STD-302 434MHz test data for half duplex communication

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1. Half-duplex data communication test (Data rate 9600bps)

TEST procedure:

Transmission DATA is fed following 7ms preamble (11001100..repeated 35bits) and 5ms Sync signal in master unit.

Slave unit returns received data to Master unit after performing data frame confirmation (Loop back function).

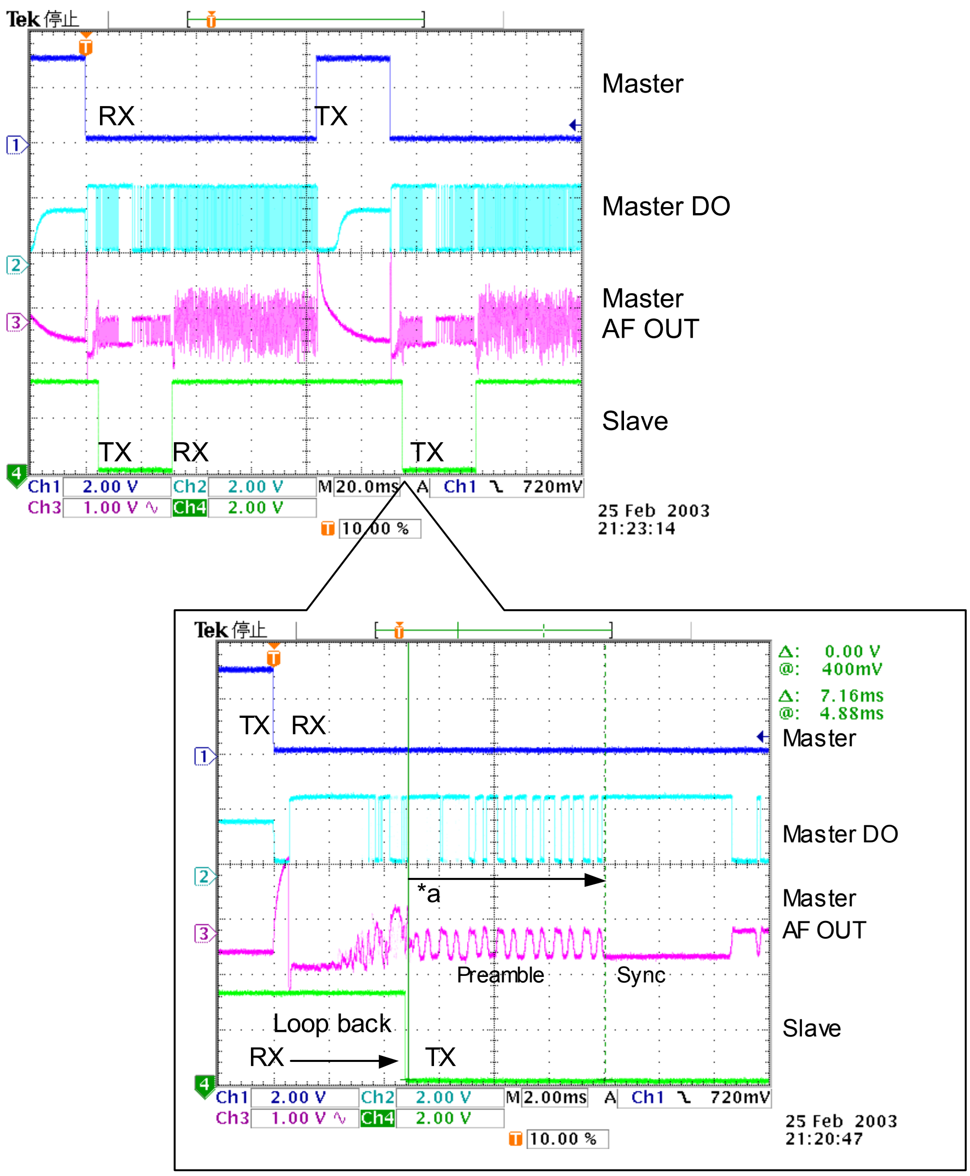
Temperature Condition: Master: at -30°C*1 Slave: In the room temperature (+28 +/-5°C)

Frequency drift at the temperature: Master: -2.6kHz Slave: 0kHz

(Total 2.6kHz difference is considered as worst condition when unit work within –10°C to +55°C)

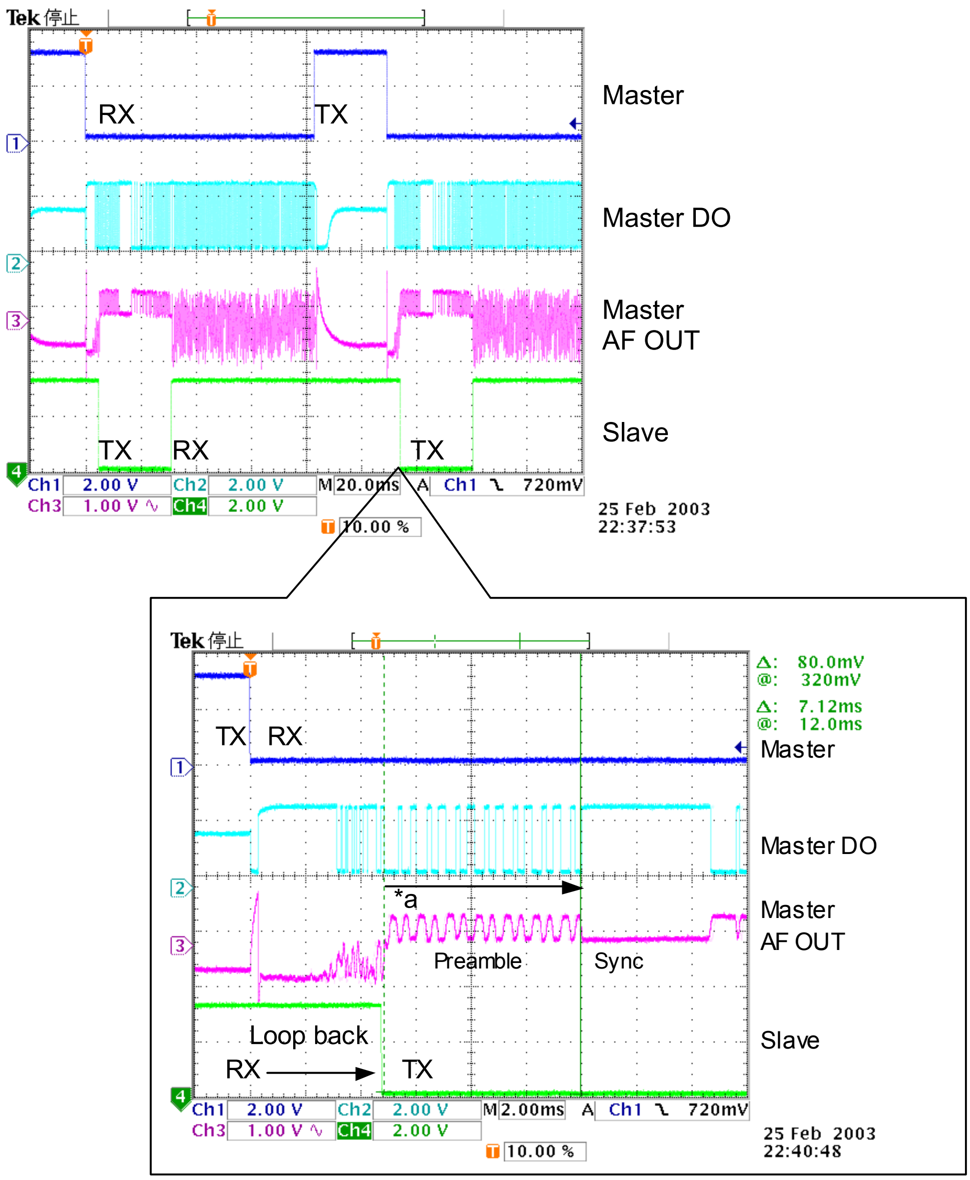
Test result: OK: 0(zero) error occur during 10,000 packets transmission.

*1: -30 °C temperature was set to create 2.6kHz frequency drift. This does not ensure the operation of STD-302 at this temperature.



Temperature Condition: Master: at +80°C*1 Slave: In the room temperature (+28 +/-5°C)
Frequency drift at the temperature: Master: +3.0kHz Slave: 0kHz
(Total 3.0kHz difference is considered as worst condition when unit work within –10°C to 55°C)
Test result: OK: 0(zero) error occur during 10,000 packets transmission.

*1: +80 °C temperature was set to create 3.0kHz frequency drift. This does not ensure the operation of STD-302 at this temperature.



Time required for the data becomes valid at TX -> RX, RX-> TX operation varies by ambient temperature. **Recommended preamble periods (≈ Time required for the data from DO becomes valid.** Marked with *a in figures**) are shown in below.**

Same preamble periods are recommended even the transceiver in system set receiving continuously.

-10°C to +55°C: 7 ms or more

-20°C to +65°C (excluding the above range): 15 ms or more

Timing may change by setting method of PLL and/or antenna location. User is recommended to check and verify the operation behavior and optimize the timing.

2. Receiver frequency change timing (25kHz & 100kHz change)

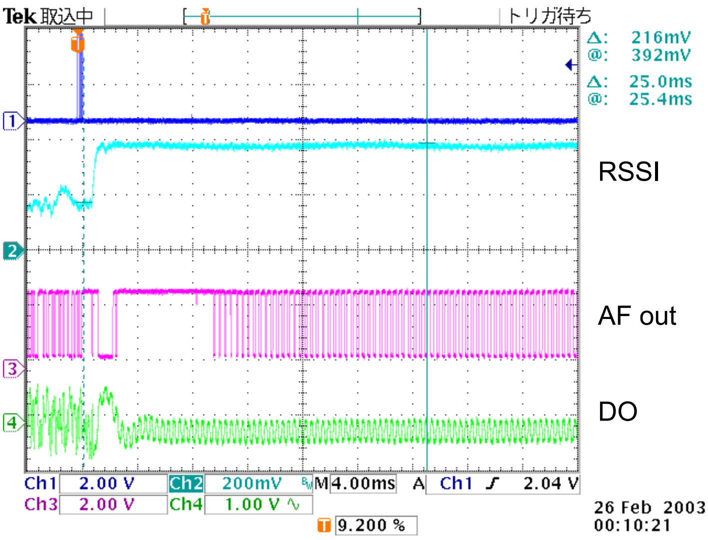
Test signal: 9600bps 110011001100….repeated signal

A. Temperature condition: -30°C

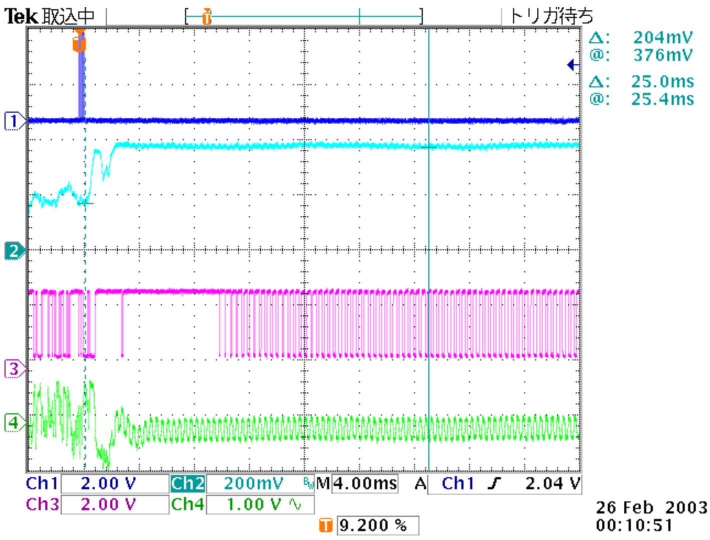
Frequency drift –2.6kHz

RX frequency change:

434.000MHz -> 434.025MHz (+25kHz)

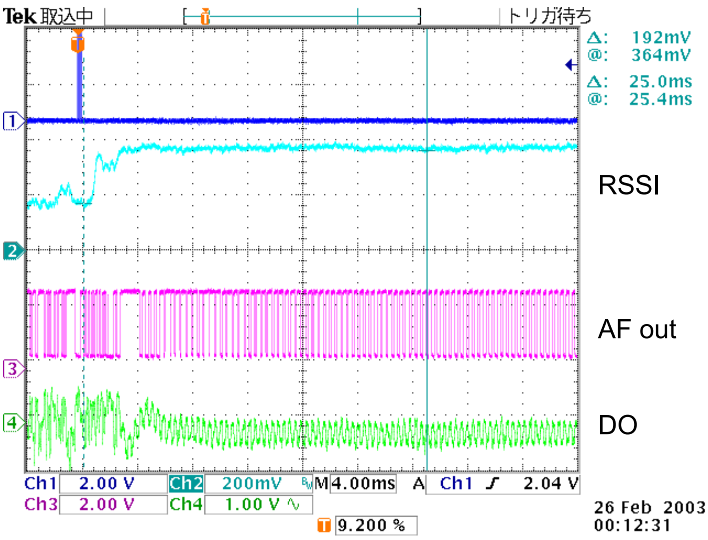


434.025MHz -> 434.000MHz (-25kHz)

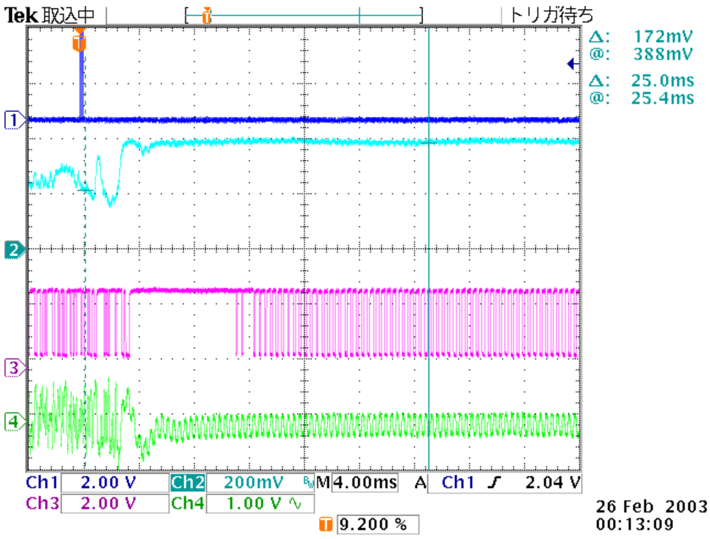


RX frequency change:

434.000MHz -> 434.100MHz (+100kHz)



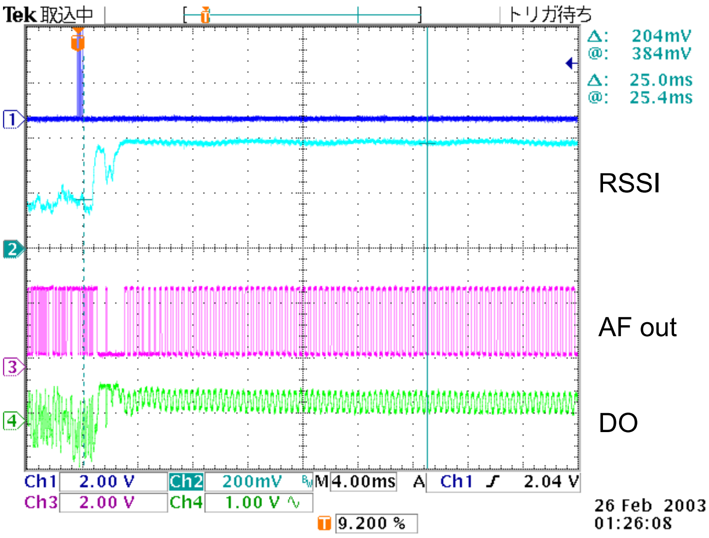
434.100MHz -> 434.000MHz (-100kHz)



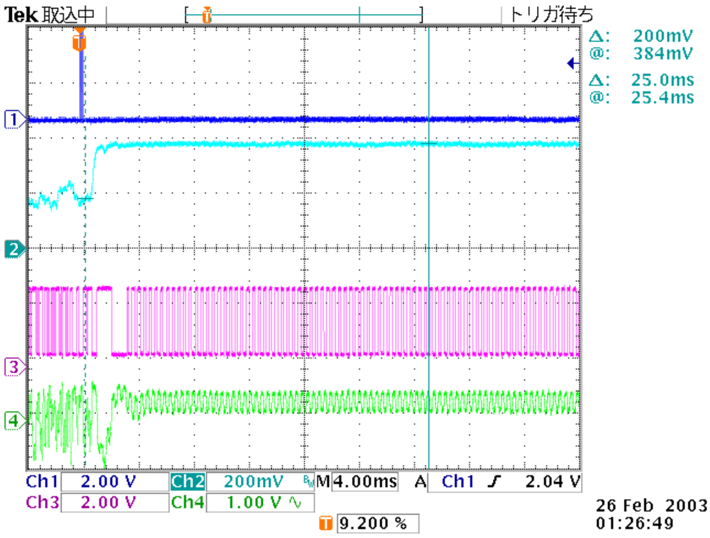
B. Temperature condition: +80°C
Frequency drift +3.0kHz

RX frequency change:

434.000MHz -> 434.025MHz (+25kHz)

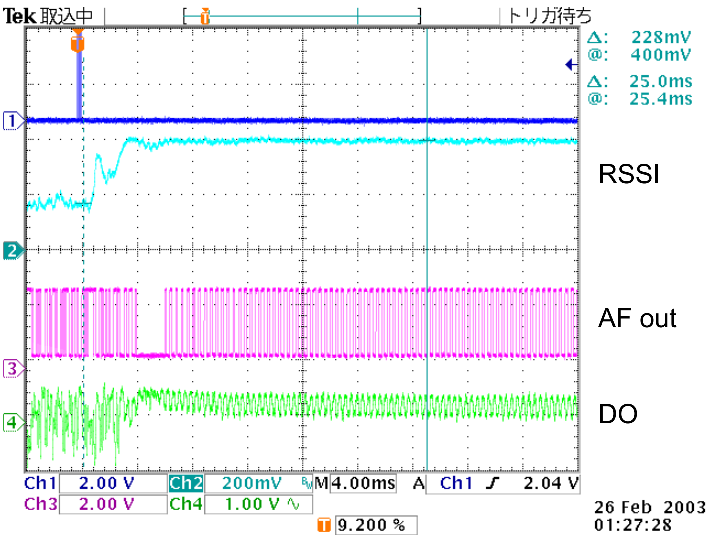


434.025MHz -> 434.000MHz (-25kHz)

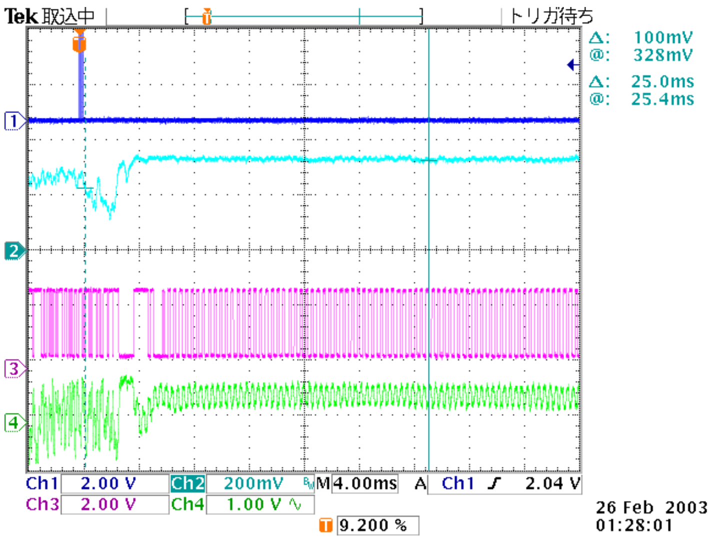


RX frequency change:

434.000MHz -> 434.100MHz (+100kHz)



434.100MHz -> 434.000MHz (-100kHz)



Recommended timing for RX frequency shift

*** RSSI rise (25kHz or 100kHz shift)**

-20°C to +65°C 12ms

*** Valid output data (25kHz shift)**

-10°C to +55°C: 25ms

-20°C to +65°C (excluding the above range): 40ms

Timing may change by setting method of PLL and/or antenna location. User is recommended to check and verify the operation behavior and optimize the timing.

3. Temperature vs Frequency drift

PLL reference X'tal Temperature characteristics

+/- 4ppm -10°C to +55°C

+/- 9ppm -20°C to +65°C (excluding the above range)

Blue line: Temperature characteristics worst case presented by X'tal manufacturer

Red line: Frequency drift temperature characteristics compensated by STD-302 internal circuit.

At -20 degree C, -4.12kHz frequency drift that X'tal itself show is improved to -2.15kHz.

Fig. Crystal frequency drift data