STD-302 434MHz slicer circuit (Automatic threshold control)

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STD-302 is optimized for communication with 9600bps data rate. Recommended signal pulse width in signal is minimum 104us and maximum 5ms.

This application note shows the measurement data when longer data width than 5ms is input and the change in signal from DO when RF field strength is changed.

STD-302 receiver has performance of 0 error at 2556 bits transmission (PN9 signal) with 9600bps at –110dBm received signal field strength.

Fig. 1 and Fig. 2

  <RX data output figure from STD-302.   Test signal is PN9 at 600bps data rate>

Fig.1: When the data that contains 8ms sequence of 1s (high status) is received, DO failed to output correct signal level due to low SNR.

Fig. 2: When the received signal strength is increased by +3dB, the DO outputs 12ms sequence of 1s (high status) without fail.

Fig.1

-110dBm

Signal: PN9

1% error

*1 Signal

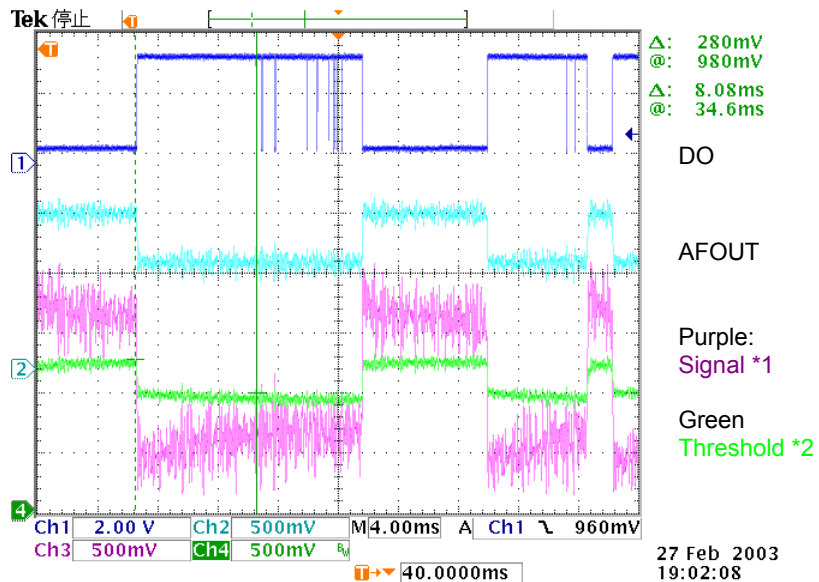Signal to slicer circuit

*2 Threshold

Threshold of slicer circuit
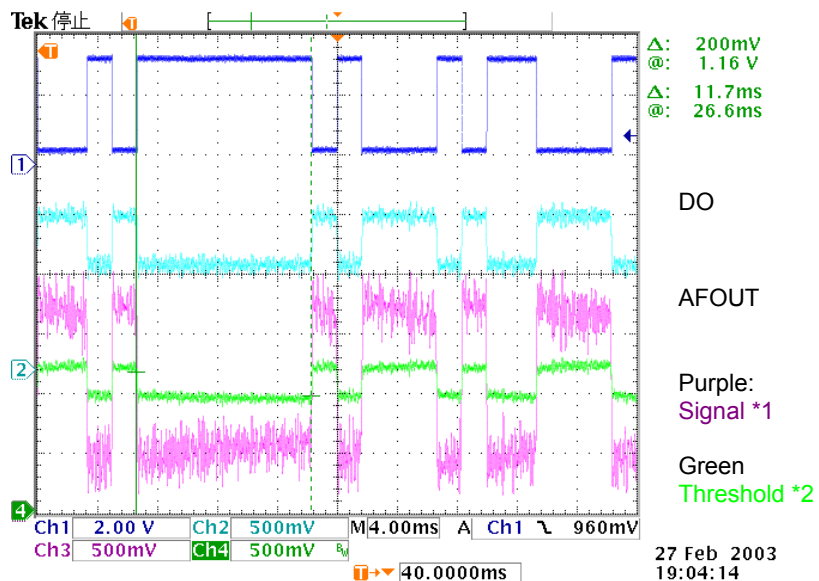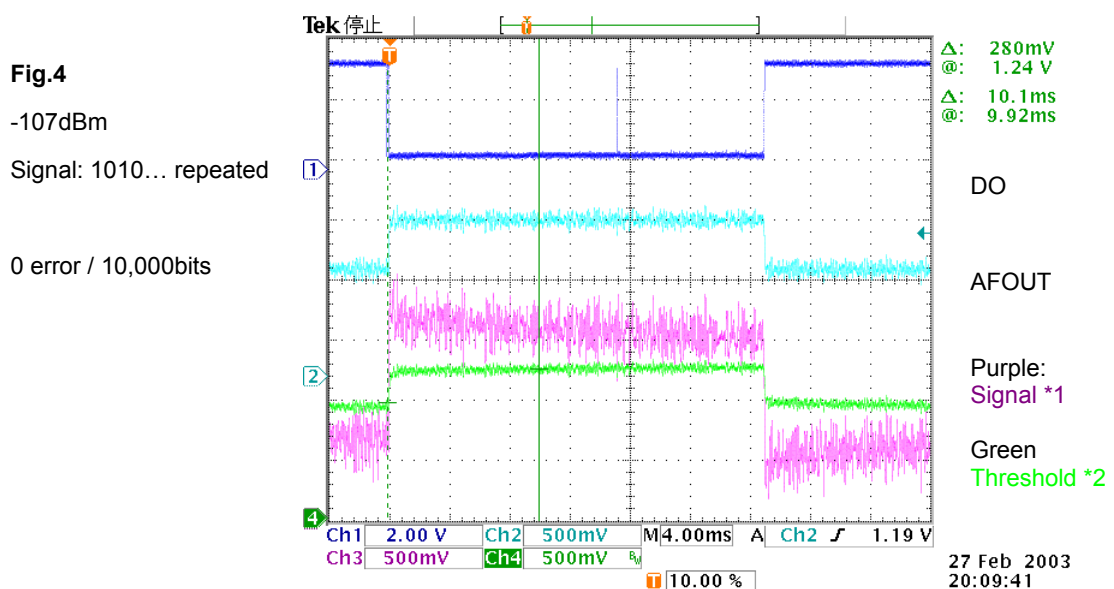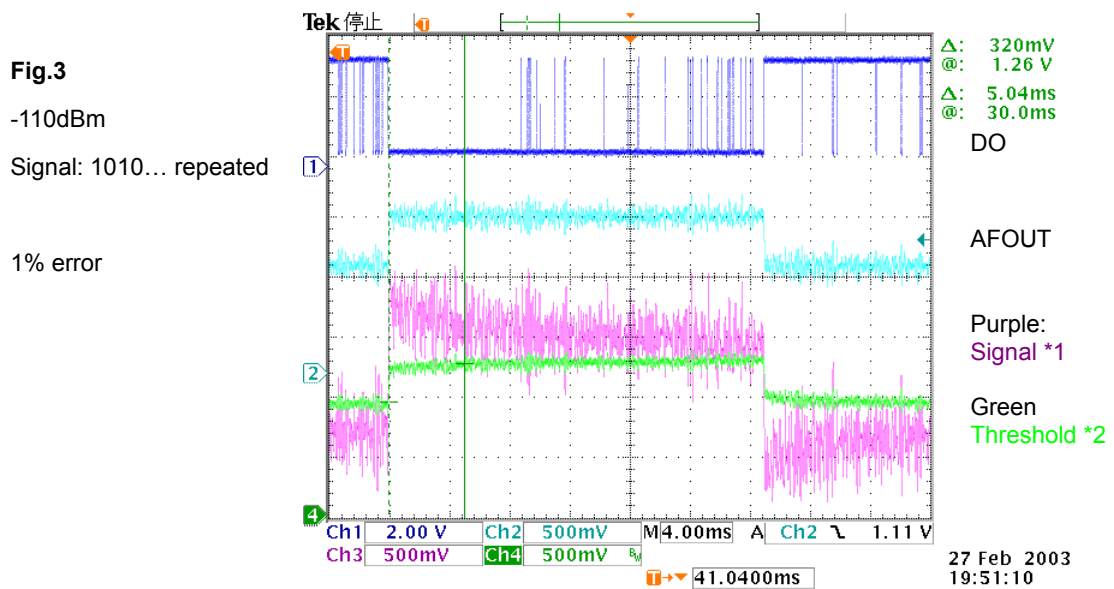

Fig.2

-107dBm

Signal: PN9

0 error / 10,000bits

Fig. 3 and Fig. 4

 < RX data output figure from STD-302. Test signal is 1010…repeated signal at 40bps data rate>

Fig.1: When the data that contains 24ms sequence of 1s (high status) is received, DO failed to output correct signal level due to low SNR.

Fig. 2: When the received signal strength is increased by +3dB, the DO outputs 24ms sequence of 1s (high status) with better shape than the condition of fig.1.

Fig.3

-110dBm

Signal: 1010… repeated

1% error

Fig.4

-107dBm

Signal: 1010… repeated

0 error / 10,000bits

9600bps data rate with pulse width of minimum 104us and maximum 5ms is recommended when user design own communication protocol.

However if maximum pulse width of 10ms is necessary for the dedicated protocol of the user system, please make sure to test the system for the communication range as well as operation at extreme temperature of them.
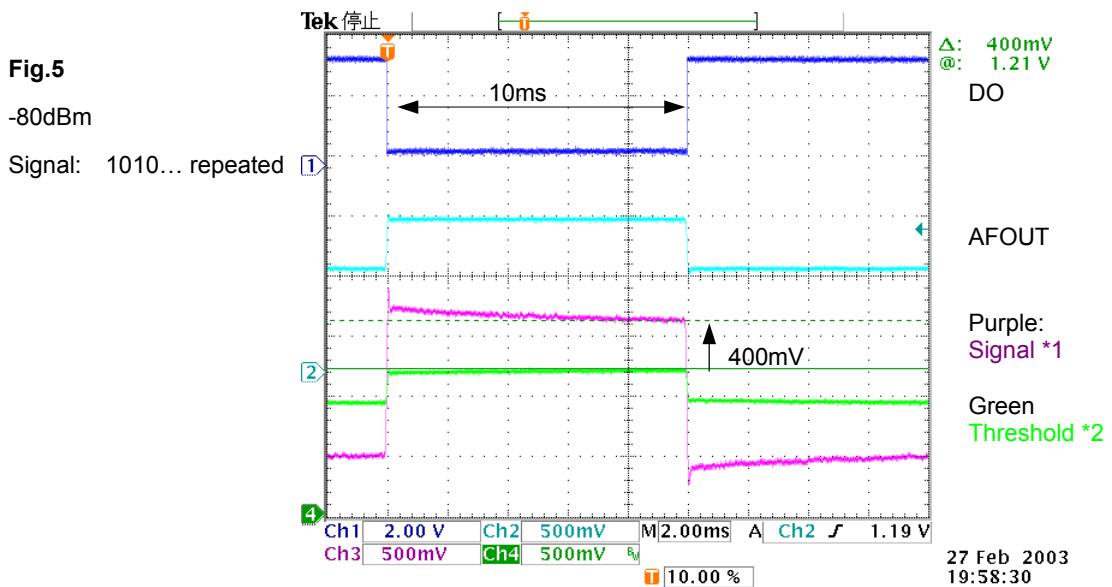
Fig. 5 shows operation of STD-302 with 10ms sequence of 0s (low status).

Fig. 5
   < Test transmission signal: 1010…repeated signal at 100bps data rate (10ms pulse width)>

The difference of voltage between signal and threshold of comparator at the end of 10ms 0s is approx. 400mV. This level ensures to binarize the signal by slicer circuit.

When RF signal strength become lower, the S/N of signal is getting worse then if the noises go over the threshold level, the slicer circuit fails the binalization. As result, error signal is output from DO.

Fig.5

-80dBm

Signal: 1010… repeated