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**Application notes ADW1000 for wireless modules****V3.01**

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Considering the complexity of communication in the air and some innate characters of wireless data transmission, some factors should be taken into consideration in order to build more robust and reliable wireless link.

**1. Data Delay**

For a half duplex transceiver, it transmit signals after receiving a certain number of data or waiting for some time until no new data is coming. Dozens or hundreds of milliseconds of delay will be introduced, which also might be affected by serial data rate, RF data rate, the size of package, etc. Besides that it also takes some time from the RF receiving part to the terminator. Anyway the delay time should be fixed in the same conditions.

**2. Control of Data Flow**

Though the RF modules of Dorji Applied Technologies have large data buffer, the overflow of data will also cause the missing of data if the UART data rate (MCU $\leftrightarrow$ RF module) exceeds RF data rate (RF. Module $\leftrightarrow$ RF module). In order to avoid this problem the UART data rate should not exceed 60% of RF data rate.

E.g. UART data rate=9600bps RF data rate=4800bps.

If the terminal (MCU, etc.) sends 100 bytes of data to RF module per time and the corresponding time is about 104ms, the time gap will be 347ms  $[(104\text{ms}/0.6)*(9600/4800)]$ . If the time interval of the terminal sending data to RF module is not less than 347ms, the problem mentioned above will not appear.

**3. Error Control**

RF modules produced by Dorji Applied Technologies have strong anti-interference ability. High efficient looped interleaving EDAC (Error Detection and correction) has been utilized in RF modules. However, it is inevitable to lose data in some extreme conditions such as receiving critical status, etc. Users can make further development on link-layer protocol similar to TCP/IP slip window or resending missed packages which can improve wireless communication greatly in reliability and flexibility.

**4. Antenna Selection**

Antenna places a very important role in communication system. Its features have great influence on system specifications. Users must pay high attention to its quality. Generally speaking, users need to take two factors into consideration. One is the type of antenna and another is the electric features of antenna.

For the first factor, the direction pattern of antenna must meet the requirement of system design on radiating range; as to the second factor, the frequency bandwidth, gain, rated power, etc. must be compliant to the requirements of system design. It would be better for users to inquiry with antenna producers if their products can meet your requirements, especially for the key parameters mentioned above.

## Frequently Asked Questions

Problems	
<b>No communication</b>	1. Data format inconsistent, e.g. UART rate, different parity check
	2. Different RF chips
	3. Improper power supply
	4. RF module damaged
	5. Wrong setting for EN pin
	6. Distance is out of normal range
	7. antenna installed incorrectly
<b>Short Distance</b>	1. Power Supply out of range
	2. Serious voltage ripple
	3. Incorrect antenna type
	4. Antenna too close to metal surface
	5. Small ground copper for RF modules
	6. Extremely environment, e.g. densely buildings, strong interference
	7. Co-channel interference
<b>Wrong Deceived Data</b>	1. Wrong data rate
	2. Unsteady contact of interface
	3. Coaxial cable too long

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