WPEB-265AXI(BT) [B18]/[R18] Series

802.11ax/ac/a/b/g/n 2T2R Industrial Grade Wi-Fi / Bluetooth 5.0 Combo Half mini PCIe Module

Industrial-Grade Wi-Fi / Bluetooth Combo Solution

WPEB-265AXI(BT) series is a WLAN 802.11ax (WiFi 6) +BT5.0 Module, 802.11ax (WiFi 6) allow efficient allocation of low data-rate connections, improve the battery life of IoT sensors, and extend the range of Wi-Fi signals. The new 802.11ax standard with its unique features such as OFDMA, 1024QAM, Target Wake Time (TWT). WPEB-265AXI(BT) series enables smooth streaming of high-resolution videos, fewer dropped connections and faster connections farther away from the router and in dense environments.

There are two basic types of WPEB-265AXI(BT) Series models, one is USB interface for Bluetooth the other is UART interface for Bluetooth. Function GPIO & UART work with VIO 1.8V. The included PCIe interface for WiFi. The 802.11ax (WiFi 6) half mini PCIe module can support Multi-User MIMO (MU-MIMO) technology to increase channel capacity when simultaneously servicing multiple devices using the same frequency chunks. Bluetooth 5 provides doubles data rates speed for faster transmissions thereby reducing the overall power consumption. Additionally, Bluetooth 5 adds new enhanced data broadcasting enabling seamless services.

Embedded Application

Applications include medical devices, security systems, industrial PC, Point of Sale, digital signs, STB, embedded / tablet PC's, smart devices, thin client devices, Gaming machine, tablets, etc.

Key Feature

- Dual-stream spatial multiplexing up to 1200 Mbps data rate
- Wi-Fi 6 features including 1024-QAM Modulation, OFDMA, MU-MIMO, and WPA3
- IEEE 802.11ax beam forming
- BT 5.0 features including Low-Energy 2 Mbps and Low-Energy Long Range

Specification

Standards	IEEE 802.11 ax/ac/a/b/g/n 2T2R Bluetooth V5.0, V4.2, V4.1, V4.0 LE, V3.0+HS, V2.1+EDR
Chipset	Broadcom
Data Rate	802.11b: 11Mbps 802.11a/g: 54Mbps 802.11n: MCS0~15 802.11ac: MCS0~9 802.11ax: HE0~11 Bluetooth: 1 Mbps, 2Mbps and Up to 3Mbps
Operating Frequency	IEEE 802.11 ax/ac/a/b/g/n ISM Band, 2.400GHz~2.4835GHz, 5.15GHz~5.35GHz, 5.47GHz~5.725GHz, 5.725GHz~5.85GHz *Subject to local regulations
Interface	WLAN: PCIe ; Bluetooth: USB or UART
Form Factor	Half Mini PCIe
Antenna	2 x IPEX MHF1 connectors (ANT1 for WIFI+BT, ANT2 for WIFI)
Modulation	Wi-Fi: 802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11n: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11a: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11ac: OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM) 802.11ax: OFDMA (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM) Bluetooth: GFSK, π/4-DQPSK, 8-DPSK
Power Consumption	**TBD**
Operating Voltage	DC 3.3V Note: (Function GPIO & UART VIO: 18V)
Operating Temperature Range	-40°C~+85°C
Storage Temperature Range	-40°C~+105°C

Humidity **(Non-Condensing)**	10%~90% (Operating) 5%~90% (Storing)
Dimension L x W x H (in mm)	29.85mm(± 0.15mm) x 26.65mm(± 0.15mm) x 2.8 mm(±0.2mm)

Weight (g)	≦ 4g
Driver Support	Linux, Android
Security	64/128-bits WEP, WPA, WPA2, WPA3, 802.1x

OUTPUT POWER & SENSITIVITY		
802.11b		
Data Rate	**Tx ± 2dBm**	**Rx Sensitivity**
11Mbps	18.5dBm	≦-88dBm

802.11g		
Data Rate	**Tx ± 2dBm**	**Rx Sensitivity**
54Mbps	17dBm	≦-77dBm

802.11n / 2.4GHz				
HT20	**Data Rate**	**Tx ± 2dBm (1TX)**	**Tx ± 2dBm (2TX)**	**Rx Sensitivity**
	MCS7	16.5dBm	19.5dBm	≦-75dBm

802.11ax		
Data Rate	**Tx ± 2dBm (1TX)**	**Rx Sensitivity**
HE7	16.5dBm	≦-75dBm

802.11n / 5GHz				
HT20	**Data Rate**	**Tx ± 2dBm (1TX)**	**Tx ± 2dBm (2TX)**	**Rx Sensitivity**
	MCS7	13.5dBm	16.5dBm	≦-74dBm
HT40	MCS7	13.5dBm	16.5dBm	≦-71dBm

802.11ac				
VHT80	Data Rate	Tx ± 2dBm (1TX)	Tx ± 2dBm (2TX)	Rx Sensitivity
	MCS9	9dBm	12dBm	≦-62dBm

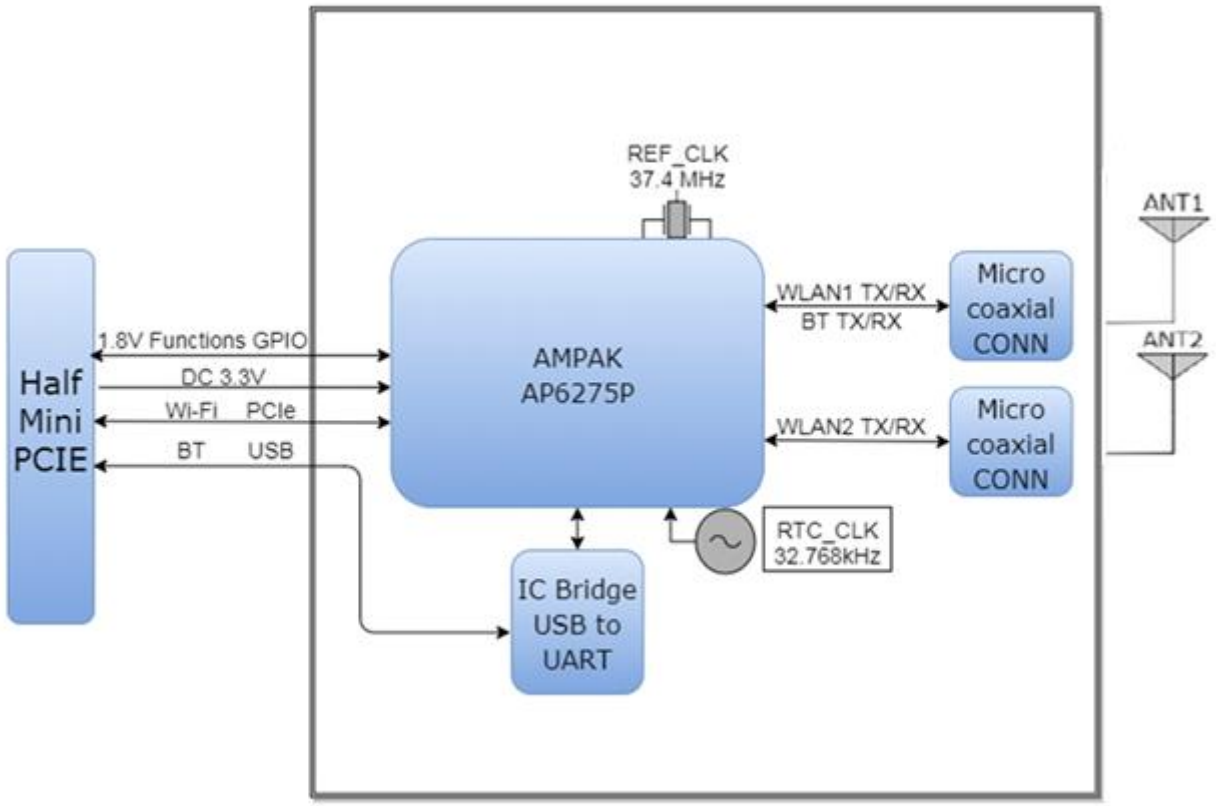
802.11ax				
HE20	Data Rate	Tx ± 2dBm (1TX)	Tx ± 2dBm (2TX)	Rx Sensitivity
	HE7	13.5dBm	16.5dBm	≦-69dBm

802.11ax				
HE40	Data Rate	Tx ± 2dBm (1TX)	Tx ± 2dBm (2TX)	Rx Sensitivity
	HE7	13.5dBm	16.5dBm	≦-69dBm

802.11ax				
HE80	Data Rate	Tx ± 2dBm (1TX)	Tx ± 2dBm (2TX)	Rx Sensitivity
	HE9	9dBm	12dBm	≦-60dBm

Bluetooth		
Data Rate	Tx ± 2dBm (Class 1 Device)	Rx Sensitivity
1Mbps	+0≦ Output Power ≦+8dBm	<0.1% BR, BER at -88dBm
3Mbps	+0≦ Output Power ≦+7dBm	<0.1% BER at -85dBm

Block Diagram for WPEB-265AXI(BT) [B18]



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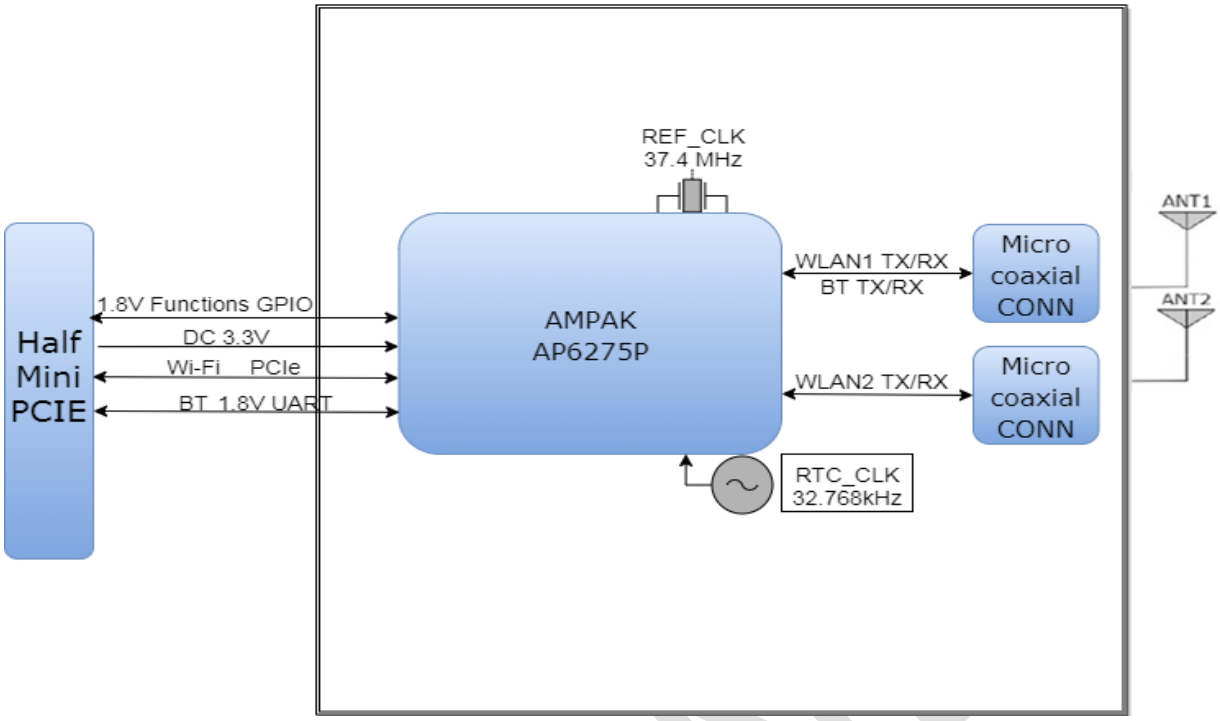
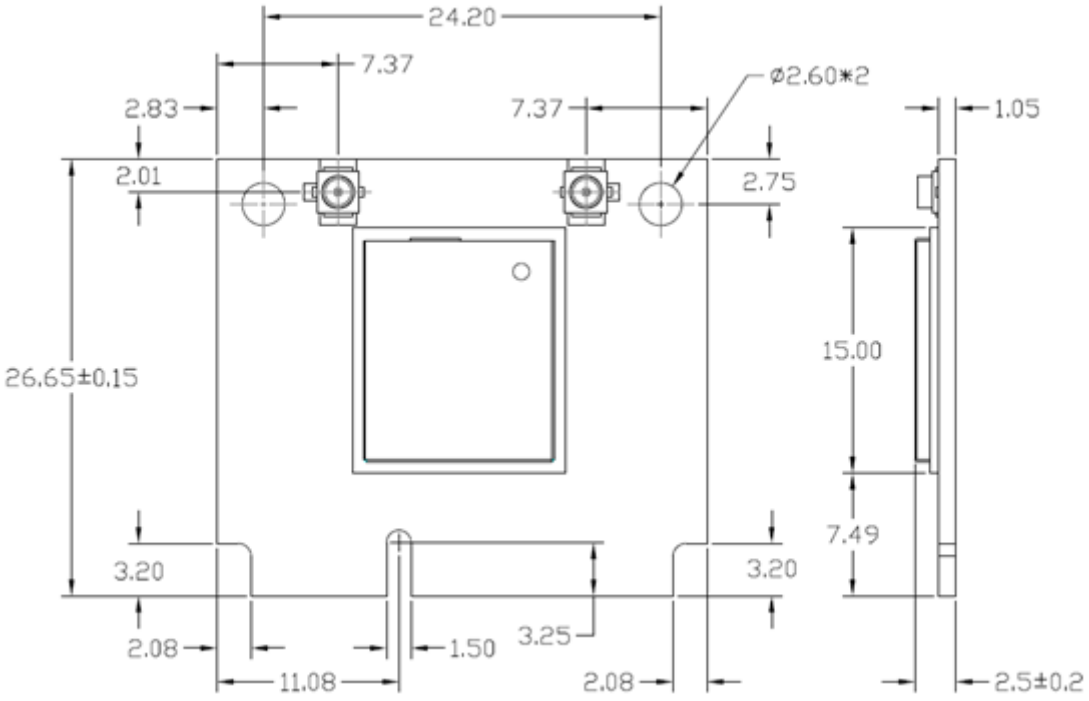
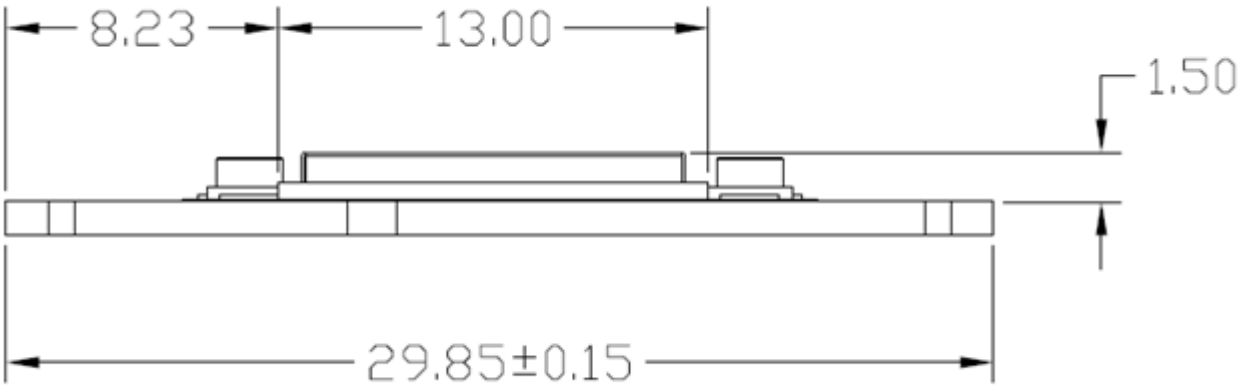
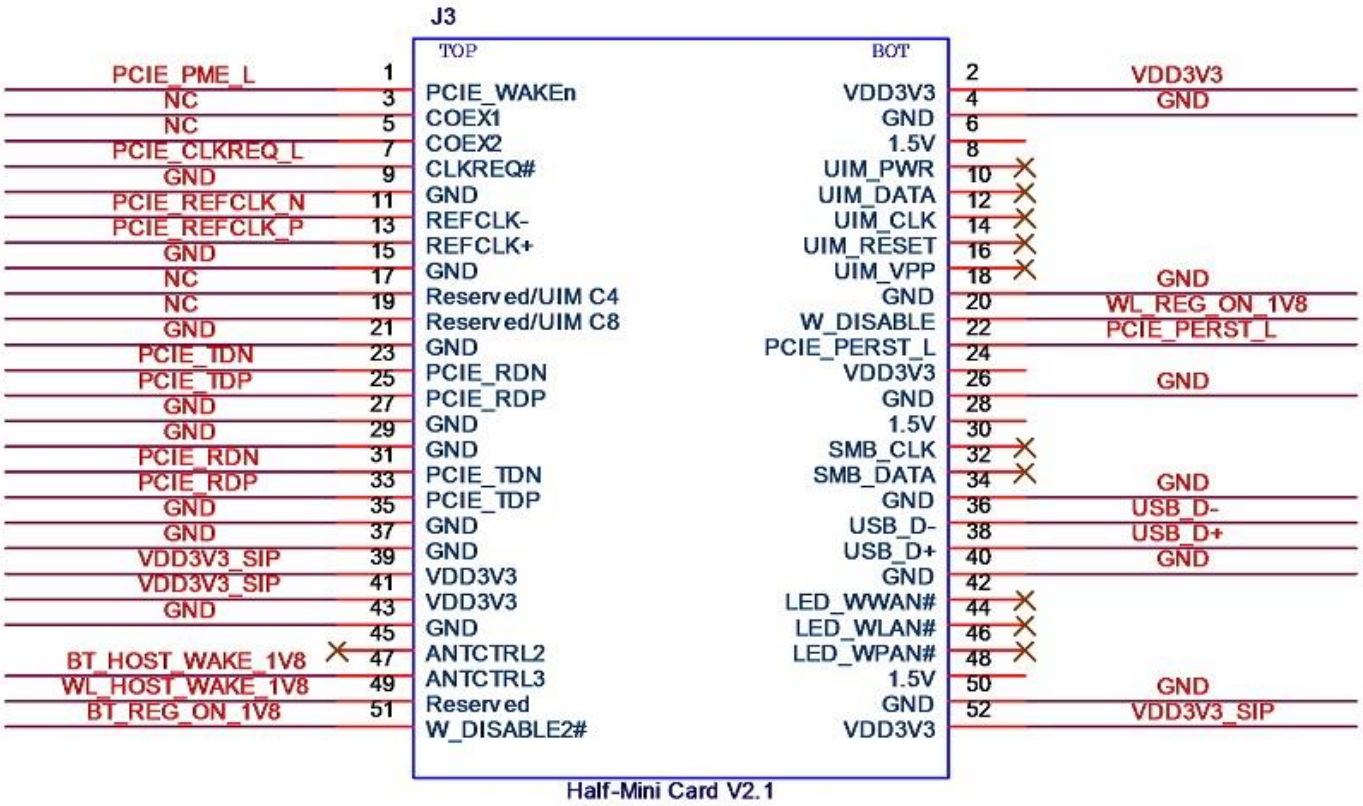


Mechanical Diagram (mm)





Pin Assignment for WPEB-265AXI(BT) [B18]



WPEB-265AXI(BT) [B18] Pin Assignment

TOP			
Pin#	**Pin Name**	**Type**	**Description**
1	PCIE_PME_L	OD	PCI power management event output.
3	NC	—	No connect
5	NC	—	No connect
7	PCIE_CLKREQ_L	OD	PCIe clock request
9	GND	G	Ground connections
11	PCIE_RCLK_N	I	PCIe differential clock input- Negative
13	PCIE_RCLK_P	I	PCIe differential clock input- Positive
15	GND	G	Ground connections
17	NC	—	No connect
19	NC	—	No connect
21	GND	G	Ground connections
23	PCIE_TDN	O	PCIe Transmit data-Negative
25	PCIE_TDP	O	PCIe Transmit data-Positive
27	GND	G	Ground connections
29	GND	G	Ground connections
31	PCIE_RDN	I	PCIe receive data-Negative
33	PCIE_RDP	I	PCIe receive data-Positive
35	GND	G	Ground connections
37	GND	G	Ground connections
39	VDD_3V3_SIP	P	VDD system power supply input
41	VDD_3V3_SIP	P	VDD system power supply input
43	GND	G	Ground connections
45	NC	—	No connect
47	BT_HOST_WAKE_1V8	O	Bluetooth device to wake-up HOST
49	WL_HOST_WAKE_1V8	O	WLAN to wake-up HOST
51	BT_REG_ON_1V8	I	Low asserting reset for Bluetooth core

Note: 1. Each pin has a type, that power (P), ground (G), open-drain (OD), input (I), and output (O).

WPEB-265AXI(BT) [B18] Pin Assignment

BOTTOM			
Pin#	**Pin Name**	**Type**	**Description**
2	VDD_3V3	P	VDD system power supply input
4	GND	G	Ground connections
6	NC	—	No connect
8	NC	—	No connect
10	NC	—	No connect
12	NC	—	No connect
14	NC	—	No connect
16	NC	—	No connect
18	GND	G	Ground connections
20	WL_REG_ON_1V8	I	Low asserting reset for WiFi core
22	PCIE_PERST_L	I	PCIe host indication to reset the device. Active low.
24	NC	—	No connect
26	GND	G	Ground connections
28	NC	—	No connect
30	NC	—	No connect
32	NC	—	No connect
34	GND	G	Ground connections
36	USB_D-	I/O	USB serial differential data Negative
38	USB_D+	I/O	USB serial differential data Positive
40	GND	G	Ground connections
42	NC	—	No connect
44	NC	—	No connect
46	NC	—	No connect
48	NC	—	No connect
50	GND	G	Ground connections
52	VDD_3V3_SIP	P	VDD system power supply input

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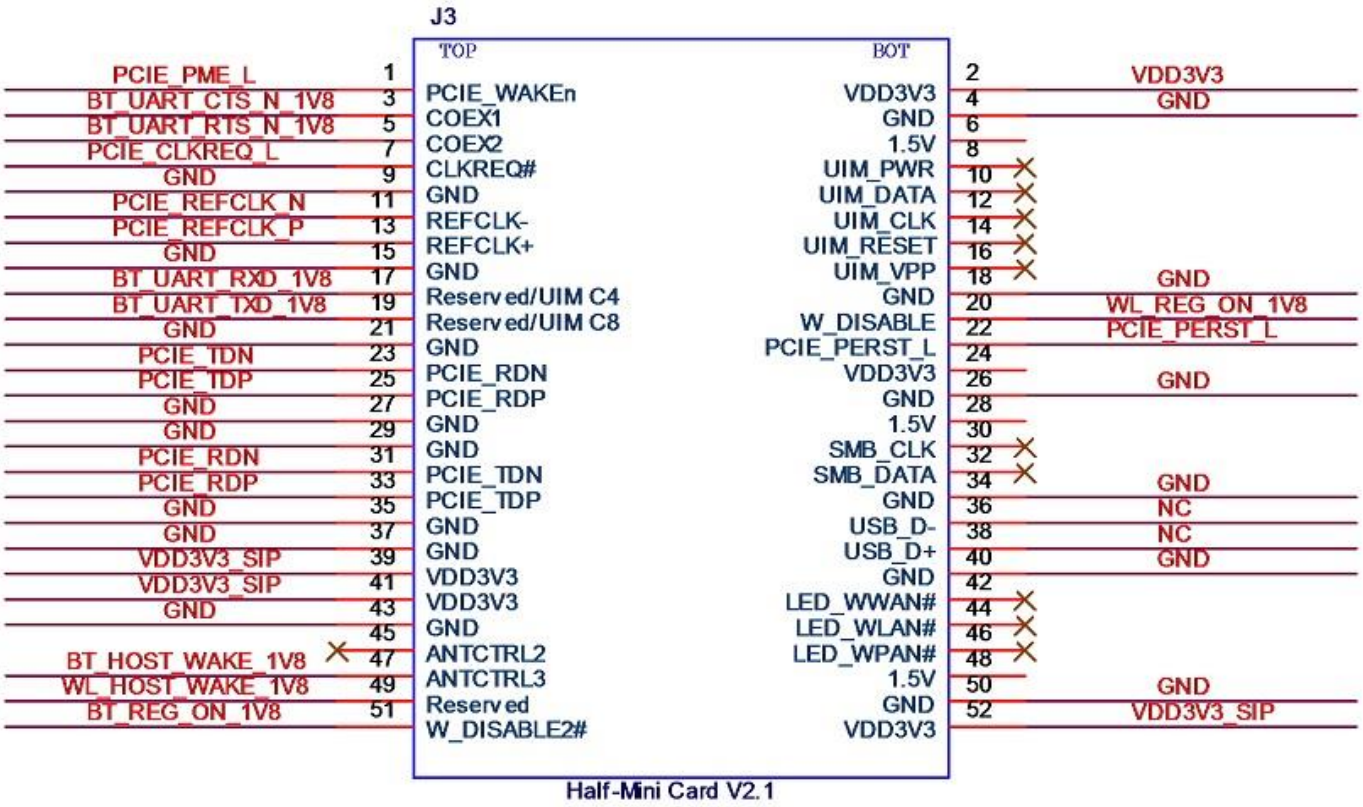

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Pin#	**Pin Name**	**Type**	**Description**
1	PCIE_PME_L	OD	PCI power management event output.
3	BT_UART_CTS_N_1V8	I	Bluetooth UART clear to send
5	BT_UART_RTS_N_1V8	O	Bluetooth UART request to send
7	PCIE_CLKREQ_L	OD	PCIe clock request
9	GND	G	Ground connections
11	PCIE_RCLK_N	I	PCIe differential clock input- Negative
13	PCIE_RCLK_P	I	PCIe differential clock input- Positive
15	GND	G	Ground connections
17	BT_UART_RXD_1V8	I	Bluetooth UART serial data input
19	BT_UART_TXD_1V8	O	Bluetooth UART serial data input
21	GND	G	Ground connections
23	PCIE_TDN	O	PCIe Transmit data-Negative
25	PCIE_TDP	O	PCIe Transmit data-Positive
27	GND	G	Ground connections
29	GND	G	Ground connections
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33	PCIE_RDP	I	PCIe receive data-Positive
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39	VDD_3V3_SIP	P	VDD system power supply input
41	VDD_3V3_SIP	P	VDD system power supply input
43	GND	G	Ground connections
45	NC	—	No connect
47	BT_HOST_WAKE_1V8	O	Bluetooth device to wake-up HOST
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Certification

Dipole Ant.

- ■ **FCC**
- ■ **IC**
- □ **NCC**
- ■ **CE** (RED EN 300 328 V2.2.2 / EN 301 893 V2.1.1)
- ■ **MIC**
- □ **ASNZS**

Ordering Information

Product Name	Part Number	Description
WPEB-265AXI(BT) [B18]	R9701A90002	802.11ax/ac/a/b/g/n 2T2R+BT5.0 (Function GPIO VIO 1.8v) Half Mini PCIe Module
WPEB-265AXI(BT) [R18]	R9701A90004	802.11ax/ac/a/b/g/n 2T2R+BT5.0 (BT for UART 1.8v) Half Mini PCIe Module

Optional Accessory

Product Name	Part Number	Description
AD-103AG	R3410110203	Dipole Antenna, 2dBi 2.4GHz/5GHz, RP-SMA(M) connector
AD-302N	R3410110221	Dipole Antenna, 3dBi/2dBi 2.4G/5GHz, RP-SMA(M) connector
AD-303N	R3410110222	Dipole Antenna, 3dBi/3dBi 2.4G/5GHz, RP-SMA(M) connector
AD-305N	R3410110223	Dipole Antenna, 5dBi/5dBi 2.4G/5GHz, RP-SMA(M) connector
CBIRF-ME150	R3470300023	RF Cable, I-PEX/MHF1 to RP-SMA(F); L:150mm; Coaxial 1.37 Black
CBIRF-ME250	R3470300024	RF Cable, I-PEX/MHF1 to RP-SMA(F); L:250mm; Coaxial 1.37 Black