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10 Attorneys for Plaintiff  
IMPINJ, INC.

11  
12 UNITED STATES DISTRICT COURT  
13 NORTHERN DISTRICT OF CALIFORNIA

14  
15 IMPINJ, INC., a Delaware corporation,  
16 Plaintiff,  
17 v.  
18 NXP USA, INC., a Delaware corporation,  
19 Defendant.

Case No.

**COMPLAINT FOR PATENT  
INFRINGEMENT**

**JURY TRIAL DEMANDED**

1 Plaintiff Impinj, Inc. (“Impinj”), for its Complaint, alleges as follows:

2 **NATURE OF THE CASE**

3 1. This is a complex patent infringement action arising from Defendant’s copying of  
4 Impinj’s patented innovations, its infringement of multiple patents owned by Impinj, its refusal to  
5 cease such infringement, and its refusal to even meet with Impinj to address the dispute. Impinj  
6 recognizes that the number of patents asserted will affect case management and is willing to work  
7 with the Court and Defendant to create a workable case management plan.

8 **THE PARTIES**

9 2. Impinj is a Delaware corporation with its principal place of business in Seattle,  
10 Washington.

11 3. Defendant NXP USA, Inc. (“NXP”) is, on information and belief, a Delaware cor-  
12 poration, with its corporate headquarters in Austin, Texas. NXP is, upon information and belief, a  
13 subsidiary of NXP Semiconductors N.V. (“NXP Semiconductors”), a corporation headquartered in  
14 Eindhoven, Netherlands.

15 4. Venue is proper in this district under 28 U.S.C. § 1400(b) because NXP has com-  
16 mitted acts of infringement and has a regular and established place of business in this district.

17 **IMPINJ AND ITS PATENT RIGHTS**

18 5. Impinj is a leading provider of RAIN RFID solutions, including hardware and soft-  
19 ware products that wirelessly connect everyday items to the internet. More specifically, Impinj  
20 sells a platform that includes endpoint integrated circuits (“ICs”), reader ICs, readers and gateways  
21 that enable wireless connectivity to everyday items, and software that delivers information about  
22 those connected items.

23 6. Impinj was founded in March 2000 based on research done at the California Institute  
24 of Technology by Carver Mead and Chris Diorio. Impinj has developed technology in connection  
25 with radio frequency identification, known as “RFID.” Impinj has been instrumental in the devel-  
26 opment of what is now known as RAIN RFID, as well as to the formation of the RAIN RFID global  
27 alliance, which promotes the universal adoption of a certain type of RFID that uses ultra-high fre-  
28 quency (“UHF”) radio waves and a communication protocol known as Gen2. From its inception,

1 Impinj has been known as a leading innovator, particularly in the RAIN RFID space. The United  
2 States Patent and Trademark Office has acknowledged many of Impinj's innovations, awarding  
3 Impinj more than 250 issued patents and allowed applications.

4 7. Impinj's RFID products include Monza RFID tag chips, which were the very first  
5 UHF Gen2 RFID tag chips. Impinj's current Monza R6 IC chip is the most advanced RFID chip  
6 available today, and it has important features and/or functionality such as consistently accurate and  
7 high-quality data delivery, improved yield, auto-tuning to optimize readability for the environment  
8 and application, and other advanced features that have been recognized by the industry. Impinj  
9 also sells Indy reader chips, Speedway readers and gateways, and ItemSense Software.

#### 10 **NXP'S ACTS OF INFRINGEMENT**

11 8. NXP makes and sells ICs that are used in RFID tags and compete with Impinj RAIN  
12 RFID ICs. NXP's products include UCODE 7 and UCODE 8 ICs, which are sold to various cus-  
13 tomers. The UCODE 8 IC was developed, on information and belief, by copying many of the  
14 patented inventions in Impinj's Monza R6 IC chip and in an attempt to mimic the quality and func-  
15 tionality of Impinj's Monza R6 IC.

16 9. After Impinj became aware of NXP's UCODE 8 ICs, it advised NXP Semiconduc-  
17 tors, by letter dated August 11, 2017, that such ICs, and any associated RFID tags, were likely to  
18 infringe many U.S. patents owned by Impinj, which were listed by patent number.

19 10. In response, NXP by letter dated September 7, 2017, indicated it would need to see  
20 a "claim chart" before it would discuss the issues.

21 11. By letter dated September 14, 2017, Impinj suggested the parties meet in person,  
22 and provided a draft non-disclosure agreement to facilitate such discussions.

23 12. NXP indicated it would not enter into any non-disclosure agreement but reiterated  
24 its request for claim charts.

25 13. Since September 14, 2017, Impinj and NXP have exchanged correspondence relat-  
26 ing to the dispute, including correspondence regarding infringement of Impinj's patents by NXP's  
27 UCODE 7 and UCODE 8 ICs. Impinj has provided NXP, among other things, claim charts  
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1 detailing how NXP infringes the patents asserted below. Impinj has also requested, on multiple  
2 occasions, that the parties meet to try to resolve the issues.

3 14. For many of the asserted patents, NXP has not denied that the claims read on its  
4 products, but it asserted that it is the beneficiary of a license under the EPC<sup>TM</sup> Specification for  
5 RFID Air Interface Protocol for Communications at 860 MHz – 960 MHz (“Gen2 protocol”). Un-  
6 der that protocol, Impinj agreed to license patent claims that were “necessary” to practice the Gen2  
7 protocol.

8 15. By claiming a license under the Gen2 protocol, NXP has admitted that it is practic-  
9 ing the claims of those patents.

10 16. None of the patent claims asserted below are necessary to practice the Gen2 proto-  
11 col.

12 17. For other of the asserted patents, NXP has not denied that the claims read on its  
13 products but claimed that the patents are invalid.

14 18. NXP cannot establish that any of the asserted patents are invalid.

15 19. Despite numerous and repeated requests, NXP has refused to meet with Impinj to  
16 address its infringement of Impinj’s patents.

17 20. Impinj was thus forced to file this lawsuit to protect its patent rights.

18 **NXP’S INFRINGEMENT OF U.S. PATENT NO. 7,215,251**

19 21. Impinj owns U.S. Patent No. 7,215,251 (“the ’251 Patent”), which is directed to an  
20 RFID transponder with an inventive flag circuit.

21 22. Claim 8 of the ’251 Patent reads as follows:

22 8. A Radio-Frequency Identification (RFID) transponder including:

23 an identification flag circuit to maintain an RFID transponder  
24 state, the identification flag circuit including a first capacitor and  
25 a digital element coupled to the first capacitor to receive a voltage  
of the first capacitor; and

26 a discharge circuit to drain the first capacitor via a discharge cur-  
27 rent that is distinct from a semiconductor leakage current,  
wherein the discharge circuit includes:

28 a discharge circuit capacitor to store voltage; and

1 a transistor circuit coupled to the discharge circuit capacitor to convert voltage stored on a discharge circuit capacitor into the discharge current.

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3 23. Claim 9 of the '251 Patent reads as follows:

4 9. The RFID transponder of claim 8, wherein the transistor circuit includes:

5 a first transistor having a gate, a source and a drain, the gate coupled to the discharge circuit capacitor; and

6  
7 a second transistor having a gate, a source and a drain the gate coupled to the discharge circuit capacitor.

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9 24. Claim 10 of the '251 Patent reads as follows:

10 10. The RFID transponder of claim 9, wherein the discharge circuit capacitor is to store the gate voltage of the first transistor and the gate voltage of the second transistor responsive to detection of power loss on the RFID transponder.

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13 25. NXP's UCODE 7 and UCODE 8 IC have each of the elements of claims 8, 9, and 10 of the '251 Patent, including the recited identification flag circuit and discharge circuit.

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15 26. NXP has indirectly infringed the '251 Patent, including at least claims 9 and 10 of the '251 Patent, under 35 U.S.C. §§ 271(b) and (c), by supplying UCODE 7 and UCODE 8 ICs for inclusion in transponders with knowledge of the '251 Patent. NXP's UCODE 7 and UCODE 8 IC's have no substantial noninfringing use, and NXP has induced inlay manufacturers and others to incorporate UCODE 8 ICs into RFID transponders so that they practice the claims.

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19 27. In the correspondence exchanged between the parties, NXP has not denied that it is practicing claims 9 and 10 of the '251 Patent.

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22 28. NXP has continued its infringing activities despite knowledge of the '251 Patent (including knowledge from correspondence with Impinj), and such infringement is egregious and willful.

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25 **NXP'S INFRINGEMENT OF U.S. PATENT NO. 7,116,240**

26 29. Impinj owns U.S. Patent No. 7,116,240 ("the '240 Patent"), which is directed to an RFID transponder with an inventive circuit design.

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1           30. Claim 1 of the '240 Patent reads as follows:

- 2                   1. A Radio-Frequency Identification (RFID) transponder including:
- 3                           a capacitor;
- 4                           a digital element coupled to the capacitor to receive a voltage of
- 5                           the capacitor; and
- 6                           a charge and leakage circuit including an NMOS device having a
- 7                           source, a drain and a gate, the source node of the NMOS device
- 8                           being coupled to the capacitor and the drain node of the NMOS
- 9                           device being coupled to a first CMOS inverter,
- 10                       wherein the first CMOS inverter is powered by a regulated sup-
- 11                       ply voltage such that the voltage on the capacitor is substantially
- 12                       not dependent on the forward voltage drop of the NMOS device.

13           31. Claim 2 of the '240 Patent reads as follows:

- 14                   2. The RFID transponder of claim 1, wherein the regulated supply
- 15                       voltage is lower than VDD.

16           32. Claim 8 of the '240 Patent reads as follows:

- 17                   8. The RFID transponder of claim 1, including an output voltage
- 18                       node coupled to the digital element, the output voltage node in-
- 19                       dicating an identification flag state.

20           33. NXP's UCODE 8 IC has each of the elements of claims 1, 2, and 8 of the '240

21 Patent, including the recited circuit.

22           34. In the correspondence exchanged between the parties, NXP has not denied that it is

23 practicing claim 1 of the '240 Patent.

24           35. NXP has indirectly infringed the '240 Patent, including at least claims 2 and 8 of

25 the '240 Patent, under 35 U.S.C. §§ 271(b) and (c), by supplying UCODE 8 ICs for inclusion in

26 transponders with knowledge of the '240 Patent. NXP's UCODE 8 IC's have no substantial non-

27 infringing use, and NXP has induced inlay manufacturers and others to incorporate UCODE 8 ICs

28 into RFID transponders so that they practice the claims.

          36. NXP has continued its infringing activities despite knowledge of the '240 Patent

(including knowledge from correspondence with Impinj), and such infringement is egregious and

willful.

**NXP'S INFRINGEMENT OF U.S. PATENT NO. 9,471,816**

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2 37. Impinj owns U.S. Patent No. 9,471,816 (“the ’816 Patent”), which is directed to an  
3 RFID IC with an inventive circuit for tuning variable impedance.

4 38. Claim 1 of the ’816 Patent reads as follows:

5 1. A Radio Frequency Identification (RFID) integrated circuit (IC)  
6 requiring a sufficient power to operate according to a protocol  
(SPOI), the IC comprising:

7 a variable impedance;

8 a tuning circuit configured to tune the variable impedance; and

9 a rectifier coupled to the variable impedance and configured to  
10 extract a power from an RF wave; wherein

11 during a first time period in which an extracted power before tun-  
ing (EPBT) is less than the SPOI but at least equal to a sufficient  
12 power to tune (SPTT), the IC is configured to:

13 disable the tuning circuit; and

14 tune the variable impedance to an initial impedance value;  
and

15 during a second time period after the first time period, the IC is  
16 configured to:

17 enable the tuning circuit; and

18 cause the tuning circuit to tune the variable impedance such  
that an extracted power after tuning (EPAT) is at least equal  
19 to the SPOI.

20 39. Claim 3 of the ’816 Patent reads as follows:

21 3. The IC of claim 1, where in the IC is further configured to:

22 during the first time period, use a voltage for tuning the variable  
23 impedance; and

24 during the second time period, use another voltage different from  
the voltage for tuning the variable impedance.

25 40. Claim 4 of the ’816 Patent reads as follows:

26 4. The IC of claim 3, wherein:

27 the rectifier comprises a plurality of serially-coupled rectifier  
28 stages;

1 the voltage is provided from one of the rectifier stages; and  
2 the other voltage is provided from another one of the rectifier  
3 stages.

4 41. NXP's UCODE 8 IC has each of the elements of claims 1, 3, and 4 of the '816  
5 Patent, including the recited tuning circuit.

6 42. NXP has directly infringed the '816 Patent, including at least claims 3 and 4 of the  
7 '816 Patent, by making, importing, selling, and offering for sale UCODE 8 ICs.

8 43. NXP has continued its infringing activities despite knowledge of the '816 Patent  
9 (including knowledge from correspondence with Impinj), and such infringement is egregious and  
10 willful.

11 **NXP'S INFRINGEMENT OF U.S. PATENT NO. 7,388,468**

12 44. Impinj owns U.S. Patent No. 7,388,468 ("the '468 Patent"), which is directed to an  
13 RFID tag with an inventive oscillator calibration design.

14 45. Claim 1 of the '468 Patent reads as follows:

- 15 1. A radio-frequency identification (RFID) tag including:  
16 a non-volatile memory to store an oscillator calibration value re-  
17 ceived from a calibration module;  
18 an oscillator, coupled to the non-volatile memory, to receive the  
19 oscillator calibration value from the nonvolatile memory, and to  
20 generate an oscillation frequency signal within the RFID tag uti-  
21 lizing the oscillator calibration value;  
22 a tag controller to generate a command signal within the RFID  
23 tag, the command signal being based on command data received  
24 at the RFID tag in a received radio-frequency signal from an  
RFID reader; and  
25 a modulator to backscatter modulate a transmitted radio-fre-  
26 quency signal in accordance with both the oscillation frequency  
27 signal and the command signal.

28 46. NXP's UCODE 7 and UCODE 8 IC have each of the elements of claim 1 of the  
'468 Patent, including the recited oscillator, tag controller, and modulator.



1           47.     NXP has indirectly infringed the '468 Patent, including at least claim 1 of the '468  
2 Patent, under 35 U.S.C. §§ 271(b) and (c), by supplying UCODE 7 and UCODE 8 ICs for inclusion  
3 in RFID tags with knowledge of the '468 Patent. NXP's UCODE 7 and UCODE 8 ICs have no  
4 substantial noninfringing use, and NXP has induced inlay manufacturers and others to incorporate  
5 UCODE 7 and UCODE 8 ICs into RFID tags so that they practice the claims.

6           48.     In the correspondence exchanged between the parties, NXP has not denied that it is  
7 practicing claim 1 of the '468 Patent.

8           49.     NXP has continued its infringing activities despite knowledge of the '468 Patent  
9 (including knowledge from correspondence with Impinj), and such infringement is egregious and  
10 willful.

11                           **NXP'S INFRINGEMENT OF U.S. PATENT NO. 8,952,792**

12           50.     Impinj owns U.S. Patent No. 8,952,792 ("the '792 Patent"), which is directed to an  
13 RFID IC with an inventive design for tuning variable impedance.

14           51.     Claim 10 of the '792 Patent reads as follows:

15                   10. A Radio Frequency Identification (RFID) integrated circuit (IC)  
16                   requiring a sufficient power to operate according to a protocol  
                      (SPOI), the IC comprising

17                           a variable impedance and

18                           a tuning circuit requiring a sufficient power to tune the variable  
19                           impedance (SPTT), the SPOI greater than the SPTT, wherein the  
                      IC is configured to:

20                                 extract, before tuning the variable impedance, a first power  
21                                 from an RF wave incident on an antenna, the first power  
                                     greater than the SPTT but less than the SPOI;

22                                 tune the variable impedance to increase an efficiency of  
23                                 power extraction;

24                                 extract, after tuning the variable impedance, a second power  
25                                 from the RF wave incident on the antenna greater than the  
                                     SPOI; and

26                                 operate according to the protocol after tuning the variable im-  
                                     pedance.

27           52.     Claim 11 of the '792 Patent reads as follows:  
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1 11. The IC of claim 10, wherein the variable impedance includes at  
2 least one of a switched capacitor, a variable capacitor, a switched  
3 inductor, a variable inductor, a switched transmission line, a var-  
4 iable length transmission line, a switched resistor, and a variable  
5 resistor.

6 53. Claim 13 of the '792 Patent reads as follows:

7 13. The IC of claim 10, wherein the IC is configured to tune the var-  
8 iable impedance by setting the variable impedance to an initial  
9 state.

10 54. NXP's UCODE 8 IC has each of the elements of claims 10, 11, and 13, including  
11 the recited tuning circuit.

12 55. NXP has directly infringed the '792 Patent, including claims 11 and 13 of the '792  
13 Patent, by making, importing, selling, and offering for sale UCODE 8 ICs.

14 56. NXP has continued its infringing activities despite knowledge of the '792 Patent  
15 (including knowledge from correspondence with Impinj), and such infringement is egregious and  
16 willful.

17 **NXP'S INFRINGEMENT OF U.S. PATENT 10,002,266**

18 57. Impinj owns U.S. Patent No. 10,002,266 ("the '266 Patent"), which is directed to an  
19 RFID IC that inventively reduces its clock frequency while tuning its impedance.

20 58. Claim 6 of the '266 Patent reads as follows:

21 6. A Radio Frequency Identification (RFID) integrated circuit (IC)  
22 requiring a minimum clock frequency to operate according to a  
23 protocol (MFOP), a sufficient power to tune a variable imped-  
24 ance (SPTT), and a sufficient power to operate according to the  
25 protocol (SPOI) greater than the SPTT, the IC comprising:

26 a tuning circuit configured to tune the variable impedance during  
27 a tuning phase; and

28 a processor block configured to:

in the tuning phase:

extract a first power at least equal to the SPTT from an  
RF wave; cause the tuning circuit to tune the variable im-  
pedance to increase power extraction from the RF wave;  
and

operate at a first clock frequency less than the MFOP  
while causing the tuning circuit to tune the variable

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impedance, wherein the IC is unable to communicate with an RFID reader according to the protocol while operating at the first clock frequency; and

in a protocol phase subsequent to the tuning phase: extract a second power at least equal to the SPOI from the RF wave;

operate at a second clock frequency greater than or equal to the MFOP; and

communicate with an RFID reader according to the protocol while operating at the second clock frequency.

59. Claim 8 of the '266 Patent reads as follows:

- 8. The IC of claim 6, wherein the processor block is further configured to:
  - initially operate in the tuning phase; and
  - subsequently operate in the protocol phase.

60. Claim 10 of the '266 Patent reads as follows:

- 10. The IC of claim 6, further comprising:
  - a first clock oscillator configured to provide the first clock frequency; and
  - a second clock oscillator configured to provide the second clock frequency.

61. NXP's UCODE 8 IC has each of the elements of claims 6, 8, and 10 of the '266 Patent, including the recited tuning circuit.

62. NXP has directly infringed the '266 Patent, including at least claims 8 and 10 of the '266 Patent, by making, importing, selling, and offering for sale UCODE 8 ICs.

63. NXP has continued its infringing activities despite knowledge of the '266 Patent (including knowledge from correspondence with Impinj), and such infringement is egregious and willful.

**NXP'S INFRINGEMENT OF U.S. PATENT NO. 9,349,090**

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2 64. Impinj owns U.S. Patent No. 9,349,090 (“the ’090 Patent”), which is directed to an  
3 RFID tag with an inventive design for tuning the variable impedance.

4 65. Claim 8 of the ’090 Patent reads as follows:

5 8. A Radio Frequency Identification (RFID) integrated circuit (IC)  
6 requiring a sufficient power to operate according to a protocol  
7 (SPOI), the IC comprising at least a variable impedance and a  
8 tuning circuit coupled to the variable impedance, the tuning cir-  
circuit requiring a sufficient power to tune the variable impedance  
(SPTT), and the SPOI greater than the SPTT, wherein the IC is  
configured to:

9 extract, before tuning the variable impedance, a first power  
10 greater than the SPTT from an RF wave;

11 tune the variable impedance to increase power extraction;

12 extract, after tuning the variable impedance, a second power  
greater than the SPOI from the RF wave; and

13 operate according to the protocol using the second power.

14 66. Claim 9 of the ’090 Patent reads as follows:

15 9. The IC of claim 8, further configured to store a variable imped-  
16 ance setting corresponding to the tuning in a memory.

17 67. Claim 11 of the ’090 Patent reads as follows:

18 11. The IC of claim 8, further configured to tune the variable imped-  
19 ance by setting the variable impedance to an initial state.

20 68. Claim 13 of the ’090 Patent reads as follows:

21 13. The IC of claim 8, further configured to tune the variable imped-  
22 ance in response to a command.

23 69. NXP’s UCODE 8 IC has each of the elements of claims 8, 9, 11, and 13 of the ’090  
24 Patent, including the recited tuning circuit.

25 70. NXP has directly infringed the ’090 Patent, including at least claims 9, 11, and 13  
26 of the ’090 Patent by making, importing, selling, and offering for sale UCODE 8 ICs.

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**NXP’S INFRINGEMENT OF U.S. PATENT NO. 8,391,785**

78. Impinj owns U.S. Patent No. 8,391,785 (“the ’785 Patent”), which is directed to an RFID tag circuit with an inventive interference rejection circuit.

79. Claim 1 of the ’785 Patent reads as follows:

1. A Radio Frequency Identification (RFID) tag circuit including:

a demodulator adapted to receive a modulated wireless RF input signal from an RFID reader and to derive a first digital output signal responsive to the modulated wireless RF input signal, wherein the first digital output signal comprises a sequence of digital pulses; and

an interference rejection circuit adapted to receive the first digital output signal and to derive a second digital output signal responsive to the first digital output by substantially removing digital pulses shorter than a time duration threshold while substantially retaining digital pulses longer than the time duration threshold,

wherein the time duration threshold is determined from one of a frame-sync tari symbol encoded in the modulated wireless RF input signal, a data rate associated with the modulated wireless RF input signal, and a statistic of a characteristic of a received data packet.

80. Claim 5 of the ’785 Patent reads as follows:

5. The circuit of claim 1, wherein the time duration threshold is derived from another modulated wireless RF input signal received from the RFID reader.

81. Claim 7 of the ’785 Patent reads as follows:

7. The circuit of claim 1, wherein the time duration threshold is determined based on one of a statistic of a characteristic of a received data packet or a data rate of a received data packet.

82. NXP’s UCODE 7 and UCODE 8 ICs have each of the elements of claims 1, 5, and 7 of the ’785 Patent, including the recited interference rejection circuit.

83. NXP has directly infringed the ’785 Patent, including at least claims 5 and 7 of the ’785 Patent, by making, importing, selling and offering for sale its UCODE 7 and UCODE 8 ICs.

84. In the correspondence exchanged between the parties, NXP has not denied that it is practicing claims 1, 5 and 7 of the ’785 Patent.



1 receive a modulated wireless RF input signal from an RFID  
2 reader, and

3 derive a first digital output signal responsive to the modulated  
4 wireless RF input signal, wherein the first digital output sig-  
5 nal comprises a sequence of digital pulses;

6 a counter configured to generate artifact numbers by counting  
7 time durations of the digital pulses; and

8 an interference rejection circuit configured to:

9 receive the first digital output signal,

10 determine a first low number corresponding to a first time  
11 duration threshold,

12 derive a second digital output signal responsive to the first  
13 digital output signal by substantially removing digital pulses  
14 with artifact numbers less than the first low number while  
15 substantially retaining digital pulses with artifact numbers  
16 greater than the first low number.

17 90. NXP's UCODE 7 and UCODE 8 IC have each of the elements in claims 1, 2, and  
18 15 of the '298 Patent, including the recited interference rejection circuit.

19 91. NXP has directly infringed the '298 Patent, including at least claims 2 and 15 of the  
20 '298 Patent, by making, importing, selling, and offering for sale its UCODE 7 and UCODE 8 ICs.

21 92. In the correspondence exchanged between the parties, NXP has not denied that it is  
22 practicing claims 1, 2 and 15 of the '298 Patent.

23 93. NXP has continued its infringing activities despite knowledge of the '298 Patent  
24 (including knowledge from correspondence with Impinj), and such infringement is egregious and  
25 willful.

26 **NXP'S INFRINGEMENT OF U.S. PATENT NO. 9,031,504**

27 94. Impinj owns U.S. Patent No. 9,031,504 ("the '504 Patent"), which is directed to an  
28 inventive method of rejecting interference, to be performed by an RFID tag circuit.

95. Claim 1 of the '504 Patent reads as follows:

1. A method for a Radio Frequency Identification (RFID) tag circuit  
comprising:

receiving a modulated wireless RF input signal;



1 deriving a first digital output signal responsive to the modulated  
2 wireless RF input signal, wherein the first digital output signal  
3 comprises a sequence of digital pulses;

4 generating artifact numbers by counting time durations of the  
5 digital pulses: and

6 deriving a second digital output signal responsive to the first dig-  
7 ital output signal at an interference rejection circuit of a RFID tag  
8 circuit by substantially removing digital pulses with artifact num-  
9 bers less than a first low number while substantially retaining  
10 digital pulses with artifact numbers greater than the first low  
11 number, wherein the first low number corresponds to a first time  
12 duration threshold.

13 96. Claim 2 of the '504 Patent reads as follows:

14 2. The method of claim 1, further comprising determining the first  
15 time duration threshold from at least one of a frame-sync tari  
16 symbol encoded in the modulated wireless RF input signal, a data  
17 rate associated with the modulated wireless RF input signal, and  
18 a statistic of a characteristic of a received data packet.

19 97. Claim 7 of the '504 Patent reads as follows:

20 7. The method of claim 1, further comprising adjusting the first low  
21 number based on at least one aspect associated with the wireless  
22 RF input signal selected from at least one of a preamble, a re-  
23 ceived packet, a filtered output signal, a data rate, and an ex-  
24 pected next packet.

25 98. NXP's UCODE 7 and UCODE 8 IC perform each of the steps of the methods recited  
26 in claims 1, 2, and 7 of the '504 Patent.

27 99. NXP has directly infringed the '504 Patent, including claims 2 and 7 of the '504  
28 Patent, by performing the recited methods through its use of its UCODE 7 and UCODE 8 ICs.

100. NXP has also indirectly infringed the '504 Patent, including claims 2 and 7 of the  
'504 patent, under 35 U.S.C. §§ 271(b) and (c), by supplying its UCODE 7 and UCODE 8 ICs to  
others. The UCODE 7 and UCODE 8 ICs have no substantial noninfringing use, and NXP has  
induced its customers to use the UCODE 7 and UCODE 8 ICs in a manner that leads the UCODE  
7 and UCODE 8 ICs to perform the patented methods.

101. In the correspondence exchanged between the parties, NXP has not denied that it is  
practicing claims 1, 2, and 7 of the '504 Patent.

1           102. NXP has continued its infringing activities despite knowledge of the '504 Patent  
2 (including knowledge from correspondence with Impinj), and such infringement is egregious and  
3 willful.

4                                   **NXP'S INFRINGEMENT OF U.S. PATENT NO. 7,246,751**

5           103. Impinj owns U.S. Patent No. 7,246,751 ("the '751 Patent"), which is directed to an  
6 IC for an RFID tag with a modulator and an inventive processing block for deriving a BP number  
7 for operating the modulator.

8           104. Claim 1 of the '751 Patent reads as follows:

9                   1. A circuit for a radio frequency identification (RFID) tag, comprising:

10                                   a demodulator that is arranged to demodulate a waveform of a  
11                                   wirelessly received wave;

12                                   a processing block that includes:

13   a counter configured to determine an L-number from a dura-  
14   tion of a calibration feature of the waveform, and

15   a combining circuit configured to combine a first nonzero  
16   version of the L-number with a second nonzero version of the  
17   L-number so as to derive a BP-number such that the derived  
18   BP-number substantially equals the L-number divided by a  
19   preset non-integer divide ratio; and

20   a modulator that is arranged to modulate a second wave with en-  
21   coded symbols that have a periodicity determined from the BP-  
22   number.

23           105. Claim 9 of the '751 Patent reads as follows:

24                   9. The circuit of claim 1, wherein

25                                   the combining circuit comprises an adder operable to add the first  
26                                   version to the second version.

27           106. Claim 12 of the '751 Patent reads as follows:

28                   12. The circuit of claim 1, wherein

                                 the processing block further comprises an offset adder operable  
                                 to add an offset to one of the first version, the second version,  
                                 and the BP-number.

1 107. Claim 38 of the '751 Patent reads as follows:

2 38. A circuit for a radio frequency identification (RFID) tag that is  
3 responsive to an RFID reader, the RFID tag comprising:

4 a means for demodulating a waveform from a first wireless wave  
5 received from the reader;

6 a means for determining an L-number from a duration of a cali-  
7 bration feature of the waveform;

8 a means for deriving a BP-number by combining a first nonzero  
9 version of the L-number with a second nonzero version of the L-  
10 number such that the derived BP-number substantially equals the  
11 L-number divided by a preset non-integer divide ratio; and

12 a means for modulating a second wave that is to be received by  
13 the reader by encoding symbols with a periodicity determined  
14 from the BP-number.

15 108. NXP's UCODE 7 and UCODE 8 IC have each of the elements of claims 1, 9, 12,  
16 and 38 of the '751 Patent, including the recited processing block.

17 109. NXP has directly infringed the '751 Patent, including at least claims 9, 12, and 38  
18 of the '751 Patent, by making, importing, selling and offering for sale its UCODE 7 and UCODE  
19 8 ICs.

20 110. In the correspondence exchanged between the parties, NXP has not denied that it is  
21 practicing claims 1, 9, 12, and 38 of the '751 Patent.

22 111. NXP has continued its infringing activities despite knowledge of the '751 Patent  
23 (including knowledge from correspondence with Impinj), and such infringement is egregious and  
24 willful.

25 **NXP'S INFRINGEMENT OF U.S. PATENT NO. 7,472,835**

26 112. Impinj owns U.S. Patent No. 7,472,835 ("the '835 Patent"), which is directed to a  
27 circuit for an RFID tag, including an inventive structure for demodulating waveforms that encode  
28 a gross number and a divide ratio.

1 113. Claim 1 of the '835 Patent reads as follows:

2 1. An RFID tag comprising:

3 a demodulator to demodulate waveforms from an RFID reader  
4 that encode a gross number and a divide ratio, the gross number  
5 being expressed in terms of bits;

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a processor to determine a result by dividing the gross number by the divide ratio and adding an adjustment, in which the dividing takes place by discarding at least one of the bits; and  
  
a modulator to backscatter a tag waveform that includes symbols using a symbol period determined from the result.

114. Claim 20 of the '835 Patent reads as follows:

20. A device comprising:  
  
means for receiving waveforms from an RFID reader;  
  
means for determining a gross number and a divide ratio from the waveforms, the gross number being expressed in terms of bits;  
  
means for generating a result by dividing the gross number by the divide ratio and adding an adjustment, in which the dividing takes place by discarding at least one of the bits; and  
  
means for backscattering a tag waveform that includes symbols using a symbol period determined from the result.

115. Claim 36 of the '835 Patent reads as follows:

36. A method for an RFID tag comprising:  
  
receiving waveforms from an RFID reader;  
  
determining a gross number and a divide ratio from the waveforms, the gross number being express in terms of bits;  
  
generating a result by dividing the gross number by the divide ratio and adding an adjustment in which the dividing takes place by discarding at least one of the bits; and  
  
backscattering a tag waveform that includes symbols using a symbol period determined from the result.

116. Claim 52 of the '835 Patent reads as follows:

52. A circuit for an RFID tag having an antenna, comprising:  
  
a demodulator to demodulate waveforms by the antenna that encode a gross number and a divide ratio, the gross number being expressed in terms of bits;  
  
a processor to determine a result by dividing the gross number by the divide ratio and adding an adjustment, in which the dividing takes place by discarding at least one of the bits; and  
  
a modulator to backscatter via the antenna a tag waveform that includes symbols using a symbol period determined from the result.

1 117. NXP's UCODE 7 and UCODE 8 ICs have each of the elements of claims 1 and 20  
2 of the '835 Patent when inserted into an RFID tag, perform each of the steps of claim 36 when used  
3 in an RFID tag, and have each of the elements of claim 52 of the '835 Patent, including the recited  
4 demodulator, processor and modulator.

5 118. NXP has directly infringed the '835 Patent, including at least claim 52 of the '835  
6 Patent, by making, importing, selling and offering for sale its UCODE 7 and UCODE8 ICs.

7 119. NXP has also indirectly infringed the '835 Patent, including claims 1,20 and 36 of  
8 the '835 patent, under 35 U.S.C. §§ 271(b) and (c), by supplying its UCODE 7 and UCODE 8 ICs  
9 to others for use in RFID tags. The UCODE 7 and UCODE 8 ICs have no substantial noninfringing  
10 use, and NXP has induced its customers to use the UCODE 7 and UCODE 8 ICs in a manner that  
11 leads the tags incorporating UCODE 7 and UCODE 8 ICs to practice claims 1, 20 and 36 of the  
12 '835 Patent.

13 120. In the correspondence exchanged between the parties, NXP has not denied that it is  
14 practicing claims 1, 20, 36, and 52 of the '835 Patent.

15 121. NXP has continued its infringing activities despite knowledge of the '835 Patent  
16 (including knowledge from correspondence with Impinj), and such infringement is egregious and  
17 willful.

18 **NXP'S INFRINGEMENT OF U.S. PATENT NO. 7,733,227**

19 122. Impinj owns U.S. Patent No. 7,733,227 ("the '227 Patent"), which is directed to an  
20 RFID tag IC with an inventive circuit for determining the power adequacy for performing certain  
21 operations.

22 123. Claim 38 of the '227 Patent reads as follows:

23 38. A Radio Frequency Identification (RFID) circuit for use in an  
24 RFID tag, comprising:

25 a first circuit arranged to receive a command associated with a  
tag operation from an RFID reader; and

26 a second circuit arranged to determine, responsive to the received  
27 command, whether a power adequacy condition is met for per-  
forming the tag operation, and if so to perform the tag operation  
28 in response to the received command, else not to perform the tag  
operation.

1 124. Claim 43 of the '227 Patent reads as follows:

2 43. The circuit of claim 38, in which if the power adequacy condition  
3 is not met, the tag circuit is arranged to transmit a non-compliance  
4 response.

5 125. Claim 63 of the '227 Patent reads as follows:

6 63. A Radio Frequency Identification (RFID) circuit for use in an  
7 RFID tag, comprising:

8 a first circuit arranged to determine whether a power adequacy  
9 condition is met for performing a tag operation;

10 a second circuit arranged to receive a command associated with  
11 the tag operation from an RFID reader; and

12 a third circuit arranged to transmit a non-compliance response to  
13 the reader if the power adequacy condition is not met, else to per-  
14 form the tag operation in response to the received command.

15 126. Claim 66 of the '227 Patent reads as follows:

16 66. The circuit of claim 63, in which the tag is powered from one of  
17 an unmodulated carrier wave transmitted by the reader and a  
18 power source associated with the tag.

19 127. NXP's UCODE 7 and UCODE 8 IC have each of the elements of claim 38, 43, 63,  
20 and 66 of the '227 Patent, including the recited circuits.

21 128. NXP has directly infringed the '227 Patent, including at least claims 43 and 66 of  
22 the '227 Patent, by making, importing, selling and offering for sale its UCODE 7 and UCODE 8  
23 ICs.

24 129. NXP has continued its infringing activities despite knowledge of the '227 Patent  
25 (including knowledge from correspondence with Impinj), and such infringement is egregious and  
26 willful.

27 **NXP'S INFRINGEMENT OF U.S. PATENT NO. 9,633,302**

28 130. Impinj owns U.S. Patent No. 9,633,302 ("the '302 Patent"), which is directed to an  
RFID IC with an inventive channel design.

131. Claim 1 of the '302 Patent reads as follows:

1. A Radio Frequency Identification (RFID) integrated circuit (IC)  
comprising:

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an IC substrate;

a first antenna contact disposed on, and confined within a perimeter of, a surface of the IC substrate; and

a second antenna contact disposed on, and confined within the perimeter of, the surface of the IC substrate; wherein:

the first and second antenna contacts are separated by a channel having a first end, a second end opposite the first end, and a center between the first end and the second end;

the channel spans a majority of a width of the IC substrate;

a first transverse channel cross-section at the first end is substantially the same size as a second transverse channel cross-section at the second end and substantially larger than a third transverse channel cross-section at the center; and

the channel is shaped to facilitate a fluid flow from the center to the first and second ends.

132. Claim 2 of the '302 Patent reads as follows:

2. The RFID IC of claim 1, wherein the channel is shaped to facilitate a flow of a liquid adhesive during a tag assembly process, thereby reducing movement of the IC during the assembly process.

133. Claim 7 of the '302 Patent reads as follows:

7. The RFID IC of claim 1, wherein each of the antenna contacts includes:

a raised nonconductive structure; and

a conductive layer disposed on the raised nonconductive structure.

134. NXP's UCODE 7 and UCODE 8 ICs have each of the elements of claims 1, 2, and 7 of the '302 Patent, including the recited channel design.

135. NXP has directly infringed the '302 Patent, including at least claims 2 and 7 of the '302 Patent, by making, importing, selling and offering for sale its UCODE 7 and UCODE 8 ICs.

136. NXP has continued its infringing activities despite knowledge of the '302 Patent (including knowledge from correspondence with Impinj), and such infringement is egregious and willful.

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**NXP’S INFRINGEMENT OF U.S. PATENT NO. 9,495,631**

137. Impinj owns U.S. Patent No. 9,495,631 (“the ’631 Patent”), which is directed to an RFID IC with an inventive contact layer structure for facilitating its placement on an inlay to make an RFID tag.

138. Claim 13 of the ’631 Patent reads as follows:

- 13. A Radio Frequency Identification (RFID) integrated circuit (IC) comprising:
  - a plurality of contact islands raised from a surface of the IC and separated from each other by at least one trench, the at least one trench spanning at least a width of an adjacent contact island, and the contact islands covering substantially an entire surface area of the IC except for the at least one trench, wherein each contact island includes:
    - a nonconductive repassivation layer disposed on the surface of the IC;
    - a conductive contact layer disposed on and covering the repassivation layer and confined within a perimeter of the IC; and
    - an electrical coupling between the contact layer and at least one of a rectifier, a modulator, and a demodulator in the IC.

139. Claim 15 of the ’631 Patent reads as follows:

- 15. The IC of claim 13, wherein the electrical coupling of at least one of the contact islands is through at least one of:
  - the repassivation layer of the respective contact island; and
  - a side contact disposed on a side of the respective contact island.

140. Claim 17 of the ’631 Patent reads as follows:

- 17. The IC of claim 13, wherein the at least one trench forms an alignment structure for aligning the placement of the IC on an inlay.

141. NXP’s UCODE 7 and UCODE 8 IC have each of the elements recited in claims 13, 15, and 17 of the ’631 Patent, including the recited contact islands, trench and repassivation layer.

142. NXP has directly infringed the ’631 Patent, including at least claims 15 and 17 of the ’631 Patent, by making, importing, selling and offering for sale of its UCODE 7 and UCODE 8 ICs.



1 143. In the correspondence exchanged between the parties, NXP has not denied that it is  
2 practicing claims 13, 15, and 17 of the '631 Patent.

3 144. NXP has continued its infringing activities despite knowledge of the '631 Patent  
4 (including knowledge from correspondence with Impinj), and such infringement is egregious and  
5 willful.

6 **NXP'S INFRINGEMENT OF U.S. PATENT NO. 8,134,451**

7 145. Impinj owns U.S. Patent No. 8,134,451 ("the '451 Patent"), which is directed to an  
8 IC for an RFID tag with an inventive processing block that informs of multiple codes stored in its  
9 memory when queried by an RFID reader.

10 146. Claim 1 of the '451 Patent reads as follows:

- 11 1. An Integrated Circuit (IC) for use with a Radio Frequency Identification (RFID) tag having an antenna, comprising:  
12 a memory for storing a first code and a second code; and  
13 a processing block for coupling with the antenna and operable to:  
14 cause the first code to be backscattered if a first command is  
15 received from an RFID reader;  
16 receive a third command; and  
17 cause to be backscattered responsive to receiving the third  
18 command a combination made from at least portions of the  
19 first code and the second code, without receiving any com-  
mands while the combination is being backscattered.

20 147. Claim 4 of the '451 Patent reads as follows:

- 21 4. The IC of claim 1, in which the second code is a Tag Identifier  
22 (TID) code of the first tag that complies with the Gen2 Spec  
v1.1.0.

23 148. Claim 7 of the '451 Patent reads as follows:

- 24 7. The IC of claim 1, in which  
25 a custom Gush command is received in connection with the re-  
26 ceived third command, and  
27 backscattering the combination is performed responsive to re-  
28 ceiving the custom Gush command and the third command.

1 149. Claim 10 of the '451 Patent reads as follows:

2 10. The IC of claim 7, in which  
3 the first tag becomes singulated from a population of tags, and  
4 the custom Gush command is received before the first tag be-  
5 comes singulated.

6 150. NXP's UCODE 7 and UCODE 8 IC have each of the elements of claims 1, 4, 7, and  
7 10 of the '451 Patent, including the recited memory and processing block.

8 151. NXP has directly infringed the '451 Patent, including at least claims 4, 7, and 10 of  
9 the '451 Patent, by making, importing, selling and offering for sale its UCODE 8 ICs.

10 152. NXP has continued its infringing activities despite knowledge of the '451 Patent  
11 (including knowledge from correspondence with Impinj), and such infringement is egregious and  
12 willful.

13 **NXP'S INFRINGEMENT OF U.S. PATENT NO. 8,390,431**

14 153. Impinj owns U.S. Patent No. 8,390,431 ("the '431 Patent"), which is directed to an  
15 IC for an RFID tag with an inventive processing block that informs of multiple codes stored in its  
16 memory when queried by an RFID reader.

17 154. Claim 1 of the '431 Patent reads as follows:

18 1. An Integrated Circuit (IC) for use with a Radio Frequency Iden-  
19 tification (RFID) tag having an antenna, comprising:  
20 a memory storing a first code; and  
21 a processing block coupled with the antenna and configured to:  
22 cause the first code to be backscattered if a first command is  
23 received;  
24 receive a challenge;  
25 determine a response to the challenge;  
26 receive a third command; and  
27 in response to receiving the third command, cause to be  
28 backscattered a combination made from at least portions of  
the first code and the response, without receiving any com-  
mands while the combination is being backscattered.

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155. Claim 6 of the '431 Patent reads as follows:

6. The IC of claim 1, wherein determining the response includes computing the response using a key stored in the memory.

156. Claim 19 of the '431 Patent reads as follows:

19. A Radio Frequency Identification (RFID) integrated circuit (IC), comprising:

a memory storing a first code; and

a processing block configured to:

cause the first code to be backscattered if a first command is received;

receive a third command; and

in response to receiving the third command, cause to be backscattered a combination made from at least portions of the first code, portions of a second code, and at least one error-checking code associated with one of the first code, the second code, and the combination, without receiving any commands while the combination is being backscattered.

157. Claim 20 of the '431 Patent reads as follows:

20. The IC of claim 19, wherein the second code includes at least one of a date of expiration of a host item that the tag is attached to, a date by which the host item is to be sold by, a date at which the host item was sold, a code for a sale of the host item, a receipt of the sale, an identifier for a retailer that made the sale, an identifier for a store through which the sale is made, an identifier for the tag, a password for the tag, a cryptographic quantity, a random number, an electronic signature, and an indicator for how a memory of the tag is configured.

158. NXP's UCODE 7 and UCODE 8 ICs have each of the element of claims 1, 6, 19, and 20 of the '431 Patent, including the recited processing block.

159. NXP has directly infringed the '431 Patent, including at least claims 6 and 20 of the '431 Patent, by making, importing, selling and offering for sale its UCODE 7 and UCODE 8 ICs.

160. NXP has continued its infringing activities despite knowledge of the '431 Patent (including knowledge from correspondence with Impinj), and such infringement is egregious and willful.

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**NXP’S INFRINGEMENT OF U.S. PATENT NO. 8,115,597**

161. Impinj owns U.S. Patent No. 8,115,597 (“the ’597 Patent”), which is directed to an IC for an RFID tag with an inventive circuit design for a power rectifier.

162. Claim 13 of the ’597 Patent reads as follows:

- 13. A Radio Frequency Identification tag circuit, comprising:
  - a first antenna input node for receiving a first phase of an alternating RF wireless signal;
  - a second antenna input node for receiving a second phase of the alternating RF wireless signal which is substantially opposite to the first phase;
  - a plurality of serially coupled stages, at least one of the stages including:
    - a first synchronous element with a first beginning coupled to receive the second phase and a first ending, the first synchronous element including:
      - a first transistor having an input terminal at the first beginning, an output terminal, and a gate coupled to receive the first phase;
      - a second transistor having an input terminal, an output terminal at the first ending, and a gate coupled to receive the second phase, in which the input terminal of the second transistor is connected to the output terminal of the first transistor at a first intermediate node so as to form a first charge-accumulating path between the first beginning and the first ending, and there is no charge-accumulating path between the first beginning and the first ending other than the first path; and
    - a second synchronous element with a second beginning to receive the first phase and a second ending, the second synchronous element including:
      - a third transistor having an input terminal at the second beginning, an output terminal, and a gate coupled to receive the second phase;
      - a fourth transistor having an input terminal, an output terminal at the second ending, and a gate coupled to receive the first phase, in which the input terminal of the fourth transistor is connected to the output terminal of the third transistor at a second intermediate node so as to form a second charge-accumulating path between the second beginning and the second ending, and there is no charge-accumulating path between the second beginning and the second ending other than the second path; and

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in which the second beginning is coupled to the first ending.

163. Claim 15 of the '597 Patent reads as follows:

15. A rectifier for a Radio Frequency Identification tag circuit, comprising:

a first antenna input node for receiving a first phase of an alternating RF wireless signal;

a second antenna input node for receiving a second phase of the alternating RF wireless signal which is substantially opposite to the first phase;

a zeroth stage transistor having an input terminal connected to ground, an output terminal, and a gate coupled to receive the first phase;

a plurality of serially coupled stages, at least one of the stages including:

a first synchronous element with a first beginning coupled to receive the second phase and a first ending, the first synchronous element including:

a first transistor having an input terminal at the first beginning coupled to the output terminal of the zeroth stage transistor, an output terminal, and a gate coupled to receive the first phase;

a second transistor having an input terminal, an output terminal at the first ending, and a gate coupled to receive the second phase, in which the input terminal of the second transistor is connected to the output terminal of the first transistor at a first intermediate node so as to form a first charge-accumulating path between the first beginning and the first ending, and there is no charge-accumulating path between the first beginning and the first ending other than the first path; and

a second synchronous element with a second beginning to receive the first phase and a second ending, the second synchronous element including:

a third transistor having an input terminal at the second beginning, an output terminal, and a gate coupled to receive the second phase;

a fourth transistor having an input terminal, an output terminal at the second ending, and a gate coupled to receive the first phase, in which the input terminal of the fourth transistor is connected to the output terminal of the third transistor at a second intermediate node so as to form a second charge-accumulating path between the second

1 beginning and the second ending, and there is no charge-  
2 accumulating path between the second beginning and the  
second ending other than the second path; and

3 in which the second beginning is coupled to the first ending.

4 164. NXP's UCODE 8 IC has each of the element of claims 13 and 15 of the '597 Patent,  
5 including the recited circuit structure.

6 165. NXP has directly infringed the '597 Patent, including at least claims 13 and 15 of  
7 the '597 Patent, by making, importing, selling and offering for sale its UCODE 8 ICs.

8 166. In the correspondence exchanged between the parties, NXP has not denied that it is  
9 practicing claim 13 of the '597 Patent.

10 167. On information and belief, NXP has continued its infringing activities despite  
11 knowledge of the '597 Patent (including knowledge from correspondence with Impinj), and such  
12 infringement is egregious and willful.

13 **NXP'S INFRINGEMENT OF U.S. PATENT NO. 8,344,857**

14 168. Impinj owns U.S. Patent No. 8,344,857 ("the '857 Patent"), which is directed to an  
15 inventive power rectifier design for an RFID tag.

16 169. Claim 1 of the '857 Patent reads as follows:

- 17 1. A rectifier for a Radio Frequency Identification tag, comprising:  
18 a first antenna input,  
19 a second antenna input,  
20 first, second, third, and fourth capacitors,  
21 a first transistor including an input terminal, an output terminal,  
22 and a gate, and  
23 a second transistor of a type complementary to the first transistor  
and including  
24 an input terminal, an output terminal, and a gate, wherein,  
25 the input terminal of the first transistor is coupled to a begin-  
26 ning node,  
27 the output terminal of the first transistor is coupled to an av-  
28 eraging node,

- 1 the input terminal of the second transistor is coupled to the
- 2 averaging node,
- 3 the output terminal of the second transistor is coupled to an
- 4 ending node,
- 5 the first antenna input is coupled to the gate of the first tran-
- 6 sistor and to the ending node,
- 7 the second antenna input is coupled to the gate of the second
- 8 transistor and to the beginning node,
- 9 the first antenna input is coupled to the ending node via the
- 10 first capacitor,
- 11 the second antenna input is coupled to the beginning node via
- 12 the second capacitor,
- 13 the first antenna input is coupled to the gate of the first tran-
- 14 sistor via the third capacitor, and
- 15 the second antenna input is coupled to the gate of the second
- 16 transistor via the fourth capacitor.

17 170. Claim 3 of the '857 Patent reads as follows:

- 18 3. The rectifier of claim 1, further comprising a third transistor in-
- 19 cluding an input terminal, an output terminal, and a gate, wherein
- 20 the input terminal of the third transistor is coupled to a ground
- 21 node, the output terminal of the third transistor is coupled to the
- 22 beginning node, and the gate of the third transistor is coupled to
- 23 the first antenna input.

24 171. Claim 4 of the '857 Patent reads as follows:

- 25 4. The rectifier of claim 3, wherein the second and third transistors
- 26 are of the same type.

27 172. Claim 6 of the '857 Patent reads as follows:

- 28 6. A rectifier for a Radio Frequency Identification tag, comprising:
  - a first antenna input,
  - a second antenna input,
  - first, second, third, fourth, and fifth capacitors,
  - a first transistor including an input terminal, an output terminal,
  - and a gate,

1 a second transistor of a complementary type to the first transistor  
and including  
2 an input terminal, an output terminal, and a gate, and  
3 a third transistor including an input terminal, an output terminal,  
4 and a gate, wherein:  
5 the input terminal of the first transistor is coupled to a begin-  
ning node,  
6 the output terminal of the first transistor is coupled to an av-  
7 eraging node,  
8 the input terminal of the second transistor is coupled to the  
averaging node,  
9 the output terminal of the second transistor is coupled to an  
10 ending node,  
11 the input terminal of the third transistor is coupled to a ground  
node,  
12 the output terminal of the third transistor is coupled to the  
13 beginning node,  
14 the first antenna input is coupled to the gate of the first tran-  
sistor, the gate of the third transistor, and the ending node,  
15 the second antenna input is coupled to the gate of the second  
16 transistor and the beginning node,  
17 the first antenna input is coupled to the ending node via the  
first capacitor,  
18 the second antenna input is coupled to the beginning node via  
19 the second capacitor,  
20 the first antenna input is coupled to the gate of the first tran-  
sistor via the third capacitor and the gate of the third transistor  
21 via the fifth capacitor, and  
22 the second antenna input is coupled to the gate of the second  
transistor via the fourth capacitor.  
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24 173. Claim 7 of the '857 Patent reads as follows:

25 7. The rectifier of claim 6, further comprising:

26 a fourth transistor including an input terminal, an output terminal,  
27 and a gate, and  
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1 a fifth transistor of a complementary type to the fourth transistor  
2 and the first transistor, and including an input terminal, an output  
terminal, and a gate, wherein:

3 the input terminal of the fourth transistor is coupled to the ending  
4 node,

5 the output terminal of the fourth transistor is coupled to a second  
6 averaging node,

7 the input terminal of the fifth transistor is coupled to the second  
8 averaging node,

9 the output terminal of the fifth transistor is coupled to a second  
10 ending node,

11 the first antenna input is further coupled to the gate of the fifth  
12 transistor, and

13 the second antenna input is further coupled to the gate of the  
14 fourth transistor and the second ending node.

15 174. Claim 8 of the '857 Patent reads as follows:

16 8. The rectifier of claim 7, further comprising a sixth capacitor cou-  
17 pling the second antenna input to the second ending node.

18 175. Claim 9 of the '857 Patent reads as follows:

19 9. The rectifier of claim 8, further comprising seventh and eight ca-  
20 pacitors, wherein:

21 the first antenna input is coupled to the gate of the fifth transistor  
22 via the seventh capacitor, and

23 the second antenna input is coupled to the gate of the fourth tran-  
24 sistor via the eighth capacitor.

25 176. NXP's UCODE 7 and UCODE 8 ICs have each of the elements of claims 1, 3, 4, 6,  
26 7, 8, and 9 of the '857 Patent, including the recited circuit design.

27 177. NXP has directly infringed the '857 Patent, including at least claims 3, 4, 7, 8, and  
28 9 of the '857 Patent, by making, importing, selling and offering for sale its UCODE 7 and UCODE  
8 ICs.

178. In the correspondence exchanged between the parties, NXP has not denied that it is  
practicing claims 3, 4, 6, 7, 8, and 9 of the '857 Patent.

1 179. NXP has continued its infringing activities despite knowledge of the '857 Patent  
2 (including knowledge from correspondence with Impinj), and such infringement is egregious and  
3 willful.

4 **NXP'S INFRINGEMENT OF U.S. PATENT NO. 8,665,074**

5 180. Impinj owns U.S. Patent No. 8,665,074 ("the '074 Patent"), which is directed to an  
6 IC for an RFID tag with an inventive processing block that permits alternative behaviors, even  
7 hiding a portion of the memory of the RFID tag for better security.

8 181. Claim 1 of the '074 Patent reads as follows:

- 9 1. A Radio Frequency Identification (RFID) tag integrated circuit (IC) comprising:
  - 10 a memory storing an identifier; and
  - 11 a processing block configurable to:
    - 12 operate in a first behavior state;
    - 13 in response to receiving a first behavior-change command
    - 14 with a power level exceeding a threshold, transition from the
    - 15 first behavior state to a second behavior state, and not transi-
    - 16 tion if the power level does not exceed the threshold; and
    - 17 when operating in the second behavior state be configurable to
    - 18 subsequently transition back to the first behavior state; wherein
    - 19 the first behavior state is one of a public behavior state exposing
    - 20 only a portion of the identifier and a private behavior state expos-
    - 21 ing the entire identifier; and the second behavior state is the other
    - 22 one of the public behavior state exposing only a portion of the
    - 23 identifier and the private behavior state exposing the entire iden-
    - 24 tifier.

21 182. Claim 4 of the '074 Patent reads as follows:

- 22 4. The RFID tag IC of claim 1, wherein the processing block is fur-
- 23 ther configured to temporarily transition from the first behavior
- 24 state to the second behavior state, and to transition back upon
- 25 losing power.

25 183. Claim 7 of the '074 Patent reads as follows:

- 26 7. The RFID tag IC of claim 1, wherein the processing block is fur-
- 27 ther configured to only transition from the first behavior state to
- 28 the second behavior state if the first behavior-change command
- is received in a secured protocol state.

1 184. NXP's UCODE 7 and UCODE 8 IC have each of the elements of claim 1 of the  
2 '074 Patent, including the recited memory and processing block.

3 185. NXP's UCODE 8 IC has each of the elements of claims 1, 4, and 7 of the '074  
4 Patent, including the recited processing block.

5 186. NXP has directly infringed the '074 Patent, including at least claims 1, 4, and 7 of  
6 the '074 Patent, by making, importing, selling and offering for sale its UCODE 7 and UCODE 8  
7 ICs.

8 187. NXP has continued its infringing activities despite knowledge of the '074 Patent  
9 (including knowledge from correspondence with Impinj), and such infringement is egregious and  
10 willful.

11 **NXP'S INFRINGEMENT OF U.S. PATENT NO. 7,307,528**

12 188. Impinj owns U.S. Patent No. 7,307,528 ("the '528 Patent"), which is directed to an  
13 inventive IC design for testing an IC in an RFID tag.

14 189. Claim 7 of the '528 Patent reads as follows:

15 7. An apparatus, comprising:

16 a semiconductor chip for an RFID tag comprising a receive signal  
17 path that flows from one or more primary inputs, said receive  
18 signal path to process an electrical receive signal originating from  
19 said inputs as a consequence of said inputs having received a sig-  
20 nal from an antenna, said semiconductor chip further comprising  
21 a rectifier coupled to at least one of said inputs, a node where a  
supply voltage for said semiconductor chip is to appear residing  
downstream from an output of said rectifier, a diode's cathode  
coupled to said node, said diode's anode coupled to wiring that  
provides said semiconductor chip's supply voltage while said  
semiconductor chip is being tested on wafer.

22 190. Claim 10 of the '528 Patent reads as follows:

23 10. The apparatus of claim 7 wherein said receive signal path flows  
24 to a controller.

25 191. Claim 11 of the '528 Patent reads as follows:

26 11. The apparatus of claim 10 wherein said controller is coupled to a  
non-volatile memory.

27 192. Claim 21 of the '528 Patent reads as follows:

28 21. An apparatus, comprising:

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a semiconductor chip for an RFID tag comprising a receive signal path from one or more primary inputs to a controller, said receive signal path to process an electrical receive signal originating from said inputs as a consequence of said inputs having received a signal from an antenna, said semiconductor chip also comprising a response signal path that flows from said controller through an impedance controller to said inputs, said response signal path to communicate to a system that sends a wireless signal to said antenna, a third signal path flowing from said response signal path to a die edge of said semiconductor chip, said third signal path to transport a response signal while said semiconductor chip is being tested on wafer.

193. NXP’s UCODE 7 and UCODE 8 IC have each of the elements of claims 7, 10, 11, and 21 of the ’528 Patent, including the recited semiconductor chip.

194. NXP has directly infringed the ’528 Patent, including at least claims 10, 11, and 21 of the ’528 Patent, by making, importing, selling and offering for sale its UCODE 7 and UCODE 8 ICs.

195. NXP has continued its infringing activities despite knowledge of the ’528 Patent (including knowledge from correspondence with Impinj), and such infringement is egregious and willful.

**NXP’S INFRINGEMENT OF U.S. PATENT NO. 8,881,373**

196. Impinj owns U.S. Patent No. 8,881,373 (“the ’373 Patent”), which is directed to an inventive method for assembling an RFID tag precursor.

197. Claim 1 of the ’373 Patent reads as follows:

- 1. A method for assembling a Radio Frequency Identification (RFID) tag precursor, the method comprising:
  - providing an assembly having an RFID integrated circuit (IC), a nonconductive repassivation layer on a surface of the IC and confined within a perimeter of the surface, and a conductive redistribution layer on the repassivation layer and confined within the perimeter of the surface, in which at least a first portion of the redistribution layer is electrically connected to the IC through a first opening in the repassivation layer;
  - providing a substrate having a first antenna terminal;
  - forming a second opening in a nonconductive barrier present on at least one of the first antenna terminal and the first portion of

1 the redistribution layer with an etchant, where the first opening  
 2 and the second opening are nonoverlapping;  
 3 attaching the assembly to the substrate with an adhesive; and  
 4 forming a first electrical connection between the first antenna ter-  
 5 minal and the first portion of the redistribution layer through the  
 6 second opening.

6 198. Claim 3 of the '373 Patent reads as follows:

7 3. The method of claim 1, wherein the nonconductive barrier is at  
 8 least one of an oxide and a masking layer.

9 199. Claim 6 of the '373 Patent reads as follows:

10 6. The method of claim 1, wherein the etchant includes conductive  
 11 particles and the method further comprises forming the second  
 12 opening by breaking the nonconductive barrier with the conduc-  
 13 tive particles.

13 200. NXP has indirectly infringed the '373 Patent, including at least claims 3 and 6 of  
 14 the '373 Patent, under 35 U.S.C. §§ 271(b) and (c), by supplying its UCODE 7 and UCODE 8 ICs  
 15 to others for inclusion in an RFID tag. The UCODE 7 and UCODE 8 ICs have no substantial  
 16 noninfringing use, and NXP has induced its customers to use the UCODE 7 and UCODE 8 ICs in  
 17 a manner that practices each of the steps of the claims. .

18 201. In the correspondence exchanged between the parties, NXP has not denied that it is  
19 practicing claims 3 and 6 of the '373 Patent.

20 202. NXP has continued its infringing activities despite knowledge of the '373 Patent  
21 (including knowledge from correspondence with Impinj), and such infringement is egregious and  
22 willful.

23 **NXP'S INFRINGEMENT OF U.S. PATENT NO. 9,460,380**

24 203. Impinj owns U.S. Patent No. 9,460,380 ("the '380 Patent"), which is directed to an  
25 inventive method for assembling an RFID tag precursor.

26 204. Claim 1 of the '380 Patent reads as follows:

27 1. A method to assemble a Radio Frequency Identification (RFID)  
 28 tag precursor, the method comprising:

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providing an assembly having an RFID integrated circuit (IC), a nonconductive repassivation layer on a surface of the IC and confined within a perimeter of the surface, and a conductive redistribution layer on the repassivation layer and confined within the perimeter of the surface, in which a first portion of the redistribution layer is electrically connected to the IC through a first electrical connection;

attaching, with an adhesive, a substrate having a first antenna terminal to the assembly;

reacting, with a reactant, at least a first portion of a nonconductive barrier present on at least one of the first antenna terminal and the first portion of the redistribution layer to make the first portion of the nonconductive barrier conductive; and

forming a second electrical connection between the first antenna terminal and the first portion of the redistribution layer through the first portion of the nonconductive barrier.

205. Claim 2 of the '380 Patent reads as follows:

2. The method of claim 1, wherein the first electrical connection includes an opening in the repassivation layer.

206. Claim 3 of the '380 Patent reads as follows:

3. The method of claim 2, wherein the opening and a first portion of the nonconductive barrier are nonoverlapping.

207. Claim 5 of the '380 Patent reads as follows:

5. The method of claim 1, wherein the nonconductive barrier is at least one of an oxide and a masking layer.

208. NXP has indirectly infringed the '380 Patent, including at least claims 2, 3, and 5 of the '380 Patent, under 35 U.S.C. § 271(b), by supplying its UCODE 7 and UCODE 8 ICs to others for inclusion in RFID tags and inducing its customers to use the patented methods.

209. In the correspondence exchanged between the parties, NXP has not denied that it is practicing claims 1, 2, 3, and 5 of the '380 Patent.

210. On information and belief, NXP has continued its infringing activity despite knowledge of the '380 Patent, and such infringement is egregious and willful.

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**NXP’S INFRINGEMENT OF U.S. PATENT NO. 9,436,902**

211. Impinj owns U.S. Patent No. 9,436,902 (“the ’902 Patent”), which is directed to an inventive structure for an RFID tag precursor.

212. Claim 9 of the ’902 Patent reads as follows:

- 9. A Radio Frequency Identification (RFID) tag precursor comprising:
  - an assembly including an RFID integrated circuit (IC) with an IC contact, a nonconductive repassivation layer on a surface of the IC and confined within a perimeter of the surface, and a conductive redistribution layer on the repassivation layer and confined within the perimeter of the surface;
  - a substrate including a first antenna terminal;
  - an adhesive attaching the assembly to the substrate;
  - a first electrical connection between a first portion of the redistribution layer and the IC contact;
  - an opening, formed by an etchant, in a nonconductive barrier present on at least one of the first antenna terminal and the first portion of the redistribution layer; and
  - a second electrical connection formed between the first antenna terminal and the first portion of the redistribution layer through the opening.

213. Claim 11 of the ’902 Patent reads as follows:

- 11. The RFID tag precursor of claim 9, further comprising a plurality of openings formed by the etchant in the nonconductive barrier, and wherein the IC contact and at least one of the plurality of openings are nonoverlapping.

214. Claim 12 of the ’902 Patent reads as follows:

- 12. The RFID tag precursor of claim 9, wherein at least one of:
  - the etchant includes a textured surface on the redistribution layer that forms the opening by breaking the nonconductive barrier;
  - the etchant includes conductive particles that form the opening by breaking the nonconductive barrier;
  - the etchant forms the opening by reacting with the nonconductive barrier; and
  - the etchant is included in the adhesive.

1           215. Claim 13 of the '902 Patent reads as follows:

2                   13. The RFID tag precursor of claim 9, wherein the nonconductive  
3                   barrier is at least one of an oxide and a masking layer.

4           216. NXP has indirectly infringed the '902 Patent, including at least claims 11, 12, and  
5           13 of the '902 Patent, under 35 U.S.C. §§ 271(b), by selling UCODE 7 and UCODE 8 ICs for  
6           inclusion in RFID tags and inducing customers to create RFID tag precursors as recited in claims  
7           11, 12, and 13.

8           217. In the correspondence exchanged between the parties, NXP has not denied that it is  
9           practicing claims 11, 12, and 13 of the '902 Patent.

10          218. On information and belief, NXP has continued its infringing activities despite  
11          knowledge of the '902 Patent, and such infringement is egregious and willful.

12                   **NXP'S INFRINGEMENT OF U.S. PATENT NO. 10,116,033**

13          219. Impinj owns U.S. Patent No. 10,116,033 ("the '033 Patent"), which is directed to an  
14          inventive method for assembling an RFID tag.

15          220. Claim 1 of the '033 Patent reads as follows:

16                   1. A method for assembling a Radio Frequency Identification  
17                   (RFID) tag, the method comprising:

18                           providing an antenna;

19                           providing an RFID integrated circuit (IC) that includes a first  
20                           electrical bus an electrical circuitry, the electrical circuitry com-  
21                           prising one or more of a rectifier circuit, a demodulator circuit,  
22                           and a modulator circuit of the IC, wherein providing the IC com-  
23                           prises:

24                                   coupling the first electrical bus to the one or more of a recti-  
25                                   fier circuit, a demodulator circuit, and a modulator circuit of  
26                                   the IC;

27                                   disposing a plurality of conductive patches on a surface of the  
28                                   IC, wherein the plurality of distinct conductive patches co-  
                                 vers a substantial portion of the surface of the IC;

                                 capacitively coupling at least a first one of the plurality of  
                                 distinct conductive patches to the first electrical bus; and

                                 coupling the antenna to the plurality of distinct conductive  
                                 patches on the surface of the IC to form the RFID tag,  
                                 wherein at least one of the antenna-to-conductive-path and



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the first-electrical-bus-to-conductive-patch couplings is through a dielectric material and the dielectric material includes at least one of a covering layer of the antenna and a covering layer of the IC.

221. NXP has indirectly infringed the '033 Patent, including at least claim 1 of the '033 Patent, under 35 U.S.C. § 271(b), by supplying its UCODE 7 and UCODE 8 ICs to others and inducing its customers to use the patented method.

222. NXP has continued its infringing activity despite knowledge of the '033 Patent (including knowledge from correspondence with Impinj), and such infringement is egregious and willful.

**REQUEST FOR RELIEF**

WHEREFORE, Impinj requests the following relief:

- (1) A preliminary and permanent injunction enjoining NXP and its officers, agents, servants, employees, attorneys and any other persons who are in active concert or participation with such persons, from making, selling, using, offering for sale or importing its UCODE 8 IC or any other IC that is not colorably different;
- (2) For an award of damages, including lost profits, no less than a reasonable royalty under 35 U.S.C. § 284 arising from such infringement;
- (3) For increased damages pursuant to 35 U.S.C. § 285 or as otherwise permitted by law;
- (4) For an award of attorneys' fees and costs pursuant to 35 U.S.C. § 285 or as otherwise permitted by law; and
- (5) For such other relief as the Court deems just and proper.

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