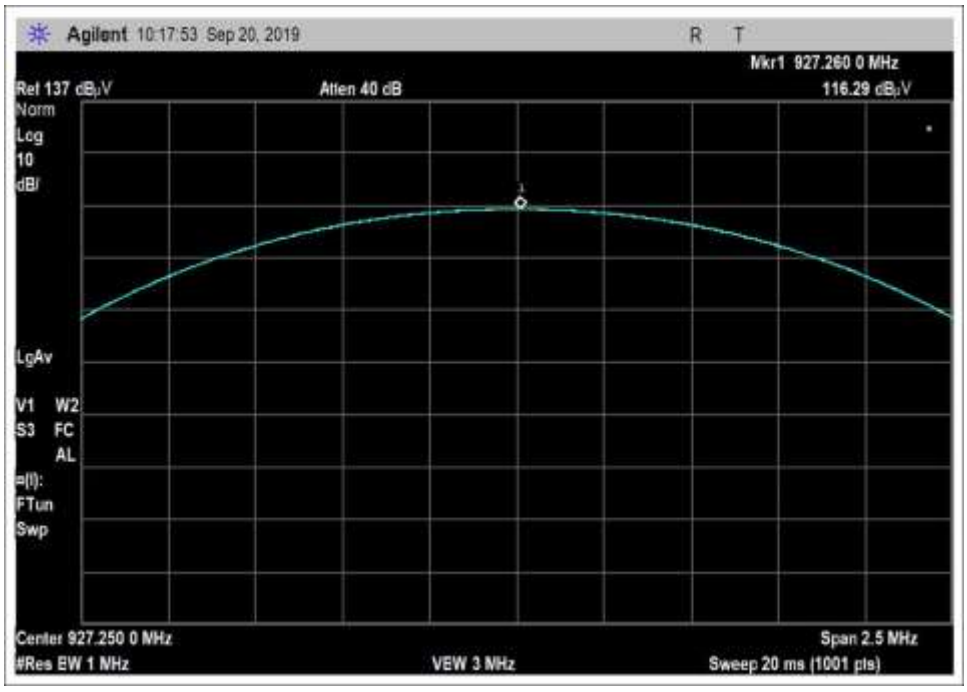
Plots



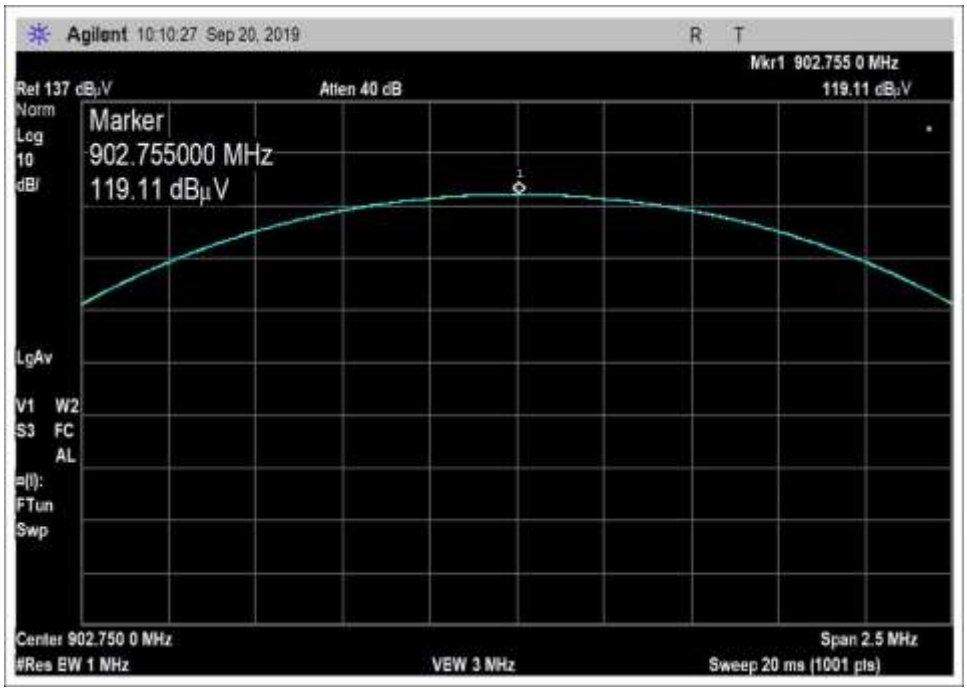
Configuration 1 Low Channel



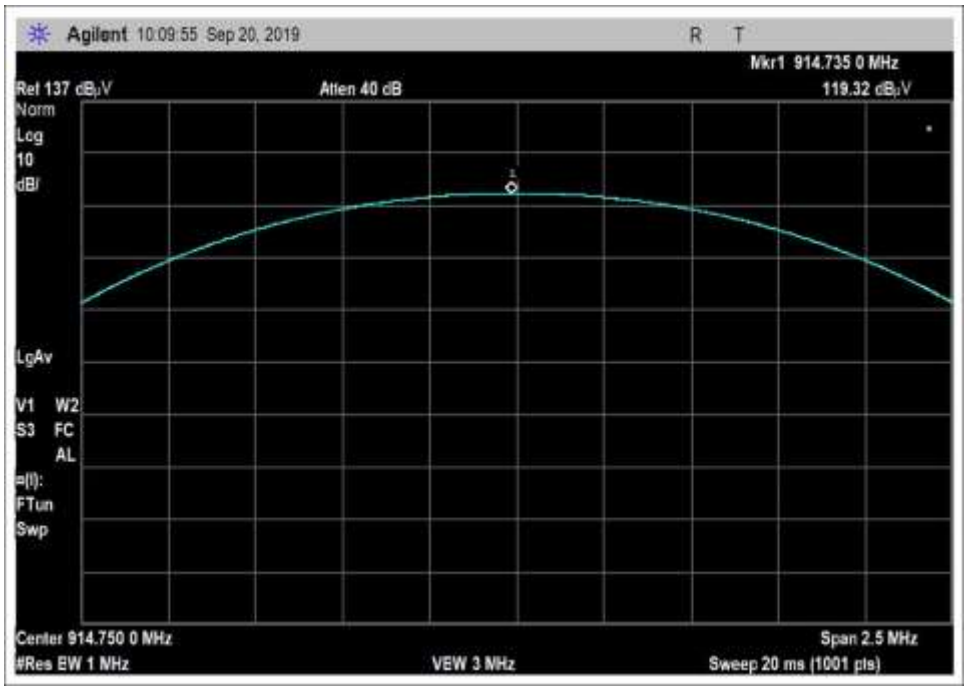
Configuration 1 Middle Channel



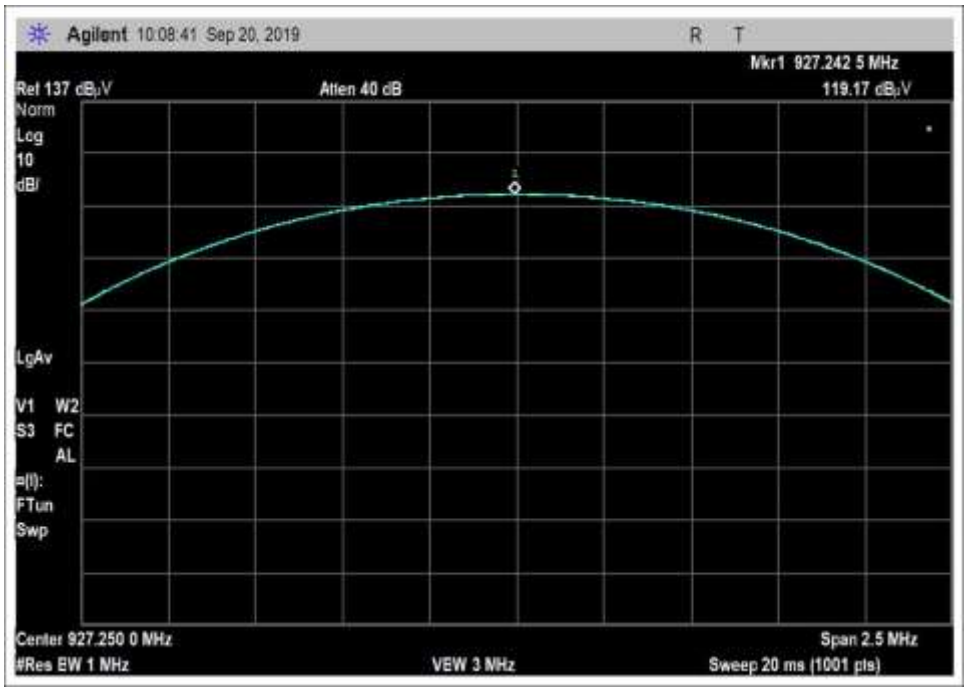
Configuration 1 High Channel



Configuration 9 Low Channel



Configuration 9 Middle Channel



Configuration 9 High Channel

Test Setup / Conditions / Data

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(b) Power Output (902-928 MHz FHSS >50 Channels)**		
Work Order #:	**103052**	Date:	10/1/2019
Test Type:	**Conducted Emissions**	Time:	09:12:24
Tested By:	Matthew Harrison	Sequence#:	27
Software:	EMITest 5.03.12		120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 902-928 MHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

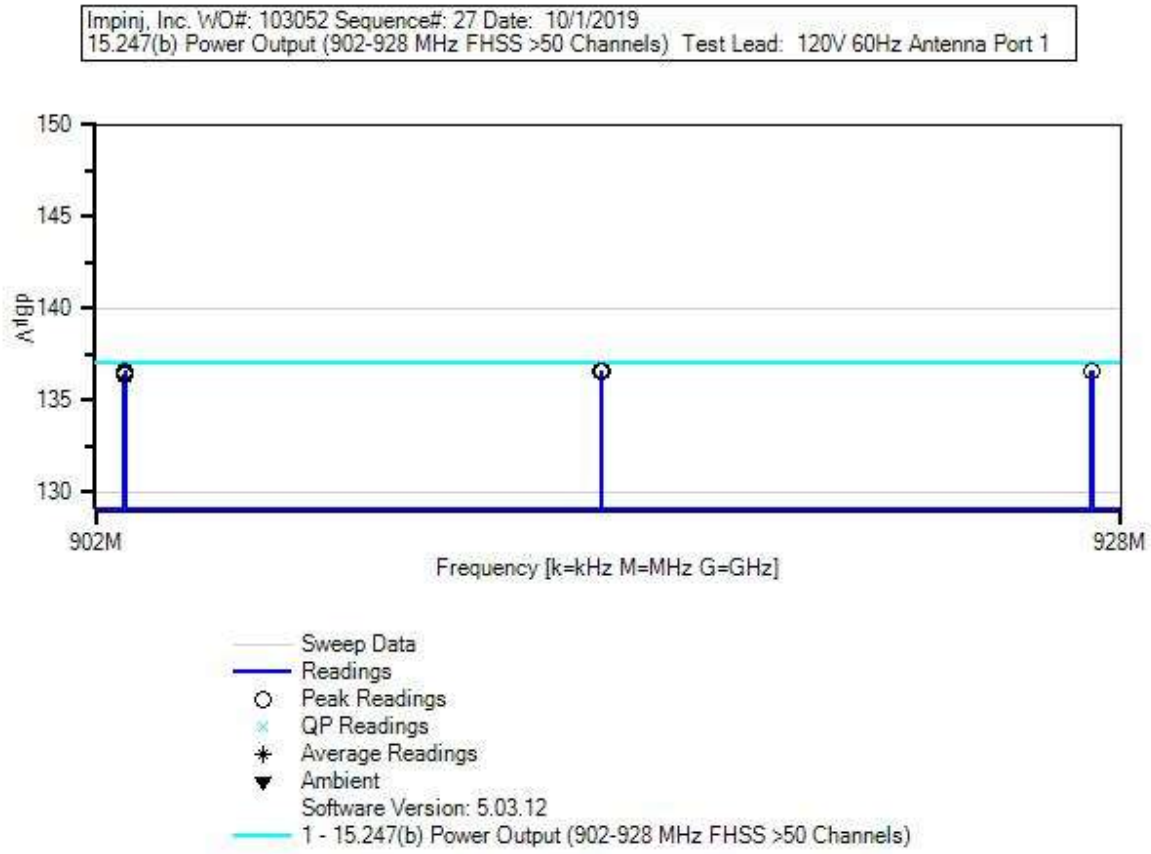
Antenna type: None
Antenna Gain: None

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set up for conducted measurements

A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop.


Impinj, Inc. WO#: 103052 Sequence#: 27 Date: 10/1/2019
15.247(b) Power Output (902-928 MHz FHSS >50 Channels) Test Lead: 120V 60Hz Antenna Port 1
150
145
140
135
130
dBµV
902M
928M
Frequency [k=kHz M=MHz G=GHz]
Sweep Data
Readings
Peak Readings
QP Readings
Average Readings
Ambient
Software Version: 5.03.12
1 - 15.247(b) Power Output (902-928 MHz FHSS >50 Channels)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05748	Attenuator	PE7004-20	4/24/2018	4/24/2020
T2	ANP07212	Cable	32026-29801-29801-18	8/7/2019	8/7/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

Measurement Data: Reading listed by margin. Test Lead: Antenna Port 1

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	902.738M	116.3	+20.0	+0.3			+0.0	136.6	137.0	-0.4	Anten
2	927.260M	116.3	+20.0	+0.3			+0.0	136.6	137.0	-0.4	Anten
3	914.753M	116.3	+20.0	+0.3			+0.0	136.6	137.0	-0.4	Anten
4	914.750M	116.3	+20.0	+0.3			+0.0	136.6	137.0 +15% VAC	-0.4	Anten
5	927.243M	116.3	+20.0	+0.3			+0.0	136.6	137.0 -15% VAC	-0.4	Anten
6	927.248M	116.3	+20.0	+0.3			+0.0	136.6	137.0 +15% VAC	-0.4	Anten
7	914.733M	116.3	+20.0	+0.3			+0.0	136.6	137.0 -15% VAC	-0.4	Anten
8	902.743M	116.2	+20.0	+0.3			+0.0	136.5	137.0 -15% VAC	-0.5	Anten
9	902.730M	116.1	+20.0	+0.3			+0.0	136.4	137.0 +15% VAC	-0.6	Anten

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(b) Power Output (902-928 MHz FHSS >50 Channels)**		
Work Order #:	**103052**	Date:	9/20/2019
Test Type:	**Conducted Emissions**	Time:	10:06:06
Tested By:	Matthew Harrison	Sequence#:	33
Software:	EMITest 5.03.12		120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 9			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 9			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 902-928 MHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 33dBm
Protocol /MCS/Modulation: Continuously modulated

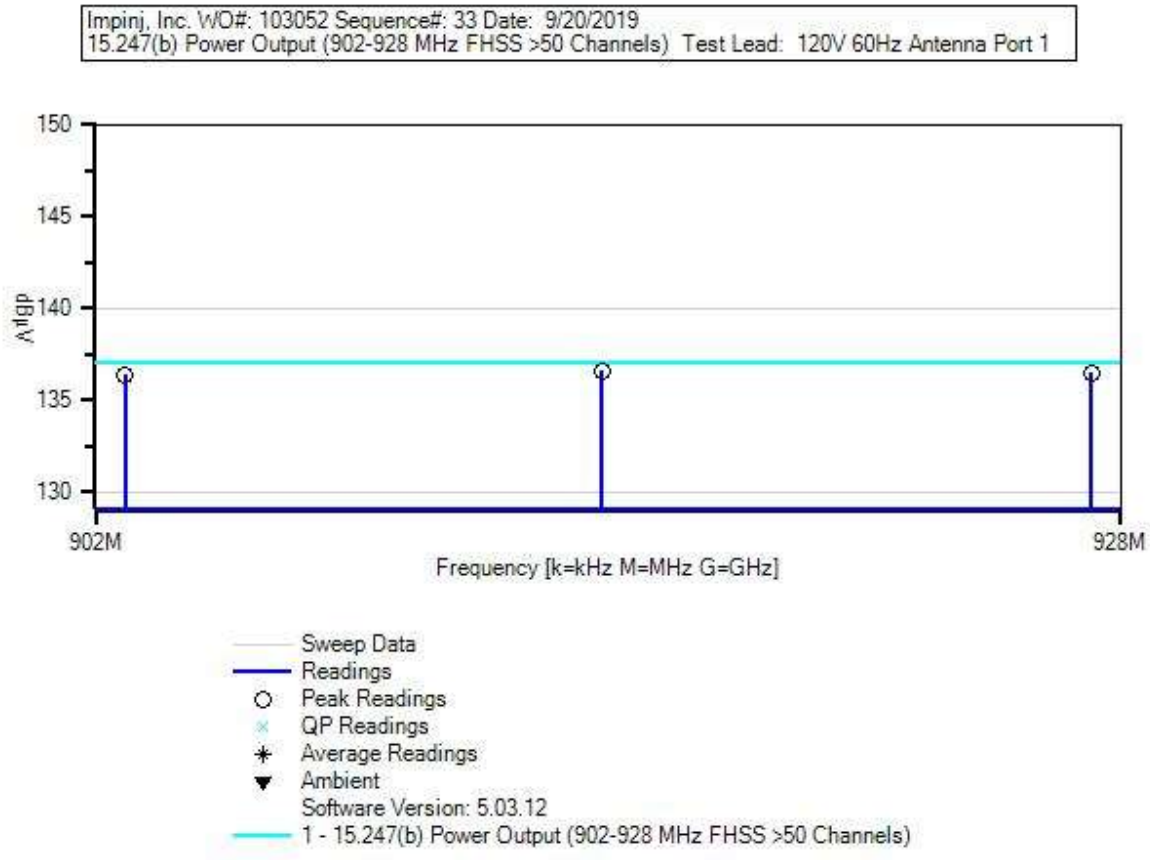
Antenna type: None
Antenna Gain: None

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set up for conducted measurements
A 3dB cable factor was used for measurements to account for declared loss.
The 33dBm setting only affects configuration 9.

A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05748	Attenuator	PE7004-20	4/24/2018	4/24/2020
T2	ANP07212	Cable	32026-29801-29801-18	8/7/2019	8/7/2021
T3	AN	Cable	Multiple	No Cal Required	No Cal Required
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

Measurement Data: Reading listed by margin. Test Lead: Antenna Port 1

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	914.735M	119.3	+20.0	+0.3	+3.0		+0.0	136.6	137.0	-0.4	Anten
2	927.243M	119.2	+20.0	+0.3	+3.0		+0.0	136.5	137.0	-0.5	Anten
3	902.755M	119.1	+20.0	+0.3	+3.0		+0.0	136.4	137.0	-0.6	Anten

Test Setup Photo(s)

15.247(d) RF Conducted Emissions & Band Edge

Test Setup / Conditions / Data

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**103052**	Date:	9/19/2019
Test Type:	**Conducted Emissions**	Time:	2:17:42 PM
Tested By:	Matthew Harrison	Sequence#:	28
Software:	EMITest 5.03.12		120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 9k-10GHz
Frequency tested: 902.75
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

Antenna type: None
Antenna Gain: None

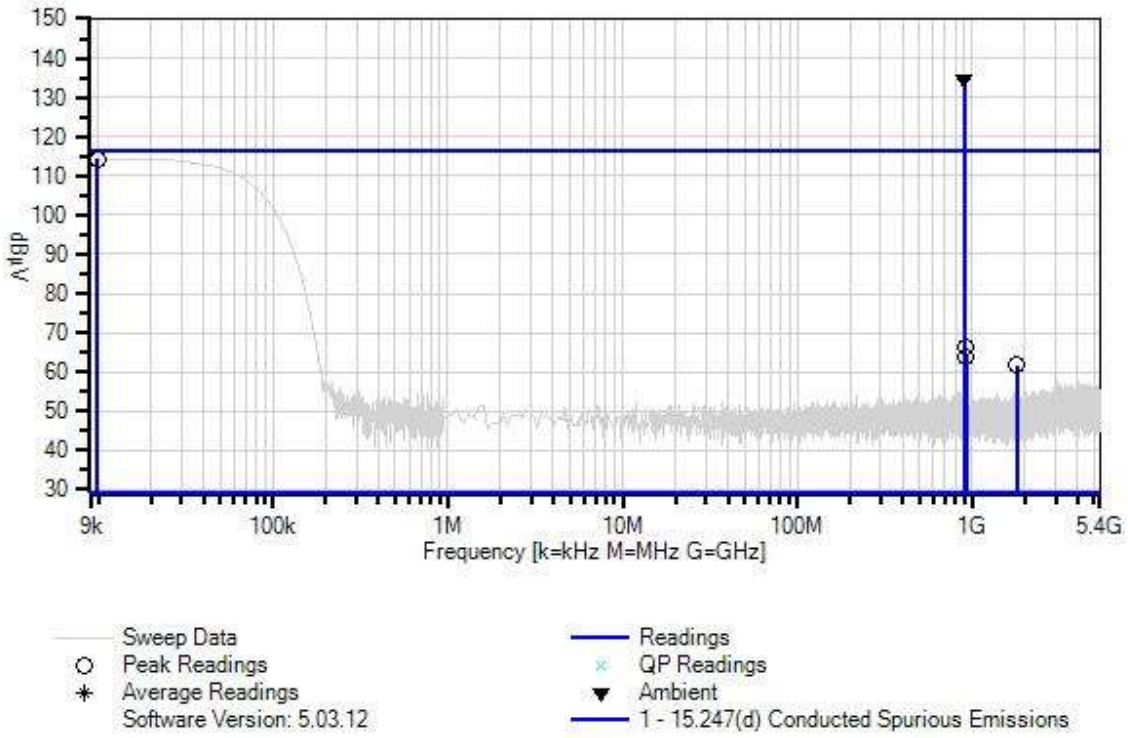
Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set up for conducted measurements

A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop.

Impinj, Inc. WO#: 103052 Sequence#: 28 Date: 9/19/2019
15.247(d) Conducted Spurious Emissions Test Lead: 120V 60Hz Antenna Port 1



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05748	Attenuator	PE7004-20	4/24/2018	4/24/2020
T2	ANP07212	Cable	32026-29801-29801-18	8/7/2019	8/7/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

Measurement Data: Reading listed by margin. Test Lead: Antenna Port 1

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	902.754M Ambient	114.3	+20.0	+0.3			+0.0	134.6	116.5	+18.1	Anten
2	9.922k	94.3	+20.0	+0.0			+0.0	114.3	116.5	-2.2	Anten
3	915.267M	45.8	+20.0	+0.3			+0.0	66.1	116.5	-50.4	Anten
4	927.779M	43.6	+20.0	+0.3			+0.0	63.9	116.5	-52.6	Anten
5	1805.456M	41.5	+20.0	+0.3			+0.0	61.8	116.5	-54.7	Anten
6	7669.214M	40.7	+20.2	+0.7			+0.0	61.6	116.5	-54.9	Anten
7	7702.247M	40.2	+20.2	+0.7			+0.0	61.1	116.5	-55.4	Anten
8	8449.193M	39.7	+20.2	+0.7			+0.0	60.6	116.5	-55.9	Anten
9	7763.008M	39.7	+20.2	+0.7			+0.0	60.6	116.5	-55.9	Anten
10	7008.754M	39.7	+20.1	+0.7			+0.0	60.5	116.5	-56.0	Anten
11	7026.772M	39.7	+20.1	+0.7			+0.0	60.5	116.5	-56.0	Anten
12	7701.646M	39.5	+20.2	+0.7			+0.0	60.4	116.5	-56.1	Anten
13	7065.111M	39.5	+20.1	+0.7			+0.0	60.3	116.5	-56.2	Anten
14	8694.939M	39.3	+20.2	+0.7			+0.0	60.2	116.5	-56.3	Anten
15	8571.315M	39.2	+20.2	+0.7			+0.0	60.1	116.5	-56.4	Anten

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**103052**	Date:	9/19/2019
Test Type:	**Conducted Emissions**	Time:	2:23:15 PM
Tested By:	Matthew Harrison	Sequence#:	29
Software:	EMITest 5.03.12		120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 9k-10GHz
Frequency tested: 914.75
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

Antenna type: None
Antenna Gain: None

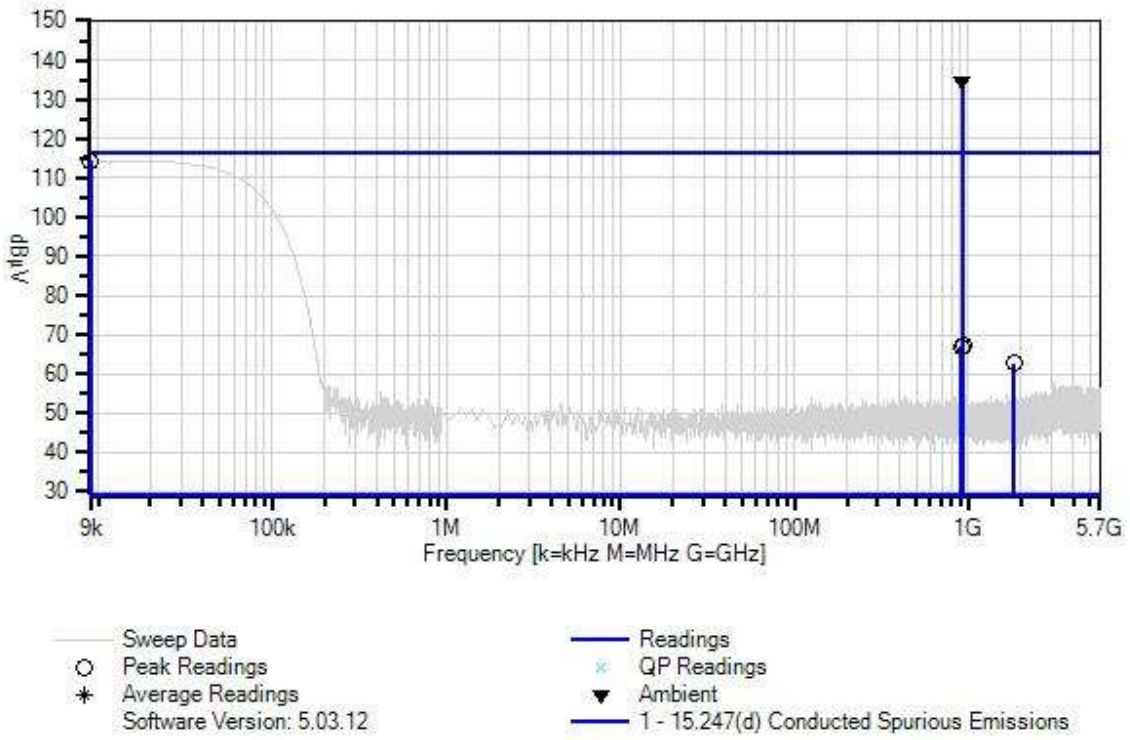
Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set up for conducted measurements

A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop.

Impinj, Inc. WO#: 103052 Sequence#: 29 Date: 9/19/2019
15.247(d) Conducted Spurious Emissions Test Lead: 120V 60Hz Antenna Port 1



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05748	Attenuator	PE7004-20	4/24/2018	4/24/2020
T2	ANP07212	Cable	32026-29801-29801-18	8/7/2019	8/7/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

Measurement Data: Reading listed by margin. Test Lead: Antenna Port 1

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	914.766M Ambient	114.2	+20.0	+0.3			+0.0	134.5	116.5	+18.0	Anten
2	9.000k	94.3	+20.0	+0.0			+0.0	114.3	116.5	-2.2	Anten
3	927.279M	46.8	+20.0	+0.3			+0.0	67.1	116.5	-49.4	Anten
4	902.254M	46.6	+20.0	+0.3			+0.0	66.9	116.5	-49.6	Anten
5	1829.480M	42.4	+20.0	+0.3			+0.0	62.7	116.5	-53.8	Anten
6	8500.044M	39.8	+20.2	+0.7			+0.0	60.7	116.5	-55.8	Anten
7	6957.303M	39.7	+20.1	+0.7			+0.0	60.5	116.5	-56.0	Anten
8	8491.435M	39.5	+20.2	+0.7			+0.0	60.4	116.5	-56.1	Anten
9	7602.948M	39.5	+20.2	+0.7			+0.0	60.4	116.5	-56.1	Anten
10	8509.253M	39.4	+20.2	+0.7			+0.0	60.3	116.5	-56.2	Anten
11	8534.679M	39.4	+20.2	+0.7			+0.0	60.3	116.5	-56.2	Anten
12	7818.964M	39.3	+20.2	+0.7			+0.0	60.2	116.5	-56.3	Anten
13	6856.202M	39.4	+20.0	+0.7			+0.0	60.1	116.5	-56.4	Anten
14	7571.016M	39.2	+20.2	+0.7			+0.0	60.1	116.5	-56.4	Anten
15	7601.747M	39.2	+20.2	+0.7			+0.0	60.1	116.5	-56.4	Anten

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**103052**	Date:	9/19/2019
Test Type:	**Conducted Emissions**	Time:	2:26:57 PM
Tested By:	Matthew Harrison	Sequence#:	30
Software:	EMITest 5.03.12		120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 9k-10GHz
Frequency tested: 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

Antenna type: None
Antenna Gain: None

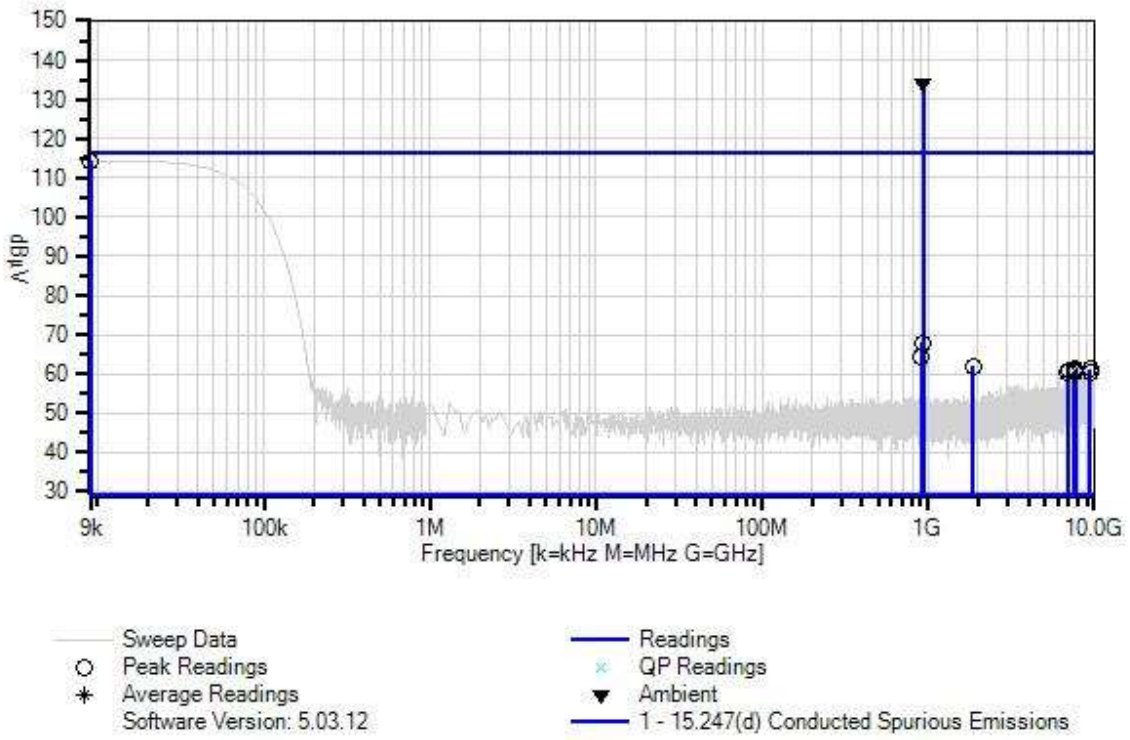
Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set up for conducted measurements

A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop.

Impinj, Inc. WO#: 103052 Sequence#: 30 Date: 9/19/2019
15.247(d) Conducted Spurious Emissions Test Lead: 120V 60Hz Antenna Port 1



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05748	Attenuator	PE7004-20	4/24/2018	4/24/2020
T2	ANP07212	Cable	32026-29801-29801-18	8/7/2019	8/7/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

Measurement Data: Reading listed by margin. Test Lead: Antenna Port 1

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	927.179M Ambient	113.7	+20.0	+0.3			+0.0	134.0	116.5	+17.5	Anten
2	9.000k	94.3	+20.0	+0.0			+0.0	114.3	116.5	-2.2	Anten
3	914.766M	47.7	+20.0	+0.3			+0.0	68.0	116.5	-48.5	Anten
4	902.254M	44.1	+20.0	+0.3			+0.0	64.4	116.5	-52.1	Anten
5	1854.505M	41.7	+20.0	+0.3			+0.0	62.0	116.5	-54.5	Anten
6	7712.958M	40.4	+20.2	+0.7			+0.0	61.3	116.5	-55.2	Anten
7	9396.139M	40.3	+20.2	+0.8			+0.0	61.3	116.5	-55.2	Anten
8	7692.537M	40.3	+20.2	+0.7			+0.0	61.2	116.5	-55.3	Anten
9	7007.953M	40.1	+20.1	+0.7			+0.0	60.9	116.5	-55.6	Anten
10	7669.114M	39.9	+20.2	+0.7			+0.0	60.8	116.5	-55.7	Anten
11	6998.644M	39.9	+20.1	+0.7			+0.0	60.7	116.5	-55.8	Anten
12	6910.456M	39.8	+20.1	+0.7			+0.0	60.6	116.5	-55.9	Anten
13	7598.243M	39.6	+20.2	+0.7			+0.0	60.5	116.5	-56.0	Anten
14	9442.786M	39.5	+20.2	+0.8			+0.0	60.5	116.5	-56.0	Anten
15	7653.899M	39.4	+20.2	+0.7			+0.0	60.3	116.5	-56.2	Anten

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**103052**	Date:	9/20/2019
Test Type:	**Conducted Emissions**	Time:	11:22:32 AM
Tested By:	Matthew Harrison	Sequence#:	36
Software:	EMITest 5.03.12		120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 9			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 9			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 9k-10GHz
Frequency tested: 902.75
Firmware power setting; 33dBm
Protocol /MCS/Modulation: Continuously modulated

Antenna type: None
Antenna Gain: None

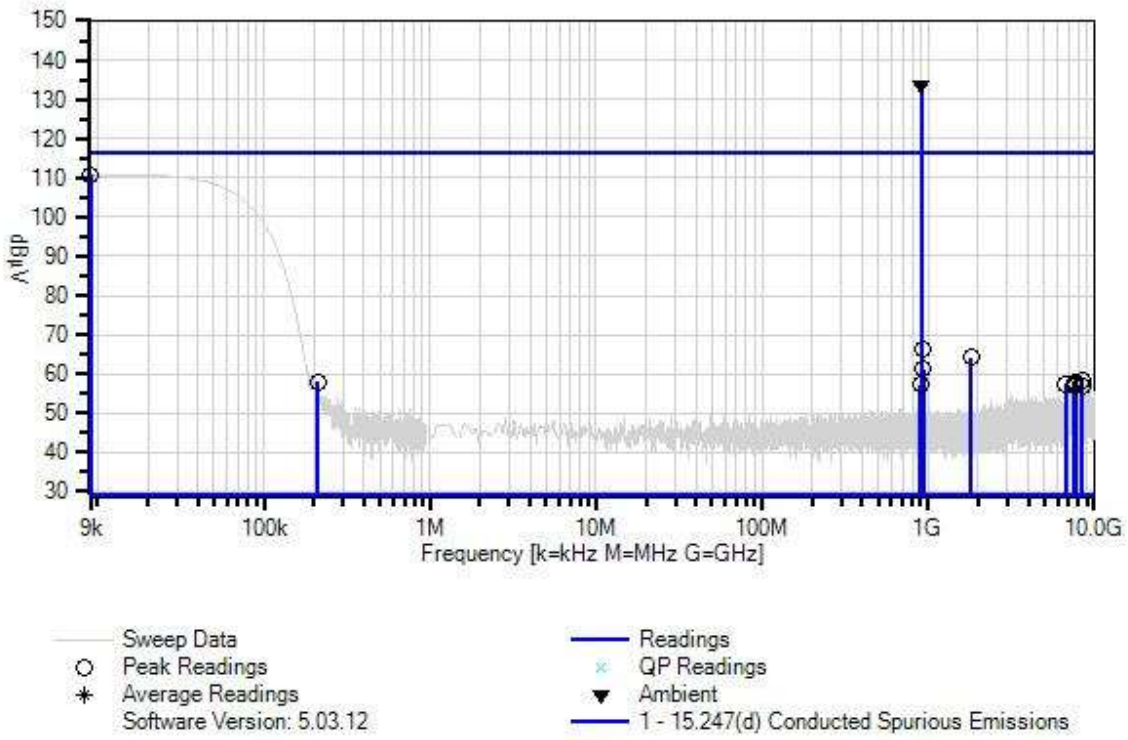
Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set up for conducted measurements
A 3dB cable factor was used for measurements to account for declared loss.
The 33dBm setting only affects configuration 9.

A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop.

Impinj, Inc. WO#: 103052 Sequence#: 36 Date: 9/20/2019
15.247(d) Conducted Spurious Emissions Test Lead: 120V 60Hz Antenna Port 1



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05748	Attenuator	PE7004-20	4/24/2018	4/24/2020
T2	ANP07212	Cable	32026-29801-29801-18	8/7/2019	8/7/2021
T3	AN	Cable	Multiple	No Cal Required	No Cal Required
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

Measurement Data: Reading listed by margin. Test Lead: Antenna Port 1

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	902.754M Ambient	116.5	+20.0	+0.3	+3.0		+0.0	133.8	116.5	+17.3	Anten
2	9.000k	93.8	+20.0	+0.0	+3.0		+0.0	110.8	116.5	-5.7	Anten
3	915.267M	48.9	+20.0	+0.3	+3.0		+0.0	66.2	116.5	-50.3	Anten
4	1805.556M	46.9	+20.0	+0.3	+3.0		+0.0	64.2	116.5	-52.3	Anten
5	927.779M	44.0	+20.0	+0.3	+3.0		+0.0	61.3	116.5	-55.2	Anten
6	8423.067M	40.7	+20.2	+0.7	+3.0		+0.0	58.6	116.5	-57.9	Anten
7	7707.352M	40.1	+20.2	+0.7	+3.0		+0.0	58.0	116.5	-58.5	Anten
8	210.251k	40.9	+20.0	+0.0	+3.0		+0.0	57.9	116.5	-58.6	Anten
9	6696.943M	39.9	+20.0	+0.7	+3.0		+0.0	57.6	116.5	-58.9	Anten
10	7657.502M	39.6	+20.2	+0.7	+3.0		+0.0	57.5	116.5	-59.0	Anten
11	890.242M	40.0	+20.0	+0.3	+3.0		+0.0	57.3	116.5	-59.2	Anten
12	7612.758M	39.4	+20.2	+0.7	+3.0		+0.0	57.3	116.5	-59.2	Anten
13	7620.265M	39.4	+20.2	+0.7	+3.0		+0.0	57.3	116.5	-59.2	Anten
14	7684.930M	39.2	+20.2	+0.7	+3.0		+0.0	57.1	116.5	-59.4	Anten
15	8463.307M	39.2	+20.2	+0.7	+3.0		+0.0	57.1	116.5	-59.4	Anten

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**103052**	Date:	9/20/2019
Test Type:	**Conducted Emissions**	Time:	11:30:23 AM
Tested By:	Matthew Harrison	Sequence#:	37
Software:	EMITest 5.03.12		120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 9			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 9			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 9k-10GHz
Frequency tested: 914.75
Firmware power setting; 33dBm
Protocol /MCS/Modulation: Continuously modulated

Antenna type: None
Antenna Gain: None

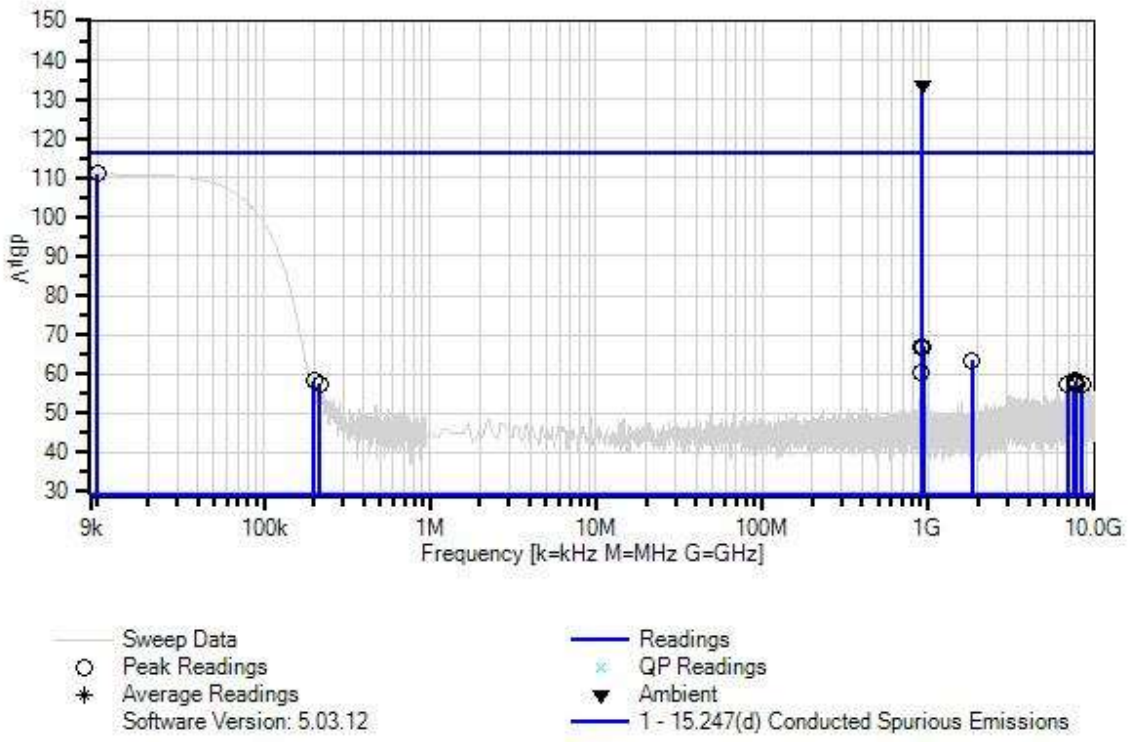
Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set up for conducted measurements
A 3dB cable factor was used for measurements to account for declared loss.
The 33dBm setting only affects configuration 9.

A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop.

Impinj, Inc. WO#: 103052 Sequence#: 37 Date: 9/20/2019
15.247(d) Conducted Spurious Emissions Test Lead: 120V 60Hz Antenna Port 1



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05748	Attenuator	PE7004-20	4/24/2018	4/24/2020
T2	ANP07212	Cable	32026-29801-29801-18	8/7/2019	8/7/2021
T3	AN	Cable	Multiple	No Cal Required	No Cal Required
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

Measurement Data: Reading listed by margin. Test Lead: Antenna Port 1

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	914.766M Ambient	116.2	+20.0	+0.3	+3.0		+0.0	133.5	116.5	+17.0	Anten
2	9.923k	94.0	+20.0	+0.0	+3.0		+0.0	111.0	116.5	-5.5	Anten
3	902.254M	49.7	+20.0	+0.3	+3.0		+0.0	67.0	116.5	-49.5	Anten
4	927.279M	49.6	+20.0	+0.3	+3.0		+0.0	66.9	116.5	-49.6	Anten
5	1829.480M	46.3	+20.0	+0.3	+3.0		+0.0	63.6	116.5	-52.9	Anten
6	913.265M	43.1	+20.0	+0.3	+3.0		+0.0	60.4	116.5	-56.1	Anten
7	7651.596M	40.4	+20.2	+0.7	+3.0		+0.0	58.3	116.5	-58.2	Anten
8	201.019k	41.3	+20.0	+0.0	+3.0		+0.0	58.3	116.5	-58.2	Anten
9	7718.363M	39.9	+20.2	+0.7	+3.0		+0.0	57.8	116.5	-58.7	Anten
10	217.636k	40.6	+20.0	+0.0	+3.0		+0.0	57.6	116.5	-58.9	Anten
11	6900.846M	39.6	+20.1	+0.7	+3.0		+0.0	57.4	116.5	-59.1	Anten
12	8469.113M	39.5	+20.2	+0.7	+3.0		+0.0	57.4	116.5	-59.1	Anten
13	7558.403M	39.4	+20.2	+0.7	+3.0		+0.0	57.3	116.5	-59.2	Anten
14	7807.953M	39.3	+20.2	+0.7	+3.0		+0.0	57.2	116.5	-59.3	Anten
15	8475.019M	39.3	+20.2	+0.7	+3.0		+0.0	57.2	116.5	-59.3	Anten

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**103052**	Date:	9/20/2019
Test Type:	**Conducted Emissions**	Time:	11:35:53 AM
Tested By:	Matthew Harrison	Sequence#:	38
Software:	EMITest 5.03.12		120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 9			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 9			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 9kHz-10GHz
Frequency tested: 927.25
Firmware power setting; 33dBm
Protocol /MCS/Modulation: Continuously modulated

Antenna type: None
Antenna Gain: None

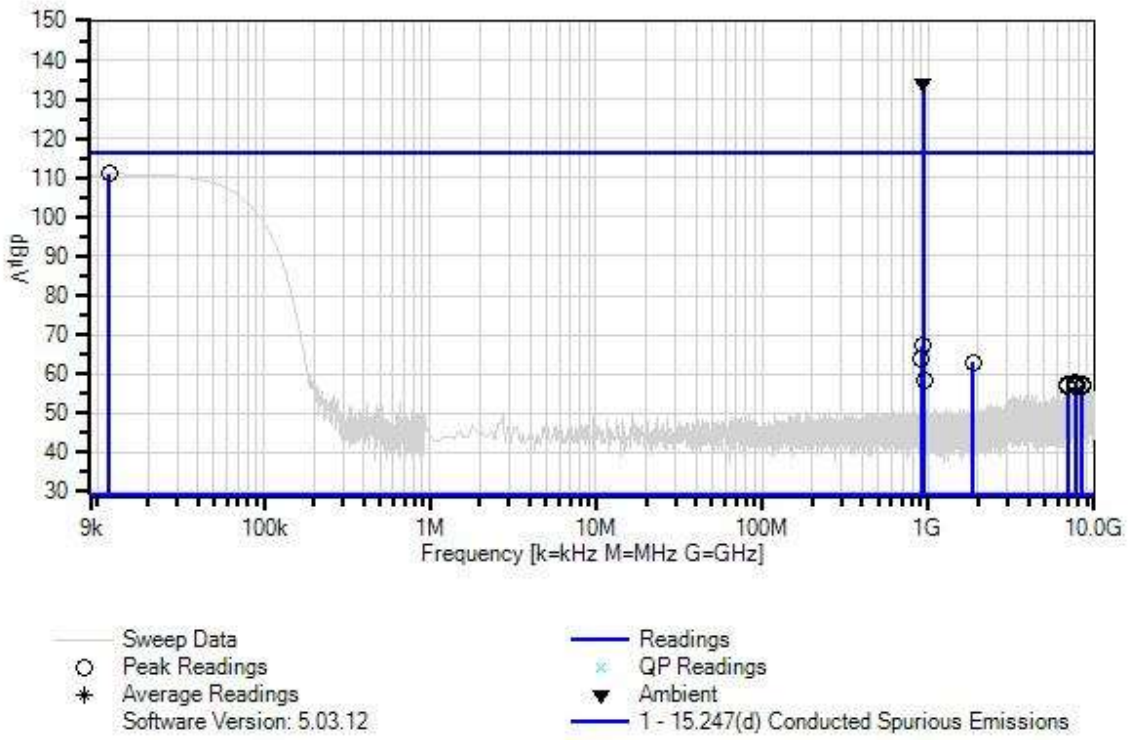
Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set up for conducted measurements
A 3dB cable factor was used for measurements to account for declared loss.
The 33dBm setting only affects configuration 9.

A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop.

Impinj, Inc. WO#: 103052 Sequence#: 38 Date: 9/20/2019
15.247(d) Conducted Spurious Emissions Test Lead: 120V 60Hz Antenna Port 1



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05748	Attenuator	PE7004-20	4/24/2018	4/24/2020
T2	ANP07212	Cable	32026-29801-29801-18	8/7/2019	8/7/2021
T3	AN	Cable	Multiple	No Cal Required	No Cal Required
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

Measurement Data: Reading listed by margin. Test Lead: Antenna Port 1

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	927.279M Ambient	116.9	+20.0	+0.3	+3.0		+0.0	134.2	116.5	+17.7	Anten
2	11.769k	94.0	+20.0	+0.0	+3.0		+0.0	111.0	116.5	-5.5	Anten
3	914.766M	49.9	+20.0	+0.3	+3.0		+0.0	67.2	116.5	-49.3	Anten
4	902.254M	46.7	+20.0	+0.3	+3.0		+0.0	64.0	116.5	-52.5	Anten
5	1854.505M	45.8	+20.0	+0.3	+3.0		+0.0	63.1	116.5	-53.4	Anten
6	939.791M	40.9	+20.0	+0.3	+3.0		+0.0	58.2	116.5	-58.3	Anten
7	7732.878M	39.9	+20.2	+0.7	+3.0		+0.0	57.8	116.5	-58.7	Anten
8	7722.768M	39.6	+20.2	+0.7	+3.0		+0.0	57.5	116.5	-59.0	Anten
9	7813.758M	39.5	+20.2	+0.7	+3.0		+0.0	57.4	116.5	-59.1	Anten
10	6938.684M	39.5	+20.1	+0.7	+3.0		+0.0	57.3	116.5	-59.2	Anten
11	8428.473M	39.4	+20.2	+0.7	+3.0		+0.0	57.3	116.5	-59.2	Anten
12	6910.156M	39.3	+20.1	+0.7	+3.0		+0.0	57.1	116.5	-59.4	Anten
13	7684.129M	39.2	+20.2	+0.7	+3.0		+0.0	57.1	116.5	-59.4	Anten
14	7746.992M	39.1	+20.2	+0.7	+3.0		+0.0	57.0	116.5	-59.5	Anten
15	8396.741M	39.1	+20.2	+0.7	+3.0		+0.0	57.0	116.5	-59.5	Anten

Band Edge

Band Edge Summary				
Configuration 1 Limit applied: Max Power/100kHz - 20dB. Operating Mode: Single Channel (Low and High)				
Frequency (MHz)	**Modulation**	**Measured (dBm)**	**Limit (dBm)**	**Results**
902	ASK	-30	<9.5	Pass
928	ASK	-32.4	<9.5	Pass

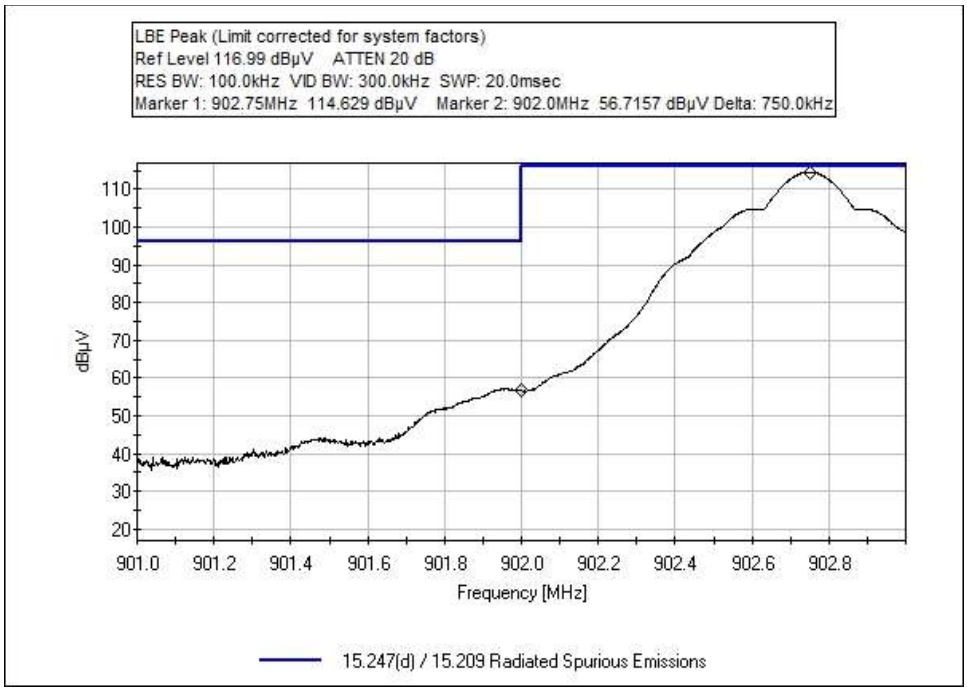
Band Edge Summary				
Configuration 1 Limit applied: Max Power/100kHz - 20dB. Operating Mode: Hopping				
Frequency (MHz)	**Modulation**	**Measured (dBm)**	**Limit (dBm)**	**Results**
902	ASK	-30.4	<9.5	Pass
928	ASK	-32	<9.5	Pass

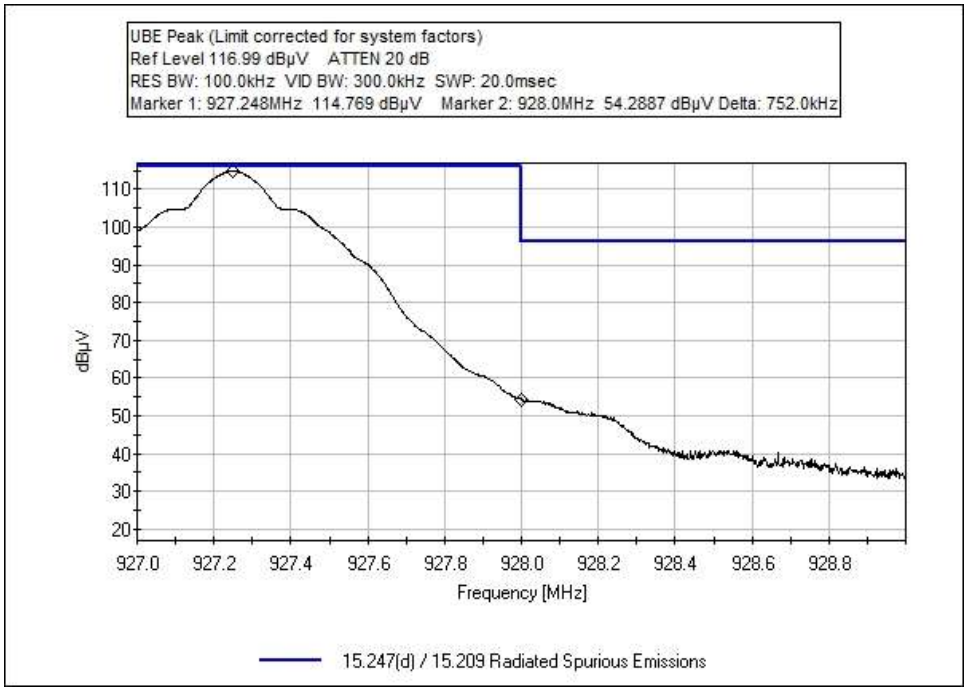
Band Edge Summary				
Configuration 9 Limit applied: Max Power/100kHz - 20dB. Operating Mode: Single Channel (Low and High)				
Frequency (MHz)	**Modulation**	**Measured (dBm)**	**Limit (dBm)**	**Results**
902	ASK	-31.5	<9.5	Pass
928	ASK	-31.9	<9.5	Pass

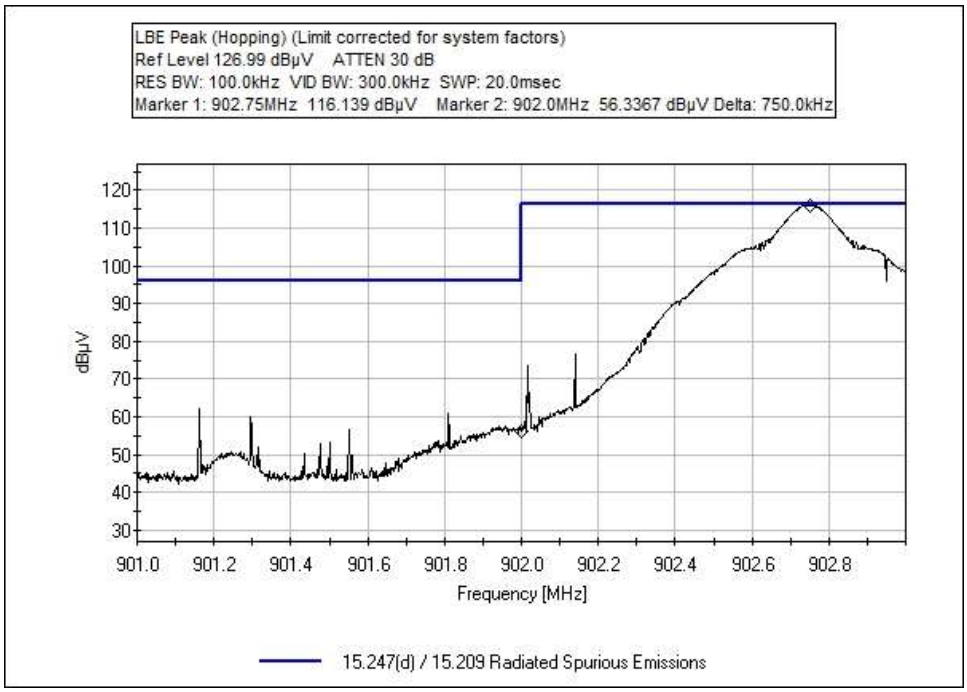
Band Edge Summary				
Configuration 9 Limit applied: Max Power/100kHz - 20dB. Operating Mode: Hopping				
Frequency (MHz)	**Modulation**	**Measured (dBm)**	**Limit (dBm)**	**Results**
902	ASK	-28.9	<9.5	Pass
928	ASK	-30.9	<9.5	Pass

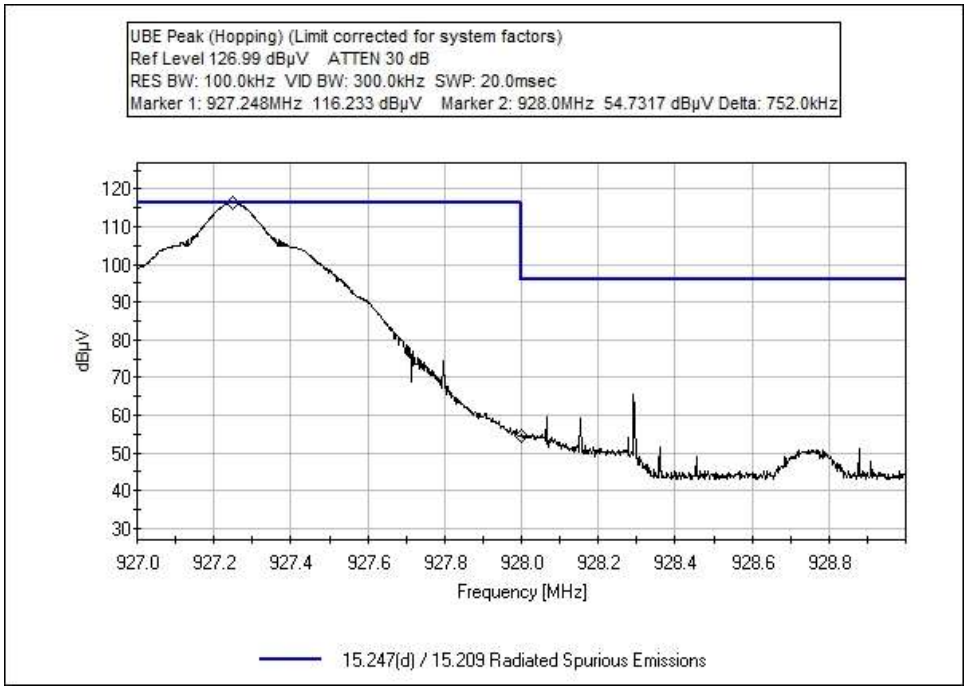
Band Edge Plots

Configuration 1

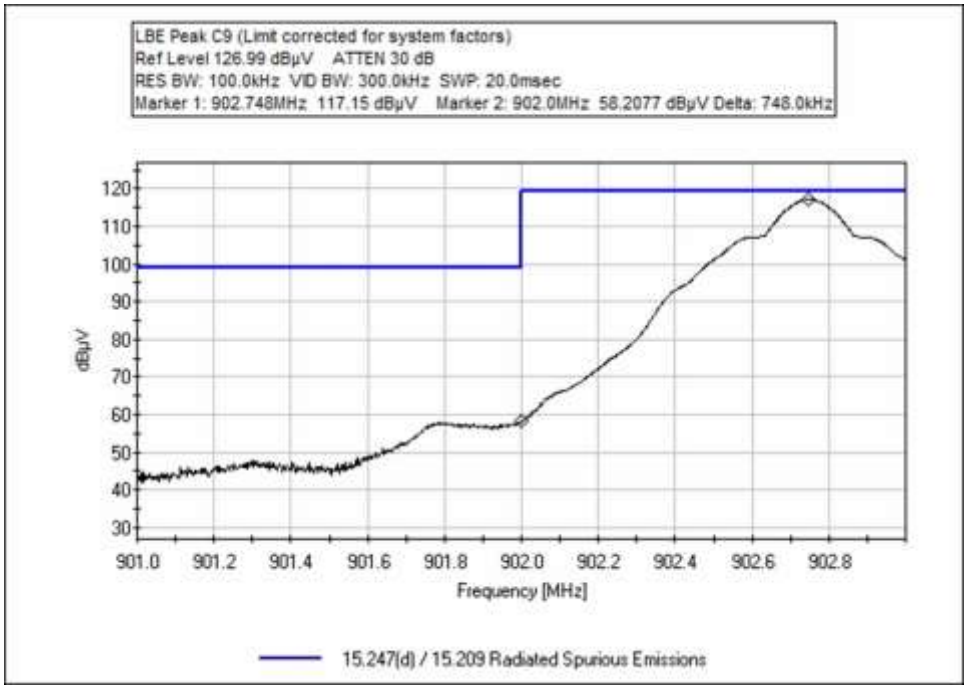


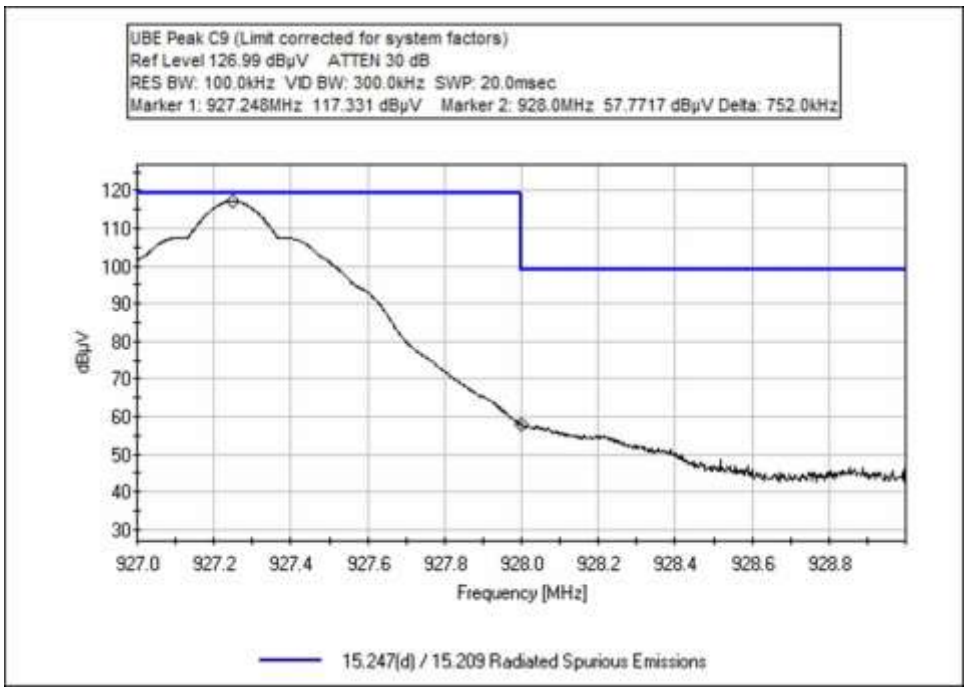


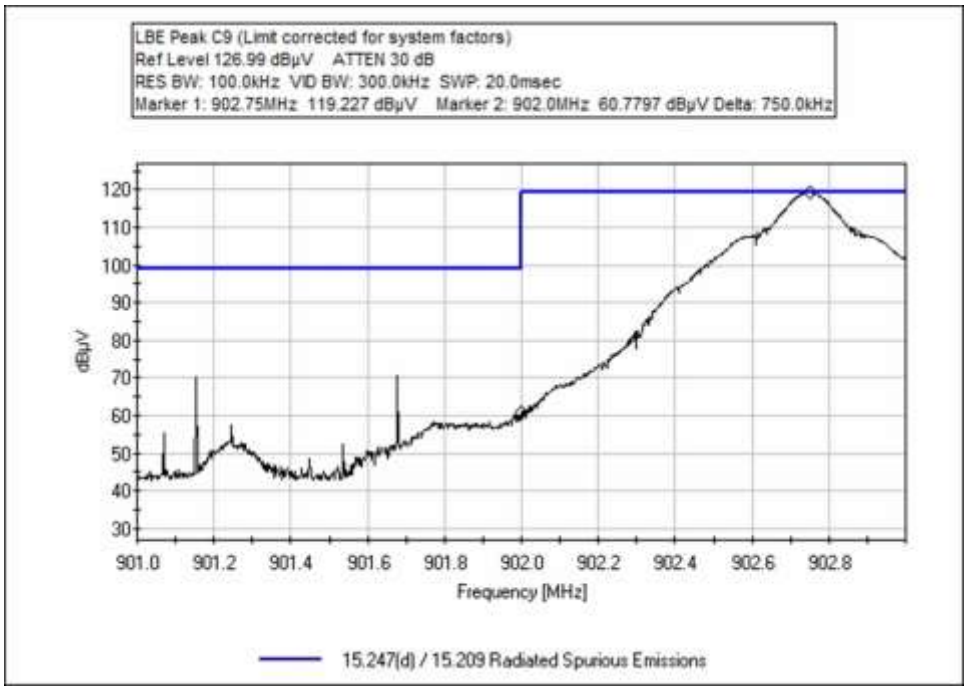

LBE Peak (Hopping) (Limit corrected for system factors)
Ref Level 126.99 dBµV ATTEN 30 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker 1: 902.75MHz 116.139 dBµV Marker 2: 902.0MHz 56.3367 dBµV Delta: 750.0kHz
dBµV
120
110
100
90
80
70
60
50
40
30
901.0
901.2
901.4
901.6
901.8
902.0
902.2
902.4
902.6
902.8
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


UBE Peak (Hopping) (Limit corrected for system factors)
Ref Level 126.99 dBµV ATTEN 30 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker 1: 927.248MHz 116.233 dBµV Marker 2: 928.0MHz 54.7317 dBµV Delta: 752.0kHz
dBµV
120
110
100
90
80
70
60
50
40
30
927.0
927.2
927.4
927.6
927.8
928.0
928.2
928.4
928.6
928.8
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

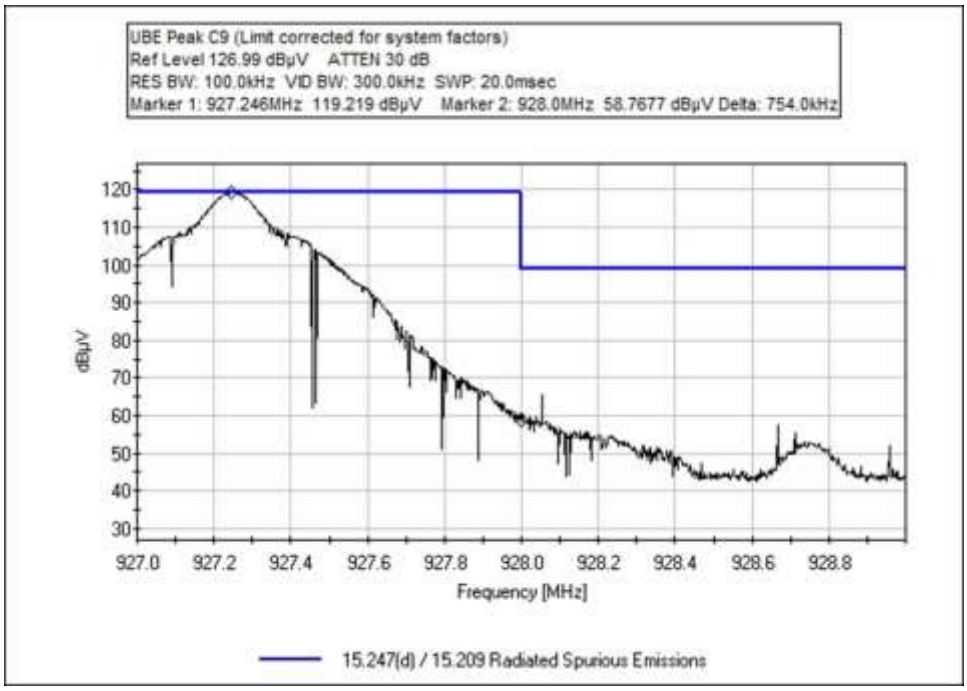
Configuration 9







Hopping



Hopping

Test Setup / Conditions / Data

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**103052**	Date:	9/19/2019
Test Type:	**Conducted Emissions**	Time:	15:31:13
Tested By:	Matthew Harrison	Sequence#:	31
Software:	EMITest 5.03.12		120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 902-928 MHz
Frequency tested: 902.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

Antenna type: None
Antenna Gain: None

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set up for conducted measurements

A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop.

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05748	Attenuator	PE7004-20	4/24/2018	4/24/2020
T2	ANP07212	Cable	32026-29801-29801-18	8/7/2019	8/7/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

Measurement Data: Reading listed by margin. Test Lead: Antenna Port 1

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	927.248M	114.8	+20.0	+0.3			+0.0	135.1	136.5	-1.4	Anten
2	902.750M	114.6	+20.0	+0.3			+0.0	134.9	136.5	-1.6	Anten
3	902.000M	56.7	+20.0	+0.3			+0.0	77.0	116.5	-39.5	Anten
4	928.000M	54.3	+20.0	+0.3			+0.0	74.6	116.5	-41.9	Anten

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**103052**	Date:	9/19/2019
Test Type:	**Conducted Emissions**	Time:	16:22:41
Tested By:	Matthew Harrison	Sequence#:	32
Software:	EMITest 5.03.12		120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 902-928 MHz
Frequency tested: 902.75, 927.25 **Hopping**

Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

Antenna type: None
Antenna Gain: None

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set up for conducted measurements

A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop.

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05748	Attenuator	PE7004-20	4/24/2018	4/24/2020
T2	ANP07212	Cable	32026-29801-29801-18	8/7/2019	8/7/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

Measurement Data: Reading listed by margin. Test Lead: Antenna Port 1

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	927.248M	116.2	+20.0	+0.3			+0.0	136.5	136.5	+0.0	Anten
2	902.750M	116.1	+20.0	+0.3			+0.0	136.4	136.5	-0.1	Anten
3	902.000M	56.3	+20.0	+0.3			+0.0	76.6	116.5	-39.9	Anten
4	928.000M	54.7	+20.0	+0.3			+0.0	75.0	116.5	-41.5	Anten

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**103052**	Date:	9/20/2019
Test Type:	**Conducted Emissions**	Time:	11:06:26
Tested By:	Matthew Harrison	Sequence#:	35
Software:	EMITest 5.03.12		120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 9			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 9			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 902-928 MHz
Frequency tested: 902.75, 927.25
Firmware power setting; 33dBm
Protocol /MCS/Modulation: Continuously modulated

Antenna type: None
Antenna Gain: None

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set up for conducted measurements
A 3dB cable factor was used for measurements to account for declared loss.
The 33dBm setting only affects configuration 9.

A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop.

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05748	Attenuator	PE7004-20	4/24/2018	4/24/2020
T2	ANP07212	Cable	32026-29801-29801-18	8/7/2019	8/7/2021
T3	AN	Cable	Multiple	No Cal Required	No Cal Required
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

Measurement Data: Reading listed by margin. Test Lead: Antenna Port 1

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	927.248M	117.3	+20.0	+0.3	+3.0		+0.0	134.6	136.5	-1.9	Anten
2	902.748M	117.2	+20.0	+0.3	+3.0		+0.0	134.4	136.5	-2.1	Anten
3	902.000M	58.2	+20.0	+0.3	+3.0		+0.0	75.5	116.5	-41.0	Anten
4	928.000M	57.8	+20.0	+0.3	+3.0		+0.0	75.1	116.5	-41.4	Anten

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**103052**	Date:	9/20/2019
Test Type:	**Conducted Emissions**	Time:	10:51:22
Tested By:	Matthew Harrison	Sequence#:	34
Software:	EMITest 5.03.12		120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 9			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 9			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 902-928 MHz
Frequency tested: 902.75, 927.25 **Hopping**

Firmware power setting; 33dBm
Protocol /MCS/Modulation: Continuously modulated

Antenna type: None
Antenna Gain: None

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set up for conducted measurements
A 3dB cable factor was used for measurements to account for declared loss.
The 33dBm setting only affects configuration 9.

A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop.

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05748	Attenuator	PE7004-20	4/24/2018	4/24/2020
T2	ANP07212	Cable	32026-29801-29801-18	8/7/2019	8/7/2021
T3	AN	Cable	Multiple	No Cal Required	No Cal Required
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

Measurement Data: Reading listed by margin. Test Lead: Antenna Port 1

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	902.750M	119.2	+20.0	+0.3	+3.0		+0.0	136.5	136.5	+0.0	Anten
2	927.246M	119.2	+20.0	+0.3	+3.0		+0.0	136.5	136.5	+0.0	Anten
3	902.000M	60.8	+20.0	+0.3	+3.0		+0.0	78.1	116.5	-38.4	Anten
4	928.000M	58.8	+20.0	+0.3	+3.0		+0.0	76.1	116.5	-40.4	Anten

Test Setup Photo(s)

15.247(d) Radiated Emissions & Band Edge

Test Setup / Conditions / Data

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/30/2019
Test Type:	**Maximized Emissions**	Time:	09:28:57
Tested By:	Matthew Harrison	Sequence#:	55
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

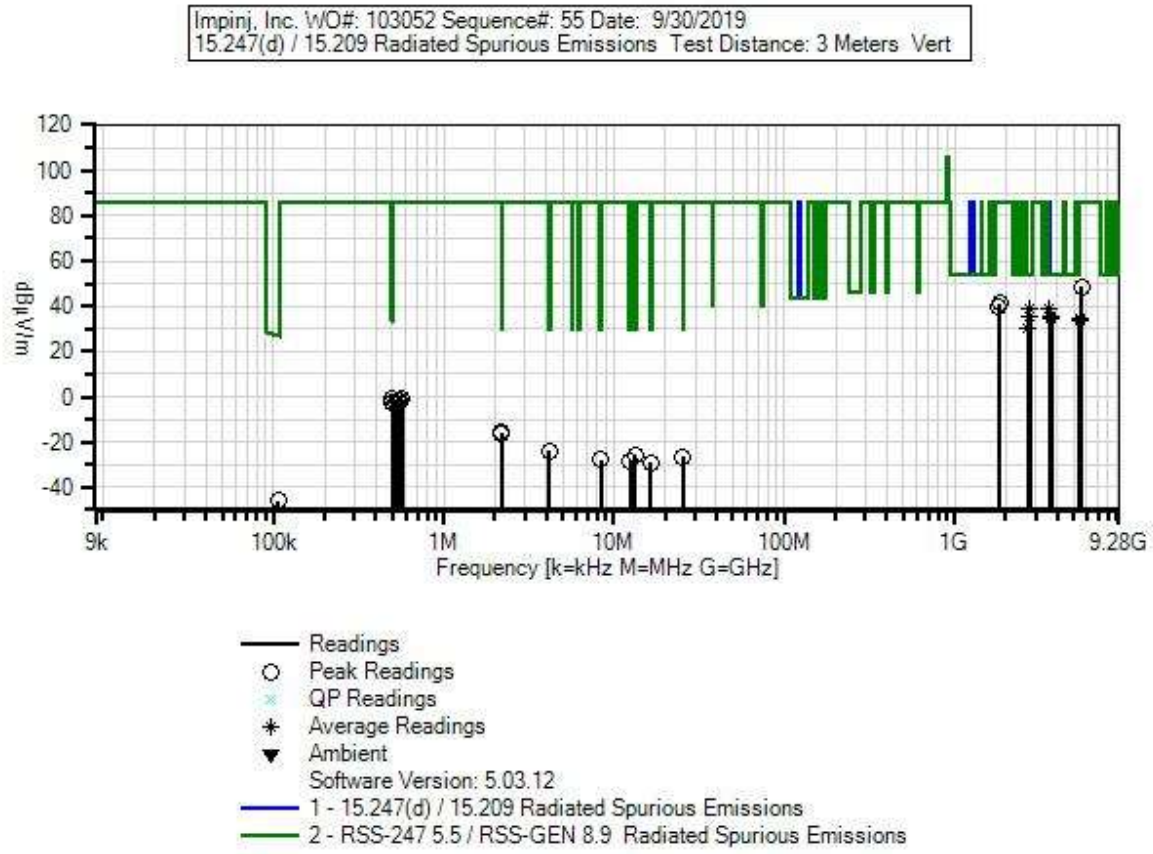
Frequency Range: 9kHz-30MHz and 1-10GHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated
Transmit

Antenna type: Mini-Guardrail Antenna
Antenna Gain: -20dBi
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 5-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.


Impinj, Inc. WO#: 103052 Sequence#: 55 Date: 9/30/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert
120
100
80
60
40
20
0
-20
-40
dBµV/m
9k
100k
1M
10M
100M
1G
9.28G
Frequency [k=kHz M=MHz G=GHz]
Readings
Peak Readings
QP Readings
Average Readings
Ambient
Software Version: 5.03.12
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
2 - RSS-247 5.5 / RSS-GEN 8.9 Radiated Spurious Emissions

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021
	AN00052	Loop Antenna	6502	5/7/2018	5/7/2020
T2	ANP06515	Cable	Heliax	6/29/2018	6/29/2020
T3	AN03540	Preamp	83017A	5/13/2019	5/13/2021
T4	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	7/5/2019	7/5/2021
T5	ANP06503	Cable	32026-29801-29801-36	3/13/2018	3/13/2020
T6	AN03170	High Pass Filter	HM1155-11SS	11/27/2017	11/27/2019

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	2744.210M	40.0	+0.7	+2.6	-34.1	+28.4	+0.0	39.3	54.0	-14.7	Vert
	Ave		+1.1	+0.6							
^	2744.210M	48.4	+0.7	+2.6	-34.1	+28.4	+0.0	47.7	54.0	-6.3	Vert
			+1.1	+0.6							
3	3611.140M	35.5	+0.8	+3.6	-33.8	+30.3	+0.0	38.5	54.0	-15.5	Vert
	Ave		+1.3	+0.8							
^	3611.140M	45.0	+0.8	+3.6	-33.8	+30.3	+0.0	48.0	54.0	-6.0	Vert
			+1.3	+0.8							
5	3658.885M	31.6	+0.9	+3.7	-33.7	+30.5	+0.0	35.2	54.0	-18.8	Vert
	Ave		+1.3	+0.9							
^	3658.885M	42.1	+0.9	+3.7	-33.7	+30.5	+0.0	45.7	54.0	-8.3	Vert
			+1.3	+0.9							
7	2781.670M	35.7	+0.7	+2.6	-34.1	+28.5	+0.0	35.1	54.0	-18.9	Vert
	Ave		+1.1	+0.6							
^	2781.670M	46.1	+0.7	+2.6	-34.1	+28.5	+0.0	45.5	54.0	-8.5	Vert
			+1.1	+0.6							
9	3709.175M	31.1	+0.9	+3.8	-33.7	+30.6	+0.0	34.9	54.0	-19.1	Vert
	Ave		+1.3	+0.9							
^	3709.175M	42.5	+0.9	+3.8	-33.7	+30.6	+0.0	46.3	54.0	-7.7	Vert
			+1.3	+0.9							
11	5416.295M	26.0	+1.0	+4.5	-33.7	+33.4	+0.0	34.0	54.0	-20.0	Vert
	Ave		+1.8	+1.0							
^	5416.295M	39.3	+1.0	+4.5	-33.7	+33.4	+0.0	47.3	54.0	-6.7	Vert
			+1.8	+1.0							
13	2708.205M	30.9	+0.7	+2.6	-34.1	+28.3	+0.0	30.1	54.0	-23.9	Vert
	Ave		+1.1	+0.6							
^	2708.205M	42.8	+0.7	+2.6	-34.1	+28.3	+0.0	42.0	54.0	-12.0	Vert
			+1.1	+0.6							
15	501.237k	39.1	+0.0	+0.0	+0.0	+0.0	-40.0	-0.9	33.6	-34.5	Para
			+0.0	+0.0							
16	497.056k	37.6	+0.0	+0.0	+0.0	+0.0	-40.0	-2.4	33.7	-36.1	Para
			+0.0	+0.0							

17	5563.345M	40.5	+1.0 +1.8	+4.5 +0.7	-33.7	+33.7	+0.0	48.5	86.0	-37.5	Vert
18	1854.595M	45.4	+0.5 +0.7	+2.3 +0.7	-34.7	+26.5	+0.0	41.4	86.0	-44.6	Vert
19	2.174M	24.2	+0.0 +0.0	+0.1 +0.0	+0.0	+0.0	-40.0	-15.7	29.5	-45.2	Para
20	2.184M	23.7	+0.0 +0.0	+0.1 +0.0	+0.0	+0.0	-40.0	-16.2	29.5	-45.7	Para
21	1829.250M	44.4	+0.5 +0.7	+2.3 +0.7	-34.8	+26.3	+0.0	40.1	86.0	-45.9	Vert
22	5488.205M Ave	26.2	+1.0 +1.8	+4.5 +0.9	-33.7	+33.5	+0.0	34.2	86.0	-51.8	Vert
^	5488.205M	40.5	+1.0 +1.8	+4.5 +0.9	-33.7	+33.5	+0.0	48.5	86.0	-37.5	Vert
24	4.178M	15.8	+0.0 +0.0	+0.1 +0.0	+0.0	+0.0	-40.0	-24.1	29.5	-53.6	Para
25	13.394M	13.9	+0.0 +0.0	+0.2 +0.0	+0.0	+0.0	-40.0	-25.9	29.5	-55.4	Para
26	25.529M	13.1	+0.1 +0.1	+0.3 +0.0	+0.0	+0.0	-40.0	-26.4	29.5	-55.9	Para
27	8.385M	12.1	+0.0 +0.0	+0.1 +0.0	+0.0	+0.0	-40.0	-27.8	29.5	-57.3	Para
28	12.520M	11.6	+0.0 +0.0	+0.2 +0.0	+0.0	+0.0	-40.0	-28.2	29.5	-57.7	Para
29	16.421M	10.8	+0.1 +0.0	+0.2 +0.0	+0.0	+0.0	-40.0	-28.9	29.5	-58.4	Para
30	107.346k	34.1	+0.0 +0.0	+0.0 +0.0	+0.0	+0.0	-80.0	-45.9	27.0	-72.9	Para
31	568.140k	38.8	+0.0 +0.0	+0.0 +0.0	+0.0	+0.0	-40.0	-1.2	86.0	-87.2	Para
32	532.598k	38.7	+0.0 +0.0	+0.0 +0.0	+0.0	+0.0	-40.0	-1.3	86.0	-87.3	Para
33	549.324k	38.0	+0.0 +0.0	+0.0 +0.0	+0.0	+0.0	-40.0	-2.0	86.0	-88.0	Para
34	522.144k	37.7	+0.0 +0.0	+0.0 +0.0	+0.0	+0.0	-40.0	-2.3	86.0	-88.3	Para

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/16/2019
Test Type:	**Maximized Emissions**	Time:	3:00:08 PM
Tested By:	Matthew Harrison	Sequence#:	12
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 30-1000MHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

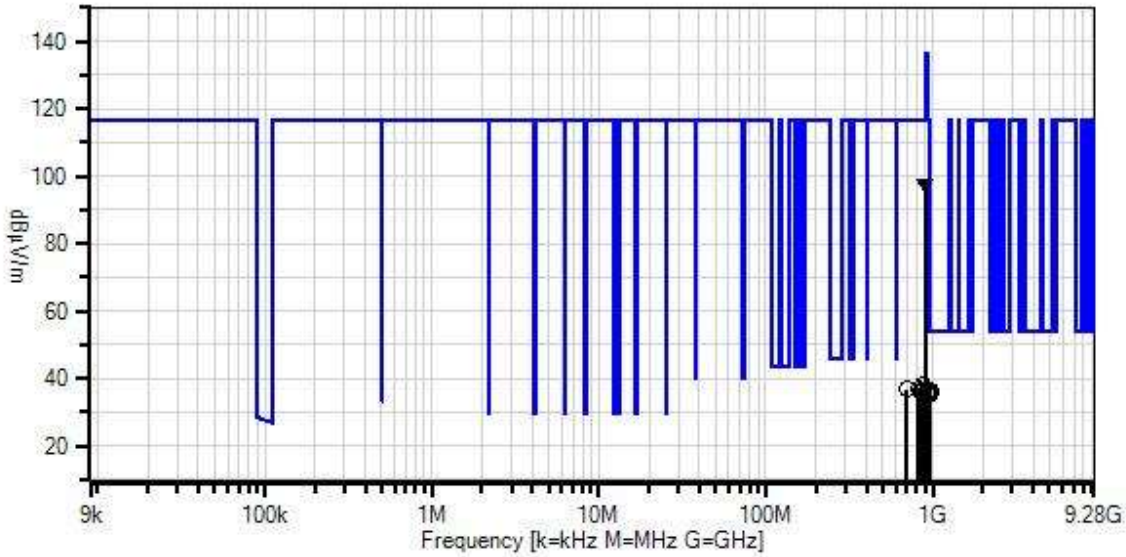
Antenna type: Mini-Guardrail Antenna
Antenna Gain: -20dBi
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 5-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.

Impinj, Inc. WO#: 103052 Sequence#: 12 Date: 9/16/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02307	Preamp	8447D	1/15/2018	1/15/2020
T2	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
T3	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T4	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T5	ANP05360	Cable	RG214	1/31/2018	1/31/2020
T6	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T7	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

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

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	902.794M	91.9	-27.4	+23.8	+5.8	+1.4	+0.0	97.8	136.5	-38.7	Horiz
	Ambient		+2.0	+0.3	+0.0						
2	860.152M	32.7	-27.6	+23.8	+5.8	+1.4	+0.0	38.3	116.5	-78.2	Horiz
			+1.9	+0.3	+0.0						
3	880.692M	32.5	-27.5	+23.8	+5.8	+1.4	+0.0	38.2	116.5	-78.3	Horiz
			+1.9	+0.3	+0.0						
4	819.191M	31.6	-27.7	+23.7	+5.8	+1.4	+0.0	36.9	116.5	-79.6	Horiz
			+1.8	+0.3	+0.0						
5	699.431M	33.2	-28.1	+22.7	+5.8	+1.3	+0.0	36.8	116.5	-79.7	Horiz
			+1.6	+0.3	+0.0						
6	881.173M	30.5	-27.5	+23.8	+5.8	+1.4	+0.0	36.2	116.5	-80.3	Horiz
			+1.9	+0.3	+0.0						
7	839.731M	30.7	-27.6	+23.7	+5.8	+1.4	+0.0	36.1	116.5	-80.4	Horiz
			+1.8	+0.3	+0.0						
8	959.178M	28.8	-27.2	+24.6	+5.8	+1.5	+0.0	36.0	116.5	-80.5	Horiz
			+2.1	+0.4	+0.0						
9	957.675M	28.4	-27.2	+24.6	+5.8	+1.5	+0.0	35.6	116.5	-80.9	Horiz
			+2.1	+0.4	+0.0						
10	945.591M	28.6	-27.2	+24.4	+5.8	+1.5	+0.0	35.5	116.5	-81.0	Horiz
			+2.0	+0.4	+0.0						
11	939.706M	28.7	-27.2	+24.3	+5.8	+1.5	+0.0	35.5	116.5	-81.0	Horiz
			+2.0	+0.4	+0.0						
12	955.609M	28.2	-27.2	+24.5	+5.8	+1.5	+0.0	35.3	116.5	-81.2	Horiz
			+2.1	+0.4	+0.0						
13	943.713M	28.4	-27.2	+24.4	+5.8	+1.5	+0.0	35.3	116.5	-81.2	Horiz
			+2.0	+0.4	+0.0						
14	934.746M	28.4	-27.2	+24.3	+5.8	+1.5	+0.0	35.2	116.5	-81.3	Horiz
			+2.0	+0.4	+0.0						
15	915.167M	29.3	-27.3	+24.0	+5.8	+1.5	+0.0	35.7	136.5	-100.8	Horiz
			+2.0	+0.4	+0.0						

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/16/2019
Test Type:	**Maximized Emissions**	Time:	14:58:48
Tested By:	Matthew Harrison	Sequence#:	11
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

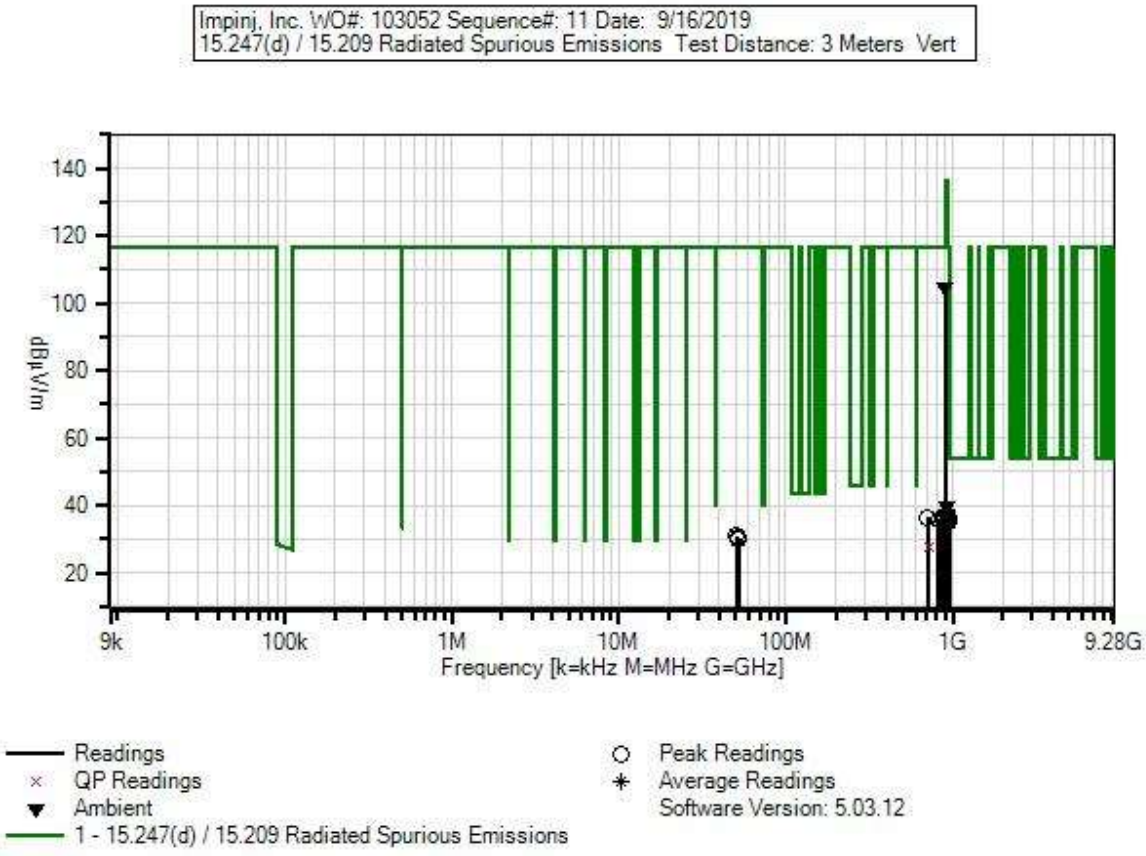
Frequency Range: 30-1000MHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

Antenna type: Mini-Guardrail Antenna
Antenna Gain: -20dBi
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 5-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.


Impinj, Inc. WO#: 103052 Sequence#: 11 Date: 9/16/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert
140
120
100
80
60
40
20
dBµV/m
9k
100k
1M
10M
100M
1G
9.28G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02307	Preamp	8447D	1/15/2018	1/15/2020
T2	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
T3	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T4	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T5	ANP05360	Cable	RG214	1/31/2018	1/31/2020
T6	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T7	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

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

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	902.794M	98.8	-27.4	+23.8	+5.8	+1.4	+0.0	104.7	136.5	-31.8	Vert
	Ambient		+2.0	+0.3	+0.0						
2	708.440M	32.6	-28.0	+22.8	+5.8	+1.3	+0.0	36.5	116.5	-80.0	Vert
			+1.7	+0.3	+0.0						
3	934.506M	29.2	-27.2	+24.3	+5.8	+1.5	+0.0	36.0	116.5	-80.5	Vert
			+2.0	+0.4	+0.0						
4	860.152M	30.1	-27.6	+23.8	+5.8	+1.4	+0.0	35.7	116.5	-80.8	Vert
			+1.9	+0.3	+0.0						
5	819.191M	30.3	-27.7	+23.7	+5.8	+1.4	+0.0	35.6	116.5	-80.9	Vert
			+1.8	+0.3	+0.0						
6	880.572M	29.9	-27.5	+23.8	+5.8	+1.4	+0.0	35.6	116.5	-80.9	Vert
			+1.9	+0.3	+0.0						
7	890.182M	29.7	-27.4	+23.8	+5.8	+1.4	+0.0	35.5	116.5	-81.0	Vert
			+1.9	+0.3	+0.0						
8	928.981M	28.8	-27.3	+24.2	+5.8	+1.5	+0.0	35.4	116.5	-81.1	Vert
			+2.0	+0.4	+0.0						
9	953.230M	28.3	-27.2	+24.5	+5.8	+1.5	+0.0	35.3	116.5	-81.2	Vert
			+2.0	+0.4	+0.0						
10	50.431M	44.7	-27.9	+7.3	+5.8	+0.4	+0.0	30.8	116.5	-85.7	Vert
			+0.4	+0.1	+0.0						
11	51.096M	44.2	-27.9	+7.3	+5.8	+0.4	+0.0	30.3	116.5	-86.2	Vert
			+0.4	+0.1	+0.0						
12	51.828M	43.9	-27.9	+7.4	+5.8	+0.4	+0.0	30.1	116.5	-86.4	Vert
			+0.4	+0.1	+0.0						
13	713.245M	23.5	-28.0	+22.8	+5.8	+1.3	+0.0	27.4	116.5	-89.1	Vert
	QP		+1.7	+0.3	+0.0						
^	713.245M	35.4	-28.0	+22.8	+5.8	+1.3	+0.0	39.3	116.5	-77.2	Vert
			+1.7	+0.3	+0.0						
15	915.287M	33.2	-27.3	+24.0	+5.8	+1.5	+0.0	39.6	136.5	-96.9	Vert
	Ambient		+2.0	+0.4	+0.0						
16	927.779M	30.6	-27.3	+24.2	+5.8	+1.5	+0.0	37.2	136.5	-99.3	Vert
	Ambient		+2.0	+0.4	+0.0						

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/30/2019
Test Type:	**Maximized Emissions**	Time:	10:26:05
Tested By:	Matthew Harrison	Sequence#:	56
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

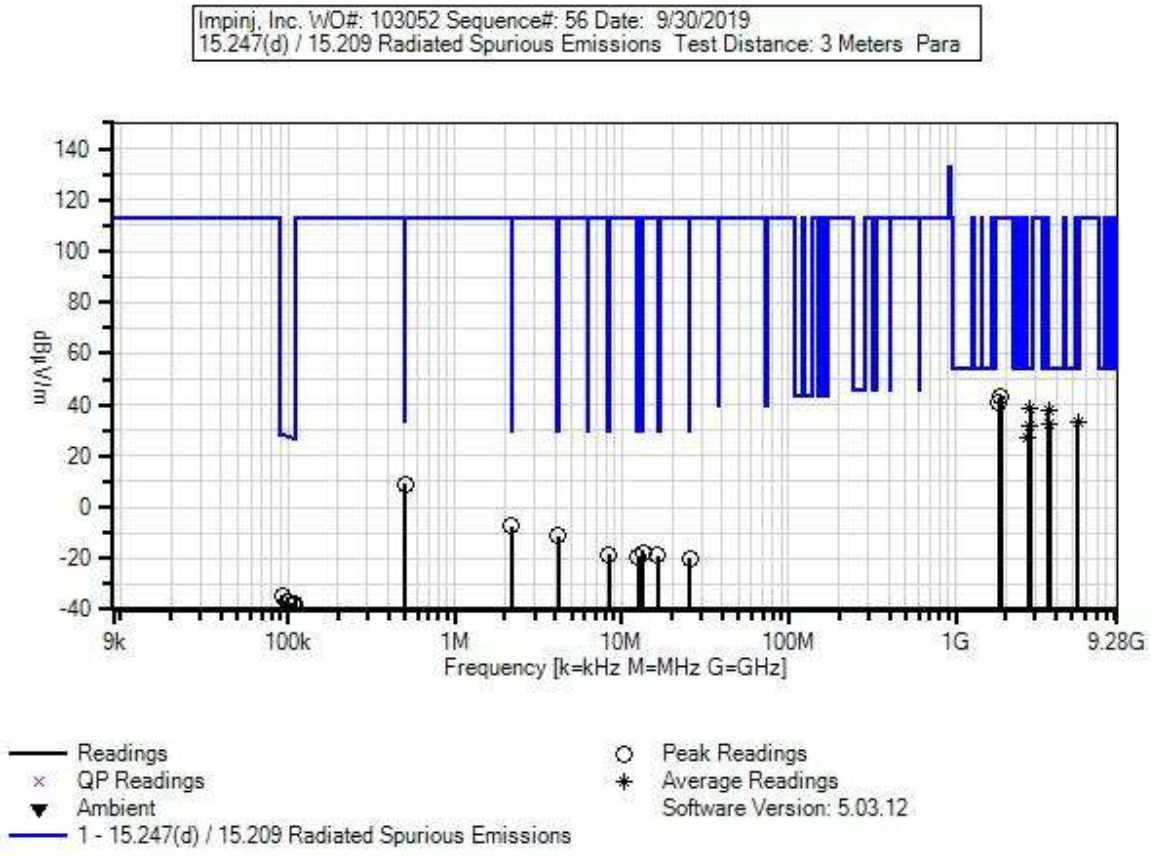
Frequency Range: 9kHz-30MHz and 1-10GHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated
Transmit

Antenna type: High Gain CP Antenna
Antenna Gain: +8.5dBiC
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 5-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.


Impinj, Inc. WO#: 103052 Sequence#: 56 Date: 9/30/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Para
140
120
100
80
60
40
20
0
-20
-40
dBµV/m
9k
100k
1M
10M
100M
1G
9.28G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021
T2	AN00052	Loop Antenna	6502	5/7/2018	5/7/2020
T3	ANP06515	Cable	Heliax	6/29/2018	6/29/2020
T4	AN03540	Preamp	83017A	5/13/2019	5/13/2021
T5	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	7/5/2019	7/5/2021
T6	ANP06503	Cable	32026-29801-29801-36	3/13/2018	3/13/2020
T7	AN03170	High Pass Filter	HM1155-11SS	11/27/2017	11/27/2019

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

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	2781.770M	39.5	+0.7	+0.0	+2.6	-34.1	+0.0	38.9	54.0	-15.1	Para
	Ave		+28.5	+1.1	+0.6						
^	2781.770M	48.2	+0.7	+0.0	+2.6	-34.1	+0.0	47.6	54.0	-6.4	Para
			+28.5	+1.1	+0.6						
3	3611.105M	34.8	+0.8	+0.0	+3.6	-33.8	+0.0	37.8	54.0	-16.2	Vert
	Ave		+30.3	+1.3	+0.8						
^	3611.105M	44.8	+0.8	+0.0	+3.6	-33.8	+0.0	47.8	54.0	-6.2	Vert
			+30.3	+1.3	+0.8						
5	5416.325M	25.3	+1.0	+0.0	+4.5	-33.7	+0.0	33.3	54.0	-20.7	Vert
	Ave		+33.4	+1.8	+1.0						
^	5416.325M	38.8	+1.0	+0.0	+4.5	-33.7	+0.0	46.8	54.0	-7.2	Vert
			+33.4	+1.8	+1.0						
7	3658.810M	29.1	+0.9	+0.0	+3.7	-33.7	+0.0	32.7	54.0	-21.3	Vert
	Ave		+30.5	+1.3	+0.9						
^	3658.810M	41.6	+0.9	+0.0	+3.7	-33.7	+0.0	45.2	54.0	-8.8	Vert
			+30.5	+1.3	+0.9						
9	2744.455M	32.7	+0.7	+0.0	+2.6	-34.1	+0.0	32.0	54.0	-22.0	Vert
	Ave		+28.4	+1.1	+0.6						
^	2744.455M	45.3	+0.7	+0.0	+2.6	-34.1	+0.0	44.6	54.0	-9.4	Vert
			+28.4	+1.1	+0.6						
11	503.328k	39.4	+0.0	+9.7	+0.0	+0.0	-40.0	9.1	33.5	-24.4	Para
			+0.0	+0.0	+0.0						
12	2708.485M	28.2	+0.7	+0.0	+2.6	-34.1	+0.0	27.4	54.0	-26.6	Vert
	Ave		+28.3	+1.1	+0.6						
^	2708.485M	42.6	+0.7	+0.0	+2.6	-34.1	+0.0	41.8	54.0	-12.2	Vert
			+28.3	+1.1	+0.6						
14	2.174M	22.9	+0.0	+9.7	+0.1	+0.0	-40.0	-7.3	29.5	-36.8	Para
			+0.0	+0.0	+0.0						
15	4.178M	18.9	+0.0	+9.7	+0.1	+0.0	-40.0	-11.3	29.5	-40.8	Para
			+0.0	+0.0	+0.0						
16	13.376M	12.9	+0.0	+9.1	+0.2	+0.0	-40.0	-17.8	29.5	-47.3	Para
			+0.0	+0.0	+0.0						

17	8.385M	12.3	+0.0 +0.0	+9.3 +0.0	+0.1 +0.0	+0.0	-40.0	-18.3	29.5	-47.8	Para
18	16.421M	12.1	+0.1 +0.0	+8.8 +0.0	+0.2 +0.0	+0.0	-40.0	-18.8	29.5	-48.3	Para
19	12.520M	11.4	+0.0 +0.0	+9.1 +0.0	+0.2 +0.0	+0.0	-40.0	-19.3	29.5	-48.8	Para
20	25.565M	12.7	+0.1 +0.0	+6.8 +0.0	+0.3 +0.0	+0.0	-40.0	-20.1	29.5	-49.6	Para
21	25.502M	12.6	+0.1 +0.0	+6.8 +0.0	+0.3 +0.0	+0.0	-40.0	-20.2	29.5	-49.7	Para
22	92.669k	35.2	+0.0 +0.0	+9.8 +0.0	+0.0 +0.0	+0.0	-80.0	-35.0	28.3	-63.3	Para
23	107.848k	33.0	+0.0 +0.0	+9.6 +0.0	+0.0 +0.0	+0.0	-80.0	-37.4	27.0	-64.4	Para
24	97.311k	33.6	+0.0 +0.0	+9.7 +0.0	+0.0 +0.0	+0.0	-80.0	-36.7	27.8	-64.5	Para
25	100.948k	33.1	+0.0 +0.0	+9.7 +0.0	+0.0 +0.0	+0.0	-80.0	-37.2	27.5	-64.7	Para
26	106.342k	32.7	+0.0 +0.0	+9.6 +0.0	+0.0 +0.0	+0.0	-80.0	-37.7	27.1	-64.8	Para
27	109.980k	32.4	+0.0 +0.0	+9.6 +0.0	+0.0 +0.0	+0.0	-80.0	-38.0	26.8	-64.8	Para
28	1854.360M	47.4	+0.5 +26.5	+0.0 +0.7	+2.3 +0.7	-34.7	+0.0	43.4	112.7	-69.3	Vert
29	1829.430M	47.1	+0.5 +26.3	+0.0 +0.7	+2.3 +0.7	-34.8	+0.0	42.8	112.7	-69.9	Vert
30	1805.490M	45.6	+0.5 +26.1	+0.0 +0.7	+2.2 +0.7	-34.8	+0.0	41.0	112.7	-71.7	Vert

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/17/2019
Test Type:	**Maximized Emissions**	Time:	09:07:16
Tested By:	Matthew Harrison	Sequence#:	14
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 30-1000MHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

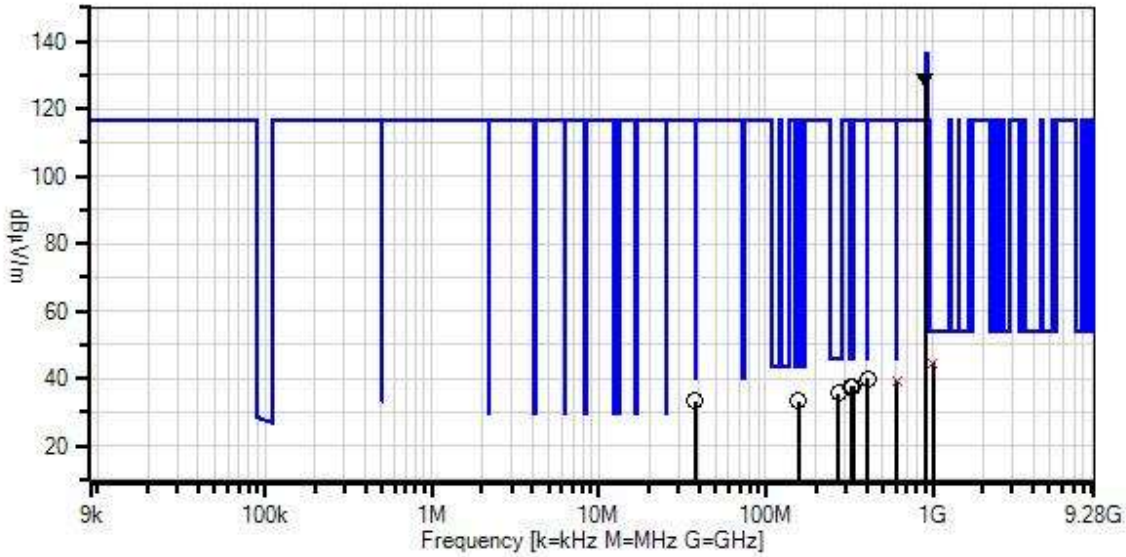
Antenna type: High Gain CP Antenna
Antenna Gain: +8.5dBiC
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 5-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.

Impinj, Inc. WO#: 103052 Sequence#: 14 Date: 9/17/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02307	Preamp	8447D	1/15/2018	1/15/2020
T1	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
T2	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	1/31/2018	1/31/2020
T5	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T6	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

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	407.299M	14.2	+17.6 +0.2	+5.8 +0.0	+1.0	+1.2	+0.0	40.0	46.0	-6.0	Horiz
2	608.260M QP	9.4	+21.1 +0.3	+5.8 +0.0	+1.2	+1.5	+0.0	39.3	46.0	-6.7	Horiz
^	608.260M	15.4	+21.1 +0.3	+5.8 +0.0	+1.2	+1.5	+0.0	45.3	46.0	-0.7	Horiz
4	37.853M	13.6	+13.1 +0.1	+5.8 +0.0	+0.3	+0.3	+0.0	33.2	40.0	-6.8	Horiz
5	902.794M Ambient	96.0	+23.8 +0.3	+5.8 +0.0	+1.4	+2.0	+0.0	129.3	136.5	-7.2	Horiz
6	331.263M	15.0	+14.6 +0.2	+5.8 +0.0	+0.9	+1.1	+0.0	37.6	46.0	-8.4	Horiz
7	322.495M	15.3	+14.2 +0.2	+5.8 +0.0	+0.9	+1.1	+0.0	37.5	46.0	-8.5	Horiz
8	324.657M	15.1	+14.3 +0.2	+5.8 +0.0	+0.9	+1.1	+0.0	37.4	46.0	-8.6	Horiz
9	996.807M QP	9.5	+25.1 +0.4	+5.9 +0.0	+1.5	+2.1	+0.0	44.5	54.0	-9.5	Horiz
^	996.807M	15.9	+25.1 +0.4	+5.9 +0.0	+1.5	+2.1	+0.0	50.9	54.0	-3.1	Horiz
11	156.729M	16.2	+9.7 +0.2	+5.8 +0.0	+0.6	+0.7	+0.0	33.2	43.5	-10.3	Horiz
12	271.444M	15.1	+12.6 +0.2	+5.8 +0.0	+0.8	+1.0	+0.0	35.5	46.0	-10.5	Horiz

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/17/2019
Test Type:	**Maximized Emissions**	Time:	08:51:09
Tested By:	Matthew Harrison	Sequence#:	13
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 30-1000MHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

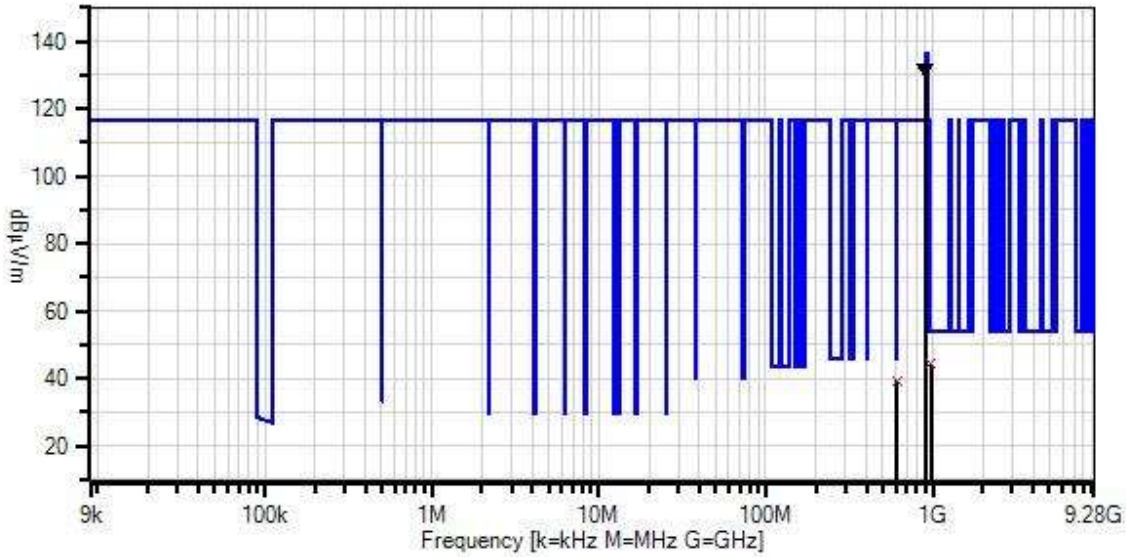
Antenna type: High Gain CP Antenna
Antenna Gain: +8.5dBiC
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 5-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.

Impinj, Inc. WO#: 103052 Sequence#: 13 Date: 9/17/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02307	Preamp	8447D	1/15/2018	1/15/2020
T1	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
T2	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	1/31/2018	1/31/2020
T5	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T6	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

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	902.794M	98.9	+23.8	+5.8	+1.4	+2.0	+0.0	132.2	136.5	-4.3	Vert
	Ambient		+0.3	+0.0							
2	610.422M	9.5	+21.1	+5.8	+1.2	+1.5	+0.0	39.4	46.0	-6.6	Vert
	QP		+0.3	+0.0							
^	610.422M	17.4	+21.1	+5.8	+1.2	+1.5	+0.0	47.3	46.0	+1.3	Vert
			+0.3	+0.0							
4	976.370M	9.5	+24.8	+5.9	+1.5	+2.1	+0.0	44.2	54.0	-9.8	Vert
	QP		+0.4	+0.0							
^	976.396M	17.4	+24.8	+5.9	+1.5	+2.1	+0.0	52.1	54.0	-1.9	Vert
			+0.4	+0.0							

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/30/2019
Test Type:	**Maximized Emissions**	Time:	11:08:11
Tested By:	Matthew Harrison	Sequence#:	57
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 9kHz-30MHz and 1-10GHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated
Transmit

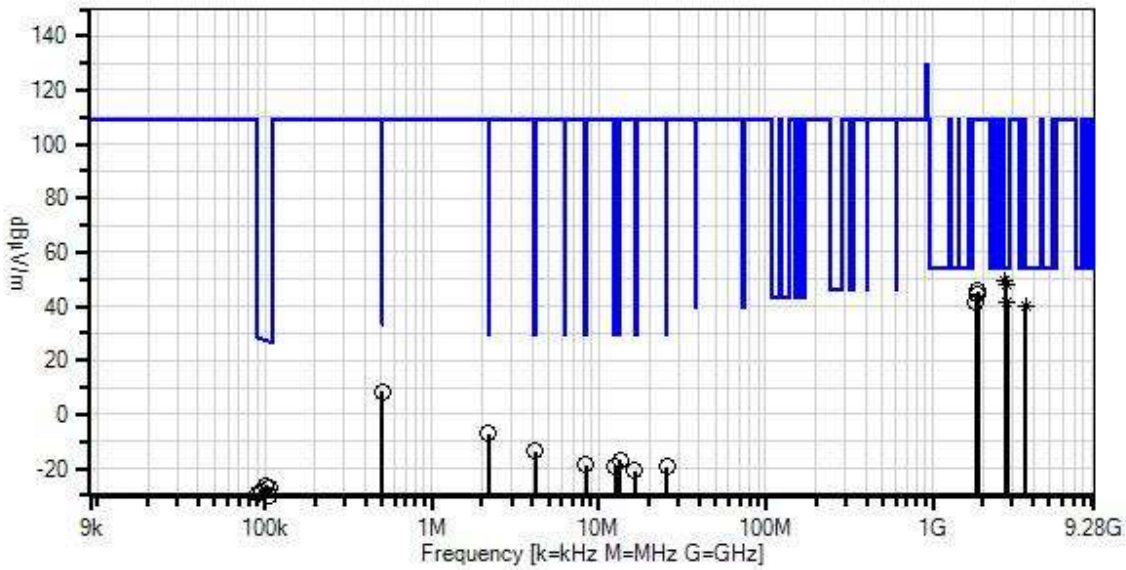
Antenna type: Slimline CP Antenna
Antenna Gain: +5.5dBiC
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 5-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.

Impinj, Inc. WO#: 103052 Sequence#: 57 Date: 9/30/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021
T2	AN00052	Loop Antenna	6502	5/7/2018	5/7/2020
T3	ANP06515	Cable	Heliax	6/29/2018	6/29/2020
T4	AN03540	Preamp	83017A	5/13/2019	5/13/2021
T5	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	7/5/2019	7/5/2021
T6	ANP06503	Cable	32026-29801-29801-36	3/13/2018	3/13/2020
T7	AN03170	High Pass Filter	HM1155-11SS	11/27/2017	11/27/2019

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

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	2708.305M	50.4	+0.7	+0.0	+2.6	-34.1	+0.0	49.6	54.0	-4.4	Vert
	Ave		+28.3	+1.1	+0.6						
^	2708.305M	56.0	+0.7	+0.0	+2.6	-34.1	+0.0	55.2	54.0	+1.2	Vert
			+28.3	+1.1	+0.6						
3	2744.315M	49.0	+0.7	+0.0	+2.6	-34.1	+0.0	48.3	54.0	-5.7	Vert
	Ave		+28.4	+1.1	+0.6						
^	2744.315M	55.7	+0.7	+0.0	+2.6	-34.1	+0.0	55.0	54.0	+1.0	Vert
			+28.4	+1.1	+0.6						
5	2781.720M	42.5	+0.7	+0.0	+2.6	-34.1	+0.0	41.9	54.0	-12.1	Vert
	Ave		+28.5	+1.1	+0.6						
^	2781.720M	50.4	+0.7	+0.0	+2.6	-34.1	+0.0	49.8	54.0	-4.2	Vert
			+28.5	+1.1	+0.6						
7	3610.820M	37.0	+0.8	+0.0	+3.6	-33.8	+0.0	40.0	54.0	-14.0	Vert
	Ave		+30.3	+1.3	+0.8						
^	3610.820M	46.9	+0.8	+0.0	+3.6	-33.8	+0.0	49.9	54.0	-4.1	Vert
			+30.3	+1.3	+0.8						
9	503.328k	38.7	+0.0	+9.7	+0.0	+0.0	-40.0	8.4	33.5	-25.1	Para
			+0.0	+0.0	+0.0						
10	2.186M	23.0	+0.0	+9.7	+0.1	+0.0	-40.0	-7.2	29.5	-36.7	Para
			+0.0	+0.0	+0.0						
11	4.178M	16.7	+0.0	+9.7	+0.1	+0.0	-40.0	-13.5	29.5	-43.0	Para
			+0.0	+0.0	+0.0						
12	13.403M	13.4	+0.0	+9.1	+0.2	+0.0	-40.0	-17.3	29.5	-46.8	Para
			+0.0	+0.0	+0.0						
13	8.385M	12.1	+0.0	+9.3	+0.1	+0.0	-40.0	-18.5	29.5	-48.0	Para
			+0.0	+0.0	+0.0						
14	25.511M	13.4	+0.1	+6.8	+0.3	+0.0	-40.0	-19.4	29.5	-48.9	Para
			+0.0	+0.0	+0.0						
15	12.520M	11.3	+0.0	+9.1	+0.2	+0.0	-40.0	-19.4	29.5	-48.9	Para
			+0.0	+0.0	+0.0						
16	16.421M	10.2	+0.1	+8.8	+0.2	+0.0	-40.0	-20.7	29.5	-50.2	Para
			+0.0	+0.0	+0.0						

17	101.827k	44.1	+0.0 +0.0	+9.7 +0.0	+0.0 +0.0	+0.0	-80.0	-26.2	27.5	-53.7	Para
18	107.597k	43.1	+0.0 +0.0	+9.6 +0.0	+0.0 +0.0	+0.0	-80.0	-27.3	27.0	-54.3	Para
19	96.683k	41.7	+0.0 +0.0	+9.7 +0.0	+0.0 +0.0	+0.0	-80.0	-28.6	27.9	-56.5	Para
20	106.342k	40.4	+0.0 +0.0	+9.6 +0.0	+0.0 +0.0	+0.0	-80.0	-30.0	27.1	-57.1	Para
21	109.102k	40.0	+0.0 +0.0	+9.6 +0.0	+0.0 +0.0	+0.0	-80.0	-30.4	26.9	-57.3	Para
22	90.662k	41.2	+0.0 +0.0	+9.8 +0.0	+0.0 +0.0	+0.0	-80.0	-29.0	28.4	-57.4	Para
23	108.099k	39.8	+0.0 +0.0	+9.6 +0.0	+0.0 +0.0	+0.0	-80.0	-30.6	26.9	-57.5	Para
24	1854.315M	49.6	+0.5 +26.5	+0.0 +0.7	+2.3 +0.7	-34.7	+0.0	45.6	109.1	-63.5	Vert
25	1829.240M	48.7	+0.5 +26.3	+0.0 +0.7	+2.3 +0.7	-34.8	+0.0	44.4	109.1	-64.7	Vert
26	1805.410M	46.3	+0.5 +26.1	+0.0 +0.7	+2.2 +0.7	-34.8	+0.0	41.7	109.1	-67.4	Vert

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/17/2019
Test Type:	**Maximized Emissions**	Time:	10:06:18
Tested By:	Matthew Harrison	Sequence#:	16
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 30-1000MHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

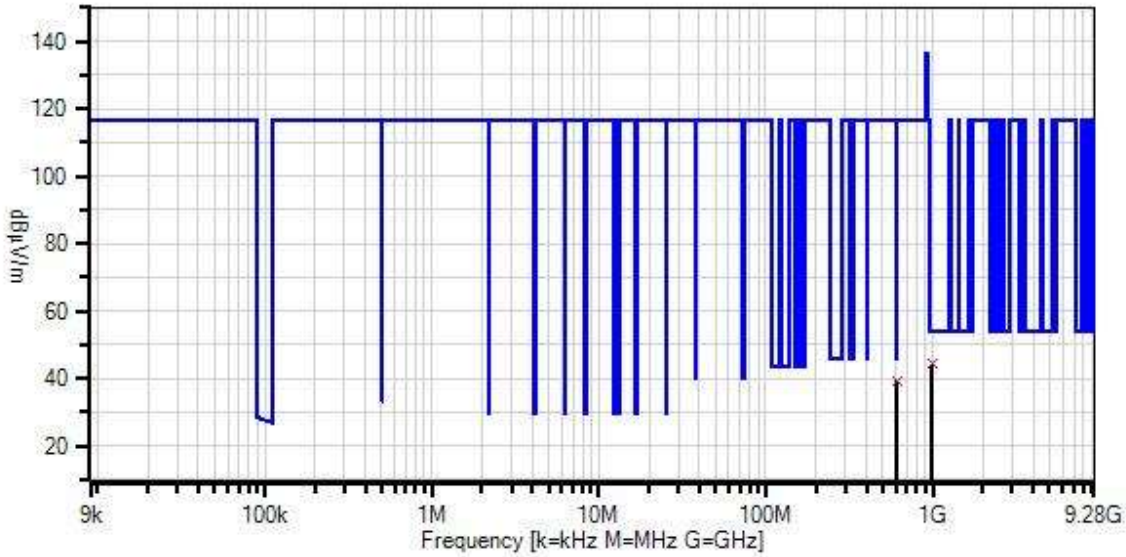
Antenna type: Slimline CP Antenna
Antenna Gain: +2dBi
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 5-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.

Impinj, Inc. WO#: 103052 Sequence#: 16 Date: 9/17/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02307	Preamp	8447D	1/15/2018	1/15/2020
T1	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
T2	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	1/31/2018	1/31/2020
T5	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	611.023M QP	9.4	+21.1 +0.3	+5.8	+1.2	+1.5	+0.0	39.3	46.0	-6.7	Horiz
^	611.023M	15.6	+21.1 +0.3	+5.8	+1.2	+1.5	+0.0	45.5	46.0	-0.5	Horiz
3	988.417M QP	9.4	+25.0 +0.4	+5.9	+1.5	+2.1	+0.0	44.3	54.0	-9.7	Horiz
^	988.417M	15.6	+25.0 +0.4	+5.9	+1.5	+2.1	+0.0	50.5	54.0	-3.5	Horiz

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/17/2019
Test Type:	**Maximized Emissions**	Time:	09:53:31
Tested By:	Matthew Harrison	Sequence#:	15
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 30-1000MHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

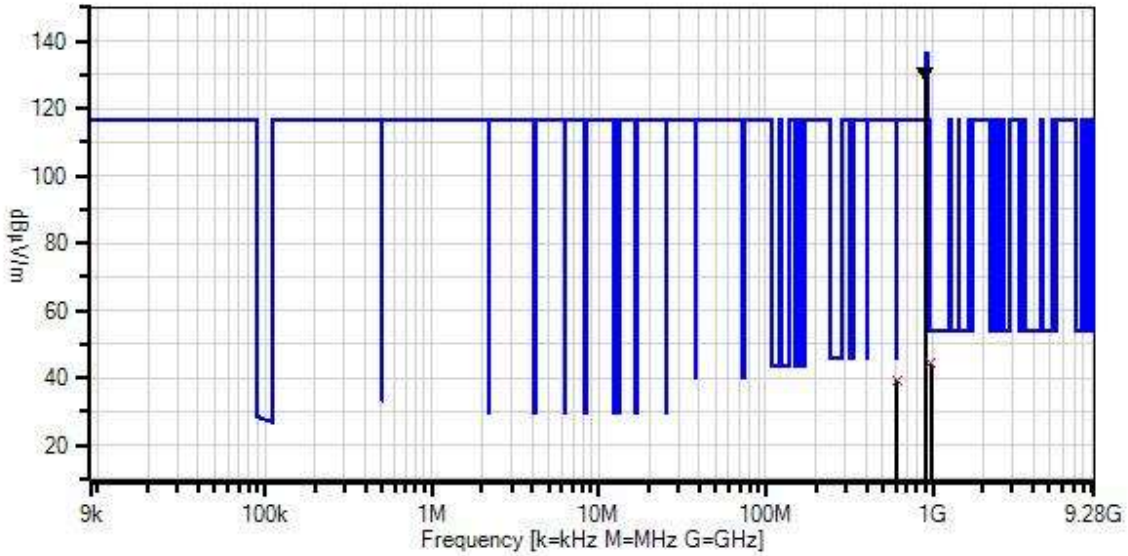
Antenna type: Slimline CP Antenna
Antenna Gain: +5.5dBiC
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 5-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.

Impinj, Inc. WO#: 103052 Sequence#: 15 Date: 9/17/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02307	Preamp	8447D	1/15/2018	1/15/2020
T1	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
T2	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	1/31/2018	1/31/2020
T5	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T6	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

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	902.794M	97.8	+23.8	+5.8	+1.4	+2.0	+0.0	131.1	136.5	-5.4	Vert
	Ambient		+0.3	+0.0							
2	610.182M	9.5	+21.1	+5.8	+1.2	+1.5	+0.0	39.4	46.0	-6.6	Vert
	QP		+0.3	+0.0							
^	610.182M	15.2	+21.1	+5.8	+1.2	+1.5	+0.0	45.1	46.0	-0.9	Vert
			+0.3	+0.0							
4	972.889M	9.5	+24.8	+5.9	+1.5	+2.1	+0.0	44.2	54.0	-9.8	Vert
	QP		+0.4	+0.0							
^	972.889M	16.5	+24.8	+5.9	+1.5	+2.1	+0.0	51.2	54.0	-2.8	Vert
			+0.4	+0.0							

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/30/2019
Test Type:	**Maximized Emissions**	Time:	11:37:37
Tested By:	Matthew Harrison	Sequence#:	58
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 5			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 5			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 9kHz-30MHz and 1-10GHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated
Transmit

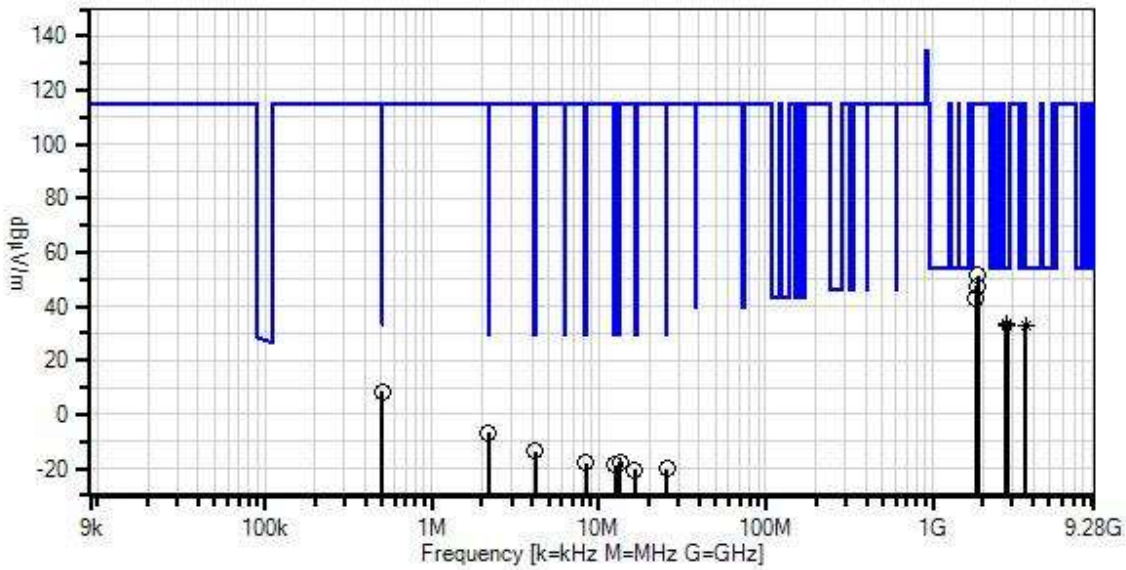
Antenna type: Brickyard Antenna
Antenna Gain: +2dBi
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 1.5-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.

Impinj, Inc. WO#: 103052 Sequence#: 58 Date: 9/30/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021
T2	AN00052	Loop Antenna	6502	5/7/2018	5/7/2020
T3	ANP06515	Cable	Heliax	6/29/2018	6/29/2020
T4	AN03540	Preamp	83017A	5/13/2019	5/13/2021
T5	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	7/5/2019	7/5/2021
T6	ANP06503	Cable	32026-29801-29801-36	3/13/2018	3/13/2020
T7	AN03170	High Pass Filter	HM1155-11SS	11/27/2017	11/27/2019

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

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	2781.680M	34.0	+0.7	+0.0	+2.6	-34.1	+0.0	33.4	54.0	-20.6	Vert
	Ave		+28.5	+1.1	+0.6						
^	2781.680M	45.6	+0.7	+0.0	+2.6	-34.1	+0.0	45.0	54.0	-9.0	Vert
			+28.5	+1.1	+0.6						
3	3610.770M	30.2	+0.8	+0.0	+3.6	-33.8	+0.0	33.2	54.0	-20.8	Vert
	Ave		+30.3	+1.3	+0.8						
^	3610.770M	43.9	+0.8	+0.0	+3.6	-33.8	+0.0	46.9	54.0	-7.1	Vert
			+30.3	+1.3	+0.8						
5	2744.440M	33.7	+0.7	+0.0	+2.6	-34.1	+0.0	33.0	54.0	-21.0	Vert
	Ave		+28.4	+1.1	+0.6						
^	2744.440M	45.9	+0.7	+0.0	+2.6	-34.1	+0.0	45.2	54.0	-8.8	Vert
			+28.4	+1.1	+0.6						
7	501.237k	38.7	+0.0	+9.7	+0.0	+0.0	-40.0	8.4	33.6	-25.2	Para
			+0.0	+0.0	+0.0						
8	2.188M	23.6	+0.0	+9.7	+0.1	+0.0	-40.0	-6.6	29.5	-36.1	Para
			+0.0	+0.0	+0.0						
9	4.178M	16.7	+0.0	+9.7	+0.1	+0.0	-40.0	-13.5	29.5	-43.0	Para
			+0.0	+0.0	+0.0						
10	13.376M	13.2	+0.0	+9.1	+0.2	+0.0	-40.0	-17.5	29.5	-47.0	Para
			+0.0	+0.0	+0.0						
11	8.385M	12.7	+0.0	+9.3	+0.1	+0.0	-40.0	-17.9	29.5	-47.4	Para
			+0.0	+0.0	+0.0						
12	12.520M	12.2	+0.0	+9.1	+0.2	+0.0	-40.0	-18.5	29.5	-48.0	Para
			+0.0	+0.0	+0.0						
13	25.592M	12.6	+0.1	+6.8	+0.3	+0.0	-40.0	-20.2	29.5	-49.7	Para
			+0.0	+0.0	+0.0						
14	16.421M	10.4	+0.1	+8.8	+0.2	+0.0	-40.0	-20.5	29.5	-50.0	Para
			+0.0	+0.0	+0.0						
15	107.597k	38.7	+0.0	+9.6	+0.0	+0.0	-80.0	-31.7	27.0	-58.7	Para
			+0.0	+0.0	+0.0						
16	101.952k	38.6	+0.0	+9.7	+0.0	+0.0	-80.0	-31.7	27.4	-59.1	Para
			+0.0	+0.0	+0.0						

17	109.102k	36.7	+0.0 +0.0	+9.6 +0.0	+0.0 +0.0	+0.0	-80.0	-33.7	26.9	-60.6	Para
18	96.558k	37.6	+0.0 +0.0	+9.7 +0.0	+0.0 +0.0	+0.0	-80.0	-32.7	27.9	-60.6	Para
19	106.342k	36.0	+0.0 +0.0	+9.6 +0.0	+0.0 +0.0	+0.0	-80.0	-34.4	27.1	-61.5	Para
20	108.099k	35.8	+0.0 +0.0	+9.6 +0.0	+0.0 +0.0	+0.0	-80.0	-34.6	26.9	-61.5	Para
21	90.662k	36.8	+0.0 +0.0	+9.8 +0.0	+0.0 +0.0	+0.0	-80.0	-33.4	28.4	-61.8	Para
22	1854.580M	55.6	+0.5 +26.5	+0.0 +0.7	+2.3 +0.7	-34.7	+0.0	51.6	114.6	-63.0	Vert
23	1829.500M	51.8	+0.5 +26.3	+0.0 +0.7	+2.3 +0.7	-34.8	+0.0	47.5	114.6	-67.1	Vert
24	1805.835M	47.3	+0.5 +26.1	+0.0 +0.7	+2.2 +0.7	-34.8	+0.0	42.7	114.6	-71.9	Vert

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/17/2019
Test Type:	**Maximized Emissions**	Time:	11:26:29
Tested By:	Matthew Harrison	Sequence#:	18
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 5			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 5			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 30-1000MHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

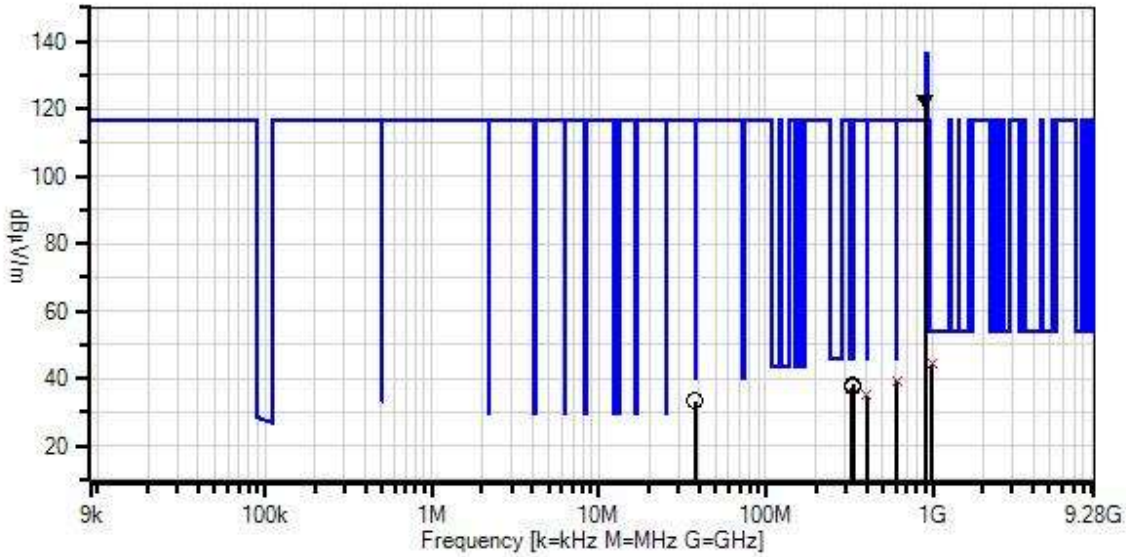
Antenna type: Brickyard Antenna
Antenna Gain: +2dBi
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 2-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.

Impinj, Inc. WO#: 103052 Sequence#: 18 Date: 9/17/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02307	Preamp	8447D	1/15/2018	1/15/2020
T1	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
T2	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	1/31/2018	1/31/2020
T5	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T6	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

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	37.653M	13.6	+13.2 +0.1	+5.8 +0.0	+0.3	+0.3	+0.0	33.3	40.0	-6.7	Horiz
2	611.023M QP	9.3	+21.1 +0.3	+5.8 +0.0	+1.2	+1.5	+0.0	39.2	46.0	-6.8	Horiz
^	611.023M	15.1	+21.1 +0.3	+5.8 +0.0	+1.2	+1.5	+0.0	45.0	46.0	-1.0	Horiz
4	332.705M	15.6	+14.7 +0.2	+5.8 +0.0	+0.9	+1.1	+0.0	38.3	46.0	-7.7	Horiz
5	327.299M	14.9	+14.4 +0.2	+5.8 +0.0	+0.9	+1.1	+0.0	37.3	46.0	-8.7	Horiz
6	990.546M QP	9.4	+25.0 +0.4	+5.9 +0.0	+1.5	+2.1	+0.0	44.3	54.0	-9.7	Horiz
^	990.546M	15.5	+25.0 +0.4	+5.9 +0.0	+1.5	+2.1	+0.0	50.4	54.0	-3.6	Horiz
8	402.735M QP	9.2	+17.5 +0.2	+5.8 +0.0	+1.0	+1.2	+0.0	34.9	46.0	-11.1	Horiz
^	402.735M	15.0	+17.5 +0.2	+5.8 +0.0	+1.0	+1.2	+0.0	40.7	46.0	-5.3	Horiz
10	902.794M Ambient	89.4	+23.8 +0.3	+5.8 +0.0	+1.4	+2.0	+0.0	122.7	136.5	-13.8	Horiz

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/17/2019
Test Type:	**Maximized Emissions**	Time:	10:43:35
Tested By:	Matthew Harrison	Sequence#:	17
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 5			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 5			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 30-1000MHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

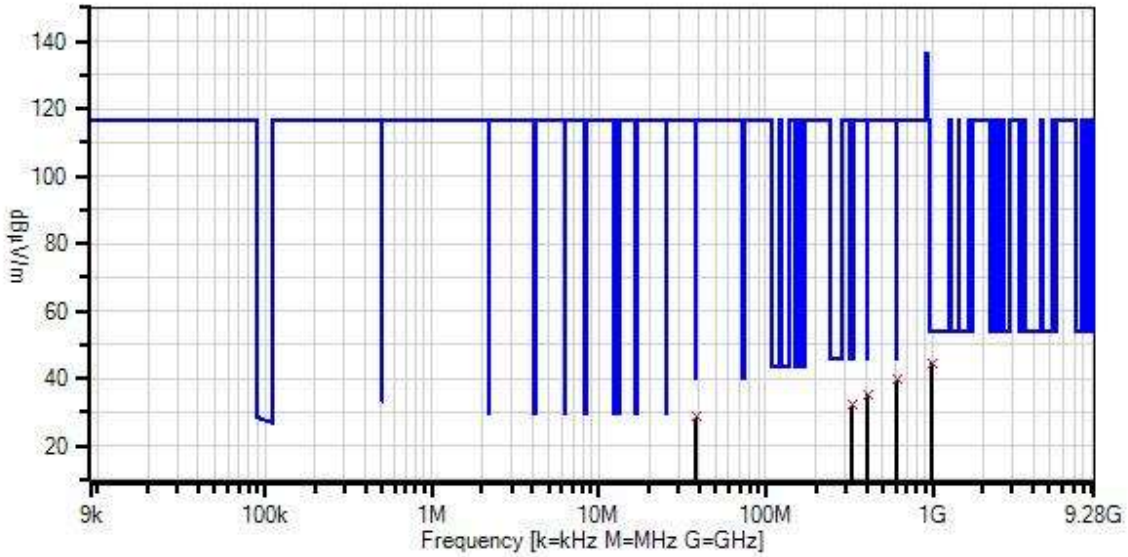
Antenna type: Brickyard Antenna
Antenna Gain: +2dBi
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 2-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.

Impinj, Inc. WO#: 103052 Sequence#: 17 Date: 9/17/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02307	Preamp	8447D	1/15/2018	1/15/2020
T1	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
T2	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	1/31/2018	1/31/2020
T5	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	613.666M	9.6	+21.2	+5.8	+1.2	+1.5	+0.0	39.6	46.0	-6.4	Vert
	QP		+0.3								
^	613.666M	25.1	+21.2	+5.8	+1.2	+1.5	+0.0	55.1	46.0	+9.1	Vert
			+0.3								
3	993.175M	9.7	+25.0	+5.9	+1.5	+2.1	+0.0	44.6	54.0	-9.4	Vert
	QP		+0.4								
^	993.175M	25.5	+25.0	+5.9	+1.5	+2.1	+0.0	60.4	54.0	+6.4	Vert
			+0.4								
5	405.000M	9.4	+17.6	+5.8	+1.0	+1.2	+0.0	35.2	46.0	-10.8	Vert
	QP		+0.2								
^	405.000M	24.2	+17.6	+5.8	+1.0	+1.2	+0.0	50.0	46.0	+4.0	Vert
			+0.2								
7	38.000M	9.0	+13.0	+5.8	+0.3	+0.3	+0.0	28.5	40.0	-11.5	Vert
	QP		+0.1								
^	38.000M	23.7	+13.0	+5.8	+0.3	+0.3	+0.0	43.2	40.0	+3.2	Vert
			+0.1								
9	330.000M	9.3	+14.6	+5.8	+0.9	+1.1	+0.0	31.9	46.0	-14.1	Vert
	QP		+0.2								
^	330.000M	24.7	+14.6	+5.8	+0.9	+1.1	+0.0	47.3	46.0	+1.3	Vert
			+0.2								

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/30/2019
Test Type:	**Maximized Emissions**	Time:	12:29:41
Tested By:	Matthew Harrison	Sequence#:	59
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 6			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 6			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 9kHz-30MHz and 1-10GHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated
Transmit

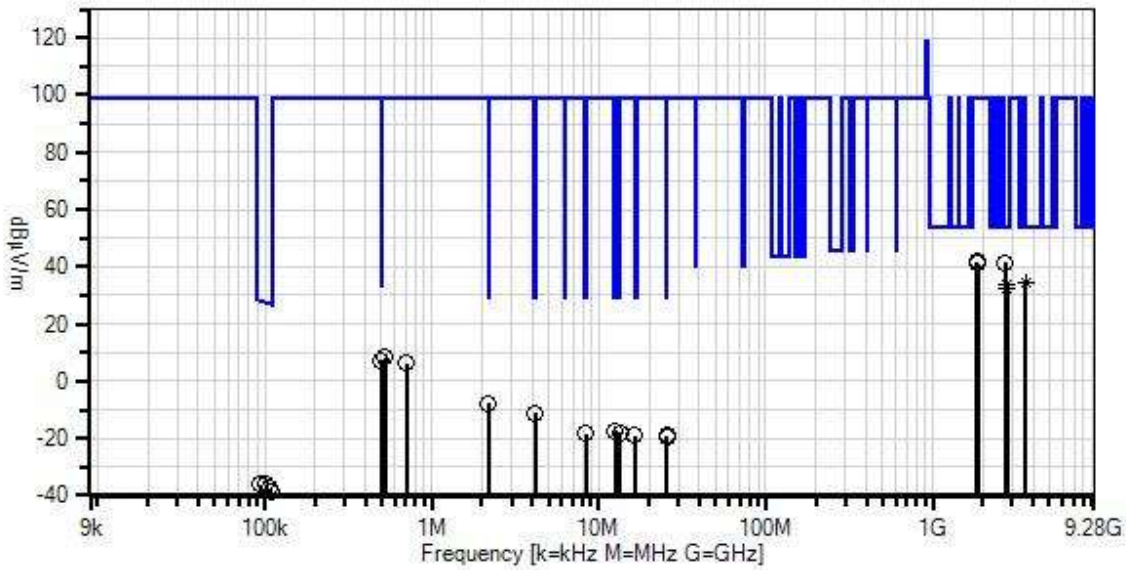
Antenna type: Matchbox Antenna
Antenna Gain: -20dBi
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 0.5-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.

Impinj, Inc. WO#: 103052 Sequence#: 59 Date: 9/30/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021
T2	AN00052	Loop Antenna	6502	5/7/2018	5/7/2020
T3	ANP06515	Cable	Heliax	6/29/2018	6/29/2020
T4	AN03540	Preamp	83017A	5/13/2019	5/13/2021
T5	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	7/5/2019	7/5/2021
T6	ANP06503	Cable	32026-29801-29801-36	3/13/2018	3/13/2020
T7	AN03170	High Pass Filter	HM1155-11SS	11/27/2017	11/27/2019

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

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	2708.710M	42.1	+0.7 +28.3	+0.0 +1.1	+2.6 +0.6	-34.1	+0.0	41.3	54.0	-12.7	Horiz
2	3610.910M Ave	31.4	+0.8 +30.3	+0.0 +1.3	+3.6 +0.8	-33.8	+0.0	34.4	54.0	-19.6	Horiz
^	3610.910M	42.4	+0.8 +30.3	+0.0 +1.3	+3.6 +0.8	-33.8	+0.0	45.4	54.0	-8.6	Horiz
4	2781.910M Ave	34.1	+0.7 +28.5	+0.0 +1.1	+2.6 +0.6	-34.1	+0.0	33.5	54.0	-20.5	Horiz
^	2781.910M	45.2	+0.7 +28.5	+0.0 +1.1	+2.6 +0.6	-34.1	+0.0	44.6	54.0	-9.4	Horiz
6	2744.250M Ave	33.2	+0.7 +28.4	+0.0 +1.1	+2.6 +0.6	-34.1	+0.0	32.5	54.0	-21.5	Horiz
^	2744.250M	45.2	+0.7 +28.4	+0.0 +1.1	+2.6 +0.6	-34.1	+0.0	44.5	54.0	-9.5	Horiz
8	497.056k	37.6	+0.0 +0.0	+9.7 +0.0	+0.0 +0.0	+0.0	-40.0	7.3	33.7	-26.4	Para
9	2.176M	22.6	+0.0 +0.0	+9.7 +0.0	+0.1 +0.0	+0.0	-40.0	-7.6	29.5	-37.1	Para
10	4.178M	19.1	+0.0 +0.0	+9.7 +0.0	+0.1 +0.0	+0.0	-40.0	-11.1	29.5	-40.6	Para
11	12.520M	13.3	+0.0 +0.0	+9.1 +0.0	+0.2 +0.0	+0.0	-40.0	-17.4	29.5	-46.9	Para
12	13.394M	12.7	+0.0 +0.0	+9.1 +0.0	+0.2 +0.0	+0.0	-40.0	-18.0	29.5	-47.5	Para
13	8.385M	12.2	+0.0 +0.0	+9.3 +0.0	+0.1 +0.0	+0.0	-40.0	-18.4	29.5	-47.9	Para
14	25.646M	13.8	+0.1 +0.0	+6.8 +0.0	+0.3 +0.0	+0.0	-40.0	-19.0	29.5	-48.5	Para
15	16.421M	11.9	+0.1 +0.0	+8.8 +0.0	+0.2 +0.0	+0.0	-40.0	-19.0	29.5	-48.5	Para
16	25.547M	13.1	+0.1 +0.0	+6.8 +0.0	+0.3 +0.0	+0.0	-40.0	-19.7	29.5	-49.2	Para

17	1829.645M	46.2	+0.5 +26.3	+0.0 +0.7	+2.3 +0.7	-34.8	+0.0	41.9	99.0	-57.1	Horiz
18	1854.500M	45.0	+0.5 +26.5	+0.0 +0.7	+2.3 +0.7	-34.7	+0.0	41.0	99.0	-58.0	Horiz
19	101.199k	34.3	+0.0 +0.0	+9.7 +0.0	+0.0 +0.0	+0.0	-80.0	-36.0	27.5	-63.5	Para
20	94.300k	34.0	+0.0 +0.0	+9.8 +0.0	+0.0 +0.0	+0.0	-80.0	-36.2	28.1	-64.3	Para
21	107.471k	32.8	+0.0 +0.0	+9.6 +0.0	+0.0 +0.0	+0.0	-80.0	-37.6	27.0	-64.6	Para
22	108.851k	31.6	+0.0 +0.0	+9.6 +0.0	+0.0 +0.0	+0.0	-80.0	-38.8	26.9	-65.7	Para
23	524.235k	38.6	+0.0 +0.0	+9.7 +0.0	+0.0 +0.0	+0.0	-40.0	8.3	99.0	-90.7	Para
24	708.217k	36.4	+0.0 +0.0	+9.9 +0.0	+0.0 +0.0	+0.0	-40.0	6.3	99.0	-92.7	Para

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/17/2019
Test Type:	**Maximized Emissions**	Time:	11:52:24
Tested By:	Matthew Harrison	Sequence#:	20
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 6			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 6			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 30-1000MHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

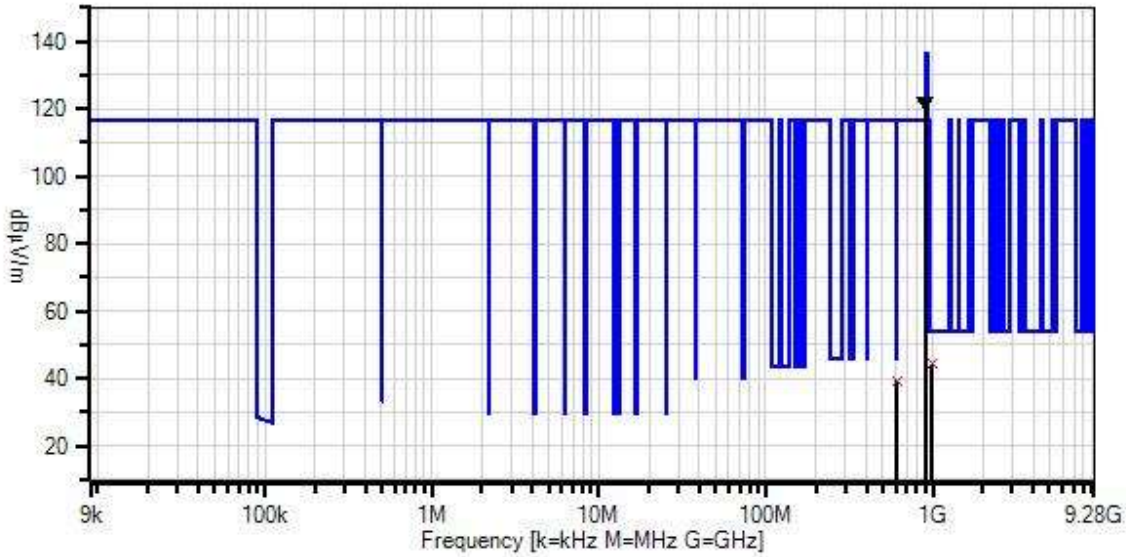
Antenna type: Matchbox Antenna
Antenna Gain: -20dBi
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 2-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.

Impinj, Inc. WO#: 103052 Sequence#: 20 Date: 9/17/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
T2	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	1/31/2018	1/31/2020
T5	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T6	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

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	608.741M	9.3	+21.1	+5.8	+1.2	+1.5	+0.0	39.2	46.0	-6.8	Horiz
	QP		+0.3	+0.0							
^	608.741M	14.9	+21.1	+5.8	+1.2	+1.5	+0.0	44.8	46.0	-1.2	Horiz
			+0.3	+0.0							
3	993.238M	9.4	+25.0	+5.9	+1.5	+2.1	+0.0	44.3	54.0	-9.7	Horiz
	QP		+0.4	+0.0							
^	993.238M	15.6	+25.0	+5.9	+1.5	+2.1	+0.0	50.5	54.0	-3.5	Horiz
			+0.4	+0.0							
5	902.794M	88.7	+23.8	+5.8	+1.4	+2.0	+0.0	122.0	136.5	-14.5	Horiz
	Ambient		+0.3	+0.0							

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/17/2019
Test Type:	**Maximized Emissions**	Time:	11:42:09
Tested By:	Matthew Harrison	Sequence#:	19
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 6			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 6			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 30-1000MHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

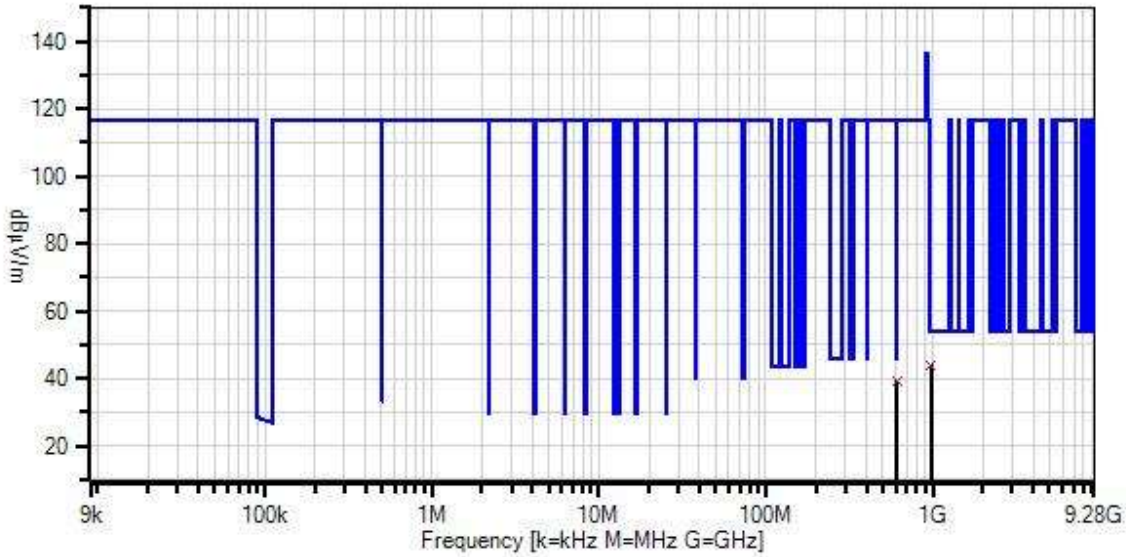
Antenna type: Matchbox Antenna
Antenna Gain: -20dBi
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 2-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.

Impinj, Inc. WO#: 103052 Sequence#: 19 Date: 9/17/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
T2	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	1/31/2018	1/31/2020
T5	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	608.380M QP	9.3	+21.1 +0.3	+5.8	+1.2	+1.5	+0.0	39.2	46.0	-6.8	Vert
^	608.380M	15.3	+21.1 +0.3	+5.8	+1.2	+1.5	+0.0	45.2	46.0	-0.8	Vert
3	972.702M QP	9.4	+24.8 +0.4	+5.9	+1.5	+2.1	+0.0	44.1	54.0	-9.9	Vert
^	972.702M	15.4	+24.8 +0.4	+5.9	+1.5	+2.1	+0.0	50.1	54.0	-3.9	Vert

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/30/2019
Test Type:	**Maximized Emissions**	Time:	13:21:34
Tested By:	Matthew Harrison	Sequence#:	60
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 7			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 7			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 9kHz-30MHz and 1-10GHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated
Transmit

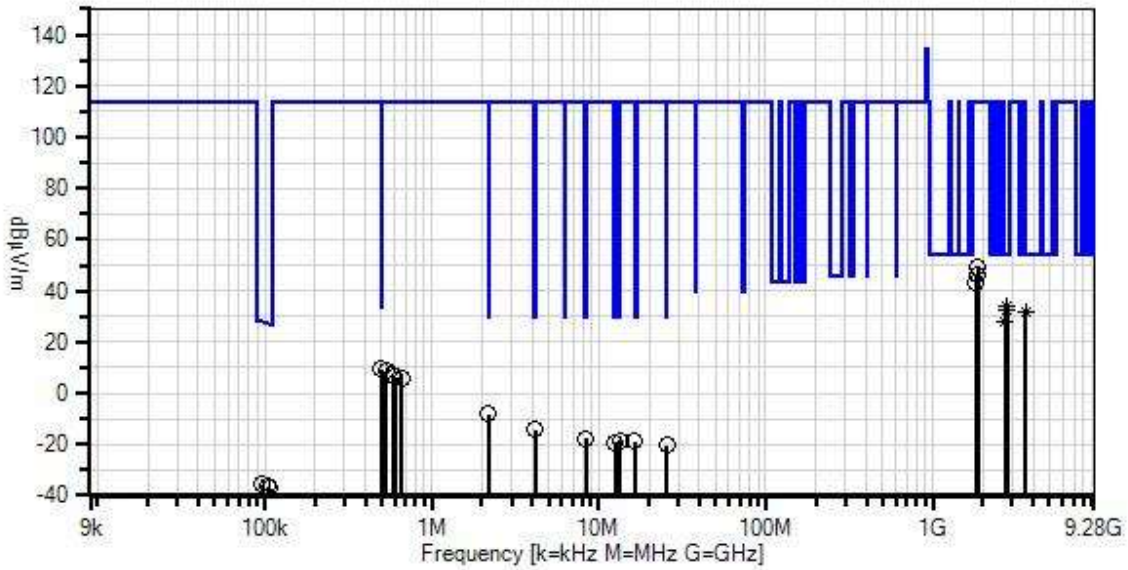
Antenna type: Threshold Antenna
Antenna Gain: +6dBi
Antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 1.5-meter cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.

Impinj, Inc. WO#: 103052 Sequence#: 60 Date: 9/30/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Para



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021
T2	AN00052	Loop Antenna	6502	5/7/2018	5/7/2020
T3	ANP06515	Cable	Heliax	6/29/2018	6/29/2020
T4	AN03540	Preamp	83017A	5/13/2019	5/13/2021
T5	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	7/5/2019	7/5/2021
T6	ANP06503	Cable	32026-29801-29801-36	3/13/2018	3/13/2020
T7	AN03170	High Pass Filter	HM1155-11SS	11/27/2017	11/27/2019

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

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	2781.805M	34.4	+0.7	+0.0	+2.6	-34.1	+0.0	33.8	54.0	-20.2	Para
	Ave		+28.5	+1.1	+0.6						
^	2781.805M	45.8	+0.7	+0.0	+2.6	-34.1	+0.0	45.2	54.0	-8.8	Para
			+28.5	+1.1	+0.6						
3	2744.505M	33.1	+0.7	+0.0	+2.6	-34.1	+0.0	32.4	54.0	-21.6	Para
	Ave		+28.4	+1.1	+0.6						
^	2744.505M	45.3	+0.7	+0.0	+2.6	-34.1	+0.0	44.6	54.0	-9.4	Para
			+28.4	+1.1	+0.6						
5	3610.700M	29.0	+0.8	+0.0	+3.6	-33.8	+0.0	32.0	54.0	-22.0	Para
	Ave		+30.3	+1.3	+0.8						
^	3610.700M	42.2	+0.8	+0.0	+3.6	-33.8	+0.0	45.2	54.0	-8.8	Para
			+30.3	+1.3	+0.8						
7	499.147k	39.6	+0.0	+9.7	+0.0	+0.0	-40.0	9.3	33.6	-24.3	Para
			+0.0	+0.0	+0.0						
8	2708.200M	28.8	+0.7	+0.0	+2.6	-34.1	+0.0	28.0	54.0	-26.0	Para
	Ave		+28.3	+1.1	+0.6						
^	2708.200M	42.5	+0.7	+0.0	+2.6	-34.1	+0.0	41.7	54.0	-12.3	Para
			+28.3	+1.1	+0.6						
10	2.184M	22.1	+0.0	+9.7	+0.1	+0.0	-40.0	-8.1	29.5	-37.6	Para
			+0.0	+0.0	+0.0						
11	4.178M	16.0	+0.0	+9.7	+0.1	+0.0	-40.0	-14.2	29.5	-43.7	Para
			+0.0	+0.0	+0.0						
12	8.385M	13.0	+0.0	+9.3	+0.1	+0.0	-40.0	-17.6	29.5	-47.1	Para
			+0.0	+0.0	+0.0						
13	13.394M	12.4	+0.0	+9.1	+0.2	+0.0	-40.0	-18.3	29.5	-47.8	Para
			+0.0	+0.0	+0.0						
14	16.421M	12.2	+0.1	+8.8	+0.2	+0.0	-40.0	-18.7	29.5	-48.2	Para
			+0.0	+0.0	+0.0						
15	12.520M	11.6	+0.0	+9.1	+0.2	+0.0	-40.0	-19.1	29.5	-48.6	Para
			+0.0	+0.0	+0.0						
16	25.646M	12.6	+0.1	+6.8	+0.3	+0.0	-40.0	-20.2	29.5	-49.7	Para
			+0.0	+0.0	+0.0						

17	104.963k	34.0	+0.0 +0.0	+9.6 +0.0	+0.0 +0.0	+0.0	-80.0	-36.4	27.2	-63.6	Para
18	96.307k	34.6	+0.0 +0.0	+9.7 +0.0	+0.0 +0.0	+0.0	-80.0	-35.7	27.9	-63.6	Para
19	106.970k	33.1	+0.0 +0.0	+9.6 +0.0	+0.0 +0.0	+0.0	-80.0	-37.3	27.0	-64.3	Para
20	1854.545M	53.4	+0.5 +26.5	+0.0 +0.7	+2.3 +0.7	-34.7	+0.0	49.4	114.1	-64.7	Para
21	1829.460M	50.3	+0.5 +26.3	+0.0 +0.7	+2.3 +0.7	-34.8	+0.0	46.0	114.1	-68.1	Para
22	1805.640M	47.8	+0.5 +26.1	+0.0 +0.7	+2.2 +0.7	-34.8	+0.0	43.2	114.1	-70.9	Para
23	530.507k	38.8	+0.0 +0.0	+9.7 +0.0	+0.0 +0.0	+0.0	-40.0	8.5	114.1	-105.6	Para
24	584.866k	37.3	+0.0 +0.0	+9.7 +0.0	+0.0 +0.0	+0.0	-40.0	7.0	114.1	-107.1	Para
25	597.410k	36.6	+0.0 +0.0	+9.7 +0.0	+0.0 +0.0	+0.0	-40.0	6.3	114.1	-107.8	Para
26	660.131k	36.2	+0.0 +0.0	+9.8 +0.0	+0.0 +0.0	+0.0	-40.0	6.0	114.1	-108.1	Para

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/17/2019
Test Type:	**Maximized Emissions**	Time:	14:21:50
Tested By:	Matthew Harrison	Sequence#:	26
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 7			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 7			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

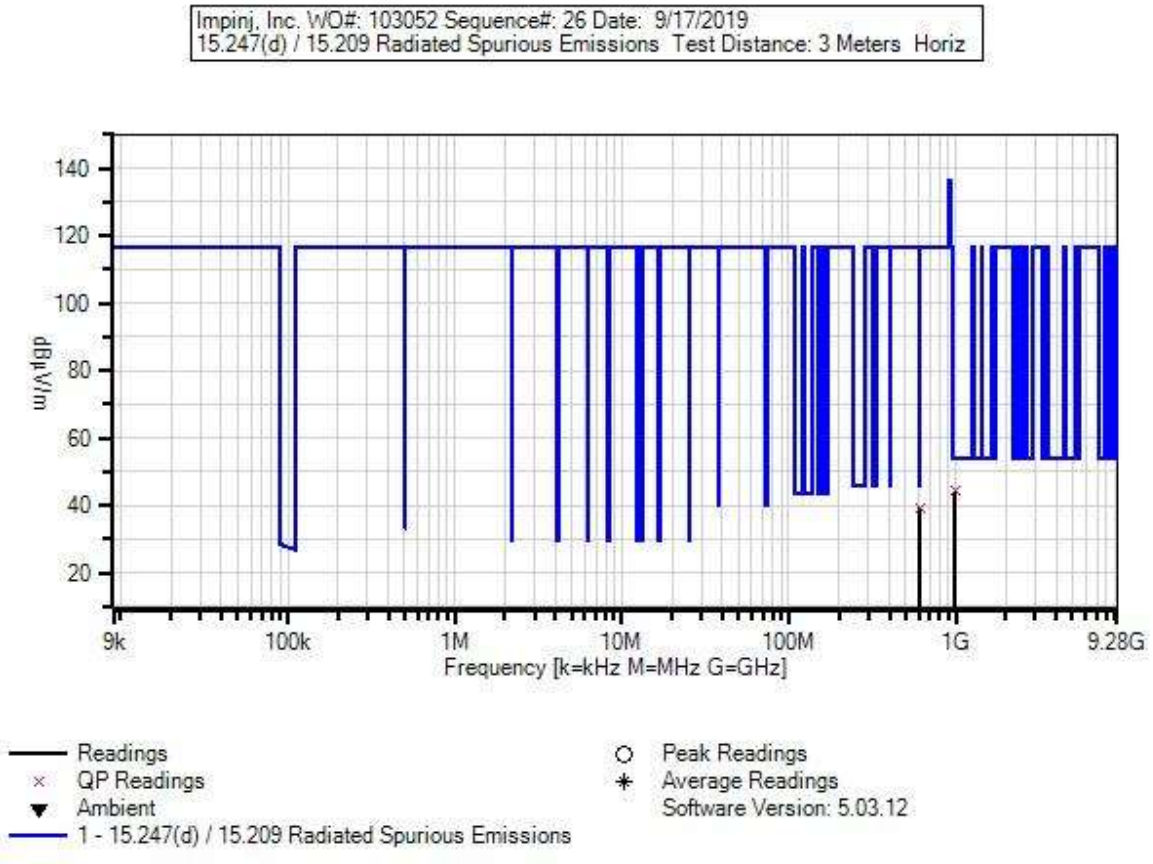
Frequency Range: 30-1000MHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

Antenna type: Threshold Antenna
Antenna Gain: +6dBi
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 2-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
T2	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	1/31/2018	1/31/2020
T5	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	608.020M QP	9.3	+21.1 +0.3	+5.8	+1.2	+1.5	+0.0	39.2	46.0	-6.8	Horiz
^	608.020M	15.6	+21.1 +0.3	+5.8	+1.2	+1.5	+0.0	45.5	46.0	-0.5	Horiz
3	983.596M QP	9.3	+24.9 +0.4	+5.9	+1.5	+2.1	+0.0	44.1	54.0	-9.9	Horiz
^	983.596M	15.3	+24.9 +0.4	+5.9	+1.5	+2.1	+0.0	50.1	54.0	-3.9	Horiz

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/17/2019
Test Type:	**Maximized Emissions**	Time:	14:05:57
Tested By:	Matthew Harrison	Sequence#:	25
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 7			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 7			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 30-1000MHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

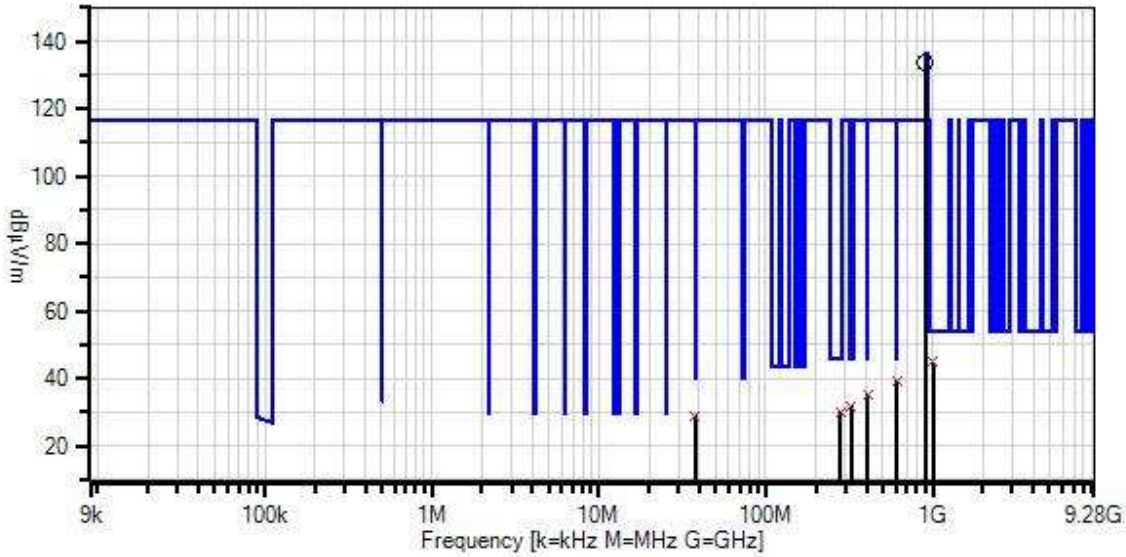
Antenna type: Threshold Antenna
Antenna Gain: +6dBi
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 2-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.

Impinj, Inc. WO#: 103052 Sequence#: 25 Date: 9/17/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
T2	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	1/31/2018	1/31/2020
T5	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	902.794M	100.7	+23.8 +0.3	+5.8	+1.4	+2.0	+0.0	134.0	136.5	-2.5	Vert
2	610.422M QP	9.5	+21.1 +0.3	+5.8	+1.2	+1.5	+0.0	39.4	46.0	-6.6	Vert
^	610.422M	19.7	+21.1 +0.3	+5.8	+1.2	+1.5	+0.0	49.6	46.0	+3.6	Vert
4	998.497M QP	9.7	+25.1 +0.4	+5.9	+1.5	+2.1	+0.0	44.7	54.0	-9.3	Vert
^	998.497M	19.4	+25.1 +0.4	+5.9	+1.5	+2.1	+0.0	54.4	54.0	+0.4	Vert
6	408.501M QP	9.4	+17.6 +0.2	+5.8	+1.0	+1.2	+0.0	35.2	46.0	-10.8	Vert
^	408.501M	19.0	+17.6 +0.2	+5.8	+1.0	+1.2	+0.0	44.8	46.0	-1.2	Vert
8	37.587M QP	9.0	+13.2 +0.1	+5.8	+0.3	+0.3	+0.0	28.7	40.0	-11.3	Vert
^	37.587M	17.2	+13.2 +0.1	+5.8	+0.3	+0.3	+0.0	36.9	40.0	-3.1	Vert
10	323.456M QP	9.3	+14.3 +0.2	+5.8	+0.9	+1.1	+0.0	31.6	46.0	-14.4	Vert
^	323.456M	19.1	+14.3 +0.2	+5.8	+0.9	+1.1	+0.0	41.4	46.0	-4.6	Vert
12	279.852M QP	9.4	+12.8 +0.2	+5.8	+0.8	+1.0	+0.0	30.0	46.0	-16.0	Vert
^	279.852M	19.4	+12.8 +0.2	+5.8	+0.8	+1.0	+0.0	40.0	46.0	-6.0	Vert

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/30/2019
Test Type:	**Maximized Emissions**	Time:	14:09:19
Tested By:	Matthew Harrison	Sequence#:	61
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 8			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 8			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

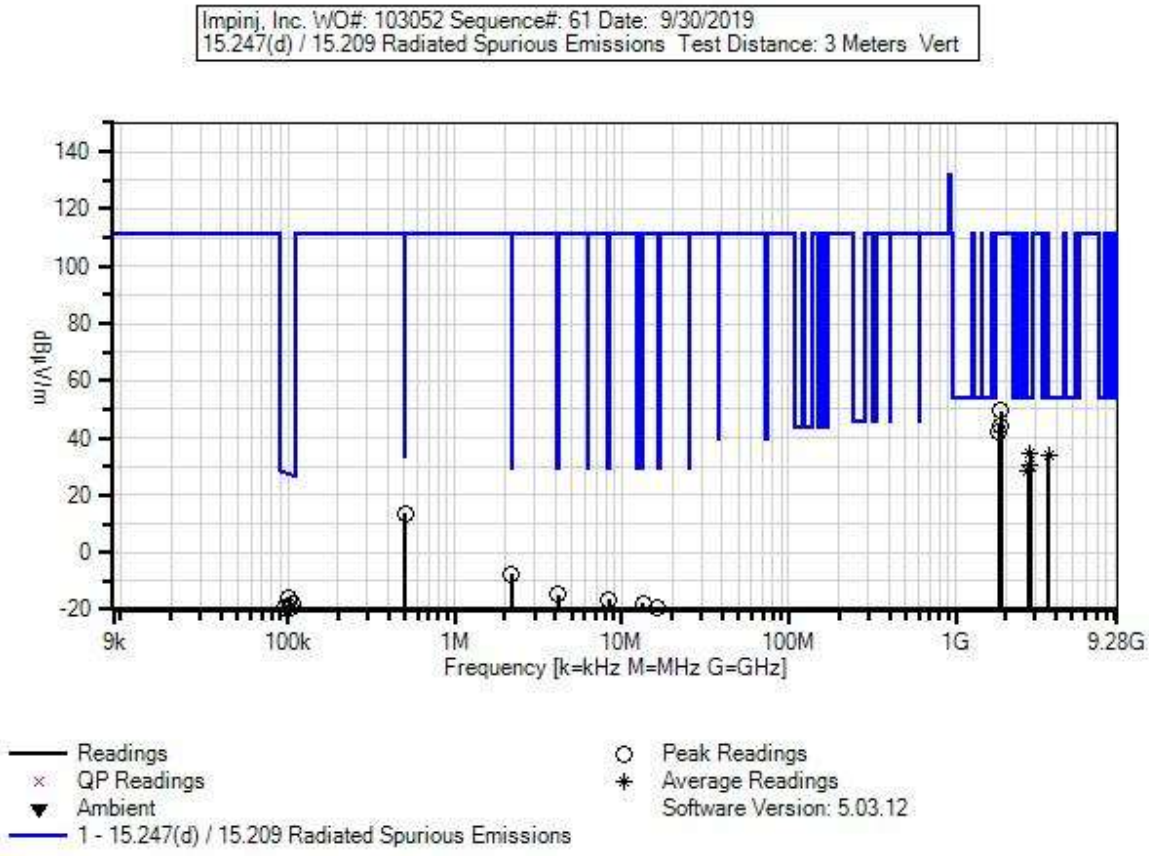
Frequency Range: 9kHz-30MHz and 1-10GHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated
Transmit

Antenna type: Guardwall Antenna
Antenna Gain: +6dBi
Antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 1.5-meter cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.


Impinj, Inc. WO#: 103052 Sequence#: 61 Date: 9/30/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert
140
120
100
80
60
40
20
0
-20
dBuV/m
9k
100k
1M
10M
100M
1G
9.28G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021
T2	AN00052	Loop Antenna	6502	5/7/2018	5/7/2020
T3	ANP06515	Cable	Heliax	6/29/2018	6/29/2020
T4	AN03540	Preamp	83017A	5/13/2019	5/13/2021
T5	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	7/5/2019	7/5/2021
T6	ANP06503	Cable	32026-29801-29801-36	3/13/2018	3/13/2020
T7	AN03170	High Pass Filter	HM1155-11SS	11/27/2017	11/27/2019

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

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	2781.665M	34.9	+0.7	+0.0	+2.6	-34.1	+0.0	34.3	54.0	-19.7	Vert
	Ave		+28.5	+1.1	+0.6						
^	2781.665M	46.8	+0.7	+0.0	+2.6	-34.1	+0.0	46.2	54.0	-7.8	Vert
			+28.5	+1.1	+0.6						
3	501.237k	44.0	+0.0	+9.7	+0.0	+0.0	-40.0	13.7	33.6	-19.9	Para
			+0.0	+0.0	+0.0						
4	3611.180M	31.0	+0.8	+0.0	+3.6	-33.8	+0.0	34.0	54.0	-20.0	Vert
	Ave		+30.3	+1.3	+0.8						
^	3611.180M	42.3	+0.8	+0.0	+3.6	-33.8	+0.0	45.3	54.0	-8.7	Vert
			+30.3	+1.3	+0.8						
6	2744.275M	31.4	+0.7	+0.0	+2.6	-34.1	+0.0	30.7	54.0	-23.3	Vert
	Ave		+28.4	+1.1	+0.6						
^	2744.275M	44.9	+0.7	+0.0	+2.6	-34.1	+0.0	44.2	54.0	-9.8	Vert
			+28.4	+1.1	+0.6						
8	2708.180M	29.6	+0.7	+0.0	+2.6	-34.1	+0.0	28.8	54.0	-25.2	Vert
	Ave		+28.3	+1.1	+0.6						
^	2708.180M	42.7	+0.7	+0.0	+2.6	-34.1	+0.0	41.9	54.0	-12.1	Vert
			+28.3	+1.1	+0.6						
10	2.178M	22.8	+0.0	+9.7	+0.1	+0.0	-40.0	-7.4	29.5	-36.9	Para
			+0.0	+0.0	+0.0						
11	101.827k	54.5	+0.0	+9.7	+0.0	+0.0	-80.0	-15.8	27.5	-43.3	Para
			+0.0	+0.0	+0.0						
12	4.178M	15.6	+0.0	+9.7	+0.1	+0.0	-40.0	-14.6	29.5	-44.1	Para
			+0.0	+0.0	+0.0						
13	107.597k	52.7	+0.0	+9.6	+0.0	+0.0	-80.0	-17.7	27.0	-44.7	Para
			+0.0	+0.0	+0.0						
14	8.385M	14.3	+0.0	+9.3	+0.1	+0.0	-40.0	-16.3	29.5	-45.8	Para
			+0.0	+0.0	+0.0						
15	102.579k	50.8	+0.0	+9.7	+0.0	+0.0	-80.0	-19.5	27.4	-46.9	Para
			+0.0	+0.0	+0.0						
16	109.102k	50.3	+0.0	+9.6	+0.0	+0.0	-80.0	-20.1	26.9	-47.0	Para
			+0.0	+0.0	+0.0						

17	13.403M	12.8	+0.0 +0.0	+9.1 +0.0	+0.2 +0.0	+0.0	-40.0	-17.9	29.5	-47.4	Para
18	96.683k	50.7	+0.0 +0.0	+9.7 +0.0	+0.0 +0.0	+0.0	-80.0	-19.6	27.9	-47.5	Para
19	13.385M	12.7	+0.0 +0.0	+9.1 +0.0	+0.2 +0.0	+0.0	-40.0	-18.0	29.5	-47.5	Para
20	108.099k	49.7	+0.0 +0.0	+9.6 +0.0	+0.0 +0.0	+0.0	-80.0	-20.7	26.9	-47.6	Para
21	103.081k	49.9	+0.0 +0.0	+9.7 +0.0	+0.0 +0.0	+0.0	-80.0	-20.4	27.4	-47.8	Para
22	106.342k	49.0	+0.0 +0.0	+9.6 +0.0	+0.0 +0.0	+0.0	-80.0	-21.4	27.1	-48.5	Para
23	16.421M	11.7	+0.1 +0.0	+8.8 +0.0	+0.2 +0.0	+0.0	-40.0	-19.2	29.5	-48.7	Para
24	1854.675M	53.4	+0.5 +26.5	+0.0 +0.7	+2.3 +0.7	-34.7	+0.0	49.4	111.7	-62.3	Vert
25	1829.515M	48.8	+0.5 +26.3	+0.0 +0.7	+2.3 +0.7	-34.8	+0.0	44.5	111.7	-67.2	Vert
26	1805.580M	47.0	+0.5 +26.1	+0.0 +0.7	+2.2 +0.7	-34.8	+0.0	42.4	111.7	-69.3	Vert

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/17/2019
Test Type:	**Maximized Emissions**	Time:	1:01:51 PM
Tested By:	Matthew Harrison	Sequence#:	22
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 8			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 8			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 30-1000MHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

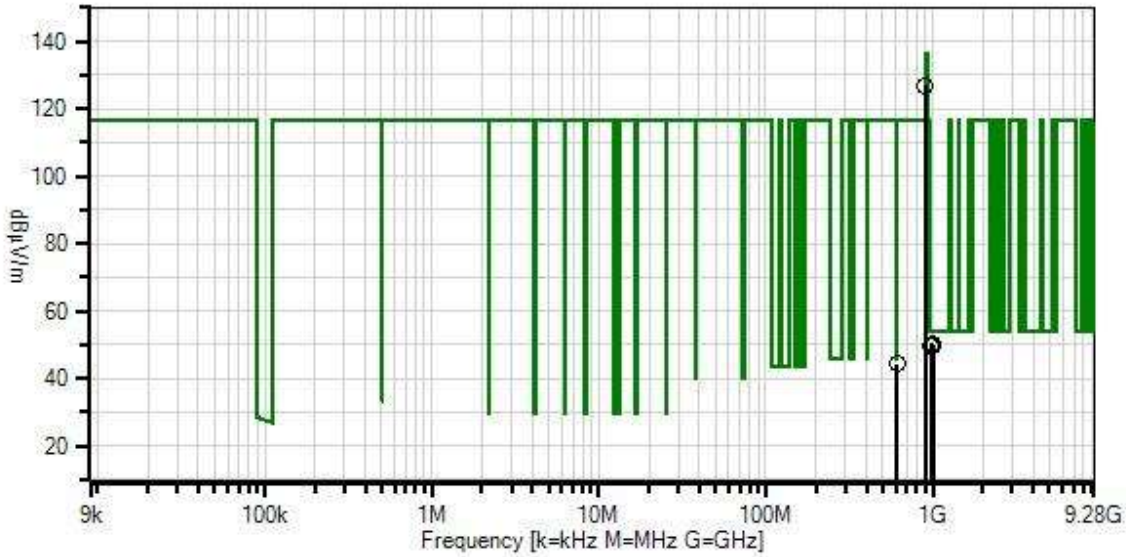
Antenna type: Guardwall Antenna
Antenna Gain: +6dBi
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 2-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.

Impinj, Inc. WO#: 103052 Sequence#: 22 Date: 9/17/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
T2	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	1/31/2018	1/31/2020
T5	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	611.984M	14.4	+21.1 +0.3	+5.8	+1.2	+1.5	+0.0	44.3	46.0	-1.7	Horiz
2	993.113M	15.3	+25.0 +0.4	+5.9	+1.5	+2.1	+0.0	50.2	54.0	-3.8	Horiz
3	995.179M	15.2	+25.0 +0.4	+5.9	+1.5	+2.1	+0.0	50.1	54.0	-3.9	Horiz
4	999.687M	15.1	+25.1 +0.4	+5.9	+1.5	+2.1	+0.0	50.1	54.0	-3.9	Horiz
5	981.342M	15.1	+24.9 +0.4	+5.9	+1.5	+2.1	+0.0	49.9	54.0	-4.1	Horiz
6	985.787M	15.0	+24.9 +0.4	+5.9	+1.5	+2.1	+0.0	49.8	54.0	-4.2	Horiz
7	975.832M	15.0	+24.8 +0.4	+5.9	+1.5	+2.1	+0.0	49.7	54.0	-4.3	Horiz
8	973.641M	15.0	+24.8 +0.4	+5.9	+1.5	+2.1	+0.0	49.7	54.0	-4.3	Horiz
9	988.605M	14.7	+25.0 +0.4	+5.9	+1.5	+2.1	+0.0	49.6	54.0	-4.4	Horiz
10	986.226M	14.8	+24.9 +0.4	+5.9	+1.5	+2.1	+0.0	49.6	54.0	-4.4	Horiz
11	984.973M	14.8	+24.9 +0.4	+5.9	+1.5	+2.1	+0.0	49.6	54.0	-4.4	Horiz
12	987.040M	14.8	+24.9 +0.4	+5.9	+1.5	+2.1	+0.0	49.6	54.0	-4.4	Horiz
13	998.560M	14.6	+25.1 +0.4	+5.9	+1.5	+2.1	+0.0	49.6	54.0	-4.4	Horiz
14	980.340M	14.7	+24.9 +0.4	+5.9	+1.5	+2.1	+0.0	49.5	54.0	-4.5	Horiz
15	902.794M	93.7	+23.8 +0.3	+5.8	+1.4	+2.0	+0.0	127.0	136.5	-9.5	Horiz

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/17/2019
Test Type:	**Maximized Emissions**	Time:	12:59:07
Tested By:	Matthew Harrison	Sequence#:	21
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 8			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 8			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 30-1000MHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

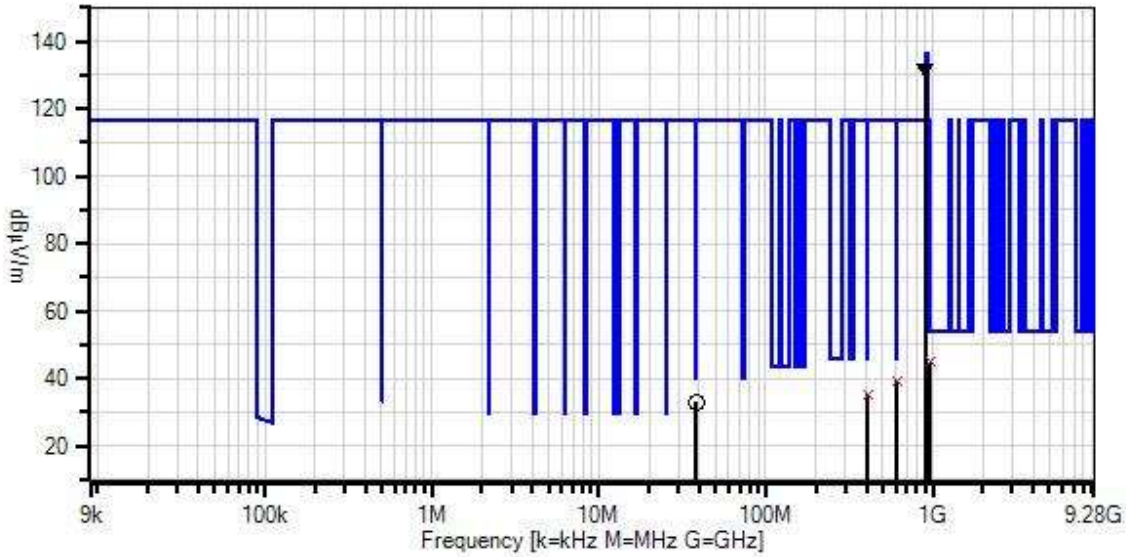
Antenna type: Guardwall Antenna
Antenna Gain: +6dBi
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 1 via a 2-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.

Impinj, Inc. WO#: 103052 Sequence#: 21 Date: 9/17/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
T2	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	1/31/2018	1/31/2020
T5	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T6	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

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	902.794M	98.7	+23.8	+5.8	+1.4	+2.0	+0.0	132.0	136.5	-4.5	Vert
	Ambient		+0.3	+0.0							
2	608.981M	9.5	+21.1	+5.8	+1.2	+1.5	+0.0	39.4	46.0	-6.6	Vert
	QP		+0.3	+0.0							
^	608.981M	15.2	+21.1	+5.8	+1.2	+1.5	+0.0	45.1	46.0	-0.9	Vert
			+0.3	+0.0							
4	38.052M	13.5	+13.0	+5.8	+0.3	+0.3	+0.0	33.0	40.0	-7.0	Vert
			+0.1	+0.0							
5	964.813M	10.1	+24.7	+5.9	+1.5	+2.1	+0.0	44.7	54.0	-9.3	Vert
	QP		+0.4	+0.0							
^	964.813M	15.9	+24.7	+5.9	+1.5	+2.1	+0.0	50.5	54.0	-3.5	Vert
			+0.4	+0.0							
7	405.017M	9.3	+17.6	+5.8	+1.0	+1.2	+0.0	35.1	46.0	-10.9	Vert
	QP		+0.2	+0.0							
^	405.017M	15.2	+17.6	+5.8	+1.0	+1.2	+0.0	41.0	46.0	-5.0	Vert
			+0.2	+0.0							

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/30/2019
Test Type:	**Maximized Emissions**	Time:	15:03:12
Tested By:	Matthew Harrison	Sequence#:	62
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 8			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 8			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

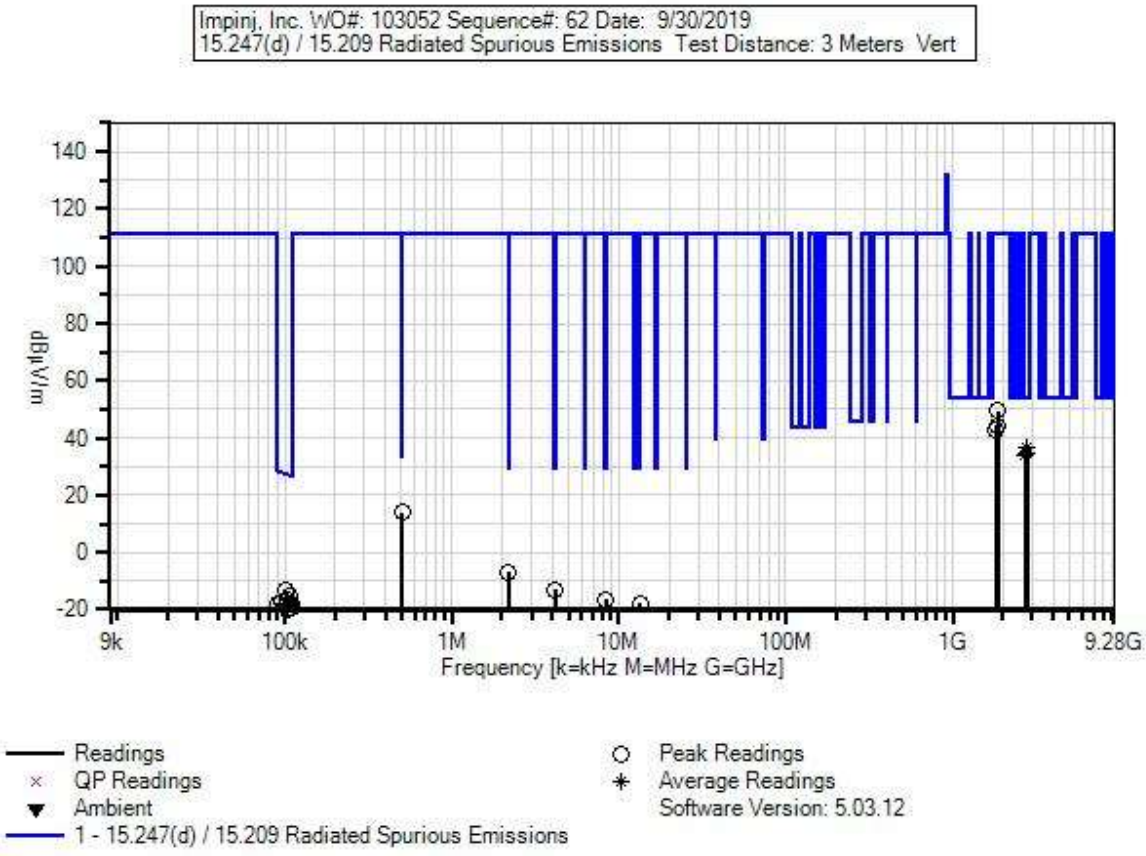
Frequency Range: 9kHz-30MHz and 1-10GHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated
Transmit

Antenna type: Guardwall Antenna
Antenna Gain: +6dBi
Antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 2 via a 1.5-meter cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.


Impinj, Inc. WO#: 103052 Sequence#: 62 Date: 9/30/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert
140
120
100
80
60
40
20
0
-20
dBuV/m
9k
100k
1M
10M
100M
1G
9.28G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021
T2	AN00052	Loop Antenna	6502	5/7/2018	5/7/2020
T3	ANP06515	Cable	Heliax	6/29/2018	6/29/2020
T4	AN03540	Preamp	83017A	5/13/2019	5/13/2021
T5	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	7/5/2019	7/5/2021
T6	ANP06503	Cable	32026-29801-29801-36	3/13/2018	3/13/2020
T7	AN03170	High Pass Filter	HM1155-11SS	11/27/2017	11/27/2019

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

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	2781.755M	37.4	+0.7	+0.0	+2.6	-34.1	+0.0	36.8	54.0	-17.2	Vert
	Ave		+28.5	+1.1	+0.6						
^	2781.755M	47.0	+0.7	+0.0	+2.6	-34.1	+0.0	46.4	54.0	-7.6	Vert
			+28.5	+1.1	+0.6						
3	2744.250M	35.5	+0.7	+0.0	+2.6	-34.1	+0.0	34.8	54.0	-19.2	Vert
	Ave		+28.4	+1.1	+0.6						
^	2744.250M	46.2	+0.7	+0.0	+2.6	-34.1	+0.0	45.5	54.0	-8.5	Vert
			+28.4	+1.1	+0.6						
5	501.237k	44.3	+0.0	+9.7	+0.0	+0.0	-40.0	14.0	33.6	-19.6	Para
			+0.0	+0.0	+0.0						
6	2708.190M	34.7	+0.7	+0.0	+2.6	-34.1	+0.0	33.9	54.0	-20.1	Vert
	Ave		+28.3	+1.1	+0.6						
^	2708.190M	46.0	+0.7	+0.0	+2.6	-34.1	+0.0	45.2	54.0	-8.8	Vert
			+28.3	+1.1	+0.6						
8	2.180M	23.3	+0.0	+9.7	+0.1	+0.0	-40.0	-6.9	29.5	-36.4	Para
			+0.0	+0.0	+0.0						
9	101.827k	56.9	+0.0	+9.7	+0.0	+0.0	-80.0	-13.4	27.5	-40.9	Para
			+0.0	+0.0	+0.0						
10	107.597k	55.0	+0.0	+9.6	+0.0	+0.0	-80.0	-15.4	27.0	-42.4	Para
			+0.0	+0.0	+0.0						
11	4.178M	17.1	+0.0	+9.7	+0.1	+0.0	-40.0	-13.1	29.5	-42.6	Para
			+0.0	+0.0	+0.0						
12	102.579k	53.4	+0.0	+9.7	+0.0	+0.0	-80.0	-16.9	27.4	-44.3	Para
			+0.0	+0.0	+0.0						
13	109.102k	52.7	+0.0	+9.6	+0.0	+0.0	-80.0	-17.7	26.9	-44.6	Para
			+0.0	+0.0	+0.0						
14	103.081k	52.6	+0.0	+9.7	+0.0	+0.0	-80.0	-17.7	27.4	-45.1	Para
			+0.0	+0.0	+0.0						
15	96.683k	53.0	+0.0	+9.7	+0.0	+0.0	-80.0	-17.3	27.9	-45.2	Para
			+0.0	+0.0	+0.0						
16	8.385M	14.3	+0.0	+9.3	+0.1	+0.0	-40.0	-16.3	29.5	-45.8	Para
			+0.0	+0.0	+0.0						

17	108.224k	51.4	+0.0 +0.0	+9.6 +0.0	+0.0 +0.0	+0.0	-80.0	-19.0	26.9	-45.9	Para
18	90.662k	52.4	+0.0 +0.0	+9.8 +0.0	+0.0 +0.0	+0.0	-80.0	-17.8	28.4	-46.2	Para
19	106.342k	51.1	+0.0 +0.0	+9.6 +0.0	+0.0 +0.0	+0.0	-80.0	-19.3	27.1	-46.4	Para
20	103.583k	50.6	+0.0 +0.0	+9.7 +0.0	+0.0 +0.0	+0.0	-80.0	-19.7	27.3	-47.0	Para
21	13.403M	13.0	+0.0 +0.0	+9.1 +0.0	+0.2 +0.0	+0.0	-40.0	-17.7	29.5	-47.2	Para
22	1854.365M	53.3	+0.5 +26.5	+0.0 +0.7	+2.3 +0.7	-34.7	+0.0	49.3	111.7	-62.4	Vert
23	1829.275M	48.6	+0.5 +26.3	+0.0 +0.7	+2.3 +0.7	-34.8	+0.0	44.3	111.7	-67.4	Vert
24	1805.445M	47.1	+0.5 +26.1	+0.0 +0.7	+2.2 +0.7	-34.8	+0.0	42.5	111.7	-69.2	Vert

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/17/2019
Test Type:	**Maximized Emissions**	Time:	13:35:36
Tested By:	Matthew Harrison	Sequence#:	24
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 8			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 8			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 30-1000MHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

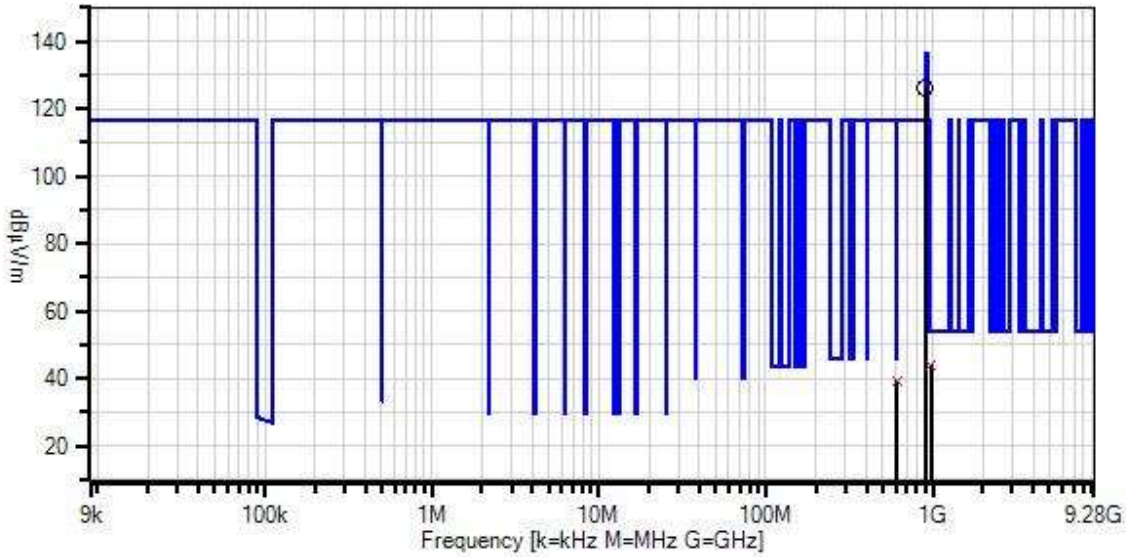
Antenna type: Guardwall Antenna
Antenna Gain: +6dBi
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 2 via a 2-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.

Impinj, Inc. WO#: 103052 Sequence#: 24 Date: 9/17/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
T2	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	1/31/2018	1/31/2020
T5	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	610.062M QP	9.4	+21.1 +0.3	+5.8	+1.2	+1.5	+0.0	39.3	46.0	-6.7	Horiz
^	610.062M	15.5	+21.1 +0.3	+5.8	+1.2	+1.5	+0.0	45.4	46.0	-0.6	Horiz
3	974.893M QP	9.4	+24.8 +0.4	+5.9	+1.5	+2.1	+0.0	44.1	54.0	-9.9	Horiz
^	974.893M	15.3	+24.8 +0.4	+5.9	+1.5	+2.1	+0.0	50.0	54.0	-4.0	Horiz
5	902.794M	93.1	+23.8 +0.3	+5.8	+1.4	+2.0	+0.0	126.4	136.5	-10.1	Horiz

Test Location:	CKC Laboratories Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Impinj, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103052**	Date:	9/17/2019
Test Type:	**Maximized Emissions**	Time:	13:26:10
Tested By:	Matthew Harrison	Sequence#:	23
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 8			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 8			

Test Conditions / Notes:

Temperature: 22° C
Humidity: 45%
Pressure: 101.3 kPa

Frequency Range: 30-1000MHz
Frequency tested: 902.75, 914.75, 927.25
Firmware power setting; 30dBm
Protocol /MCS/Modulation: Continuously modulated

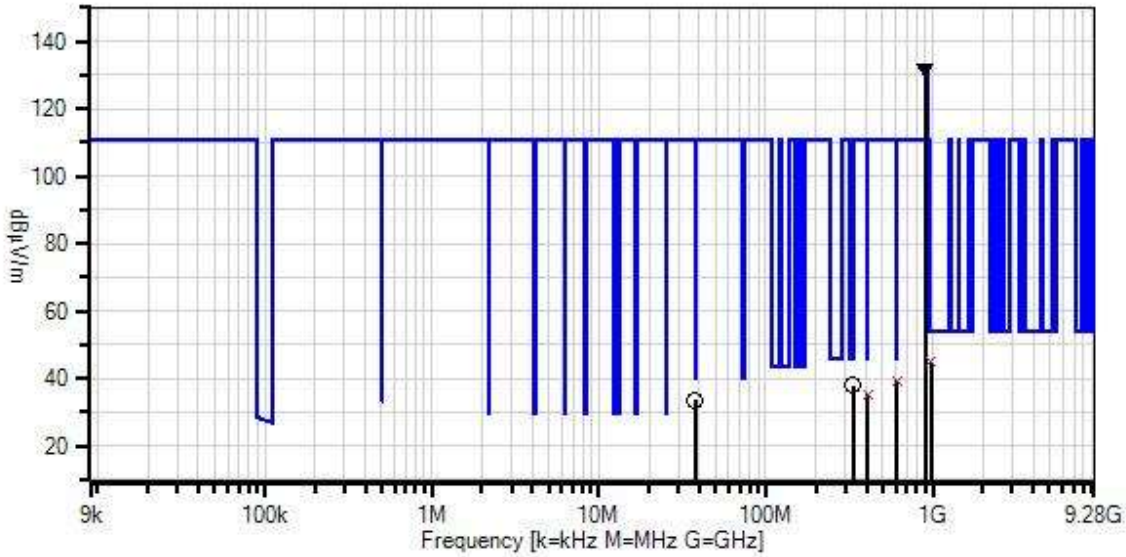
Antenna type: Guardwall Antenna
Antenna Gain: +6dBi
antenna in X, Y & Z axis investigated

Duty Cycle: 100%

Test Method: ANSI 63.10 (2013)

Setup: The EUT is set on a foam test table.
The antenna is connected to antenna port 2 via a 2-meter RG058 cable
3x USB Cables and 1 GPIO Cable connected
A shielded Cat5e is run from the EUT to a POE injector which is connected to a Wireless Router which is connected to the support laptop all located outside the chamber.

Impinj, Inc. WO#: 103052 Sequence#: 23 Date: 9/17/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
T2	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	1/31/2018	1/31/2020
T5	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T6	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

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	902.794M	98.6	+23.8	+5.8	+1.4	+2.0	+0.0	131.9	131.0	+0.9	Vert
	Ambient		+0.3	+0.0							
2	37.720M	13.8	+13.1	+5.8	+0.3	+0.3	+0.0	33.4	40.0	-6.6	Vert
			+0.1	+0.0							
3	609.461M	9.5	+21.1	+5.8	+1.2	+1.5	+0.0	39.4	46.0	-6.6	Vert
	QP		+0.3	+0.0							
^	609.461M	15.5	+21.1	+5.8	+1.2	+1.5	+0.0	45.4	46.0	-0.6	Vert
			+0.3	+0.0							
5	332.945M	15.2	+14.7	+5.8	+0.9	+1.1	+0.0	37.9	46.0	-8.1	Vert
			+0.2	+0.0							
6	981.968M	10.0	+24.9	+5.9	+1.5	+2.1	+0.0	44.8	54.0	-9.2	Vert
	QP		+0.4	+0.0							
^	981.968M	15.8	+24.9	+5.9	+1.5	+2.1	+0.0	50.6	54.0	-3.4	Vert
			+0.4	+0.0							
8	405.978M	9.3	+17.6	+5.8	+1.0	+1.2	+0.0	35.1	46.0	-10.9	Vert
	QP		+0.2	+0.0							
^	405.978M	15.1	+17.6	+5.8	+1.0	+1.2	+0.0	40.9	46.0	-5.1	Vert
			+0.2	+0.0							

Band Edge

Band Edge Summary					
Configuration 2 Operating Mode: Single Channel (Low and High)					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	ASK	Mini-Guardrail	39.3	<46	Pass
902	ASK	Mini-Guardrail	49.9	<86	Pass
928	ASK	Mini-Guardrail	49.4	< 86	Pass
960	ASK	Mini-Guardrail	43.7	<54	Pass

Band Edge Summary					
Configuration 2 Operating Mode: Hopping					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	ASK	Mini-Guardrail	39.3	<46	Pass
902	ASK	Mini-Guardrail	48.8	<86	Pass
928	ASK	Mini-Guardrail	49.7	< 86	Pass
960	ASK	Mini-Guardrail	43.7	<54	Pass

Band Edge Summary					
Configuration 3 Operating Mode: Single Channel (Low and High)					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	ASK	High Gain CP	39.4	<46	Pass
902	ASK	High Gain CP	71.7	<112.7	Pass
928	ASK	High Gain CP	68	< 112.7	Pass
960	ASK	High Gain CP	43.8	<54	Pass

Band Edge Summary					
Configuration 3 Operating Mode: Hopping					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	ASK	High Gain CP	39.4	<46	Pass
902	ASK	High Gain CP	71.6	<112.7	Pass
928	ASK	High Gain CP	70	< 112.7	Pass
960	ASK	High Gain CP	43.9	<54	Pass

Band Edge Summary					
Configuration 4 Operating Mode: Single Channel (Low and High)					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	ASK	Slimline CP	39.3	<46	Pass
902	ASK	Slimline CP	67.7	<109.1	Pass
928	ASK	Slimline CP	67.2	< 109.1	Pass
960	ASK	Slimline CP	43.9	<54	Pass

Band Edge Summary					
Configuration 4 Operating Mode: Hopping					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	ASK	Slimline CP	39.3	<46	Pass
902	ASK	Slimline CP	71	<109.1	Pass
928	ASK	Slimline CP	68.5	< 109.1	Pass
960	ASK	Slimline CP	43.7	<54	Pass

Band Edge Summary					
Configuration 5 Operating Mode: Single Channel (Low and High)					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	ASK	Brickyard	39.5	<46	Pass
902	ASK	Brickyard	74.4	<114.6	Pass
928	ASK	Brickyard	72.8	< 114.6	Pass
960	ASK	Brickyard	45.1	<54	Pass

Band Edge Summary					
Configuration 5 Operating Mode: Hopping					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	ASK	Brickyard	43.3	<46	Pass
902	ASK	Brickyard	76.1	<114.6	Pass
928	ASK	Brickyard	73.8	< 114.6	Pass
960	ASK	Brickyard	44.8	<54	Pass

Band Edge Summary					
Configuration 6 Operating Mode: Single Channel (Low and High)					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	ASK	Matchbox	39.3	<46	Pass
902	ASK	Matchbox	59.7	<99	Pass
928	ASK	Matchbox	56.3	< 99	Pass
960	ASK	Matchbox	43.7	<54	Pass

Band Edge Summary					
Configuration 6 Operating Mode: Hopping					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	ASK	Matchbox	39.3	<46	Pass
902	ASK	Matchbox	59.3	<99	Pass
928	ASK	Matchbox	55.4	< 99	Pass
960	ASK	Matchbox	43.8	<54	Pass

Band Edge Summary					
Configuration 7 Operating Mode: Single Channel (Low and High)					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	ASK	Threshold	39.4	<46	Pass
902	ASK	Threshold	73.9	<114.1	Pass
928	ASK	Threshold	71.2	< 114.1	Pass
960	ASK	Threshold	44.5	<54	Pass

Band Edge Summary					
Configuration 7 Operating Mode: Hopping					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	ASK	Threshold	39.4	<46	Pass
902	ASK	Threshold	75.5	<114.1	Pass
928	ASK	Threshold	71	< 114.1	Pass
960	ASK	Threshold	44.3	<54	Pass

Band Edge Summary					
Configuration 8 Port 1 Operating Mode: Single Channel (Low and High)					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	ASK	Guardwall	39.4	<46	Pass
902	ASK	Guardwall	72.3	<111.7	Pass
928	ASK	Guardwall	70.9	< 111.7	Pass
960	ASK	Guardwall	44.6	<54	Pass

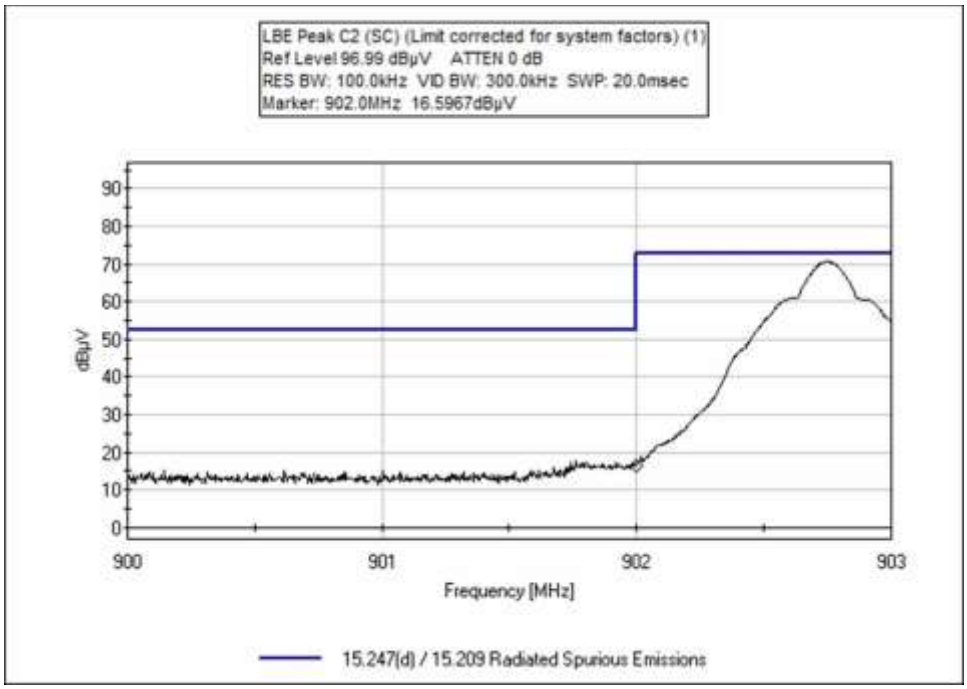
Band Edge Summary					
Configuration 8 Port 1 Operating Mode: Hopping					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	ASK	Guardwall	39.4	<46	Pass
902	ASK	Guardwall	73.3	<111.7	Pass
928	ASK	Guardwall	69.9	< 111.7	Pass
960	ASK	Guardwall	44.4	<54	Pass

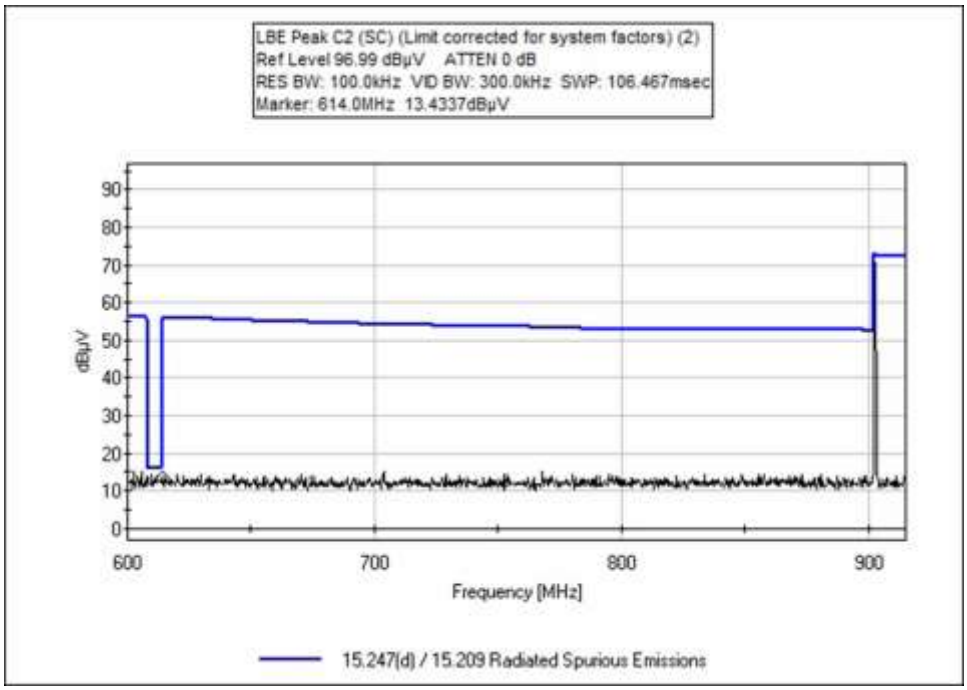
Band Edge Summary					
Configuration , Port 2 Operating Mode: Single Channel (Low and High)					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	ASK	Guardwall	39.4	<46	Pass
902	ASK	Guardwall	72	<111.7	Pass
928	ASK	Guardwall	70.1	< 111.7	Pass
960	ASK	Guardwall	44.2	<54	Pass

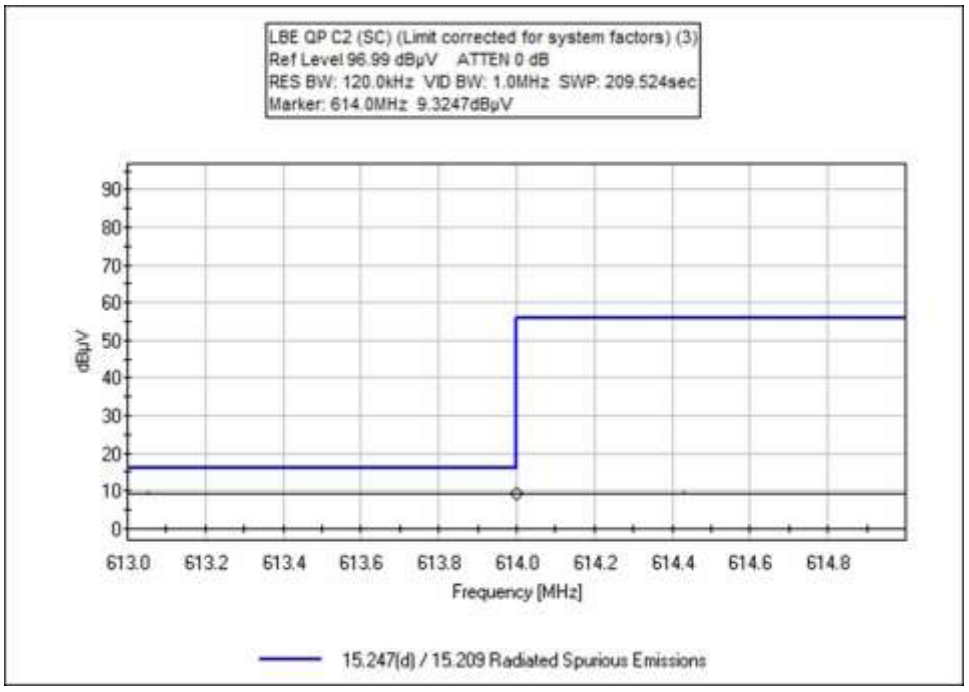
Band Edge Summary					
Configuration 8 Port 2 Operating Mode: Hopping					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	ASK	Guardwall	39.4	<46	Pass
902	ASK	Guardwall	73	<111.7	Pass
928	ASK	Guardwall	70.5	< 111.7	Pass
960	ASK	Guardwall	44.1	<54	Pass

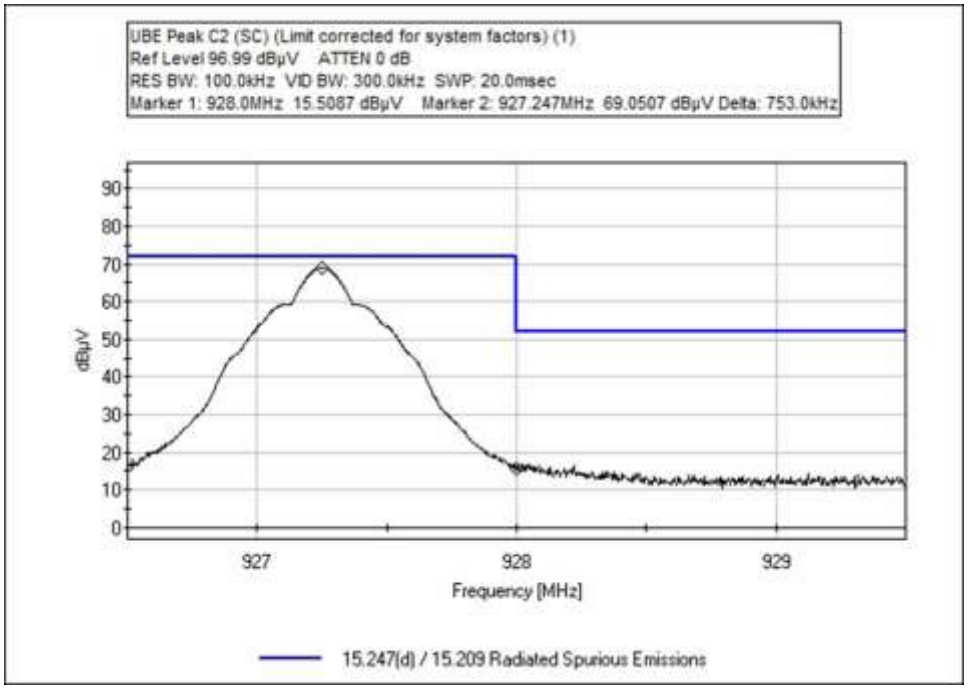
Band Edge Plots

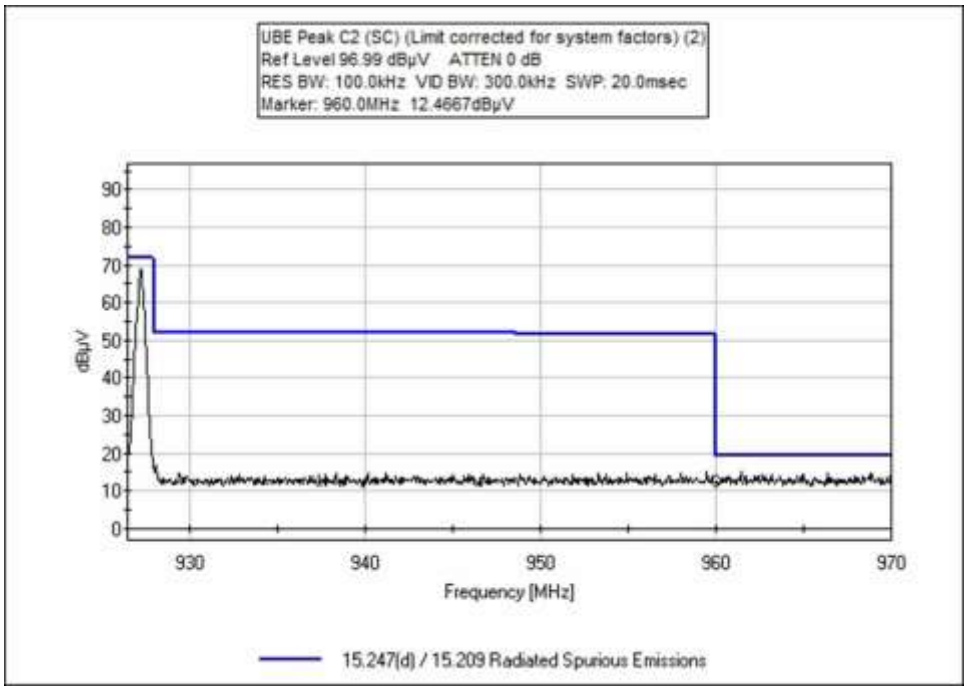
Configuration 2

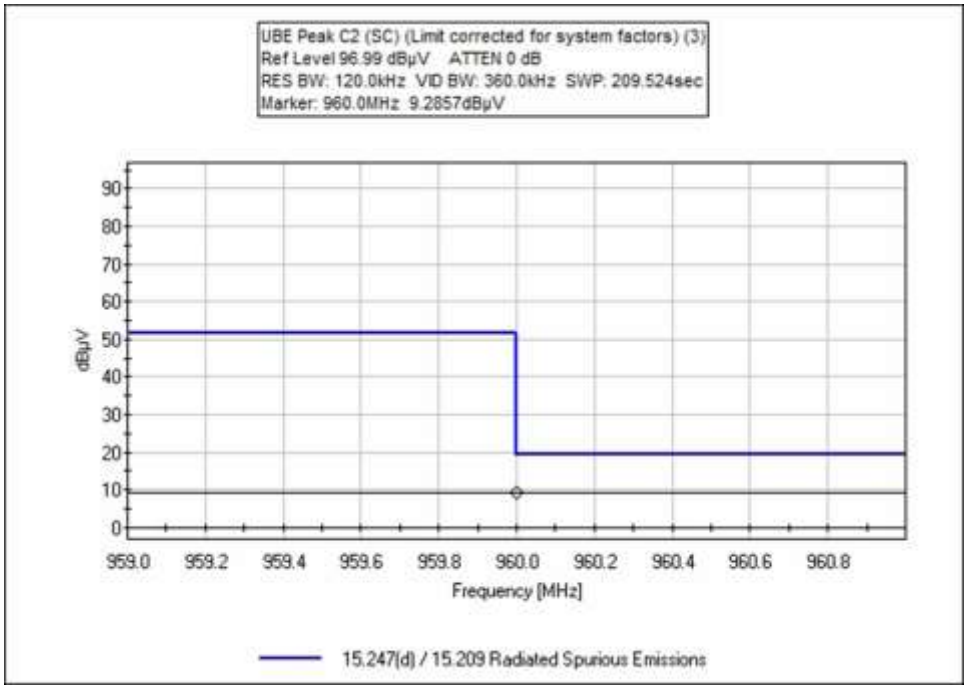


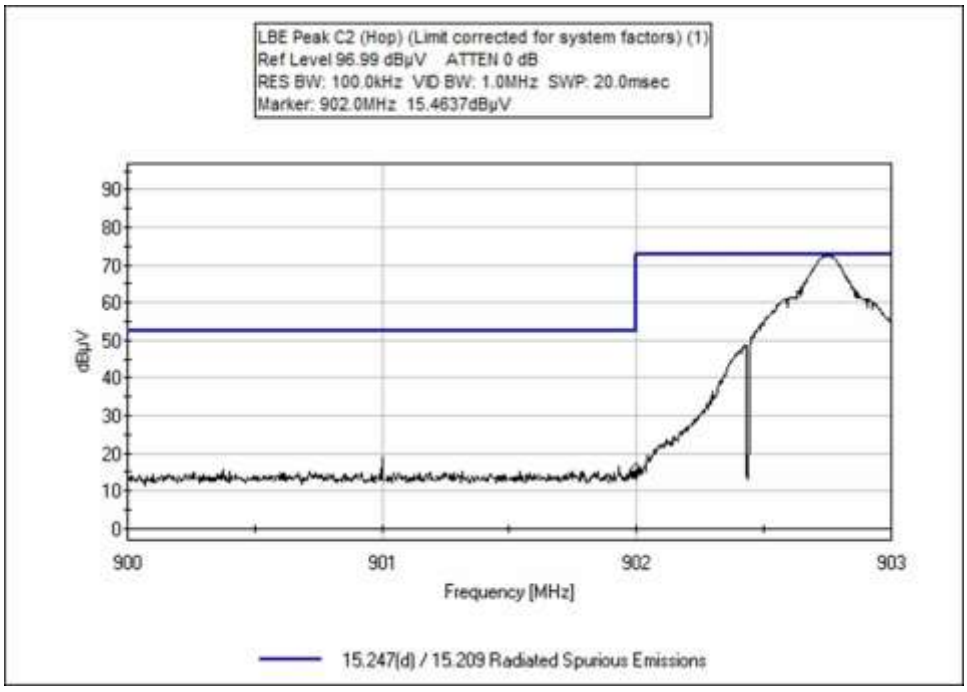


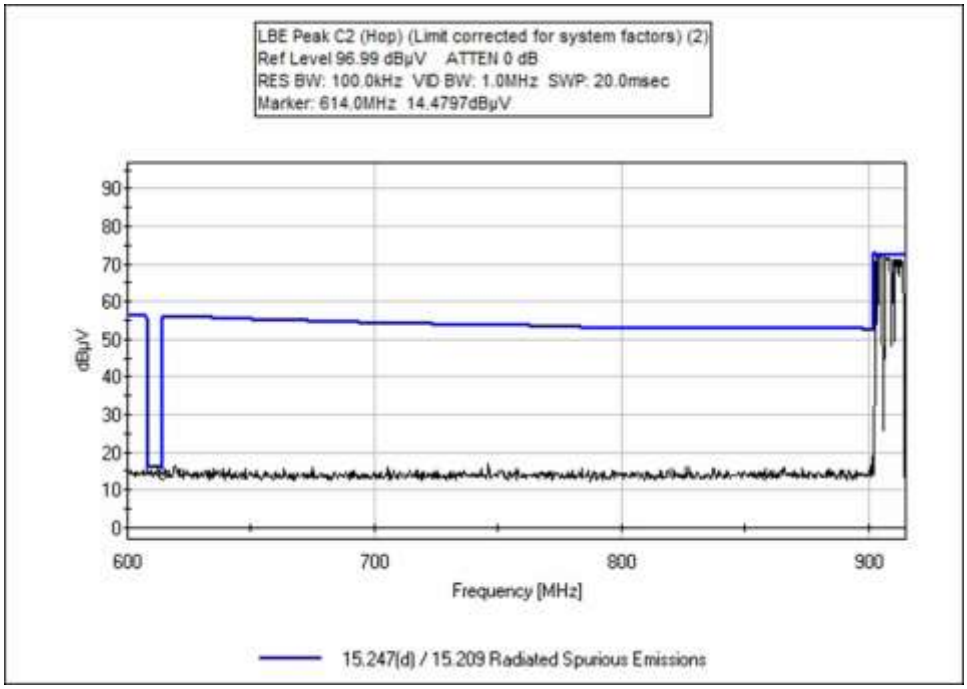

LBE QP C2 (SC) (Limit corrected for system factors) (3)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 1.0MHz SWP: 209.524sec
Marker: 614.0MHz 9.3247dBµV
dBµV
90
80
70
60
50
40
30
20
10
0
613.0
613.2
613.4
613.6
613.8
614.0
614.2
614.4
614.6
614.8
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

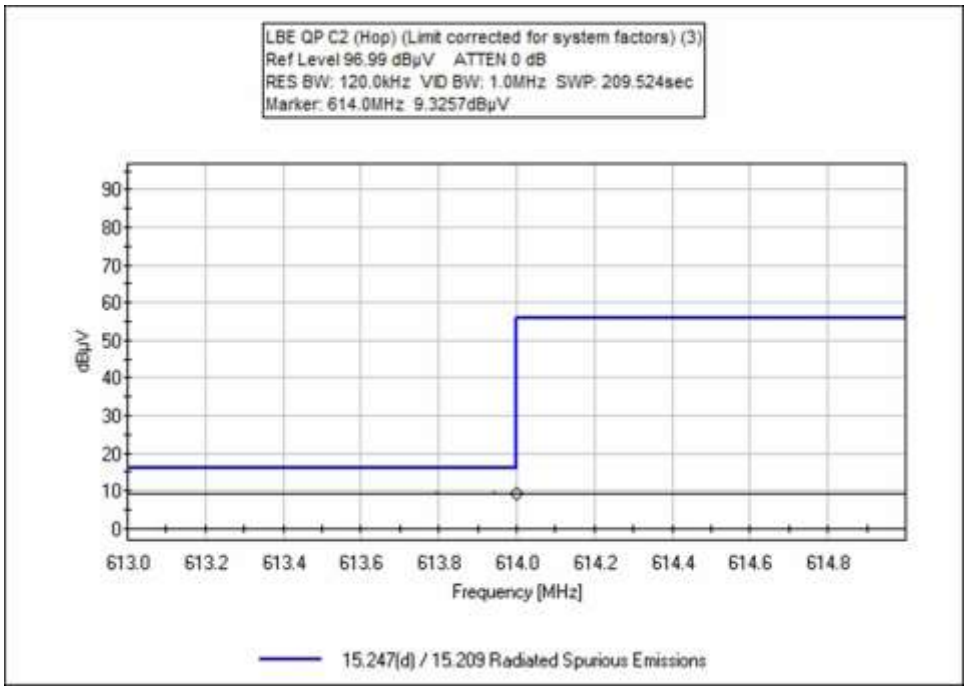

UBE Peak C2 (SC) (Limit corrected for system factors) (1)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker 1: 928.0MHz 15.5087 dBµV Marker 2: 927.247MHz 69.0507 dBµV Delta: 753.0kHz
dBµV
90
80
70
60
50
40
30
20
10
0
927
928
929
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

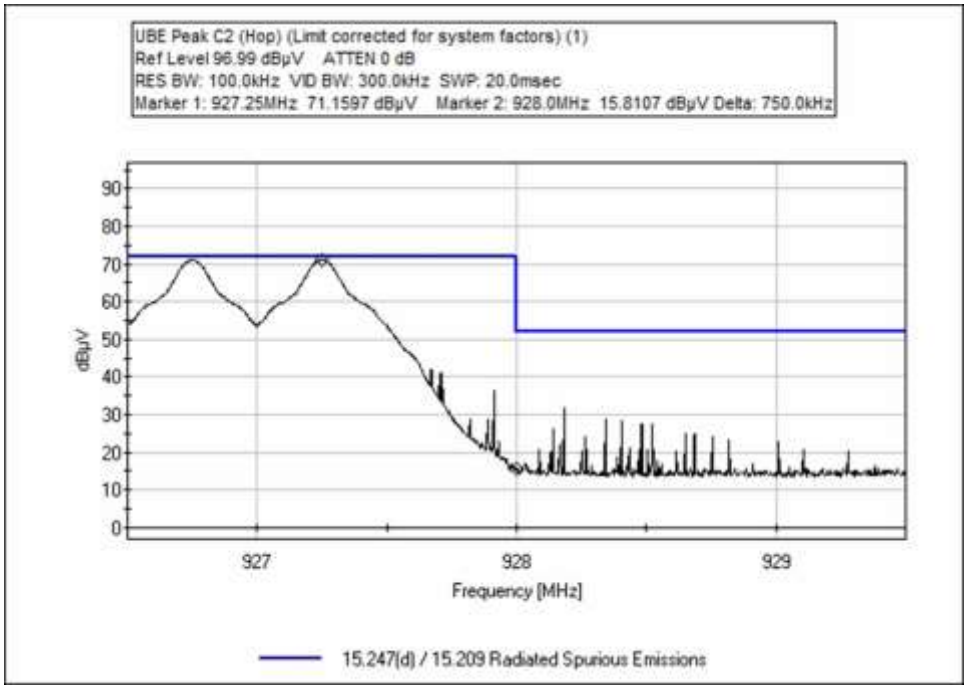

UBE Peak C2 (SC) (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 960.0MHz 12.4667dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

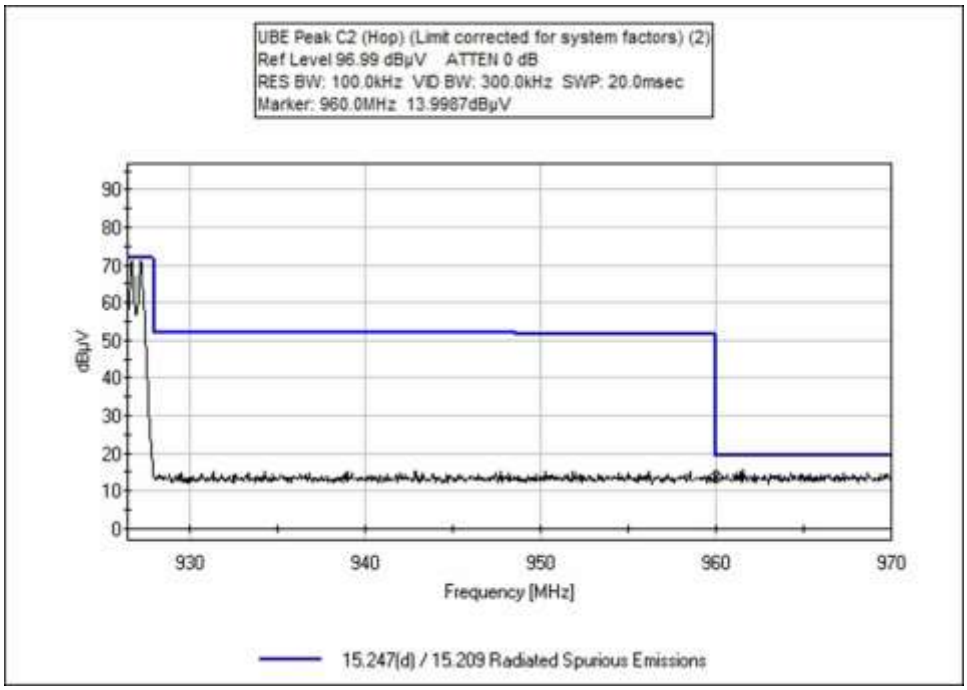

UBE Peak C2 (SC) (Limit corrected for system factors) (3)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 360.0kHz SWP: 209.524sec
Marker: 960.0MHz 9.2857dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

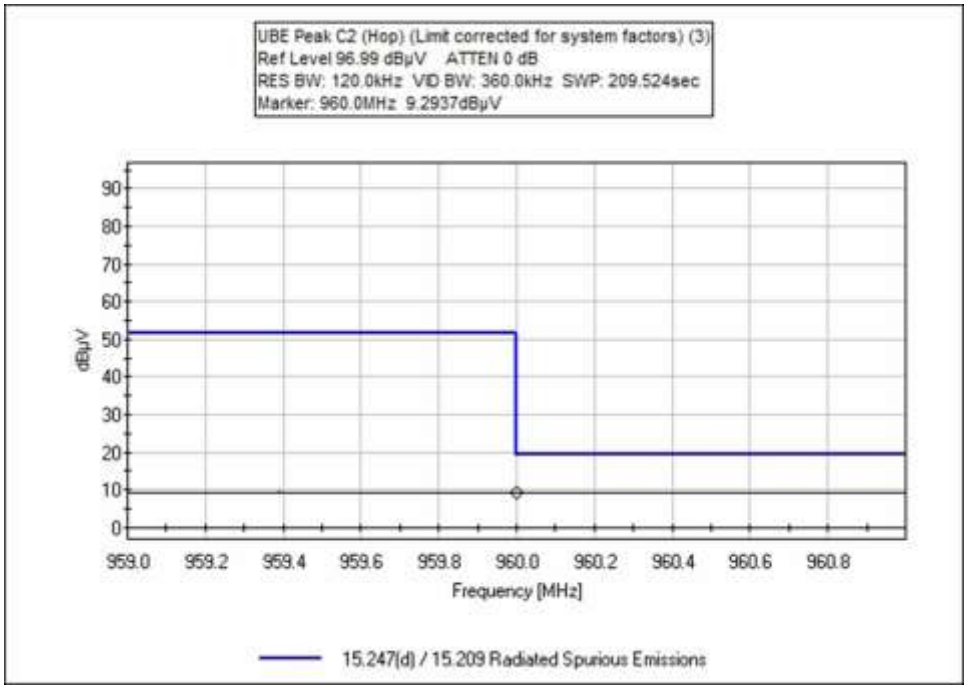

LBE Peak C2 (Hop) (Limit corrected for system factors) (1)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 1.0MHz SWP: 20.0msec
Marker: 902.0MHz 15.4637dBµV
dBµV
90
80
70
60
50
40
30
20
10
0
900
901
902
903
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


LBE Peak C2 (Hop) (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 1.0MHz SWP: 20.0msec
Marker: 614.0MHz 14.4797dBµV
dBµV
90
80
70
60
50
40
30
20
10
0
600
700
800
900
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

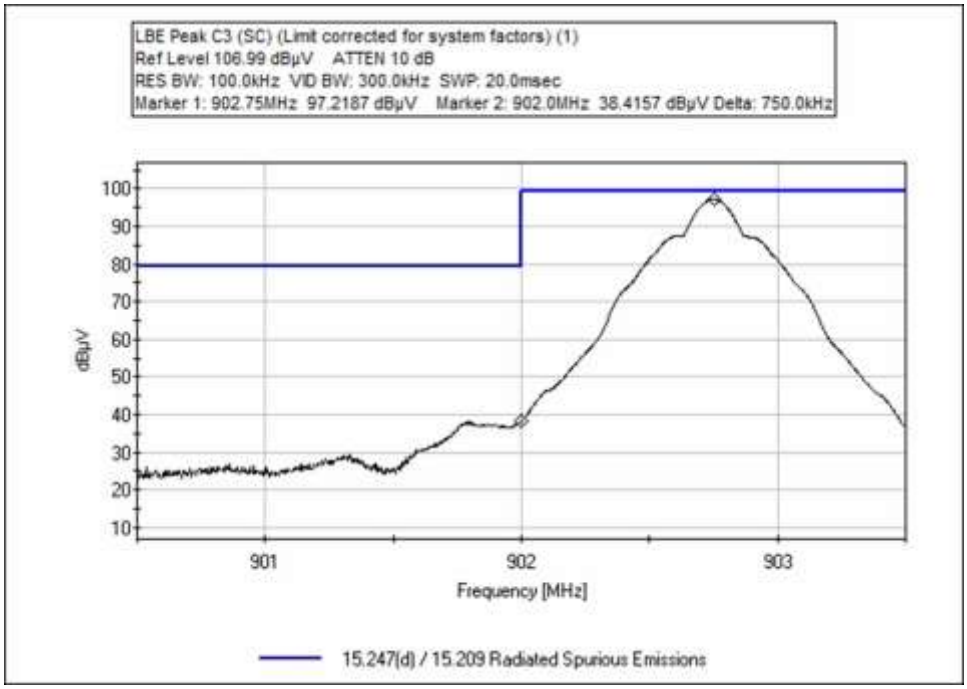

LBE QP C2 (Hop) (Limit corrected for system factors) (3)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 1.0MHz SWP: 209.524sec
Marker: 614.0MHz 9.3257dBµV
dBµV
90
80
70
60
50
40
30
20
10
0
613.0
613.2
613.4
613.6
613.8
614.0
614.2
614.4
614.6
614.8
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

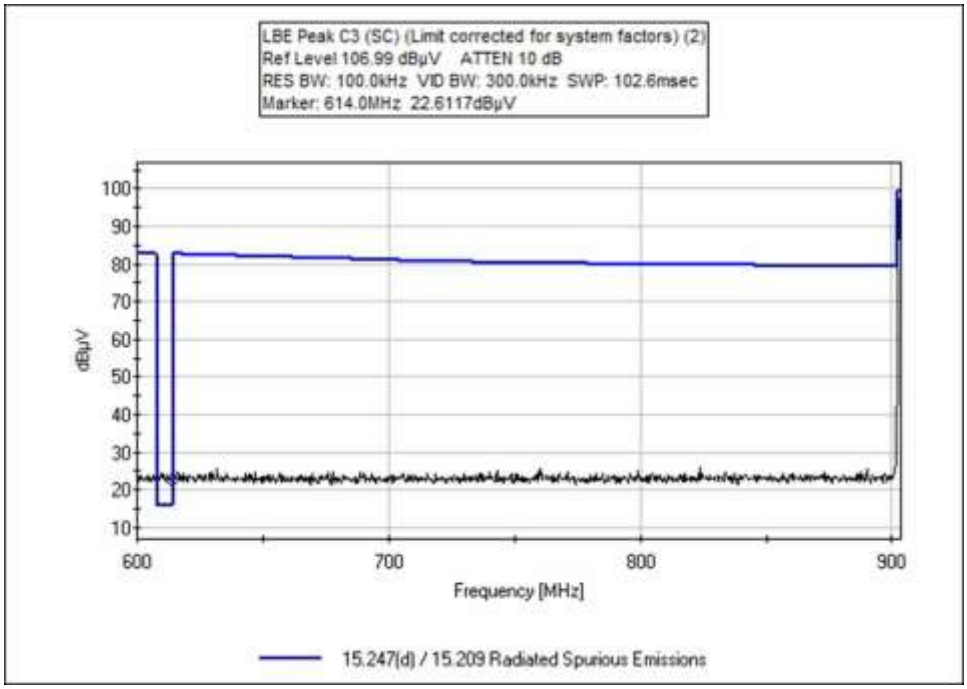

UBE Peak C2 (Hop) (Limit corrected for system factors) (1)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker 1: 927.25MHz 71.1597 dBµV Marker 2: 928.0MHz 15.8107 dBµV Delta: 750.0kHz
dBµV
90
80
70
60
50
40
30
20
10
0
927
928
929
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

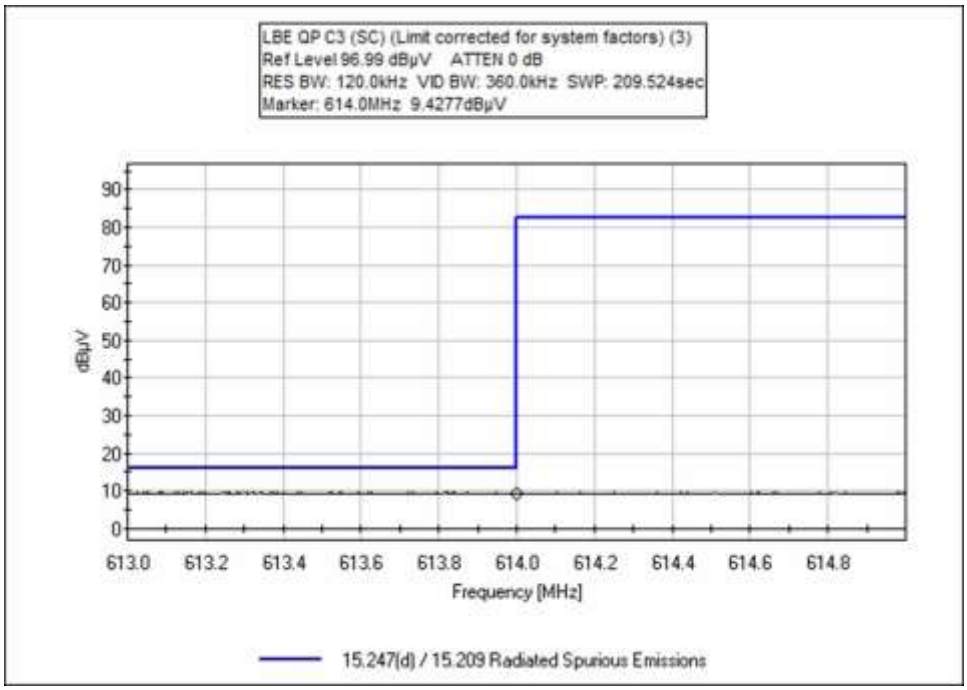

UBE Peak C2 (Hop) (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 960.0MHz 13.9987dBµV
dBµV
90
80
70
60
50
40
30
20
10
0
930
940
950
960
970
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

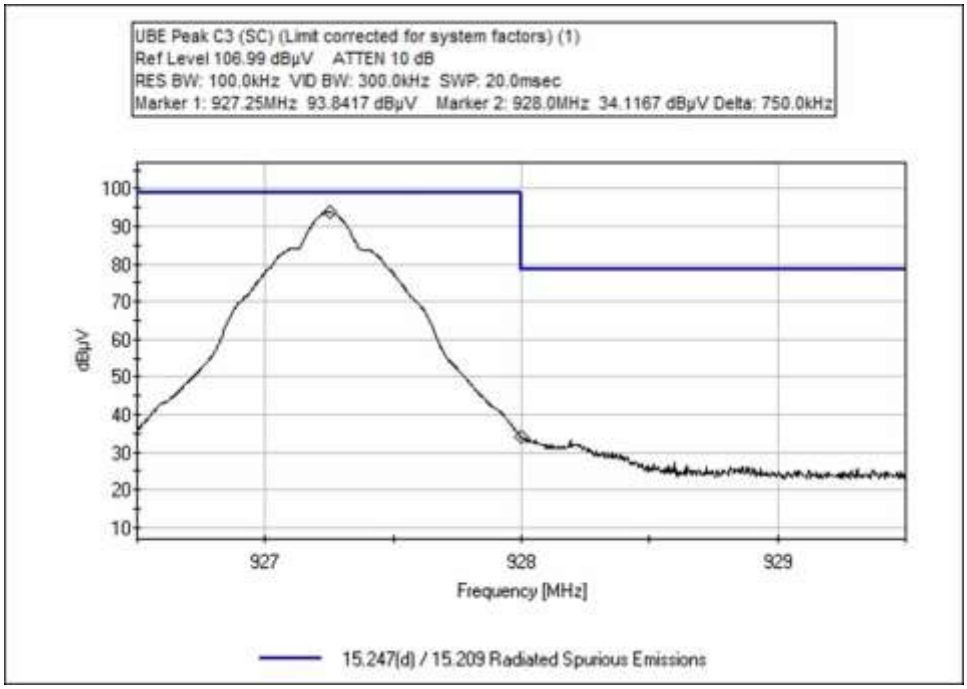

UBE Peak C2 (Hop) (Limit corrected for system factors) (3)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 360.0kHz SWP: 209.524sec
Marker: 960.0MHz 9.2937dBµV
dBµV
90
80
70
60
50
40
30
20
10
0
959.0
959.2
959.4
959.6
959.8
960.0
960.2
960.4
960.6
960.8
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

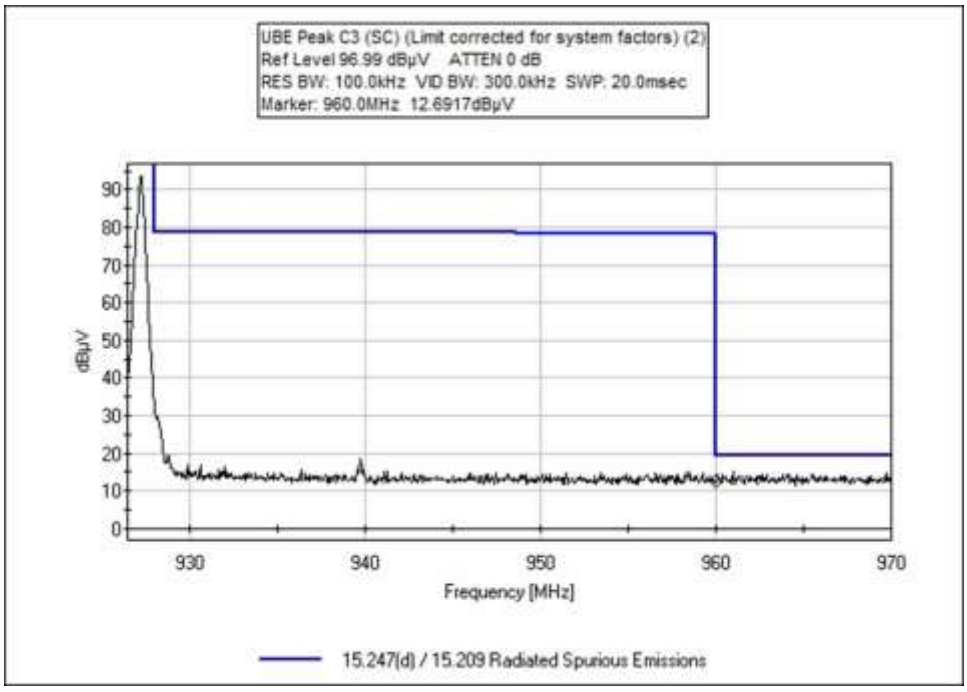
Configuration 3

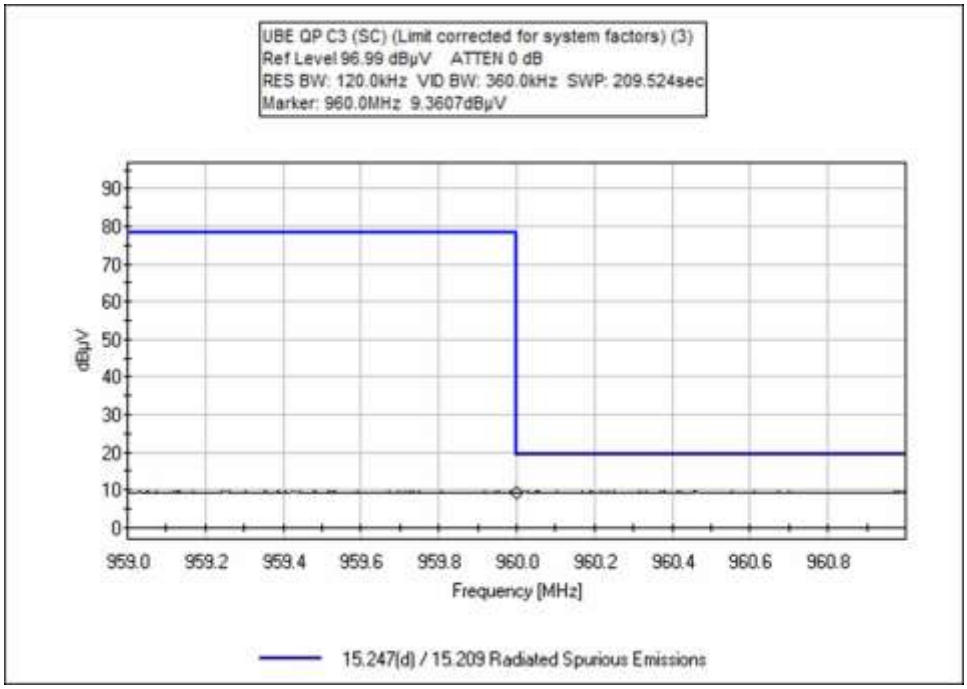





LBE QP C3 (SC) (Limit corrected for system factors) (3)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 360.0kHz SWP: 209.524sec
Marker: 614.0MHz 9.4277dBµV
dBµV
90
80
70
60
50
40
30
20
10
0
613.0
613.2
613.4
613.6
613.8
614.0
614.2
614.4
614.6
614.8
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


UBE Peak C3 (SC) (Limit corrected for system factors) (1)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker 1: 927.25MHz 93.8417 dBµV Marker 2: 928.0MHz 34.1167 dBµV Delta: 750.0kHz
dBµV
100
90
80
70
60
50
40
30
20
10
927
928
929
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


UBE Peak C3 (SC) (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 960.0MHz 12.6917dBµV
dBµV
90
80
70
60
50
40
30
20
10
0
930
940
950
960
970
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


UBE QP C3 (SC) (Limit corrected for system factors) (3)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 360.0kHz SWP: 209.524sec
Marker: 960.0MHz 9.3607dBµV
dBµV
90
80
70
60
50
40
30
20
10
0
959.0
959.2
959.4
959.6
959.8
960.0
960.2
960.4
960.6
960.8
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions