We are Your Partner more than Business

# Product Specification

# DPE109A
# WLAN 802.11abgn/ac with BT4.2 miniPCIe Card

**Version : v0.6**

**Issue Date: Nov 2017**




**Taijet Bointec Corporation**
**4F,#114,Zhouzi St., Neihu-Taipei 11493, Taiwan**
**Tel: +886-2-2759-0081 / Fax: contact@bointec.com**
**www.bointec.com**

***Subject to change without notices***

## Release history:

| Revision | Date | Author | Change List |
|---|---|---|---|
| 0.1 | 2017/01/02 | Howard Juang | Initialized |
| 0.2 | 2017/05/15 | Clinton Wu | Add Module Photo |
| 0.3 | 2017/06/14 | Cynthia Lin | add info |
| 0.4 | 2017/06/15 | Clinton Wu | add info |
| 0.5 | 2017/07/09 | Robert Hsieh | Reformat 3.2 driver support; add Freescale i.MX6 support information |
| 0.6 | 2017/11/27 | Ken Wang | add info; change module photo; revise RF characteristics |

# Contents

# 1 Product Description

Bointec DPE109A is a dual band 802.11ac/a/b/g/n Dual-Band WiFi + Bluetooth miniPCIe adapter. It is a 2T2R (WiFi/BT co-existence supported) technology, with 20/40/80MHz and 256-QAM to maximize bandwidth. DPE109A lets you move at the speed of life with faster speeds (up to 867 Mbps, 1~3Mbps EDR for Bluetooth), higher capacity, broader coverage and longer battery life. Dramatically reshapes your connected experience.

Bointec DPE109A incorporated with advanced security encryption, such as WEP, WPA, WPA2, and 802.1x for secure wireless connection.

Bointec DPE109A also supports the latest Bluetooth 4.2 specification, which includes both High Speed and Low-Energy operation to extend personal area connectivity to a variety of devices.

DPE909AA also delivers superior WLAN/Bluetooth coexistence to ensure the best possible wireless experience. DPE909AA offers advanced algorithms developed to mitigate interference and takes advantage of the physical proximity of the WLAN and Bluetooth radios to provide maximum performance.

## 1.1 Features

BT Features:

- Bluetooth V4.2, V4.1, V4.0 LE, V3.0+HS, Bluetooth V2.1+EDR system, backward compatible with BT version of 1.1, 1.2 and 2.0
- BT supports Class I (Output power up <=+10 dBm)
- BT transmission speed including 1M, 2M and 3Mbps EDR operations
- Support for Simple Pairing (SP) and Enhanced Inquiry Response (EIR) function
- Support for SCATTERNET and PICONET
- HCI USB interface to work with Windows upper layer stack

Wi-Fi Features:

- Operates at ISM frequency Band(2.4/5GHz)
- IEEE Standards Support, 802.11a, 802.11b, 802.11g, 802.11n and 802.11ac
- Wi-Fi using Low power PCI Express interface
- Enterprise level security supporting: WPA, WPA2
- Two-stream spatial multiplexing up to 867Mbps data rate
- Supports 20/40MHz at 2.4GHz and supports 20/40/80MHz at 5GHz

- Additional features include maximal likelihood (ML) decoding, low-density parity check(LDPC), maximum ratio combining(MRC),Rx space time block code(STBC), MU-MIMO and transmit beam forming

Common Features:

- Form Factor: miniPCIe
- Support OS: Microsoft Windows/Linux/Android
- Support for BT & WLAN Co-existence
- RoHS Compliance
- Low Halogen Compliance

## 1.2 Product Configuration

Bointec DPE109A provides the following configurations:

| Model | Frequency | Wi-Fi | Interface | Antenna |
|---|---|---|---|---|
| DPE109A | 5GHz | 802.11a<br>802.11ac | PCIe | IPEX antenna connector X2 |
| DPE109A | 2.4GHz | 802.11bg | PCIe | IPEX antenna connector X2 |
| DPE109A | 2.4GHz | Bluetooth | USB | IPEX antenna connector X1 |

Table 1-1: Product Configurations

## 1.3 Appearance


Figure1-1: DPE109A Appearance

# 2 Hardware

## 2.1 Block Diagram

DPE109A is hosted by QualComm Atheros QCA6174A-5 SoC. This SoC supports 2x2 MIMO (2Tx/2Rx) and operates in the 2.4GHz and 5GHz frequency band.

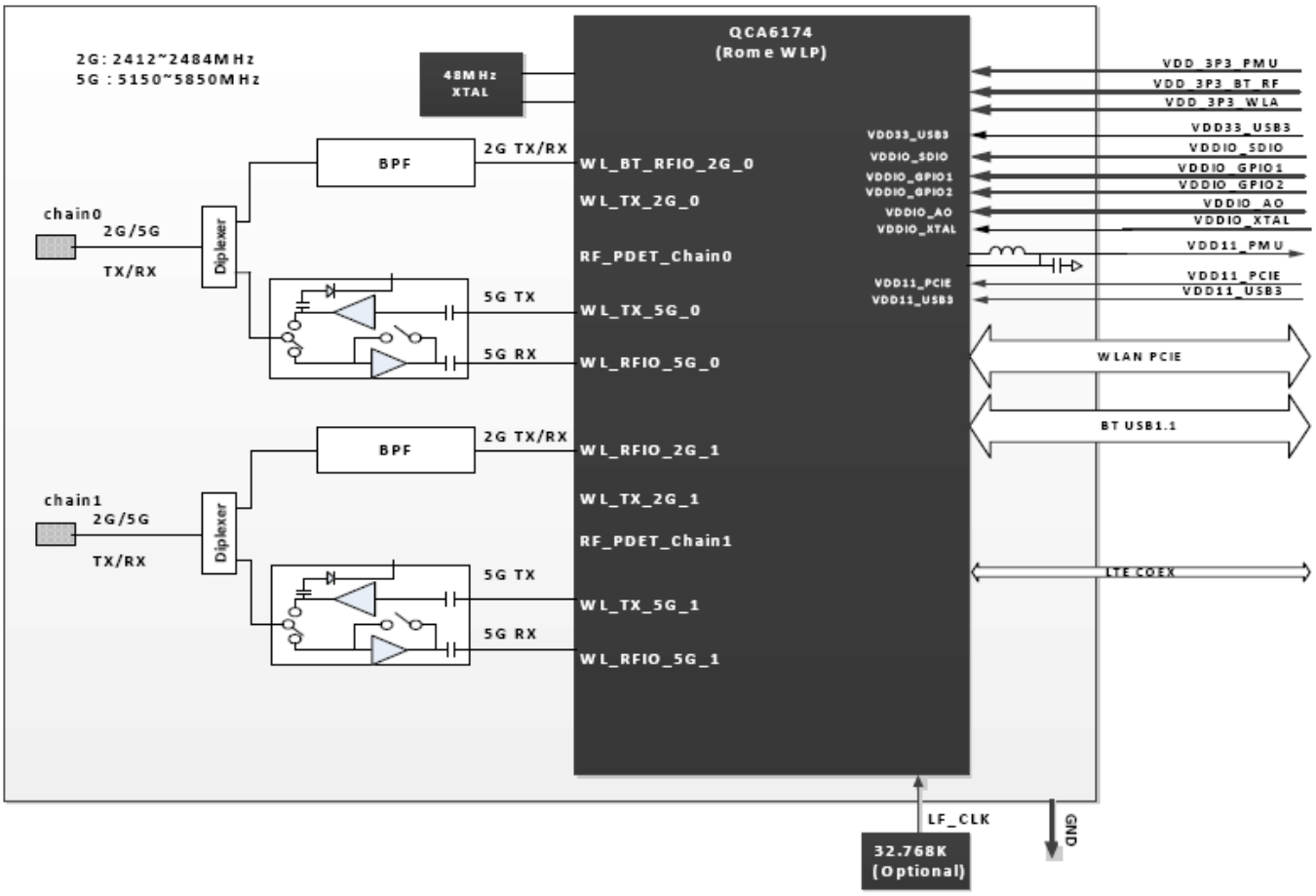


Figure 2-1. System Block Diagram of DPE109A

## 2.2 Pin assignment

Bointec DPE109A pin definition as below:

| Pin No. | Name | Direction | Description |
|---|---|---|---|
| 1 | WAKE_L | Output Open-Drain | Open Drain active Low signal. Used to request the system return from sleep/suspended state to initiated wake event. **PCIE_WAKE_L** |
| 2 | 3.3VAUX | VCC | 3.3V power supply. |
| 3 | COEX1 | --- | Floating Pin, No connect |
| 4 | GND | GND | Ground. |
| 5 | COEX2 | --- | Floating Pin, No connect |
| 6 | 1.5V | --- | Floating Pin, No connect |
| 7 | CLKREQ_L | Output Open-Drain | Reference clock request. Active low. |
| 8 | UIM_PWR | --- | Floating Pin, No connect |
| 9 | GND | GND | Ground. |
| 10 | UIM_DATA | --- | Floating Pin, No connect |
| 11 | REFCLK- | Analog input signal | Differential reference clock. **PCIE_REFCLK_P** |
| 12 | UIM_CLK | --- | Floating Pin, No connect to anything. |
| 13 | REFCLK+ | Analog input signal | Differential reference clock. **PCIE_REFCLK_N** |
| 14 | UIM_RESET | --- | Floating Pin, No connect |
| 15 | GND | GND | Ground. |
| 16 | UIM_VPP | --- | Floating Pin, No connect |
| 17 | UIM_C8 | --- | Floating Pin, No connect |
| 18 | GND | GND | Ground. |
| 19 | UIM_C4 | --- | Floating Pin, No connect |
| 20 | WLAN_DISABLE_L | Input | Turn off WLAN RF analog and front-end. Active low. **WLAN_RF_KILL_L** |
| 21 | GND | GND | Ground. |
| 22 | PERST_L | Input | PCI Express reset with weak pull-down.( Input signals with weak internal pull-down, to prevent signals from floating when left open) **PCIE_RST_L** |
| 23 | PERn0 | Analog input signal | Differential transmit **PCIE_TX_P** |
| 24 | 3.3VAUX | VCC | 3.3V power supply. |
| 25 | PERp0 | Analog input signal | Differential transmit **PCIE_TX_N** |
| 26 | GND | GND | Ground. |
| 27 | GND | GND | Ground. |
| 28 | 1.5V | --- | Floating Pin, No connect |

| | | | |
|---|---|---|---|
| 29 | GND | GND | Ground. |
| 30 | SMB_CLK | --- | Floating Pin, No connect |
| 31 | PETn0 | Analog input signal | Differential receive **PCIE_RX_N** |
| 32 | SMB_DATA | --- | Floating Pin, No connect |
| 33 | PETp0 | Analog input signal | Differential receive **PCIE_RX_P** |
| 34 | GND | GND | Ground. |
| 35 | GND | GND | Ground. |
| 36 | USB_D- | I/O | USB serial differential data Negative **BT_USB_DN** |
| 37 | GND | GND | Ground. |
| 38 | USB_D+ | I/O | USB serial differential data Positive **BT_USB_DP** |
| 39 | 3.3VAUX | VCC | 3.3V power supply |
| 40 | GND | --- | No connection. |
| 41 | 3.3VAUX | VCC | 3.3V power supply |
| 42 | LED_WWAN_L | Output Open-Drain | Active low. Used to provide status indicators via LED. **WLAN_LED** |
| 43 | GND | GND | Ground. |
| 44 | WLAN_LED | Output Open-Drain | Active low. Used to provide status indicators via LED. **BT_LED** |
| 45 | RESERVED | --- | Reserved for BT_DISABLE_SEL |
| 46 | LED_WPAN_L | Output Open-Drain | Active low. Used to provide status indicators via LED. No connection. |
| 47 | RESERVED | --- | Floating Pin, No connect |
| 48 | 1.5V | --- | Floating Pin, No connect |
| 49 | RESERVED | --- | Floating Pin, No connect |
| 50 | GND | GND | Ground. |
| 51 | RESERVED | --- | Reserved for BT_DISABLE |
| 52 | 3.3VAUX | VCC | 3.3V power supply. |

# 3 Software

## 3.1 Supported platform and driver

| Operating System | Host Platform | Chipset Driver/Open Source Driver | Description |
|---|---|---|---|
| Microsoft© Windows 2000 | x86(CISC) | Driver provided by Atheros or WHQL ;<br>Open Source not available | |
| Microsoft© Windows 7 | x86(CISC) | Driver provided by Atheros or WHQL ;<br>Open Source not available | |
| Microsoft© Windows 8 | x86(CISC) | Driver provided by Atheros or WHQL ;<br>Open Source not available | |
| Linux 2.4.xx | ARM<br>Freescale<br>i.MX6<br>MIPS II | Driver provided by Qualcomm SDK;<br>Open Source available from<br>https://github.com/kvalo/ath10k-firmware/tree/master/QCA6174<br>AP/STA Mode | ath10k-firmware are the latest firmware files for ath10k, a mac80211 driver for QCA988x, QCA6174, QCA99XX and similar. The official location to download ath10k images is from linux-firmware:<br>https://git.kernel.org/cgit/linux/kernel/git/firmware/linux-firmware.git/<br>For more information check the wiki:<br>http://wireless.kernel.org/en/users/Drivers/ath10k/firmware |
| Linux 2.6.xx | ARM<br>Freescale<br>i.MX6<br>MIPS II | Driver provided by Qualcomm SDK;<br>Open Source available from<br>https://github.com/kvalo/ath10k-firmware/tree/master/QCA6174<br>AP/STA Mode | (as above) |
| Linux 4.0 | ARM<br>Freescale<br>i.MX6<br>MIPS II | Driver provided by Qualcomm SDK;<br>Open Source available from<br>https://github.com/kvalo/ath10k-firmware/tree/master/QCA6174<br>AP/STA Mode | (as above) |

Note: It is possible to use newer ath10k driver on an older kernel with backports project

## 3.2 Driver support and porting

Bointec DPE109A driver can be released by authorization or Qualcomm Atheros Inc. directly support. Please consult your Bointec representative or distributor.

# 4 Mechanical

## 4.1 Appearance


Figure4-1: DPE109A Appearance

## 4.2 Dimension

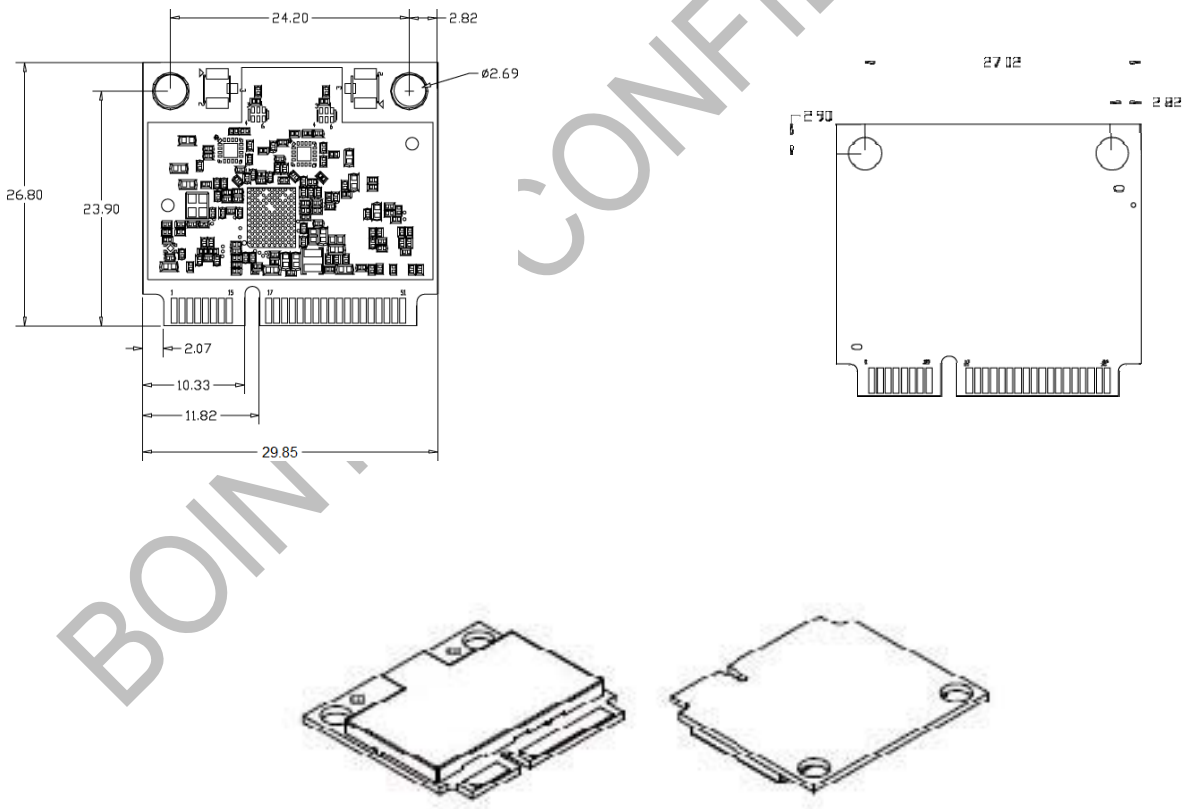


Figure 4-2. DPE109A Dimension

## 4.3 Antenna Dimension

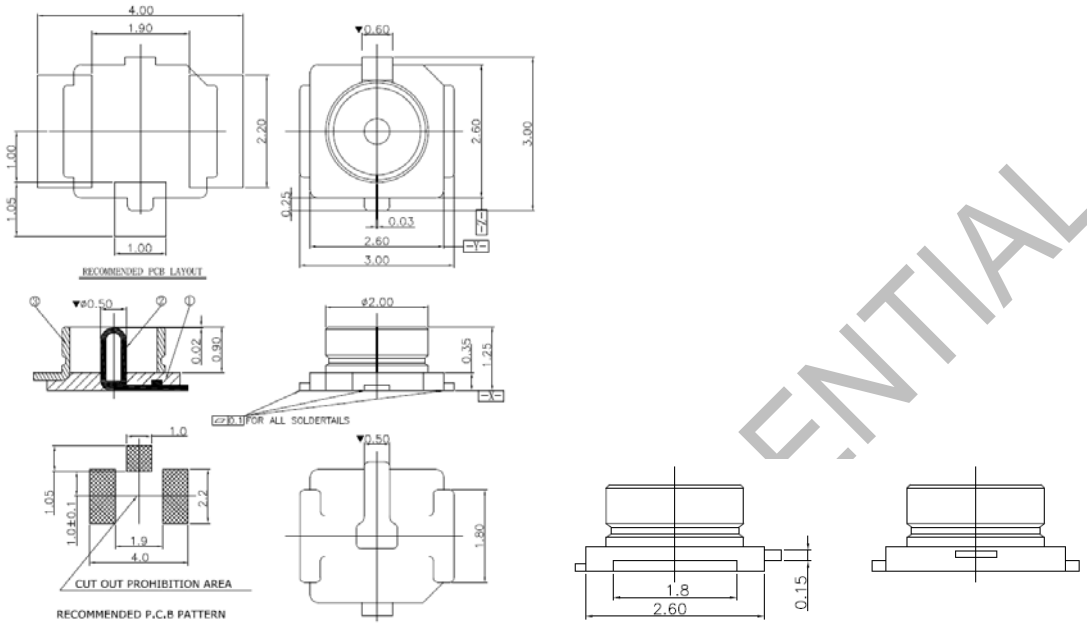


Figure 4-3. IPEX Connector Dimension Drawing (mm)

## 4.4 Packaging

100pcs modules in one Tray

Figure 4-4-1. Tray Dimension(30x22.5x3 cm)

1000pcs modules in one box.

Figure 4-4-2. Box Dimension(32x24.5x31 cm)

# 5 Specification

## 5.1 General

| Bluetooth | |
|---|---|
| **Standard** | Bluetooth V4.2, V4.1, V4.0LE, V3.0+HS, V2.1+EDR, |
| **Bus Interface** | USB1.1 |
| **Data Rate** | 1 Mbps, 2Mbps and Up to 3Mbps |
| **Modulation Scheme** | GFSK, π/4-DQPSK and 8-DPSK |
| **Frequency Range** | 2.402~2.480 GHz |
| **Transmit Output Power** | 0≤ Output Power ≤ +10; Class 1Device |
| **Receiver Sensitivity** | < 0.1% BER at -70dBm |
| **Software** | Bluetooth Suite |

| WiFi | |
|---|---|
| **Standard** | IEEE802.11ac,IEEE802.11a , IEEE802.11b , IEEE 802.11g , IEEE 802.11n |
| **BusInterface** | Low Power PCI Express |
| **Data Rate** | 802.11a: 54, 48, 36, 24, 18, 12, 9, 6 Mbps<br>802.11b: 11, 5.5, 2, 1 Mbps<br>802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps<br>802.11n: MCS 0 to 15 for HT20MHz,<br>MCS 0 to 15 for HT40MHz,<br>802.11ac: MCS 0 to 8 for HT20MHz<br>MCS 0 to 9 for HT40MHz<br>MCS 0 to 9 for HT80MHz |
| **Media Access Control** | CSMA/CA with ACK |
| **Modulation Techniques** | 802.11ac: 256QAM, 64QAM, 16QAM, QPSK, BPSK<br>802.11a: 64QAM, 16QAM, QPSK, BPSK<br>802.11b: CCK, DQPSK, DBPSK<br>802.11g: 64QAM, 16QAM, QPSK, BPSK<br>802.11n: BPSK, QPSK, 16QAM, 64QAM |
| **Network Architecture** | Ad-hoc mode (Peer-to-Peer )<br>Infrastructure mode |
| **Security** | WEP 64&128bit, WPA, WPA-PSK, WPA2, WPA2-PSK, WPS, IEEE 802.1X, IEEE 802.11i |

| Electronics characteristics | |
|---|---|
| Operating Voltage | 3.3 V ±5% I/O supply voltage |
| OS Supported | Microsoft Windows/Linux/Android |
| Antenna Type | Dual IPEX Antenna Connectors |

## 5.2 RF characteristic

### 2.4GHz RF Specification

Conditions : VDD=3.3V ; Temp:25°C

| Feature | Description |
|---|---|
| WLAN Standard | IEEE 802.11a/b/g/n/ac WiFi compliant |
| Frequency Range | 2.400 GHz ~ 2.484 GHz (2.4 GHz ISM Band) |
| Number of Channels | 2.4GHz：Ch1 ~ Ch14 |
| Modulation | 802.11b : BPSK, QPSK, CCK<br>802.11 g/n : OFDM /64-QAM,16-QAM, QPSK, BPSK |
| Output Power | 802.11b /11Mbps : 18 dBm±2dB @ EVM ≤ -9dB |
| | 802.11g /54Mbps : 15 dBm±2dB @ EVM ≤ -25dB |
| | 802.11n20 /MCS7 :14 dBm±2dB @ EVM ≤ -28dB |
| | 802.11n40 /MCS7 :14 dBm±2dB @ EVM ≤ -28dB |
| Sensitivity (11b,20MHz) @8% PER | - 1Mbps PER @ -94 dBm, typical |
| | - 11Mbps PER @ -91 dBm, typical |
| Sensitivity (11g,20MHz) @10% PER | - 6Mbps PER @ -90 dBm, typical |
| | - 54Mbps PER @ -75 dBm, typical |
| Receive Sensitivity (11n,20MHz) @10% PER | - MCS=0 PER @ -90 dBm, typical |
| | - MCS=7 PER @ -71 dBm, typical |
| MIMO Receive Sensitivity (11n,20MHz) @10% PER | - MCS=8 PER @ -91dBm, typical |
| | - MCS=15 PER @ -72 dBm, typical |
| Receive Sensitivity (11n,40MHz) @10% PER | - MCS=0 PER @ -86 dBm, typical |
| | - MCS=7 PER @ -69 dBm, typical |
| MIMO Receive Sensitivity (11n,40MHz) @10% PER | - MCS=8 PER @ -87 dBm, typical |
| | - MCS=15 PER @ -70 dBm, typical |
| Receive Sensitivity (VHT,20MHz) @10% PER | - MCS=0 PER @ -89 dBm, typical |
| | - MCS=8 PER @ -68 dBm, typical |
| MIMO Receive Sensitivity (VHT,20MHz) @10% PER | - MCS=10, NSS1 PER @ -90 dBm, typical |
| | - MCS=18, NSS1 PER @ -69 dBm, typical |
| Receive Sensitivity (VHT,40MHz) @10% PER | - MCS=0, NSS1 PER @ -86 dBm, typical |
| | - MCS=9, NSS1 PER @ -63 dBm, typical |
| MIMO Receive Sensitivity (VHT,40MHz) @10% PER | - MCS=10, NSS1 PER @ -87 dBm, typical |
| | - MCS=19, NSS1 PER @ -64 dBm, typical |

| | |
|---|---|
| Maximum Input Level | 802.11b : -10 dBm |
| | 802.11g/n : -20 dBm |
| Antenna Reference | Small antennas with 0~2 dBi peak gain |

## 5GHz RF Specification

### Conditions : VDD=3.3V ; Temp:25°C

| Feature | Description |
|---|---|
| WLAN Standard | IEEE 802.11a/n/ac 2x2, WiFi compliant |
| Frequency Range | 4.900 GHz ~ 5.845 GHz (5.0 GHz ISM Band) |
| Number of Channels | 5.0GHz：Please see the table below |
| Modulation | 802.11a : OFDM /64-QAM,16-QAM, QPSK, BPSK<br>802.11n : OFDM /64-QAM,16-QAM, QPSK, BPSK<br>802.11ac : OFDM /256-QAM, 64-QAM, 16-QAM, QPSK, BPSK |
| Output Power | 802.11a /54Mbps : 13 dBm±2dB @ EVM ≤ -25dB |
| | 802.11n20 /MCS7 : 12.5 dBm±2dB @ EVM ≤ -28dB |
| | 802.11n40 /MCS7 : 12.5 dBm±2dB @ EVM ≤ -28dB |
| | 802.11ac20 /MCS 8: 11.5 dBm±2dB @ EVM ≤ -30dB |
| | 802.11ac40 /MCS9 : 10 dBm±2dB @ EVM ≤ -32dB |
| | 802.11ac80 /MCS9 : 10 dBm±2dB @ EVM ≤ -32dB |
| Receive Sensitivity (11a,20MHz) @10% PER | - 6Mbps PER @ -90 dBm, typical |
| | - 54Mbps PER @ -78 dBm, typical |
| Receive Sensitivity (11n,20MHz) @10% PER | - MCS=0 PER @ -90 dBm, typical |
| | - MCS=7 PER @ -74 dBm, typical |
| MIMO Receive Sensitivity (11n,20MHz) @10% PER | - MCS=8 PER @ -91 dBm, typical |
| | - MCS=15 PER @ -75 dBm, typical |
| Receive Sensitivity (11n,40MHz) @10% PER | - MCS=0 PER @ -87 dBm, typical |
| | - MCS=7 PER @ -71 dBm, typical |
| MIMO Receive Sensitivity (11n,40MHz) @10% PER | - MCS=8 PER @ -88 dBm, typical |
| | - MCS=15 PER @ -72 dBm, typical |
| Receive Sensitivity (VHT,20MHz) @10% PER | - MCS=0, NSS1 PER @ -90 dBm, typical |
| | - MCS=8, NSS1 PER @ -70 dBm, typical |
| MIMO Receive Sensitivity (VHT,20MHz) @10% PER | - MCS=10, NSS1 PER @ -91 dBm, typical |
| | - MCS=18, NSS1 PER @ -71 dBm, typical |
| Receive Sensitivity (VHT,40MHz) | - MCS=0, NSS1 PER @ -87 dBm, typical |

| | |
|---|---|
| @10% PER | - MCS=9, NSS1 PER @ -65 dBm, typical |
| MIMO Receive Sensitivity | - MCS=10, NSS1 PER @ -88 dBm, typical |
| (VHT,40MHz) @10% PER | - MCS=19, NSS2 PER @ -66 dBm, typical |
| Receive Sensitivity (VHT,80MHz) | - MCS=0, NSS1 PER @ -84 dBm, typical |
| @10% PER | - MCS=9, NSS1 PER @ -62 dBm, typical |
| MIMO Receive Sensitivity | - MCS=10, NSS1 PER @ -85 dBm, typical |
| (VHT,80MHz) @10% PER | - MCS=9, NSS1 PER @ -63 dBm, typical |
| Maximum Input Level | 802.11a/n : -30 dBm |
| Antenna Reference | Small antennas with 0~2 dBi peak gain |

## 5GHz(20MHz) Channel Table

| Band (GHz) | Operating Channel | Channel center frequencies(MHz) |
|---|---|---|
| 5.15GHz~5.25GHz | 36 | 5180 |
| | 40 | 5200 |
| | 44 | 5220 |
| | 48 | 5240 |
| 5.25GHz~5.35GHz | 52 | 5260 |
| | 56 | 5280 |
| | 60 | 5300 |
| | 64 | 5320 |
| 5.5GHz~5.7GHz | 100 | 5500 |
| | 104 | 5520 |
| | 108 | 5540 |
| | 112 | 5560 |
| | 116 | 5580 |
| | 120 | 5600 |
| | 124 | 5620 |
| | 128 | 5640 |
| | 132 | 5660 |
| | 136 | 5680 |
| | 140 | 5700 |
| 5.725GHz~5.825GHz | 149 | 5745 |
| | 153 | 5765 |

| | | |
|---|---|---|
| | 157 | 5785 |
| | 161 | 5805 |

## Bluetooth Specification

Conditions : VDD=3.3V ; Temp:25°C

| Feature | | Description | | |
|---|---|---|---|---|
| **General Specification** | | | | |
| Bluetooth Standard | | BT 4.2 + HS, BLE, ANT+ | | |
| Host Interface | | USB 1.1 | | |
| Frequency Band | | 2402 MHz ~ 2480 MHz | | |
| Number of Channels | | 79 channels | | |
| Modulation | | FHSS, GFSK, DPSK, DQPSK | | |
| **Characteristics** | **Condition** | **TYP** | **BT Spec.** | **UNIT** |
| Modulation GFSK | dF1 avg | 154 | 140~ 175 | KHz |
| | dF2 max | 167 | >115 | KHz |
| | dF2 avg/dF1 avg | 1.14 | >0.8 | |
| Modulation EDR @8DPSK | RMS DEVM | 0.12 | <0.13 | |
| | 99% DEVM | 100 | >99 | % |
| | Peak DEVM | 21.5 | <25 | % |
| **RF Specification** | | | | |
| | | **Min.** | **Typical.** | **Max.** |
| Output Power (Class 1.5) | | | 6 dBm | |
| Sensitivity @ BER=0.1% for GFSK (1Mbps) | | | -91 dBm | |
| Sensitivity @ BER=0.01% for π/4-DQPSK (2Mbps) | | | -90 dBm | |
| Sensitivity @ BER=0.01% for 8DPSK (3Mbps) | | | -83 dBm | |
| Maximum Input Level | | GFSK (1Mbps):-20dBm | | |
| | | π/4-DQPSK (2Mbps) :-20dBm | | |
| | | 8DPSK (3Mbps) :-20dBm | | |

NOTE: The Bluetooth Power could be adjusted by FW.

# BLE Specification

## 1 Mbps GFSK (Bluetooth low energy)

Conditions : VDD=3.3V ; Temp:25°C. Using Anisu MT8852B

| Feature | | Description | | |
|---|---|---|---|---|
| **General Specification** | | | | |
| Bluetooth Standard | | Bluetooth 4.2 | | |
| Host Interface | | USB1.1 | | |
| Antenna Reference | | Small antennas with 0~2 dBi peak gain | | |
| Frequency Band | | 2402 MHz ~ 2480 MHz | | |
| Number of Channels | | 79 channels | | |
| Modulation | | 1M GFSK | | |
| **RF Specification** | | | | |
| Output Avg Power | | **Typical** | **Spec** | |
| 2402 | | 0 | -2~+2 | [dBm] |
| 2441 | | 0 | -2~+2 | [dBm] |
| 2480 | | 0 | -2~+2 | [dBm] |
| **Carrier Freq. Offset and Drift** | **Min** | **Typical** | **Max** | |
| Freq. Accuracy | -150 | 3.7 | 150 | [kHz] |
| Freq. Offset | -150 | 2.2 | 150 | [kHz] |
| Freq. Drift | -50 | 2 | 50 | [kHz] |
| Drift Rate | | 2.2 | ±20kHz/50us | [kHz] |
| **Modulation Char** | **Min** | **Typical** | **Max** | |
| F1avg | 225 | 254.1 | 275 | [kHz] |
| F1max | | 256.3 | | [kHz] |
| F2avg | 185 | 244.6 | | [kHz] |
| F2max | | 238.9 | | [kHz] |
| F1/F2 Ratio | 0.8 | 0.94 | | |
| **Sensitivity** | **2402** | **2441** | **2480** | |
| LE (PER=30.8%) | | -91 | <-89 | [dBm] |
| Max. Input Level (PER = 30.8%) | >= -10dBm | 0 | | [dBm] |
| PER report integrity (PER = 50~65.4%) | 50% at -30Bm | 50.66% | 65.4% at -30Bm | |

## 5.3 Environmental

| Environmental | |
|---|---|
| Operating Temperature | ● -10° ~ +65°C |
| Storage Temperature | ● -40° ~ +80°C |
| Operating Humidity | ● 10%~95%, non-condensing |

## 5.4 Certifications

EMI Certifications

| Certificate | Status |
|---|---|
| FCC (USA) | 20171120:On going |
| IC (Canada) | 20171120:On going |
| TELEC (Japan) | 20171120:On going |
| VCCI (Japan) | (TBD) |
| ETSI (EU) | (TBD) |
| CE (EU) | 20171120:On going |
| NCC (Taiwan) | 20171120:On going |
| SRRC(China) | (TBD) |
| Mexico | (TBD) |
| Brazil | (TBD) |
| Morocco | (TBD) |
| ANZ | (TBD) |
| Pakistan | (TBD) |
| Argentina | (TBD) |
| Korea | (TBD) |
| South Africa | (TBD) |

*For any country EMI/EMC certifications, radio authorizations of each country and region, other than above, please consult your Bointec Sales Representative for detail information.

# 6 Ordering Information

## 6.1 Related part numbers

Main parts

| Part Number | System Description | Marketing Description |
|---|---|---|
| T.DPE109A-DK | DPE109A-DK,Single packed, Bointec packed, development kit packed | DPE109A Development Kit for Evaluation |
| T.DPE109A | DPE109A, Single packed | 802.11abgn/AC+BT,miniPCIe,2T2R |
| TFGA-DPE109A0-13 | finished non packaing,Bointec,DPE109A | 802.11abgn/AC+BT4.2 miniPCIe,2T2R |

Accessories

| Part Number | System Description | Marketing Description |
|---|---|---|
| TWRB-103EQ22-131 | RF Coaxial, A=IPEX F/F,B=SMA M/M,50ohm,13cm | A=IPEX F/F270degree,B=SMA M/M,50ohm,13cm,guage=1.37,with Core |
| TWRB-003EQ01-210 | RF Coaxial, A=IPEX F/F,B=SMA M/M,50ohm,210mm | A=IPEX F/F270degree,B=SMA M/M,50ohm,21cm,guage=1.37 |
| TWRB-103EQ21-261 | RF Coaxial, A=IPEX F/F,B=SMA M/M,50ohm,26cm | A=IPEX F/F270degree,B=SMA M/M,50ohm,26cm,guage=1.37,with Core |
| TWRB-003EQ01-300 | RF Coaxial, A=IPEX F/F,B=SMA M/M,50ohm,300mm | A=IPEX F/F270degree,B=SMA M/M,50ohm,30cm,guage=1.37 |
| | | |
| TWRN-9161201-102 | Antenna,WIFI,108mm,2.4GHz+5GHz, 2.5/3.0dBi | Antenna F/F OMNI,WIFI,108mm,2.4GHz+5.8GHz |
| TWRN-9161202-101 | Antenna,WIFI,108mm,2.4GHz+5GHz, 2.0/2.0dBi | Antenna F/F OMNI,WIFI,108mm,2.4GHz+5.8GHz |
| TWRN-9161201-191 | Antenna,WIFI,19cm,2.4GHz/5GHz, 2.5/5.2dbi | Omni antenna, 2.4/5.8GHz,19cm |
| TWRN-9113203-151 | Antenna,WIFI,15cm,2.4GHz+5GHz, 2.6dbi+3.3dbi | PCB antenna, 2.4GHz+5GHz,PCB-IPEX,150mm, PCB size 40mm*60mm*0.5mm |
| TWRN-9113204-151 | Antenna,WIFI,15cm,2.4GHz+5GHz, | PCB antenna, |

| | | |
|---|---|---|
| | 0.9dbi+3.8dbi | 2.4GHz+5GHz,PCB-IPEX,150mm, PCB size 25mm*7mm*0.5mm |
| TWRN-2461201-001 | Antenna,WIFI,108mm,2.4GHz,2dBi | Antenna,A=F/F,B=OMNI,WIFI,108mm,2.4GHz |
| | | |
| TMEA-47C9991-001 | MISC,EXTENTION,SECC,mini PCIe extender | MISC,EXTENTION,SECC,mini PCIe extender |

## 6.2 Recommended Antenna List

| Antennas | Venders | 2.4GHz Gain | 5GHz Gain | MIC No19 | MIC No.19-3 | MIC 19-3-2 | FCC Subpart-C | FCC Subpart-E | ETSI EN300329 | ETSI EN301893 |
|---|---|---|---|---|---|---|---|---|---|---|
| TWRN-9161201-102 | Bointec | +2.50dBi | +3.00dBi | | | | | | | |
| TWRN-9161202-101 | Bointec | +2.00dBi | +2.00dBi | | | | | | | |
| TWRN-9161201-191 (Including cable loss) | Bointec | +2.48dBi | +5.18dBi | | | | | | | |
| TWRN-9113203-151 (Including cable loss) | Bointec | +2.6dBi | +3.3dBi | V | V | V | | | | |
| TWRN-9113204-151 (Including cable loss) | Bointec | +0.9dBi | +3.8dBi | V | V | V | | | | |
| TWRN-2461201-001 | Bointec | +2.48dBi | | | | | | | | |