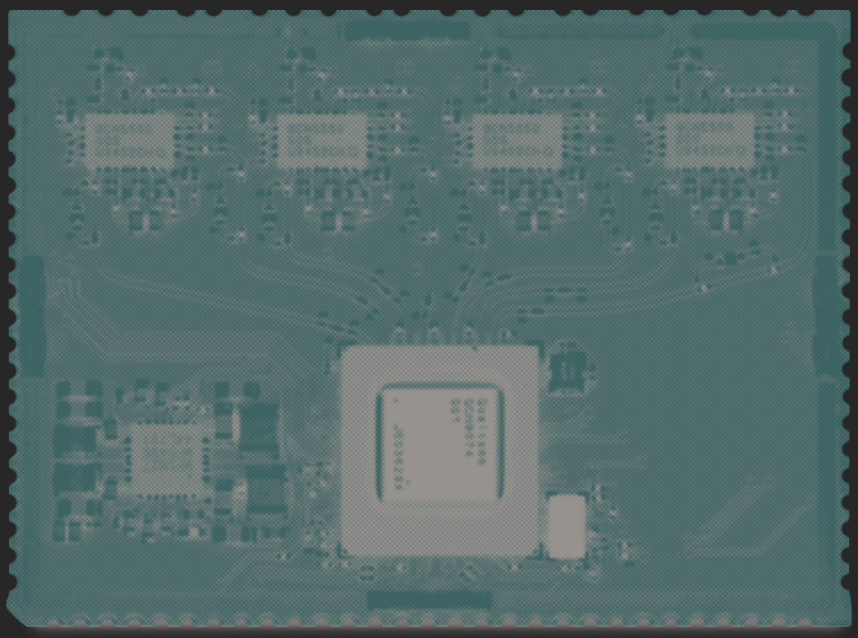

Pineapple PCIe card is based on QCN9074 Radio chip from Qualcomm, which is highly integrated wireless local area network (LAN) for 6 GHz IEEE802.11ax applications.
It performs AP and STA functionality with 4x4 MIMO and 4 spatial streams.
QCN9074 is a dual-synthesizer WLAN radio with native 160 MHz support.
The module is in a surface mountable form. Commercial temperature range: 0-65°C, industrial temperature range: -40-85°C.

Quick specs

- Wi-Fi 6E (802.11ax) 6 GHz, 4x4 MU-MIMO 1024 QAM (4SS) and 4096 QAM (2SS), 20/40/80/160 MHz, 4804 Mbps data-rate
- Based on QCN9074
- 13.23 dBm per chain RF output power
- Size - 35 by 47 mm
- Maximum power consumption - 15W
- EEPROM memory
- Available interfaces - dual lane PCIe 3.0, UART, JTAG for debugging, GPIOs

Contents

Quick specs 1

3. Electrical characteristics 3

4. Electrical characteristics 7

5. Power management 7

6. Mechanical characteristics 8

7. PCB footprint 9

8. Thermal considerations 10

9. PCIe Card 12

10. Laminate Conditions 14

11. Ordering information 15

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3. Electrical characteristics

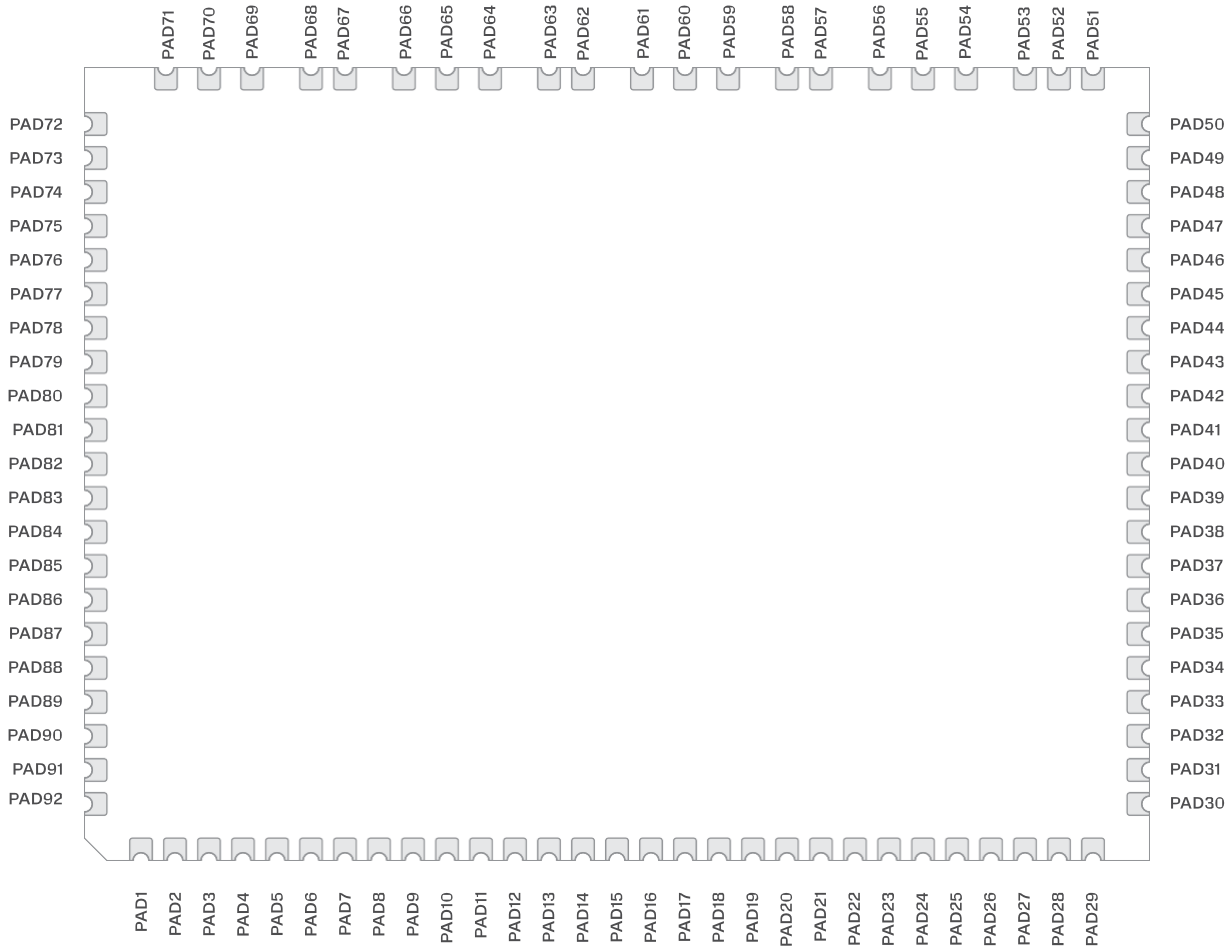


TABLE 3-1. I/O DESCRIPTION (PIN TYPE) PARAMETERS

Description	Parameter
AI	Analog input
AO	Analog output
GND	Ground
RF In/Out	RF input/output
I	Digital input signal
O	Digital output signal
IO	Digital bidirectional signal

TABLE 3-2. POWER AND GROUND

Pin ID	Pin name	Type	Description
PAD2	+3V3	I	3.3V digital power
PAD75, PAD76	+5V_XPA	AI	5V analog power for RF
PAD1, PAD7, PAD10, PAD13, PAD16, PAD19, PAD22, PAD29, PAD37, PAD41, PAD42, PAD43, PAD44, PAD45, PAD46, PAD47, PAD48, PAD49, PAD50, PAD51, PAD52, PAD53, PAD54, PAD56, PAD57, PAD58, PAD59, PAD61, PAD62, PAD63, PAD64, PAD66, PAD67, PAD68, PAD69, PAD71, PAD72, PAD73, PAD74, PAD77, PAD78, PAD79, PAD80, PAD81, PAD82, PAD83, PAD84, PAD85, PAD86, PAD87, PAD88, PAD89, PAD90, PAD91, PAD92	GND	GND	Ground

TABLE 3-3. RADIO

Pin ID	Pin name	Type	Description
PAD55	6G_CH0_ANT	RF In/Out	Signal line for antenna
PAD60	6G_CH1_ANT	RF In/Out	Signal line for antenna
PAD65	6G_CH2_ANT	RF In/Out	Signal line for antenna
PAD70	6G_CH3_ANT	RF In/Out	Signal line for antenna

TABLE 3-4. PCIE GEN3

Pin ID	Pin name	Type	Description
PAD28	PCIE_CLKREQ_N_GPIO39	IO	PCIe clock request
PAD6	PCIE0_RST_N_GPIO37	I	PCIe reset
PAD27	PCIE0_WAKE_N_GPIO38	I	PCIe wake
PAD8	PCIE0_TX1_N	AO	PCIe transmitter differential signal
PAD9	PCIE0_TX1_P	AO	
PAD12	PCIE0_RX1_P	AI	PCIe receiver differential signal
PAD11	PCIE0_RX1_N	AI	
PAD14	PCIE0_REFCLK_N	AO	Reference clock
PAD15	PCIE0_REFCLK_P	AO	
PAD17	PCIE0_TX0_N	AO	PCIe transmitter differential signal
PAD18	PCIE0_TX0_P	AO	
PAD21	PCIE0_RX0_P	AI	PCIe receiver differential signal
PAD20	PCIE0_RX0_N	AI	

TABLE 3-6. GPIO

Pin ID	Pin name	Type	Description
PAD3	GPIO48_DEBUG_UART_TXD	O	Debug UART TxD
PAD4	GPIO49_DEBUG_UART_RXD	I	Debug UART RxD
PAD23	WL_RF_KILL_GPIO51	I	An external 32.768 kHz sleep clock input pin. Can use either external (32.768 kHz) or internal (32 kHz) sleep clock, but external sleep clock provides better sleep clock accuracy. If not used, a pull-down resistor is required.
PAD24	PTA1_WL_ACT_GPIO42	O	WLAN active signal PTA1
PAD25	PTA1_ACT_GPIO40	I	Wi-Fi coexistence active signal PTA1
PAD26	PTA1_PRIO_GPIO41	I	Wi-Fi coexistence priority signal PTA1
PAD30	GPIO47_WCI_UART_TXD	I	Wireless coexistence interface (WCI) UART asynchronous.
PAD31	GPIO46_WCI_UART_RXD	O	Wireless coexistence interface (WCI) UART asynchronous; WSI data.
PAD38	GPIO35_SW_LED2	O	LED interface 1
PAD39	GPIO27_RFA_DEBUG_LED0	O	LED interface 0 for RFA debug

TABLE 3-7. JTAG

Pin ID	Pin name	Type	Description
PAD32	JTAG_TDI	I	Test data In
PAD33	JTAG_TDO	O	Test data Out
PAD34	JTAG_TCK	I	Test clock
PAD35	JTAG_TMS	I	Test mode select
PAD36	JTAG_TRST	I	Test reset

TABLE 3-8. PIN STATUS ON BOOT

Pin #	Pin name and/or function	Pin name or alt function	Voltage	Internal Pull-down (PD)/ Pull-up (PU)	Type	Description
PAD5	PBRST_IN_N	-	-	-	I	Logic input pin to start up or shut down the device
PAD40	+VDD_1V8_PX3	-	+1V8	-	O	1.8 V power supply for bootstrap pins
PAD3	GPIO48	GPIO48_DEBUG_ UART_TXD	+1V8	PD	I	Check if authentication needed: 0: PBL skips authentication. 1: PBL performs RSA authentication
PAD24	GPIO42	PTA1_WL_ACT_ GPIO42	+1V8	PU	I	Boot at different Q6 core speeds: 00: 408 MHz 01: 200 MHz
PAD31	GPIO46	GPIO46_WCI_ UART_RXD	+1V8	PD	I	Watch Dog enable/disable: 0: WDOG boot disabled 1: WDOG boot enabled
PAD33	JTAG	JTAG_TDO	+1V8	-	I	Burnin mode enable: 0: Burnin Mode 1: Normal Mode

NOTE: These pins are for booting the device, use them cautiously.

4. Electrical characteristics

TABLE 4-1. POWER SUPPLY DC CHARACTERISTICS

Symbol	Parameter	Minimum	Typical	Maximum	Units
+3V3	3.3 V Supply voltage	3	3.3	3.6	V
	3.3 V Supply current			0.7	A
+5V_XPA	5 V Supply voltage for radios	4.3	5	5.25	V
	5 V Supply current			2.5	A

TABLE 4-2. TEMPERATURE LIMIT RATINGS

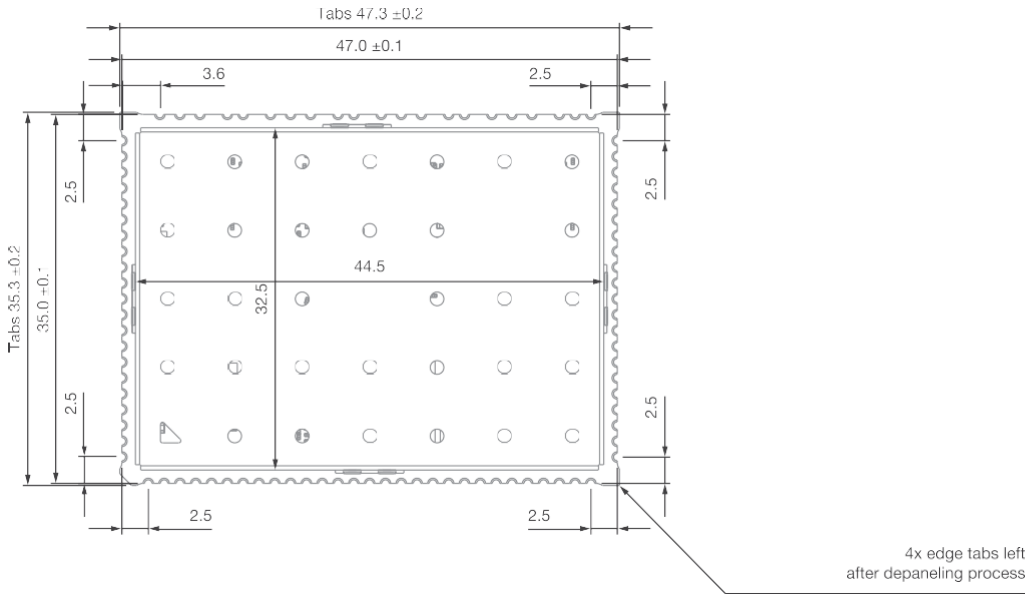
Parameter	Minimum	Maximum	Units
Storage Temperature (Commercial)	0	+110	°C
Storage Temperature (Industrial)	-40	+110	°C
Commercial Operating Temperature	0	+65	°C
Industrial Operating Temperature	-40	+85	°C
Humidity	30	60	%RH
Storage humidity	15	70	%RH

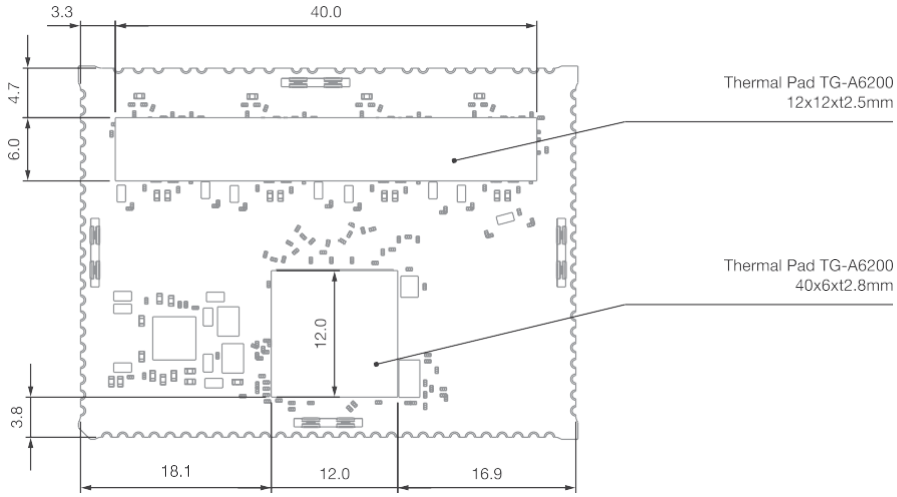
5. Power management

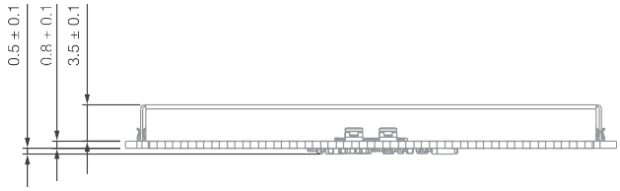
TABLE 5-1. POWER CONSUMPTION

DBS			Voltage V	Current A	Total power dBm
TX	4x4	5925-6425MHz	5	2.5	12.78
		6425-6525MHz	5	1.62	12.69
TX	4x4	6525-6875MHz	5	0.07	13.07
		6875-7125MHz	5	0.07	13.23

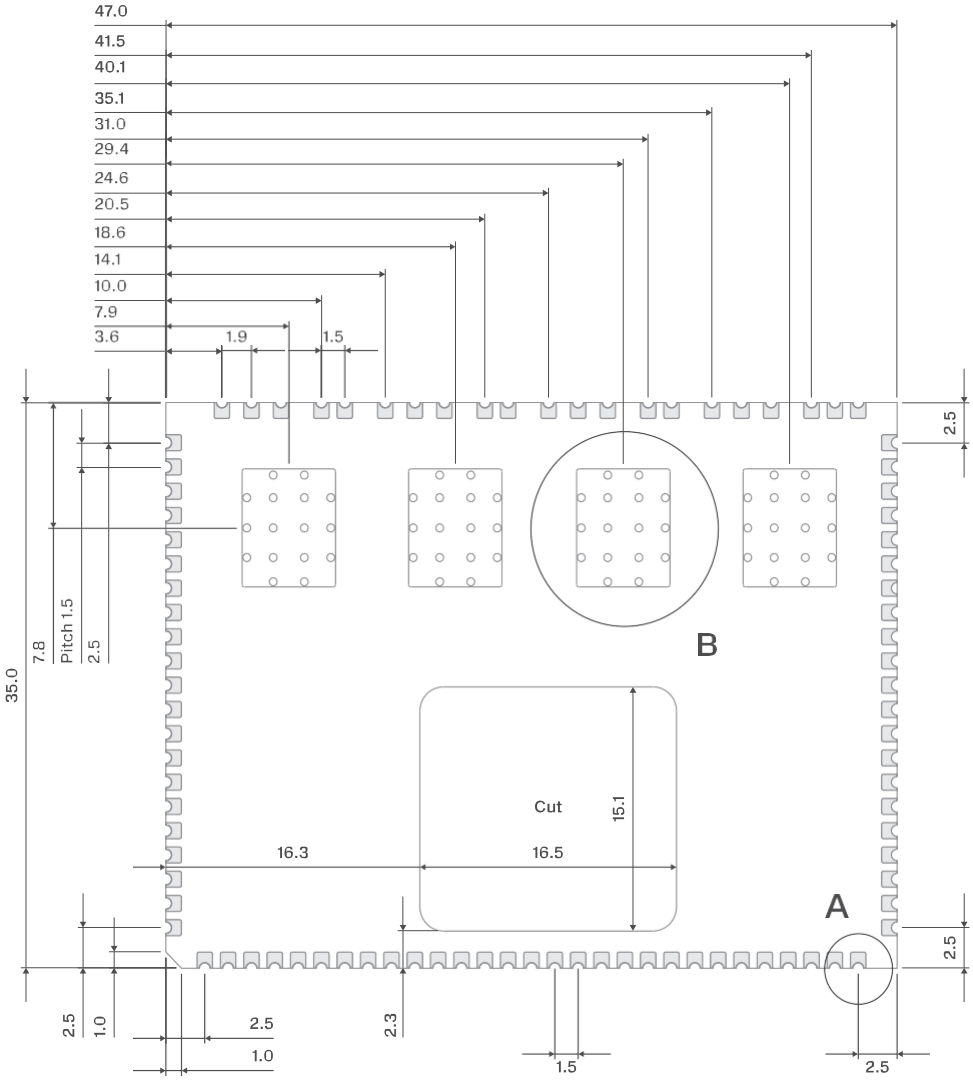
6. Mechanical characteristics

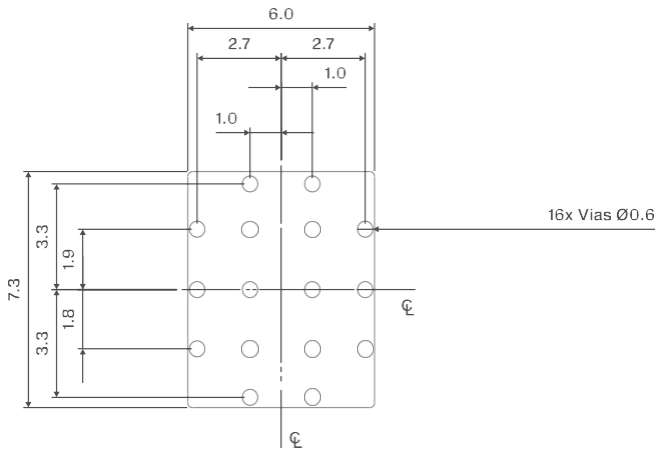




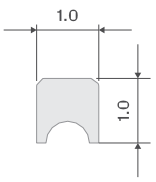


7. PCB footprint





Detail B



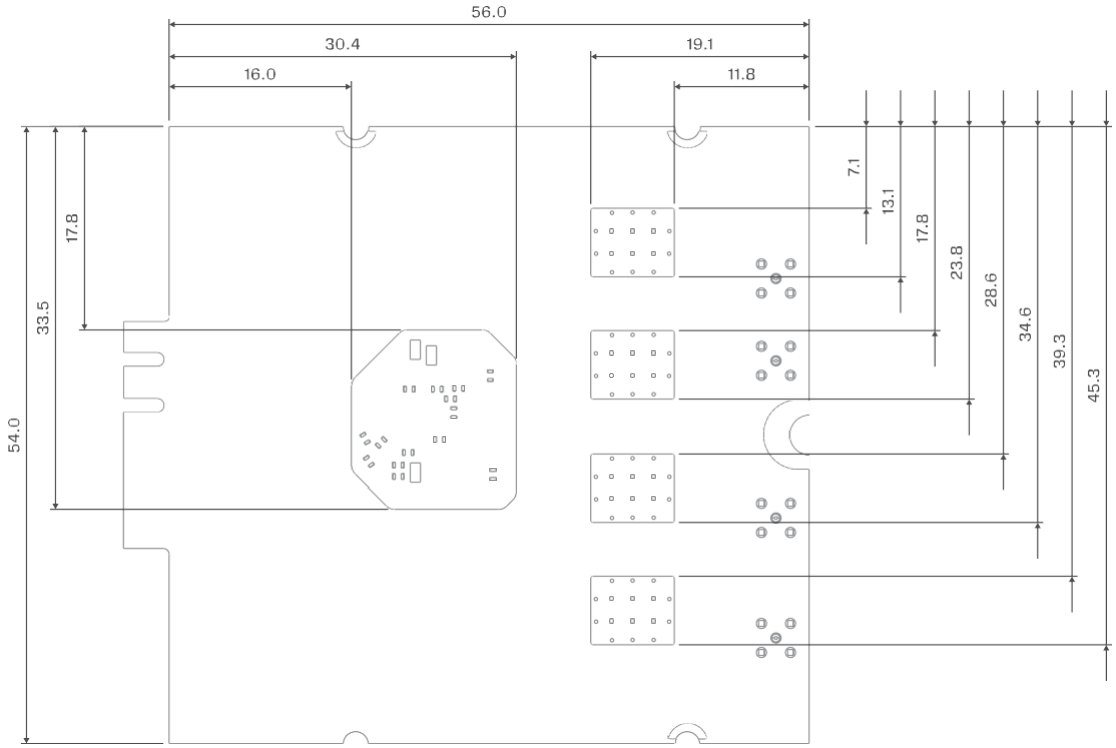
Detail A

8. Thermal considerations

Pineapple PCIe cards comes out with a heatsink

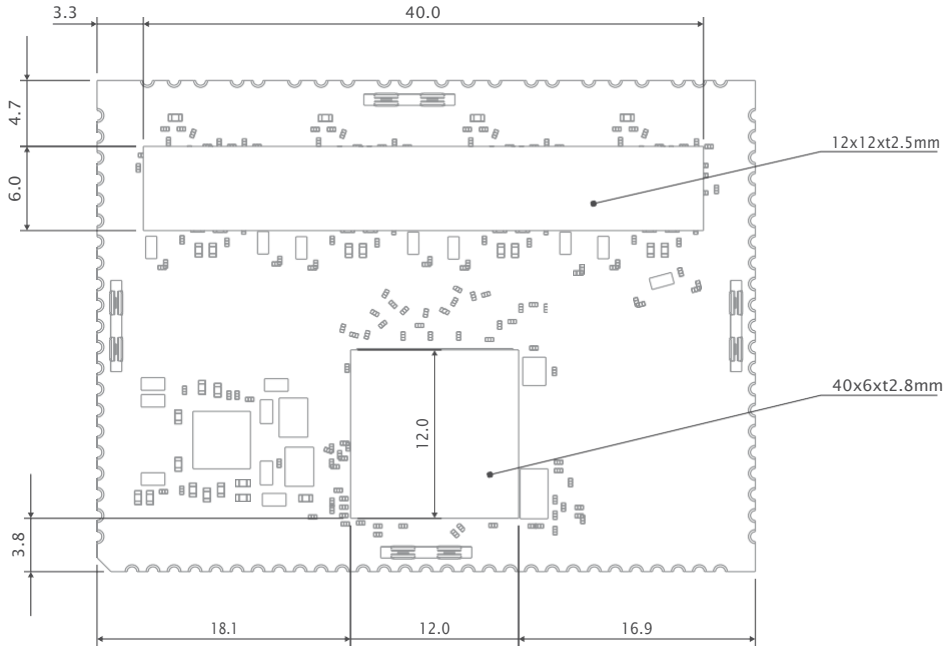
This heatsink has a 133cm² area. There are thermal pads under the RF shield. It is enough for Pineapple to not overheat. But to reach the maximum performance with the lowest possible temperature it is recommended to use around 200cm² heatsink. To achieve that it is possible to use Pineapple card with a dual heatsink, one from the top and second on the bottom. To use a second heatsink on the bottom it is necessary to use thermal pads (8-2. Picture.).

8-2. PICTURE. LOCATIONS OF WHERE THERMAL PADS ARE NECESSARY IF BOTTOM HEATSINK IS USED.



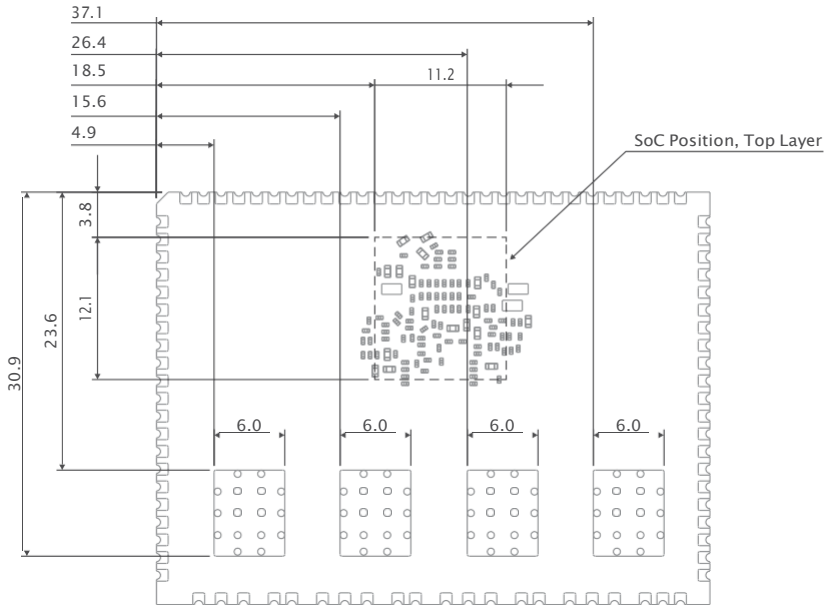
Pineapple modules does not have thermal pads assembled. Thermal pads can be assembled ONLY after SMT process, when module is soldered on a carrier board. If thermal pads are assembled before SMT process, irreversible damage may be done to the module. Depending on carrier board design, heatsink can be used on the bottom or on the top. If heatsink must be used on the top of the module, thermal pads must be put under the RF shield (9.3. Picture.).

8-3. PICTURE. LOCATIONS ON MODULE OF WHERE THERMAL PADS ARE NECESSARY IF TOP HEATSINK IS USED.



If the heatsink must be used on the bottom of the module, thermal pads must be used between module and the heatsink. (8.4. Picture.).

8-4. PICTURE. LOCATIONS ON THE MODULE OF WHERE THERMAL PADS ARE NECESSARY IF BOTTOM HEATSINK IS USED.



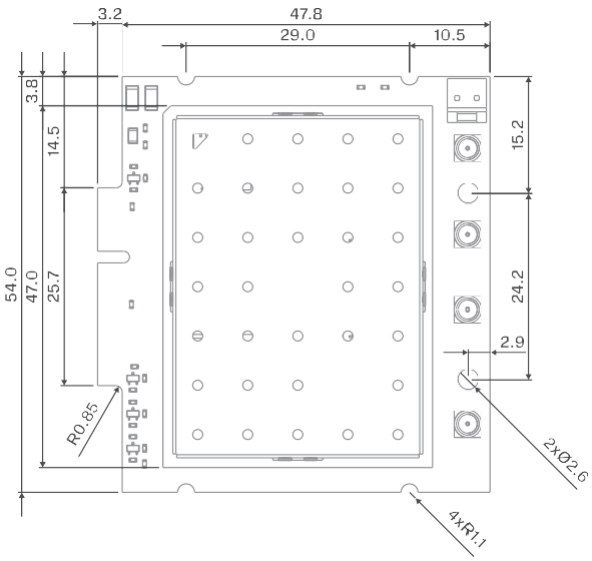
Heatsink size depends on the output power of the card.

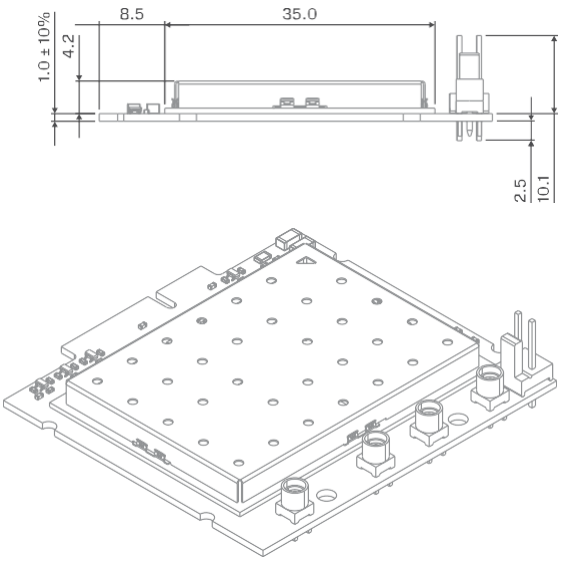
- If card is used for the low throughput, low data rate and high RF power (13.23dBm), it is needed to dissipate around 10W of power. To do that at least 230cm^2 heatsink is necessary.

9. PCIe Card

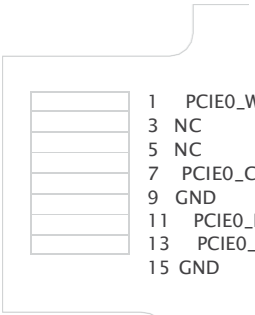
Pineapple has three types of PCIe cards. All types use MMCX connectors.

9.1. Pineapple with Mini PCIe card.

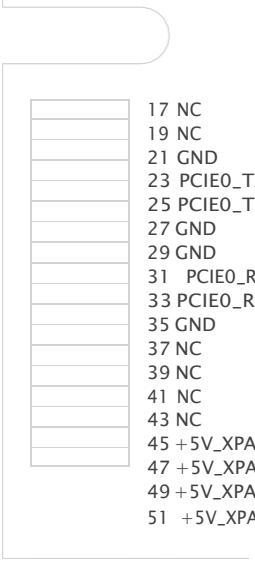




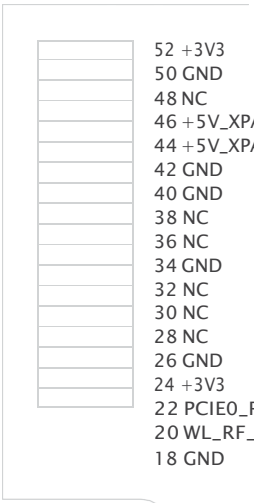
9.2. Pineapple with Mini PCIe card pin out.



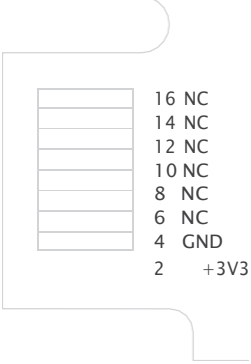
1 PCIE0_WAKE_N
3 NC
5 NC
7 PCIE0_CLKREQ_N
9 GND
11 PCIE0_REFCLK_N
13 PCIE0_REFCLK_P
15 GND



17 NC
19 NC
21 GND
23 PCIE0_TX0_N
25 PCIE0_TX0_P
27 GND
29 GND
31 PCIE0_RX0_N
33 PCIE0_RX0_P
35 GND
37 NC
39 NC
41 NC
43 NC
45 +5V_XPA (optional)
47 +5V_XPA (optional)
49 +5V_XPA (optional)
51 +5V_XPA (optional)



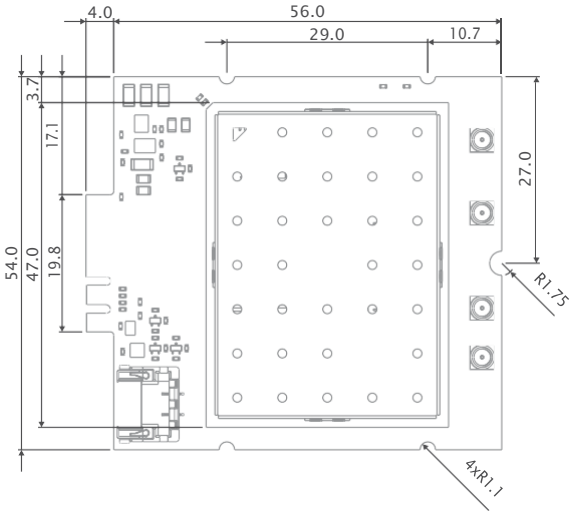
52 +3V3
50 GND
48 NC
46 +5V_XPA (optional)
44 +5V_XPA (optional)
42 GND
40 GND
38 NC
36 NC
34 GND
32 NC
30 NC
28 NC
26 GND
24 +3V3
22 PCIE0_RST_N
20 WL_RF_KILL
18 GND

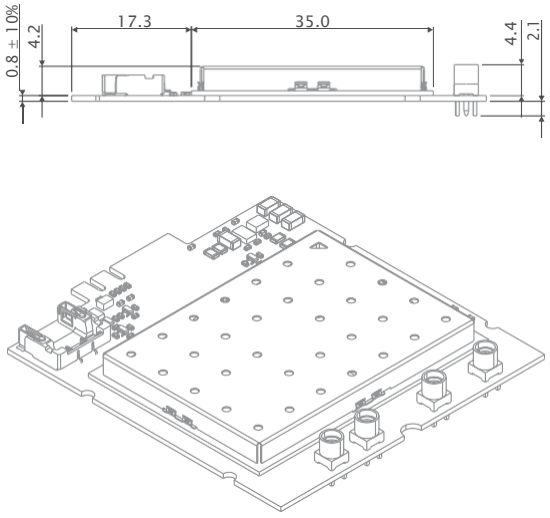


16 NC
14 NC
12 NC
10 NC
8 NC
6 NC
4 GND
2 +3V3

(optional) +5V_XPA is used only in PCIe cards, which are made to have internal power supply for radio.

9.3. Pineapple with M.2 A+E key card.





9.4. Pineapple with M.2 A+E key card pin out.

75 GND
73 NC
71 NC
69 GND
67 PCIE0_TX1_N
65 PCIE0_TX1_P
63 GND
61 PCIE0_RX1_N
59 PCIE0_RX1_P
57 GND
55 PCIE0_WAKE_N
53 PCIE0_CLKREQ_N
51 GND
49 PCIE0_REFCLK_N
47 PCIE0_REFCLK_P
45 GND
43 PCIE0_TX0_N
41 PCIE0_TX0_P
39 GND
37 PCIE0_RX0_N
35 PCIE0_RX0_P
33 GND

E key

23 +5V_XPA (optional)
21 +5V_XPA (optional)
19 +5V_XPA (optional)
17 +5V_XPA (optional)

A key

7 GND
5 NC
3 NC
1 GND

2 +3V3
4 +3V3
6 +5V_XPA (optional)

A key

16 +5V_XPA (optional)
18 GND
20 NC
22 NC

E key

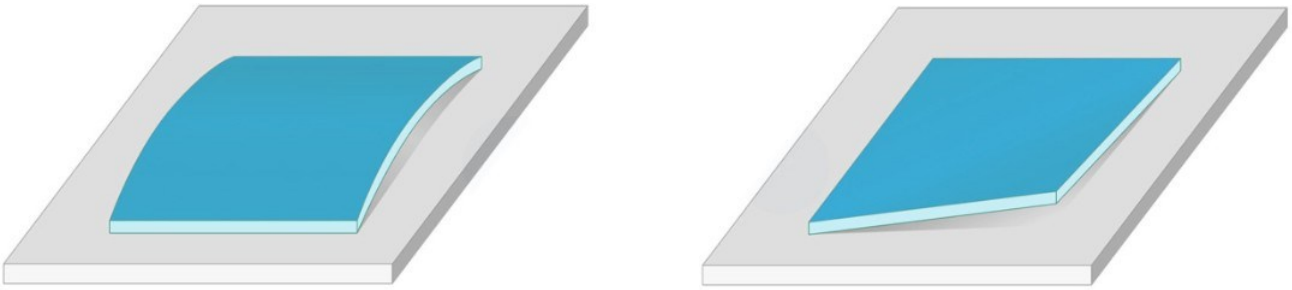
32 NC
34 NC
36 NC
38 NC
40 NC
42 NC
44 PTA1_BT_ACT
46 PTA1_WL_ACT
48 PTA1_BT_PRIO
50 NC
52 PCIE0_RST_N
54 NC
56 WL_RF_KILL
58 NC
60 NC
62 NC
64 NC
66 NC
68 NC
70 NC
72 +3V3
74 +3V3

(optional) +5V_XPA is used only in PCIe cards, which are made to have internal power supply for radio.

10. Laminate Conditions

8devices modules are manufactured according to the standard IPC-A-610D Norm Class 2.
Standard states: “Bow/twist after solder should not exceed 1.5% for through-hole and 0.75% for surface mount printed board applications”.
According to this statement, Pineapple module can be bowed and twisted up to 0.3525 mm.
To avoid negative effects of bow and twist we recommend to increase the paste thickness for the module pads to achieve better co-planarity.

FIGURE 10-1. EXAMPLE OF BOW AND TWIST



11. Ordering information

Pineapple modules are packaged into trays. Each tray fits 18 modules.
Every 5 trays are vacuum sealed and one standard packaging box contains 450 modules.

FIGURE 11-1. PINEAPPLE TRAY DIMENSIONS

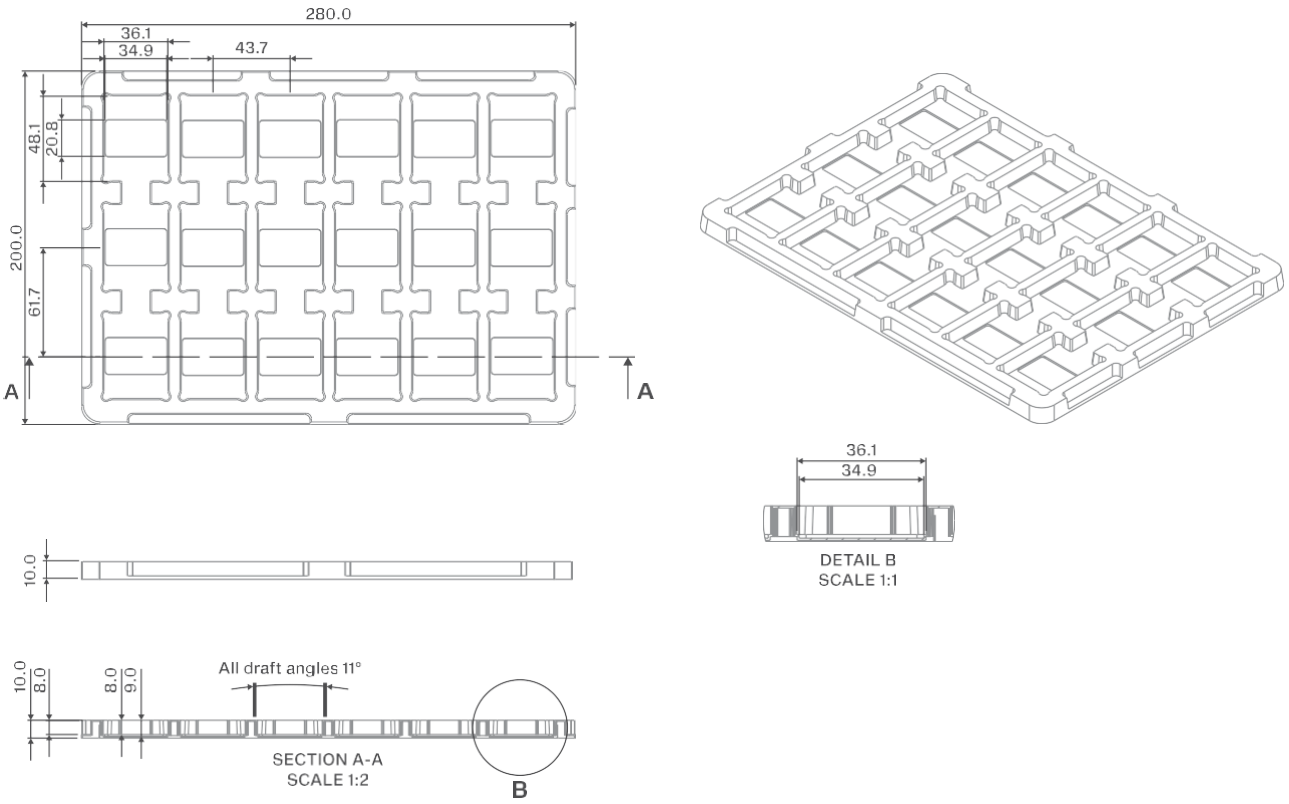
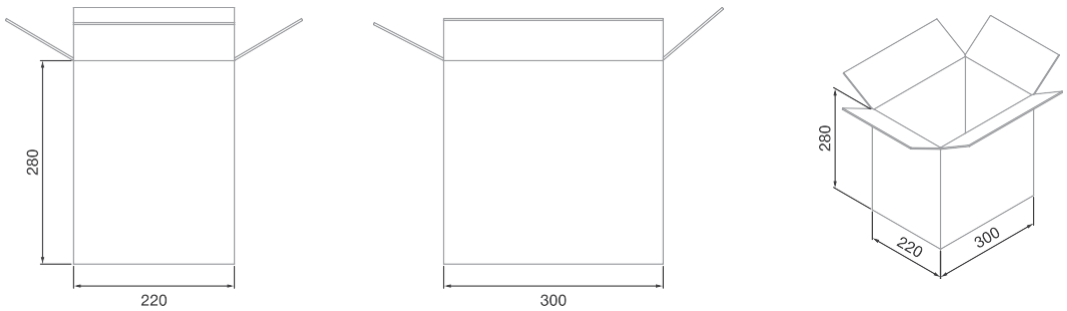
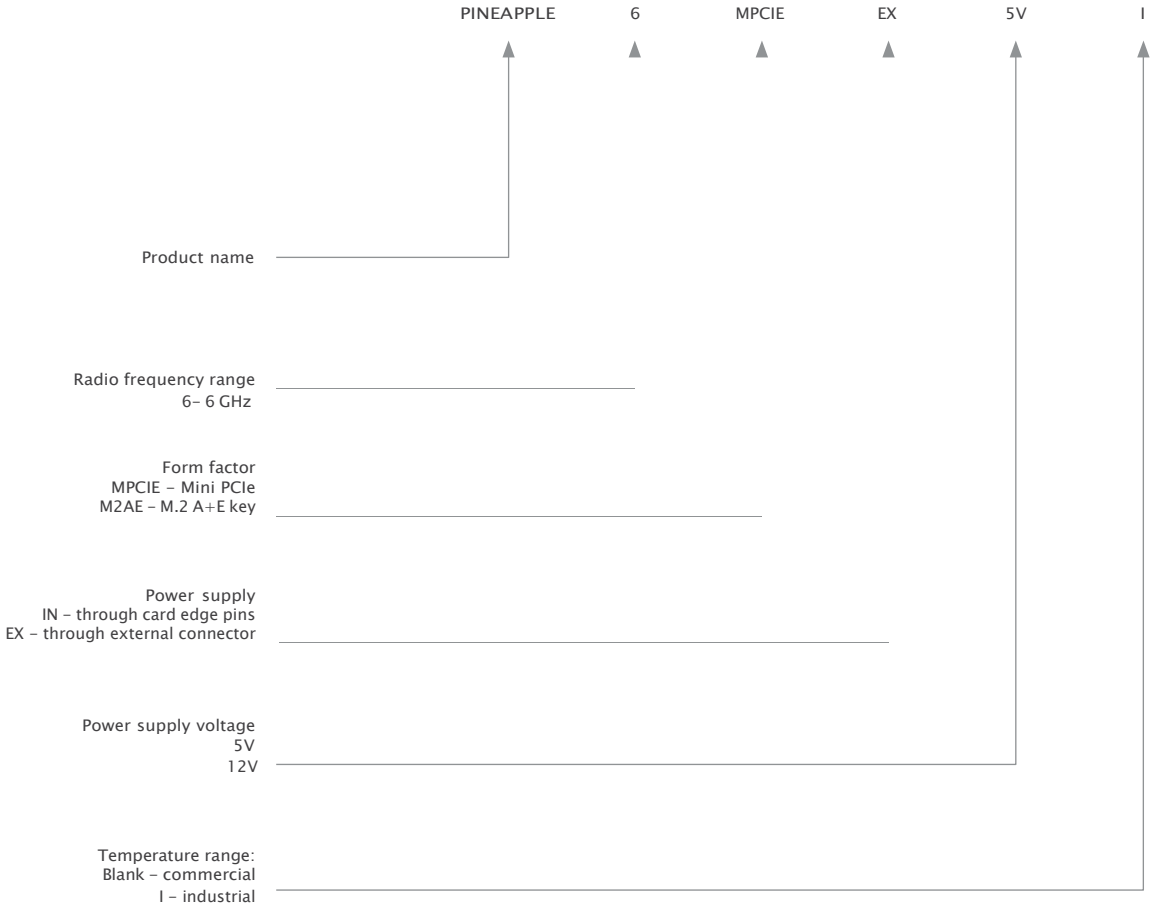


FIGURE 11-2. STANDARD PACKAGING BOX DIMENSIONS



11.3 PART NUMBER GUIDE



Pineapple with Mini PCIe (EX) has a 640454-2 connector used for a power supply. Female matching part number: 3-640441-2.

Pineapple with M.2 A.E key (EX) has a ES9P002VFZR1600 connector used for a power supply. Female matching part number: ES9S002SZA. Crimps for this connector: ES9S06K4FA.

11.4. PINEAPPLE MODULES ORDER NUMBERS AND DESCRIPTIONS

Order Number	Description
Pineapple 6	Commercial radio module with 6 GHz radio
Pineapple 6-I	Industrial radio module with 6GHz radio

11.5. PINEAPPLE RADIO CARDS ORDER NUMBERS AND DESCRIPTIONS

Order Number	Description
PINEAPPLE-6-MPCIE-IN5V	Pineapple 6 Mini PCIe card; 5 V power supply through card edge pins, Commercial
PINEAPPLE-6-MPCIE-EX5V	Pineapple 6 Mini PCIe card; 5 V power supply through connector, Commercial
PINEAPPLE-6-M2AE-IN5V	Pineapple 6 M.2 A+E key card; 5 V power supply through card edge pins, Commercial
PINEAPPLE-6-M2AE-EX5V	Pineapple 6 M.2 A+E key card; 5 V power supply through connector, Commercial
PINEAPPLE-6-M2AE-IN12V	Pineapple 6 M.2 A+E key card; 12 V power supply through card edge pins, Commercial*
PINEAPPLE-6-M2AE-EX12V	Pineapple 6 M.2 A+E key card; 12 V power supply through connector, Commercial*
PINEAPPLE-6-MPCIE-IN5V-I	Pineapple 6 Mini PCIe card; 5 V power supply through card edge pins, Industrial
PINEAPPLE-6-MPCIE-EX5V-I	Pineapple 6 Mini PCIe card; 5 V power supply through connector, Industrial
PINEAPPLE-6-M2AE-IN5V-I	Pineapple 6 M.2 A+E key card; 5 V power supply through card edge pins, Industrial
PINEAPPLE-6-M2AE-EX5V-I	Pineapple 6 M.2 A+E key card; 5 V power supply through connector, Industrial
PINEAPPLE-6-M2AE-IN12V-I	Pineapple 6 M.2 A+E key card; 12 V power supply through card edge pins, Industrial*
PINEAPPLE-6-M2AE-EX12V-I	Pineapple 6 M.2 A+E key card; 12 V power supply through connector, Industrial*

* Pineapple M.2 A+E PCIe cards which can be supplied by 12V, are manufactured upon the request.

12. Module warning

12.1 List of applicable FCC rules

CFR 47 FCC PART 15 SUBPART E has been investigated. It is applicable to the modular.

12.2 Specific operational use conditions

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

12.3 Limited module procedures

Not applicable

12.4 Trace antenna designs

Not applicable

12.5 RF exposure considerations

To maintain compliance with FCC's RF Exposure guidelines, this equipment should be installed and operated with minimum distance of 20cm from your body.

12.6 Antennas

This radio transmitter FCC ID: Z9W-PIN6 has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Antenna type	Input impedance (ohm)	Maximum Antenna gain
Dipole	50	5dBi

12.7 Label and compliance information

The final end product must be labeled in a visible area with the following" Contains FCC ID: Z9W-PIN6

12.8 Information on test modes and additional testing requirements

Host manufacturer is strongly recommended to confirm compliance with FCC requirements for the transmitter when the module is installed in the host.

12.9 Additional testing, Part 15 Subpart B disclaimer

Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B.

FCC warning

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
This transmitter must not be colocated or operating in conjunction with any other antenna or transmitter.
This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/TV technician for help.

ISCEDC warning

This device complies with Industry Canada license -exempt RSS standard(s). Operation is subject to the following two conditions: (1) This device may not cause interferenc e, and (2) This device must accept any interference, including interference that may cause un desired operation of the device.
Le présentappareilestconforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitationestautorisée aux deux conditions suivantes: (1) l'appa reil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareildoit accepter tout brouilla geradioélectriquesubi, mêmesi le brouillageest susceptible d'encompromettre le fonctionnem ent.

Radiation Exposure Statement
This equipment complies with Canada radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.
Déclaration d'exposition aux radiations
Cet équipement est conforme Canada limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement doit être installé et utilisé à distance minimum de 20cm entre le radiateur et votre corps.

This device is intended only for OEM integrators under the following condition: The transmitter module may not be co-located with any other transmitter or antenna. As long as the condition above is met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.
Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes:
Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne. Tant que les 1 condition ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

End Product Labeling
The final end product must be labeled in a visible area with the following: Contains IC: 11468A-PIN6. Plaque signalétique du produit final
Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: Contient des IC: 11468A-PIN6.

Manual Information to the End User
The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.
The end user manual shall include all required regulatory information/warning as show in this manual. Manuel d'information à l'utilisateur final
L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module. Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.

Statement of antenna for IC part:
This radio transmitter IC: 11468A-PIN6 has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.
Énoncé de l'antenne pour la partie IC:
Cet émetteur radio IC: 11468A-PIN6 a été approuvé par Innovation, sciences et développement économique Canada pour fonctionner avec les types d'antennes énumérés ci-dessous, avec le gain maximal autorisé indiqué. Les types d'antennes non inclus dans cette liste qui ont un gain supérieur au gain maximum indiqué pour tout type listé sont strictement interdits pour une utilisation avec cet appareil.

Restriction Notes:
a. Prohibited for control of or communications with unmanned aircraft systems.
e. No direct internet connection permitted.
g. limited to indoor use by low-power indoor access point association.
i. Attestation Required.
j. Under the control of an access point and is not capable of initiating a network.
The operation of this device is prohibited on oil platforms, cars, trains, boats, and aircraft, except that operation of this device is permitted in large aircraft while flying above 10,000 feet.
Operation of transmitters in the 5.925-7.125 GHz band is prohibited for control of or communications with unmanned aircraft systems.

13. Document Revision History

Revision	Revision Date	Description
Revision: v1.0	2021 04 06	Initial Release
Revision: v1.1	2022 03 31	Card pinout changes
Revision: v1.2	2022 07 25	Block diagram update, added PAD23 description, updated 9th chapter
Revision: v1.3	2022 10 19	Removed information about B+M card, updated thermal dissipation information
Revision: v1.4	2022 12 21	Product drawings updated
Revision: v1.5	2023 09 04	Power consumption data, laminated conditions, updated ordering data
Revision: v1.6	2024 02 01	Industrial Part Numbers added
Revision: v1.7	2024 04 26	Module warning added