

# PIOT-V3(GA) SPEC

## User Manual

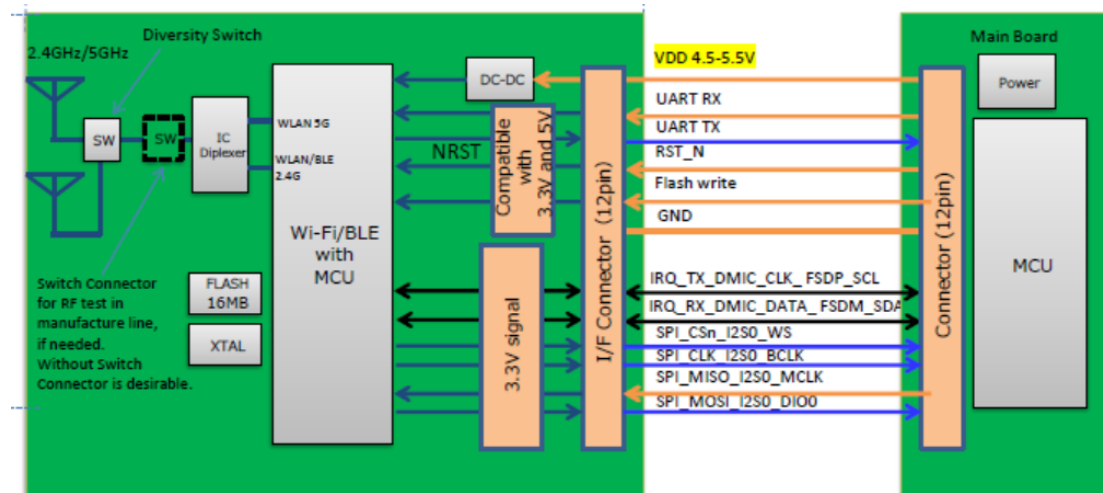
Revision

Revision	Date	Description	Revised By
0.0	2024/10/28	- Initial Released	Pan Dong Mei

# 1. Introduction

## 1.1 Overview

PIOT-V3(GA) is Supports WIFI and Bluetooth functions, and supports 2 2.4G/5GHz dual band antennas.



# 1.2 Product Features

## 2. General Specification

Item	Base Specification
Wireless Chipset	RTL8721DCM-VA3
Antenna	Selective Diversity Support
Module Dimention	48.0mm x 30.0mm
I/F Connector	SM12B-GHS-TB (LF)(SN)
External Flash memory	16M Byte
Power supply	Recommended operation conditions :  DC +4.5~+5.5V Absolution Maximum
Interface	UART, SPI, I2S, DMIC, USB,(3.3V and 5.0V logic levels are required for UART)
Operating temperature and Humidity	-10degC~70degC,95%Rh
WLAN	802.11 a/b/g/n, 1x1, 2.4GHz & 5GHz
Bluetooth	Bluetooth Low Energy (Bluetooth 5.0)
operating temperature range	-10~70° C

### Test Point Information on Bottom Side

Test Point	Signal name	Pin assignment	Minimum Diameter [mm]	Dimension [mm] (X, Y)
TP1	5V	I/F CN_12pin	1.20	(20.96, 6.73)
TP2	UART_RX	I/F CN_11pin	1.20	(20.83, 3.18)
TP3	UART_TX	I/F CN_10pin	1.20	(17.15, 7.37)
TP4	RST	I/F CN_9pin	1.00	(17.15, 3.56)
TP7	Flash_Write	I/F CN_6pin	1.20	(9.78, 3.56)
TP8	GND	I/F CN_5pin	1.20	(9.78, 7.37)
TP9	UART2_RX	PB4	1.00	(26.29, 25.78)
TP10	UART2_TX	PB5	1.00	(26.29, 22.23)
TP11	SWD_DIO	PA31	1.00	(20.96, 12.07)
TP12	SWD_CLK	PA30	1.00	(17.15, 11.05)
TP15	CHIP_EN	CHIP_EN	1.00	(13.46, 11.05)
TP16	F_SPI_CS	PA18	1.20	(6.10, 18.67)
TP17	F_SPI_SO/DATA1	PA17	1.20	(6.10, 15.11)
TP18	F_SPI_CLK	PA14	1.20	(9.78, 22.23)
TP19	F_SPI_SI/DATA0	PA15	1.20	(9.78, 18.67)
TP20	VD33	DC/DC output_pin	1.00	(25.40, 14.61)
TP21	F_SPI_HOLD/DATA3	PA13	1.20	(6.10, 22.23)
TP22	F_SPI_WP/DATA2	PA16	1.20	(9.78, 15.11)

### Interface

### 3. Physical Dimensions

#### Pin position

CN pin assignment	Ameba D+ pin assignment	Type 1	
		Signal name	3.3/5VLS
1	PB19	SPI_MOSI	No
2	PB20	SPI_MISO	No
3	PB18	SPI_CLK	No
4	PB21	SPI_CS <sub>n</sub>	No
5		GND	
6	PB22	Flash_write	Yes
7	PA29	IRQ_TX	No
8	PA28	IRQ_RX	No
9	CHIP_EN	RST	Yes
10	PB31	UART_TX	Yes
11	PB30	UART_RX	Yes
12		5V	

#### Label Information

Wireless Module  
Model: PIOT-V3(GA)  
Made in China  
Panasonic Corporation



XXXXXXXXXXXXXXXXXX

T XXX-XXXXXXX  
R XXX-XXXXXXX

FCC ID:XXXXXXXXXX ○  
IC:XXXX-XXXX

JJBWB4321-V04-R0  
2024.10.23



# **Integration instructions for host product manufacturers according to KDB996369 D03 OEMManual v01**

Conditions on using Panasonic Corporation of North America regulatory approvals:

A. Customer must ensure that its product (The " Wi-Fi/BT module") is electrically identical to Panasonic Corporation of North America reference designs. Customer acknowledges that any modifications to Panasonic Corporation of North America reference designs may invalidate regulatory approvals in relation to the CUSTOMER Product, or may necessitate notifications to the relevant regulatory authorities.

B. Customer is responsible for ensuring that antennas used with the product are of the same type, with same or lower gains as approved and providing antenna reports to Panasonic Corporation of North America.

C. Customer is responsible for regression testing to accommodate changes to Panasonic Corporation of North America reference designs, new antennas, and portable RF exposure safety testing/approvals.

D. Appropriate labels must be affixed to the CUSTOMER Product that comply with applicable regulations in all respects.

E. A user's manual or instruction manual must be included with the customer product that contains the text as required by applicable law. Without limitation of the foregoing, an example (for illustration purposes only) of possible text to include is set forth below.

## 2.2 List of applicable FCC rules:

FCC Part 15 Subpart C 15.247, FCC Part 15 Subpart E

## 2.3 Summarize the specific operational use conditions

Radio Technology: Bluetooth BLE

Operation frequency: 2402-2480MHz Channel

No.: 40 channels

Data rate: 1Mbps, 2Mbps, 125kbps, 500Kbps

Channel Separation: 2MHz

Modulation: GFSK

Antenna Type: PCB antenna,

Left max gain: 2.59dBi, Right max gain: 2.30dBi

(Antenna information is provided by applicant.)

Radio Technology: 2.4G WIFI

Operation frequency:

2412MHz-2462MHz for IEEE 802.11 b, g, n/HT20,

2422MHz~2452MHz for IEEE802.11n/HT40,

Channel No.: 802.11b/802.11g/802.11n/(HT20): 11

802.11(HT40): 7

Modulation type:

IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)

IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)

IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)

Antenna Type: PCB antenna,

Left max gain: 2.20dBi, Right max gain: 1.80dBi

(Antenna information is provided by applicant.)

Radio Technology: 5G WIFI

Operation frequency:

UNII-1: 5180 MHz~5240 MHz

UNII-2A: 5260 MHz ~ 5320 MHz

UNII-2C: 5500 MHz ~ 5700 MHz

UNII-3: 5745 MHz~5825MHz

Channel separation:

20MHz for 802.11a/802.11n (HT20)

40MHz for 802.11n(HT40)

Modulation type:

IEEE 802.11n: OFDM (64QAM,16QAM,QPSK,BPSK)

IEEE 802.11a: OFDM (64QAM,16QAM,QPSK,BPSK)

Antenna Type: PCB antenna,

Left max gain: 5.71dBi, Right max gain: 3.63dBi

(Antenna information is provided by applicant.)

The module can be used for mobile applications with a maximum 5.71dBi antenna. The host manufacturer installing this module into their product must ensure that the final composite product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operation. The host manufacturer 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.

## 2.4 Limited module procedures

Not applicable. The module is a Single module and complies with the requirement of FCC Part 15.212.

## 2.5 Trace antenna designs

The antenna used is the PCB antenna on the module

## 2.6 RF exposure considerations

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

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 radi-ate radio frequency energy and, if not in-stalled 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 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.

The antennas used for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be located or operating in conjunction with any other antenna or transmitter.

## 2.7 Antennas

Antenna Specification are as follows:

Antenna Type: PCB antenna

BLE: Left max gain: 2.59dBi, Right max gain: 2.30dBi,

(Provided by applicant)

2.4G WIFI: Left max gain: 2.20dBi, Right max gain: 1.80dBi

(Provided by applicant)

5G WIFI: Left max gain: 5.71dBi, Right max gain: 3.63dBi

(Provided by applicant)

This device is intended only for host manufacturers under the following conditions:

The transmitter module may not be co-located with any other transmitter or antenna;

As long as the conditions above are met, further transmitter test will not be required. However, the host manufacturer is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for

example, digital device emissions, PC peripheral requirements,etc.).

## 2.8 Label and compliance information

Host product manufacturers need to provide a physical or e-label stating “Contains FCC ID: ACJ-V3GA” With their finished product.

## 2.9 Information on test modes and additional testing requirements

Radio Technology: Bluetooth BLE

Operation frequency:2402-2480MHZChannel

No.: 40 channels

Data rate: 1Mbps, 2Mbps, 125kbps, 500Kbps

Channel Separation: 2MHz

Modulation: GFSK

Antenna Type: PCB antenna,

Left max gain: 2.59dBi, Right max gain: 2.30dBi

(Antenna information is provided by applicant.)

Radio Technology: 2.4G WIFI

Operation frequency:

2412MHz-2462MHz for IEEE 802.11 b, g, n/HT20,

2422MHZ~2452MHz for IEEE802.11n/HT40,

Channel No.:802.11b/802.11g/802.11n/(HT20): 11

802.11(HT40): 7

Modulation type:

IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)

IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)

IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)

Antenna Type: PCB antenna,

Left max gain: 2.20dBi, Right max gain: 1.80dBi

(Antenna information is provided by applicant.)

Radio Technology: 5G WIFI

Operation frequency:

UNII-1: 5180 MHz~5240 MHz

UNII-2A: 5260 MHz ~ 5320 MHz

UNII-2C: 5500 MHz ~ 5700 MHz

UNII-3: 5745 MHz~5825MHz

Channel separation:

20MHz for 802.11a/802.11n (HT20)

40MHz for 802.11n(HT40)

Modulation type:

IEEE 802.11n: OFDM (64QAM,16QAM,QPSK,BPSK)

IEEE 802.11a: OFDM (64QAM,16QAM,QPSK,BPSK)

Antenna Type: PCB antenna,

Left max gain: 5.71dBi, Right max gain: 3.63dBi

(Antenna information is provided by applicant.)

Host manufacturer must perform test of radiated & conducted emission and spurious emission, etc according to the actual test modes for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting Modules or other transmitters in a host product.

Only when all the test results of test modes comply with FCC requirements, then the end product can be sold legally.

## 2.10 Additional testing, Part 15 Subpart B disclaimer

The modular transmitter is only FCC authorized for FCC Part 15 Subpart C 15.247 that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuitry), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

# FCC & IC Statement

## FCC Statement:

Federal Communication Commission Interference Statement

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 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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the authority to operate this equipment.

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.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

This device and its antennas(s) must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.

This device is restricted for indoor use.

## IMPORTANT NOTE:

### FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

### USERS MANUAL OF THE END PRODUCT:

The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. If the device is small or for such use that it is not practicable to place the statement on the product, then additional FCC part 15. 19 statement is required to be available in the users manual: This device complies with Part 15 of 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.

#### LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains FCC ID : ACJ-V3GA. If the device is small or for such use that it is not practicable to place the statement on the product, then the following FCC part 15.19 statement has to also be available on the label: This device complies with Part 15 of 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.

#### **IC Statement:**

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 interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

Pour les produits disponibles aux États-Unis / Canada du marché, seul le canal 1 à 11 peuvent être exploités. Sélection d'autres canaux n'est pas possible.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with IC multi-transmitter product procedures.

Cet appareil et son antenne (s) ne doit pas être co-localisés ou fonctionner en association avec une autre antenne ou transmetteur.

Dynamic Frequency Selection (DFS) for devices operating in the bands 5250- 5350 MHz, 5470-5600 MHz and 5650-5725 MHz  
Sélection dynamique de fréquences (DFS) pour les dispositifs fonctionnant dans les bandes 5250-5350 MHz, 5470-5600 MHz et 5650-5725 MHz

The device for operation in the band 5150 5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems.

les dispositifs fonctionnant dans la bande 5150-5250 MHz sont réservés uniquement pour une utilisation à afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux.

The maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the e.i.r.p. limit.

le gain maximal permis pour les dispositifs utilisant les bandes 5250-5350 MHz et 5470-5725 MHz doit se conformer à la limite de p.i.r.e.

The maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits specified for point-to-point and non-point-to-point operation as appropriate.

le gain maximal permis (pour les dispositifs utilisant la bande 5725-5850 MHz)

doit se conformer à la limite de p.i.r.e. spécifiée pour point à point et non point à point, selon le cas.

Users should also be advised that high-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and that these radars could cause interference and/or damage to LE-LAN devices.

De plus, les utilisateurs devraient aussi être avisés que les

utilisateurs de radars de haute puissance sont désignés utilisateurs principaux (c.-à-d., ont la priorité) pour les bandes 5250-5350 MHz et 5650-5850MHz et que ces radars pourraient causer du brouillage et/ou des dommages aux dispositifs LAN-EL.

For indoor use only.

Pour une utilisation en intérieur uniquement.

**IMPORTANT NOTE:**

**IC Radiation Exposure Statement:**

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé .

Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

This radio transmitter(IC: 216A-V3GA) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio(IC No: 6132A-AP72598V) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

#### USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the IC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes o

modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. If the device is small or for such use that it is not practicable to place the statement on the product, then following IC statement is required to be available in the users manual: IC statement is required to be available in the users manual: This device complies with Industry Canada license-exempt RSS standard(s). This Class B digital apparatus complies with Canadian ICES-003. 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.

#### LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following

" Contains IC :216A-V3GA