

## WNFT-280AX(BT)

WiFi 6/6E 2x2 MU-MIMO

802.11ax/ac/a/b/g/n Tri-band 2.4GHz/5GHz/6GHz

2T2R Wi-Fi+ Bluetooth 5.2 M.2 module



### High-Speed Wireless Internet Access

SparkLAN WNFT-280AX(BT), the first M.2 WiFi-6E (802.11ax) module with latest Bluetooth technology 5.2 from Realtek, powering by the latest Realtek Combo chip, supports full IEEE802.11 ax/ac/a/b/g/n protocol, while working with Bluetooth at the same time.

WNFT-280AX(BT) supports 2 spatial streams concurrently (2T2R, or 2x2) in MU-MIMO mode. With a standard M.2 A/E key 2230 formfactor, WNFT-280AX(BT) can accommodate to all existing platform that has M.2 Adaptor pre-integrated, no extra work with platform design.

Software wise WNFT-280AX(BT) supports Windows/Linux/Android, the OS support enables WNFT-280AX(BT) capable to run both x86 platform, and ARM based platform\*. WNFT-280AX(BT) will mainly support STA mode, recommended application includes digital signage/POS, tablets, laptops and other media consumption application (Consumer and commercial use) that requires high speed data transmission with low AP mode demand, and temperature requirement.

#### Embedded Application

Tablet/ Notebook/ Advertising machine/ OTT Box/ IPTV/ DVB/ STB / DV/ IPC/ Mini Driving Recorder/ Doorbell / Smart TV/ Intelligent Projector Pico/ VR/ AR terminal/ Wireless storage/ Printer/ POS machine/ Vehicle mounted front/ Rear Terminal UAV/ Robot/ Intelligent Gateway/ Smart city and other consumer electronic products.

#### Key Feature

- Support 2.4Ghz, 5Ghz, 6Ghz band channels
- Two Transmit and Two Receive paths 20MHz / 40MHz / 80MHz/ 160 MHz bandwidth transmission
- Supports 802.11ax 2x2, Wave-2 compliant with MU-MIMO
- Maximum PHY data rate up to 286.8 Mbps using 20MHz bandwidth, 573.5Mbps using 40MHz bandwidth, and 1201Mbps using 80MHz bandwidth and 2402Mbps using 160MHz
- Bluetooth 5 system (BT 5.2 Logo Compliant)

**Specification**

<b>Standards</b>	IEEE 802.11ax/ac/a/b/g/n (2T2R) Bluetooth V5.2, V5.1, V5.0, V4.2, V4.1, V4.0 LE, V3.0, V2.1+EDR
<b>Chipset</b>	Realtek RTL8852CE
<b>Data Rate</b>	802.11b: 11Mbps 802.11a/g: 54Mbps 802.11n: MCS0~15 802.11ac: MCS0~9 802.11ax: MCS0~11 Bluetooth: 1 Mbps, 2Mbps and Up to 3Mbps
<b>Operating Frequency</b>	IEEE 802.11ax/ac/a/b/g/n ISM Band, 2.412GHz~2.484GHz, 4.905GHz~5.915GHz, 5.930GHz~7.110GHz *Subject to local regulations
<b>Interface</b>	WLAN: PCIe Bluetooth: USB
<b>Form Factor</b>	M.2 2230-S3-A-E Key
<b>Antenna</b>	2 x IPEX MHF4 connectors, Support WLAN/BT co-existence Main: WLAN Aux: WLAN / BT
<b>Modulation</b>	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) BT: Header: GFSK Payload 2M: $\pi/4$ -DQPSK Payload 3M: 8-DPSK
<b>Power Consumption</b>	TX mode: 860 mA(Average) RX mode: 470 mA(Average)

<b>Operating Voltage</b>	DC 3.3V
<b>Operating Temperature Range</b>	0°C~+70°C
<b>Storage Temperature Range</b>	-40°C~85°C
<b>Humidity (Non-Condensing)</b>	5%~90% (Operating) 5%~90% (Storing)
<b>Dimension L x W x H (in mm)</b>	30mm(±0.15mm) x 22mm(±0.15mm) x 2.15 mm(±0.15mm)
<b>Weight (g)</b>	2.55g
<b>Driver Support</b>	Windows/Linux/Android
<b>Security</b>	64/128-bits WEP, WPA, WPA2, WPA3, 802.1x,802.11i

### OUTPUT POWER & SENSITIVITY

#### 802.11b

Data Rate	Tx $\pm$ 2dBm	Rx Sensitivity
11Mbps	19dBm	$\leq$ -76dBm

#### 802.11g

Data Rate	Tx $\pm$ 2dBm	Rx Sensitivity
54Mbps	18dBm	$\leq$ -65dBm

#### 802.11n / 2.4GHz

	Data Rate	Tx $\pm$ 2dBm (1TX)	Tx $\pm$ 2dBm (2TX)	Rx Sensitivity
HT20	MCS7	17dBm	20dBm	$\leq$ -64dBm
	MCS7	17dBm	20dBm	$\leq$ -61dBm

#### 802.11a

Data Rate	Tx $\pm$ 2dBm	Rx Sensitivity
54Mbps	16dBm	$\leq$ -65dBm

#### 802.11n / 5GHz

	Data Rate	Tx $\pm$ 2dBm (1TX)	Tx $\pm$ 2dBm (2TX)	Rx Sensitivity
HT20	MCS7	15dBm	18dBm	$\leq$ -64dBm
	MCS7	15dBm	18dBm	$\leq$ -61dBm

#### 802.11ac

	Data Rate	Tx $\pm$ 2dBm (1TX)	Tx $\pm$ 2dBm (2TX)	Rx Sensitivity
VHT80	MCS9	13dBm	16dBm	$\leq$ -51dBm

#### 802.11ax / 2.4 GHz

	Data Rate	Tx $\pm$ 2dBm (1TX)	Tx $\pm$ 2dBm (2TX)	Rx Sensitivity
HE40	MCS11	13 dBm	16dBm	$\leq$ -49dBm

#### 802.11ax / 5GHz

	Data Rate	Tx $\pm$ 2dBm (1TX)	Tx $\pm$ 2dBm (2TX)	Rx Sensitivity
HE40	MCS7	15 dBm	18dBm	$\leq$ -61dBm
	MCS9	13 dBm	16dBm	$\leq$ -51dBm
HE80	MCS9	13 dBm	16dBm	$\leq$ -51dBm
HE160	MCS11	11dBm	14dBm	$\leq$ -46dBm

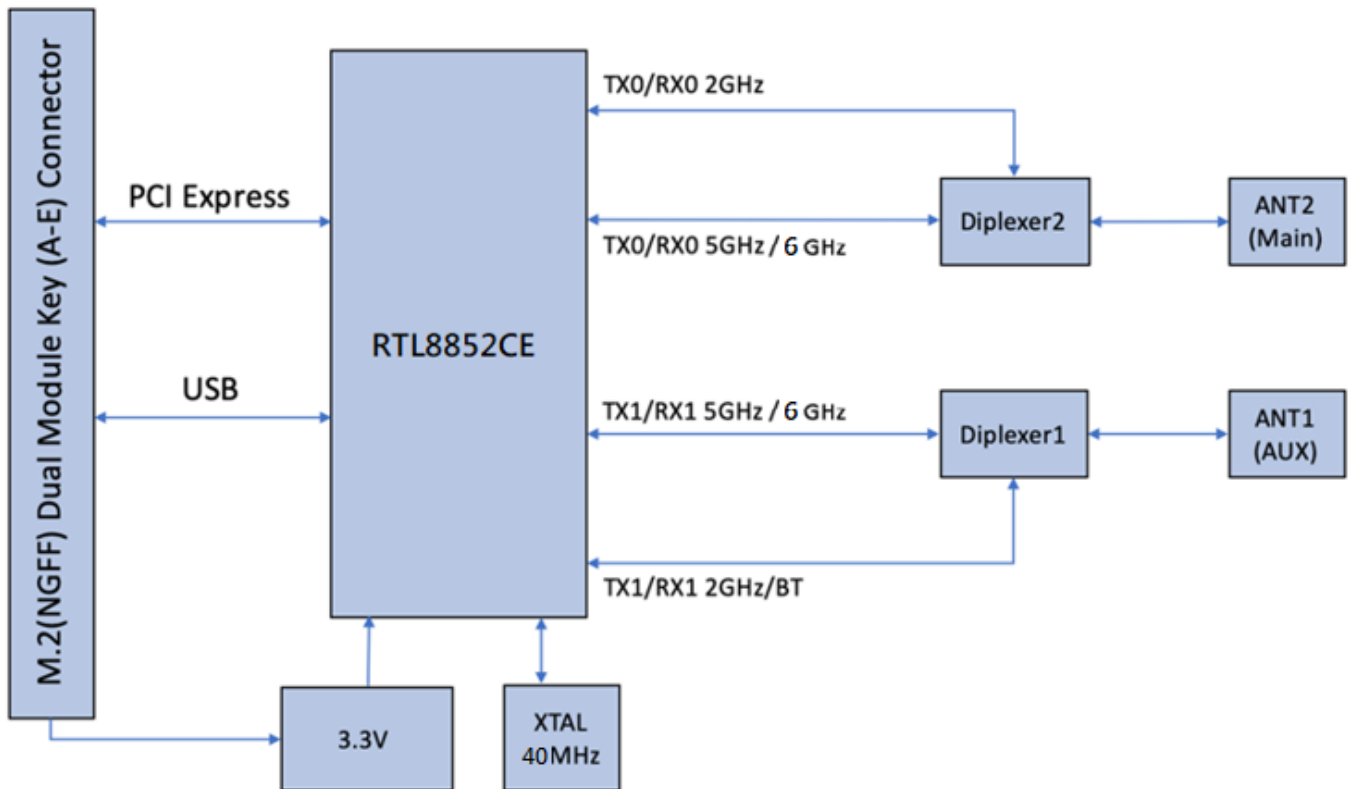
**802.11ax / 6GHz**

HE20	Data Rate	Tx ± 2dBm (1TX)	Tx ± 2dBm (2TX)	Rx Sensitivity
	MCS7	13dBm	16dBm	≤ -65dBm
HE40	MCS7	13dBm	16dBm	≤ -61dBm
HE80	MCS9	11 dBm	14dBm	≤ -51dBm
HE160	MCS11	9 dBm	12 dBm	≤ -46 dBm

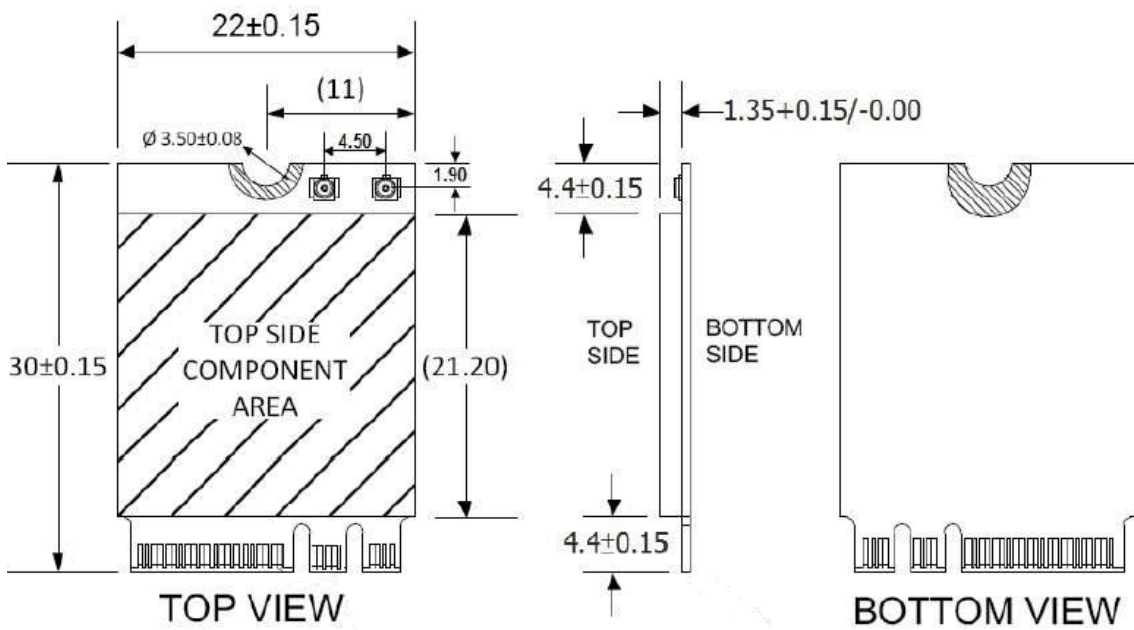
**Bluetooth**

Data Rate	Tx ± 2dBm (Class I Device)	Rx Sensitivity
3Mbps	0 ≤ Output Power ≤ +6dBm	<0.1% BR, BER at -70dBm

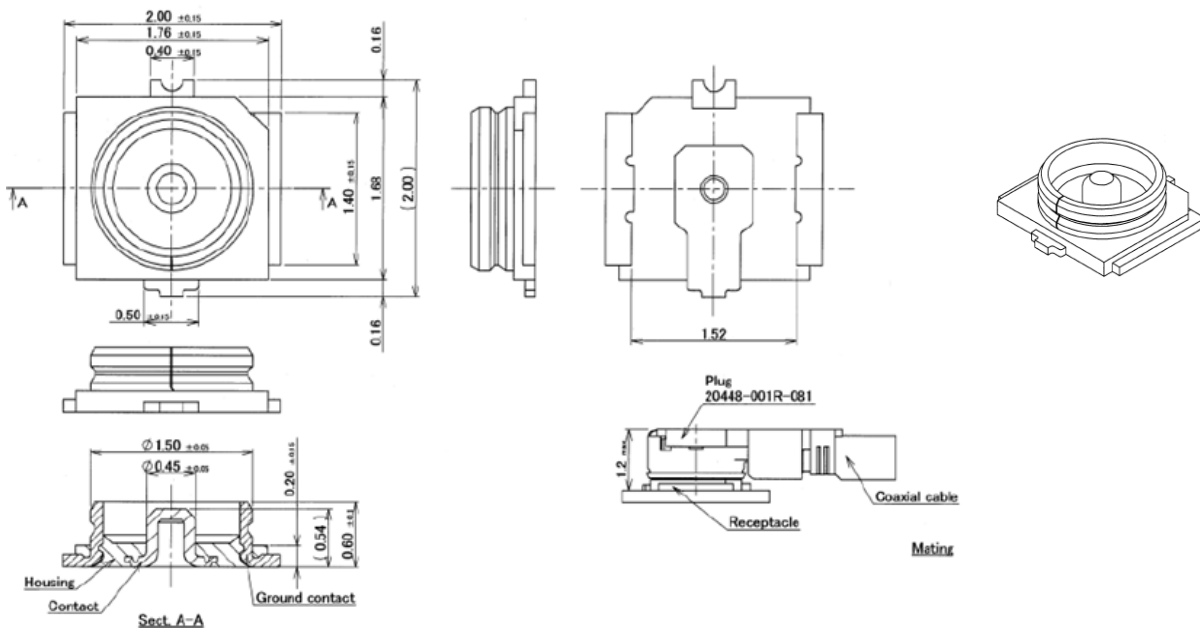
**Block Diagram**



### Mechanical Diagram (mm)



### MHF4 Connector spec.



## Pin Assignment

The following section illustrate signal pin-outs for the module connector.

TOP			
Pin#	Pin Name	Type	Description
1	GND	G	Ground connections
3	USB_D+	I/O	USB serial differential data Positive
5	USB_D-	I/O	USB serial differential data Negative
7	GND	G	Ground connections
9	NOTCH FOR KEY A	NC	No Connection
11	NOTCH FOR KEY A	NC	No Connection
13	NOTCH FOR KEY A	NC	No Connection
15	NOTCH FOR KEY A	NC	No Connection
17	NC	NC	No Connection
19	NC	NC	No Connection
21	NC	NC	No Connection
23	NC	NC	No Connection
25	NOTCH FOR KEY E	NC	No Connection
27	NOTCH FOR KEY E	NC	No Connection
29	NOTCH FOR KEY E	NC	No Connection
31	NOTCH FOR KEY E	NC	No Connection
33	GND	G	Ground connections
35	PERp0	I	PCI Express receive data-Positive
37	PERn0	I	PCI Express receive data-Negative
39	GND	G	Ground connections
41	PETp0	O	PCI Express transmit data- Positive
43	PETn0	O	PCI Express transmit data- Negative
45	GND	G	Ground connections
47	REFCLKp0	I	PCI Express differential clock input- Positive
49	REFCLKn0	I	PCI Express differential clock input- Negative
51	GND	G	Ground connections
53	CLKREQ0#	O	PCIe clock request
55	PEWAKE0#	O	PCIe wake signal
57	GND	G	Ground connections
59	RESERVED	NC	No Connection
61	RESERVED	NC	No Connection
63	GND	G	Ground connections

TOP			
Pin#	Pin Name	Type	Description
65	RESERVED	NC	No Connection
67	RESERVED	NC	No Connection
69	GND	G	Ground connections
71	RESERVED	NC	No Connection
73	RESERVED	NC	No Connection
75	GND	G	Ground connections

### Pin Assignment

BOTTOM			
Pin#	Pin Name	Type	Description
2	3.3V	P	VDD system power supply input
4	3.3V	P	VDD system power supply input
6	LED_1#	O/OD	WLAN LED
8	NOTCH FOR KEY A	NC	No Connection
10	NOTCH FOR KEY A	NC	No Connection
12	NOTCH FOR KEY A	NC	No Connection
14	NOTCH FOR KEY A	NC	No Connection
16	LED_2#	O/OD	Bluetooth LED
18	GND	G	Ground connections
20	NC	DNC	Do Not Connect
22	NC	DNC	Do Not Connect
24	NOTCH FOR KEY E	NC	No Connection
26	NOTCH FOR KEY E	NC	No Connection
28	NOTCH FOR KEY E	NC	No Connection
30	NOTCH FOR KEY E	NC	No Connection
32	NC	DNC	Do Not Connect
34	NC	DNC	Do Not Connect
36	NC	DNC	Do Not Connect
38	VENDOR DEFINED	DNC	Do Not Connect
40	VENDOR DEFINED	NC	No Connection
42	VENDOR DEFINED	NC	No Connection
44	COEX3	NC	No Connection
46	COEX_TXD	DNC	Do Not Connect
48	COEX_RXD	DNC	Do Not Connect
50	SUSCLK	NC	No Connection



BOTTOM			
Pin#	Pin Name	Type	Description
52	PERST0#	I	PCIe host indication to reset the device Active low.
54	W_DISABLE2#	I	Turn off BT RF analog and front-end. Active low.
56	W_DISABLE1#	I	Turn off WLAN RF analog and front-end. Active low.
58	I2C_DATA	NC	No Connection
60	I2C_CLK	NC	No Connection
62	ALERT#	NC	No Connection
64	RESERVED	NC	No Connection
66	UIM_SWP	DNC	Do Not Connect
68	UIM_POWER_SNK	DNC	Do Not Connect
70	UIM_POWER_SRC	DNC	Do Not Connect
72	3.3V	P	VDD system power supply input
74	3.3V	P	VDD system power supply input

Note: power (P), ground (G), open-drain (OD), input (I), output (O), Do Not Connect (DNC), No Connection (NC)

## Certification

- 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
WNFT-280AX(BT)	R9701A10008	802.11ax/ac/b/g/n Tri-band 2T2R WiFi+BT M.2 Card

## Optional Accessory

Product Name	Part Number	Description
AD-510AX	R3410A10051	Dipole Antenna,2.27dBi /2.88dBi / 3.52dBi /2.4G/5G/ 6GHz,RP-SMA (M)connector
CBIRF-NE150	R3470300025	RF Cable, I-PEX/MHF4 to RP-SMA(F); L150mm; Coaxial 0.81 Black
CBIRF-NE250	R3470300026	RF Cable, I-PEX/MHF4 to RP-SMA(F); L250mm; Coaxial 0.81 Black