

# Product Specification of NWD7605

## **WLAN Function Description**

This WLAN device is adapted to 11a/b/g/n/ac/ax. Operation of each part is based and explained in a module RF Block diagram. The device does not support partially RU function. UNII-2A/2C bands have been disabled by software.

| RF Exposure Condition                                                                                                             | Item | Capable Transmit Configurations |                 |
|-----------------------------------------------------------------------------------------------------------------------------------|------|---------------------------------|-----------------|
| Standalone                                                                                                                        | 1    | DTS Chain 0                     | + DTS Chain 1   |
|                                                                                                                                   | 2    | U-NII Chain 0                   | + U-NII Chain 1 |
|                                                                                                                                   | 3    |                                 |                 |
|                                                                                                                                   | 4    |                                 |                 |
| Notes:<br>1. DTS Radio can transmit simultaneously with DTS Radio<br>2. U-NII Radio can transmit simultaneously with U-NII Radio. |      |                                 |                 |

## **Time base of the transmission frequency:**

For IF and RF frequency, WLAN chip operating frequency is a 40MHz Crystal reference.

## **Transmission:**

The digital PHY incorporates an OFDM and DSSS transceiver that supports all data rates defined by IEEE 802.11 a/b/g/n/ac. Modulation schemes include BPSK, QPSK, 16-QAM, 64-QAM, 128-QAM, 256-QAM, 1024-QAM and forward error correction coding with rates of 1/2, 2/3, 3/4, and 5/6. It powers on the digital to analog converter (DAC) and transmit the training symbol. The training symbols are a fixed waveform and are generated within the digital PHY in parallel with the PCU sending the TX header (from length, data rate, etc.) An 2x2 2G/5G MIMO system.

## **Receiver:**

The receiver consists of an LNA, a pair of Quadrature radio frequency (RF) mixers, and in-phase (I) and Quadrature (Q) BB programmable gain filter/amplifiers (PGA). The mixers convert the output of the on-chip LNA to BB I and Q signals. The I and Q signals are low-pass filtered and amplified by a BB programmable gain filter controlled by digital logic. The BB signals are sent to ADC within the MAC/BB processor.

## **Base band Processing:**

Data Modulation: DSSS,(BPSK/QPSK/CCK) and OFDM (BPSK / QPSK / 16QAM / 64QAM / 128QAM / 256QAM / 1024QAM)

## **Channel Selection Restriction:**

The operating band is 2412-2462MHz (channel 1~11) and 5180-5240MHz (channel 36~ 48) and 5745-5825MHz (channel 149~165), which 2.4GHz and 5GHz signals are separated by Diplexer.

A transmitting part is constituted in the WLAN block of RTL8832BU. The data signal is modulated by CCK / OFDM Modulator inside RTLThese are the only ways the digital baseband portion will turn on the RF transmitter, which it then turns off at the end of the packet. Therefore, the transmitter will be on only

while one of the aforementioned packets is being transmitted. In other words, this device automatically discontinues transmission in case of either absence of information to transmit or operational failure. The digital modulation signal is changed into the analog modulation signal by digital / analog converter (DAC).

We, ZYXEL COMMUNICATIONS CORPORATION, hereby declare that the device operates on 2412-2462MHz and in CH12-CH13 has been disabled.

#### 1. 2.4G Band Antenna gain :

| Ant No. | Transmitter circuit | Brand name | Model name | Ant type | Gain(dBi) |
|---------|---------------------|------------|------------|----------|-----------|
| 1       | Chain(0)            | LYNwave    | 7822ant-1  | printed  | 3.6       |
| 2       | Chain(1)            | LYNwave    | 7822ant-2  | printed  | 3.1       |

#### 2. 5G Band Antenna gain :

| Ant No. | Transmitter circuit | Brand name | Model name | Ant type | Gain(dBi) |
|---------|---------------------|------------|------------|----------|-----------|
| 1       | Chain(0)            | LYNwave    | 7822ant-1  | printed  | 4.5       |
| 2       | Chain(1)            | LYNwave    | 7822ant-2  | printed  | 5.6       |

## Product Description

### 2.4GHz

|                     |                                                                                                                                    |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Operating Frequency | 2412MHz – 2462MHz                                                                                                                  |
| Moulation           | CCK, DQPSK, DBPSK for DSSS<br>64QAM, 16QAM, QPSK, BPSK for OFDM<br>1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDMA             |
| Transfer Rate       | 802.11b : up to 11Mbps<br>802.11g : up to 54Mbps<br>802.11n : up to MCS15<br>802.11ac : up to MCS9<br>802.11ax : up to MCS11       |
| Number of Channel   | 11 for 802.11b, 802.11g, 802.11n(HT20), 802.11ac(VHT20),<br>802.11ax(HE20)<br>7 for 802.11n(HT40), 802.11ac(VHT40), 802.11ax(HE40) |

### Tune-up power:

### Wi-Fi 2.4GHz (DTS Band)

| Band            | Mode               | Ch # | Freq.<br>(MHz) | Tune up Power (dBm) |         |
|-----------------|--------------------|------|----------------|---------------------|---------|
|                 |                    |      |                | Chain 0             | Chain 1 |
| 2.4GHz<br>(DTS) | 802.11b            | 1    | 2412           | 19.0                | 19.0    |
|                 |                    | 6    | 2437           | 19.0                | 19.0    |
|                 |                    | 11   | 2462           | 17.0                | 17.0    |
|                 | 802.11g            | 1    | 2412           | 19.0                | 19.0    |
|                 |                    | 6    | 2437           | 19.0                | 19.0    |
|                 |                    | 11   | 2462           | 17.0                | 17.0    |
|                 | 802.11n<br>(HT20)  | 1    | 2412           | 19.0                | 18.0    |
|                 |                    | 6    | 2437           | 19.0                | 18.0    |
|                 |                    | 11   | 2462           | 16.0                | 16.0    |
|                 | 802.11n<br>(HT40)  | 3    | 2422           | 18.0                | 17.0    |
|                 |                    | 6    | 2437           | 16.0                | 16.0    |
|                 |                    | 9    | 2452           | 14.5                | 14.5    |
|                 | 802.11ax<br>(HE20) | 1    | 2412           | 19.0                | 18.0    |
|                 |                    | 6    | 2437           | 19.0                | 18.0    |
|                 |                    | 11   | 2462           | 16.0                | 16.0    |
|                 | 802.11ax<br>(HE40) | 3    | 2422           | 18.0                | 17.0    |
|                 |                    | 6    | 2437           | 16.0                | 16.0    |
|                 |                    | 9    | 2452           | 14.5                | 14.5    |

NOTE: 802.11n and 802.11ac have same tune-up power with 802.11ax under the same bandwidth

**5GHz**

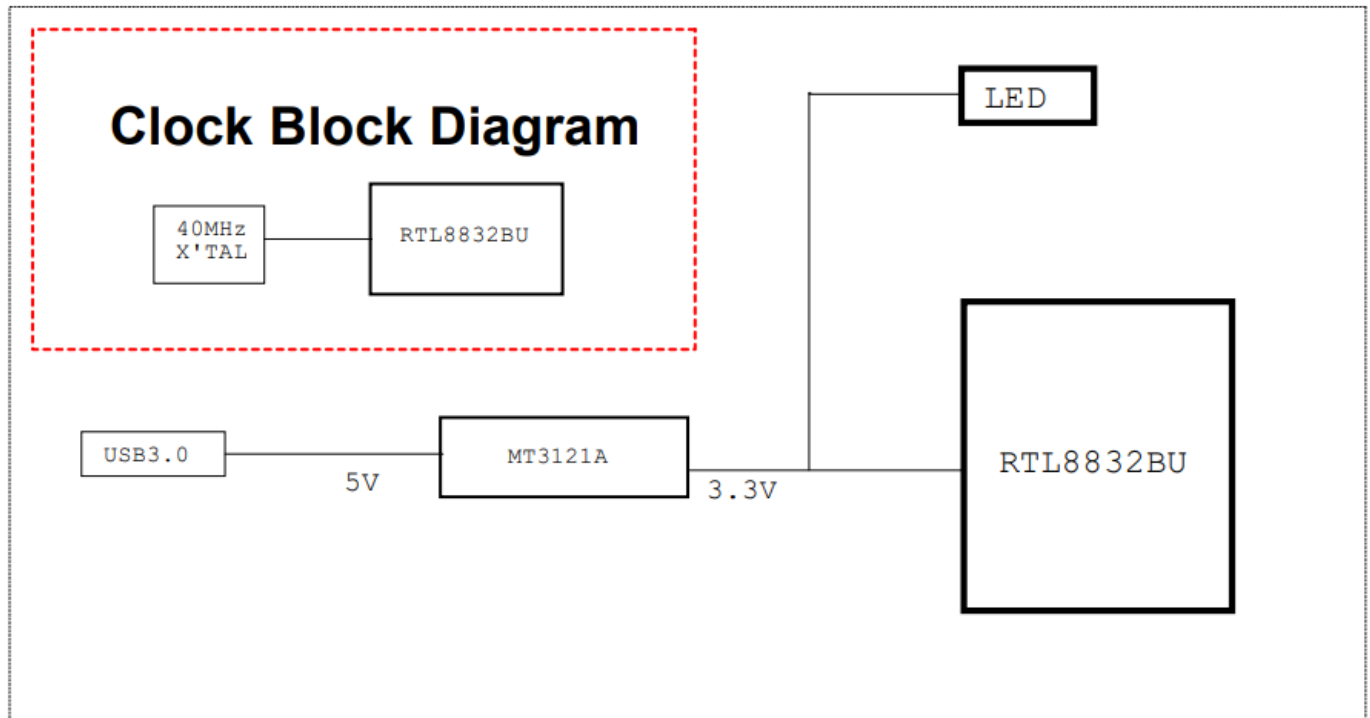
|                     |                                                                                                    |                                                                  |
|---------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Operating Frequency | 5180MHz – 5240MHz, 5745MHz – 5825MHz                                                               |                                                                  |
| Moulation           | 1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK                                                          |                                                                  |
| Transfer Rate       | 802.11a : up to 54Mbps<br>802.11n : up to MCS15<br>802.11ac : up to MCS9<br>802.11ax : up to MCS11 |                                                                  |
| Number of Channel   | 5180MHz – 5240MHz                                                                                  | 4 for 802.11a, 802.11n(HT20),<br>802.11ac(VHT20), 802.11ax(HE20) |
|                     |                                                                                                    | 2 for 802.11n(HT40), 802.11ac(VHT40),<br>802.11ax(HE40)          |
|                     |                                                                                                    | 1 for 802.11ac(VHT80), 802.11ax(HE80)                            |
|                     | 5745MHz – 5825MHz                                                                                  | 5 for 802.11a, 802.11n(HT20),<br>802.11ac(VHT20), 802.11ax(HE20) |
|                     |                                                                                                    | 2 for 802.11n(HT40), 802.11ac(VHT40),<br>802.11ax(HE40)          |
|                     |                                                                                                    | 1 for 802.11ac(VHT80), 802.11ax(HE80)                            |

**Tune- up Power:  
Wi-Fi 5GHz (U-NII Bands)**

| Band<br>(GHz)    | Mode                | Ch # | Freq.<br>(MHz) | Tune up Power (dBm) |         |
|------------------|---------------------|------|----------------|---------------------|---------|
|                  |                     |      |                | Chain 0             | Chain 1 |
| 5.2<br>(U-NII 1) | 802.11a             | 36   | 5180           | 14.5                | 14.5    |
|                  |                     | 40   | 5200           | 14.5                | 14.5    |
|                  |                     | 44   | 5220           | 14.5                | 14.5    |
|                  |                     | 48   | 5240           | 14.5                | 14.5    |
|                  | 802.11n<br>(HT20)   | 36   | 5180           | 14                  | 13.5    |
|                  |                     | 40   | 5200           | 14                  | 13.5    |
|                  |                     | 44   | 5220           | 13.5                | 13.5    |
|                  |                     | 48   | 5240           | 13.5                | 13.5    |
|                  | 802.11n<br>(HT40)   | 38   | 5190           | 14                  | 14      |
|                  |                     | 46   | 5230           | 14                  | 14      |
|                  | 802.11ac<br>(VHT20) | 36   | 5180           | 14                  | 13.5    |
|                  |                     | 40   | 5200           | 14                  | 13.5    |
|                  |                     | 44   | 5220           | 13.5                | 13.5    |
|                  |                     | 48   | 5240           | 13.5                | 13.5    |
|                  | 802.11ac<br>(VHT40) | 38   | 5190           | 14                  | 14      |
|                  |                     | 46   | 5230           | 14                  | 14      |
|                  | 802.11ac<br>(VHT80) | 42   | 5210           | 9.5                 | 9.5     |
|                  | 802.11ax<br>(HE20)  | 36   | 5180           | 14                  | 13.5    |
|                  |                     | 40   | 5200           | 14                  | 13.5    |
|                  |                     | 44   | 5220           | 13.5                | 13.5    |
|                  |                     | 48   | 5240           | 13.5                | 13.5    |
|                  | 802.11ax<br>(HE40)  | 38   | 5190           | 14                  | 14      |
|                  |                     | 46   | 5230           | 14                  | 14      |
|                  | 802.11ax<br>(HE80)  | 42   | 5210           | 9.5                 | 9.5     |

| Band<br>(GHz)    | Mode                | Ch # | Freq.<br>(MHz) | Tune up Power (dBm) |         |
|------------------|---------------------|------|----------------|---------------------|---------|
|                  |                     |      |                | Chain 0             | Chain 1 |
| 5.8<br>(U-NII 3) | 802.11a             | 149  | 5745           | 12.5                | 11.5    |
|                  |                     | 157  | 5785           | 12.5                | 11.5    |
|                  |                     | 165  | 5825           | 12.5                | 11.5    |
|                  | 802.11n<br>(HT20)   | 149  | 5745           | 12                  | 11      |
|                  |                     | 157  | 5785           | 12                  | 11      |
|                  |                     | 165  | 5825           | 12                  | 11      |
|                  | 802.11n<br>(HT40)   | 151  | 5755           | 12                  | 11      |
|                  |                     | 159  | 5795           | 12                  | 11      |
|                  | 802.11ac<br>(VHT20) | 149  | 5745           | 12                  | 11      |
|                  |                     | 157  | 5785           | 12                  | 11      |
|                  |                     | 165  | 5825           | 12                  | 11      |
|                  | 802.11ac<br>(VHT40) | 151  | 5755           | 12                  | 11      |
|                  |                     | 159  | 5795           | 12                  | 11      |
|                  | 802.11ac<br>(VHT80) | 155  | 5775           | 12                  | 11      |
|                  | 802.11ax<br>(HE20)  | 149  | 5745           | 12                  | 11      |
|                  |                     | 157  | 5785           | 12                  | 11      |
|                  |                     | 165  | 5825           | 12                  | 11      |
|                  | 802.11ax<br>(HE40)  | 151  | 5755           | 12                  | 11      |
|                  |                     | 159  | 5795           | 12                  | 11      |
|                  | 802.11ax<br>(HE80)  | 155  | 5775           | 12                  | 11      |

## Block diagram



## Power

- Operating Voltage : 5V

## S/W

- Based on Realtek driver
- OS: Windows 10 、 Linux 、

## Environment

- Temperature
  - Operating Temperature: 0 °C to 40 °C (32 °F to 149 °F)
  - Storage Temperature: -20 ° to 65 ° C (-4 °F to 149 °F)
- Humidity
  - Operating Humidity: 10 % to 90 % (Non-condensing)
  - Storage Humidity: 10 % to 90 % (Non-condensing)

## Quality

- MTBF 25°C exceed 100,000 hours
- MTBF 40°C exceed 75,000 Hours