Rayson Technology Co., Ltd.

Radio test and DTM RF Testing Guide

March 2025

Nordic's SDK provides two methods for RF testing :

Radio test

Radio test is more suitable for multi-national certifications, such as FCC, ETSI, and other certification tests, as well as for testing using a spectrum analyzer.

Rayson provides RF test firmware specifically for Radio tests. Through UART commands, users can configure the radio, such as TX Power, Frequency, TX Modulation Carrier, RX Carrier, etc.

Rayson FW Name : RadioTet-NL15X_n290_RC_25030700.hex

DTM (Direct Test Mode)

DTM is RF test firmware based on the Bluetooth SIG-specified data format, as required by Nordic.

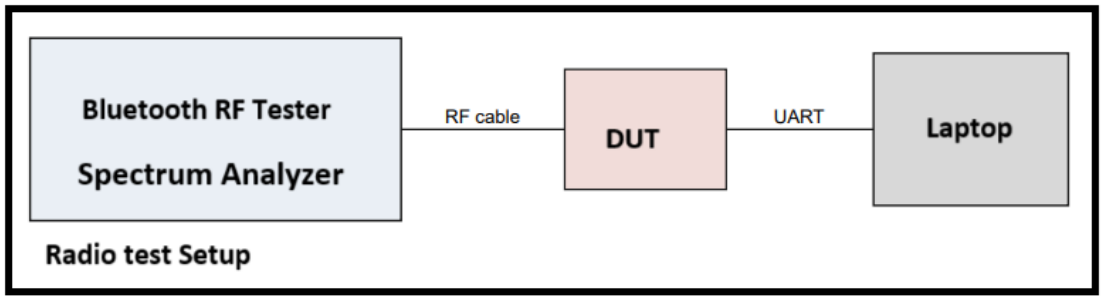
Rayson has already configured the Baud Rate and UART TX/RX pins, so RF testing can be performed directly after firmware programming.

This method is more suitable for Bluetooth BQB certification testing or when using test equipment like the MT8852B or N4010A.

Rayson FW Name : DTM-NL15X_n290_RC_25030500.hex

1. Radio test

Step 1. Test Setup



Radio test Setup

Step 2. Uart setting

P0.00: UART_TX

P0.01: UART_RX

P2.09: LED status

H/W flow ctrl: none

Parity: none

Buadrate: 115,200 bps

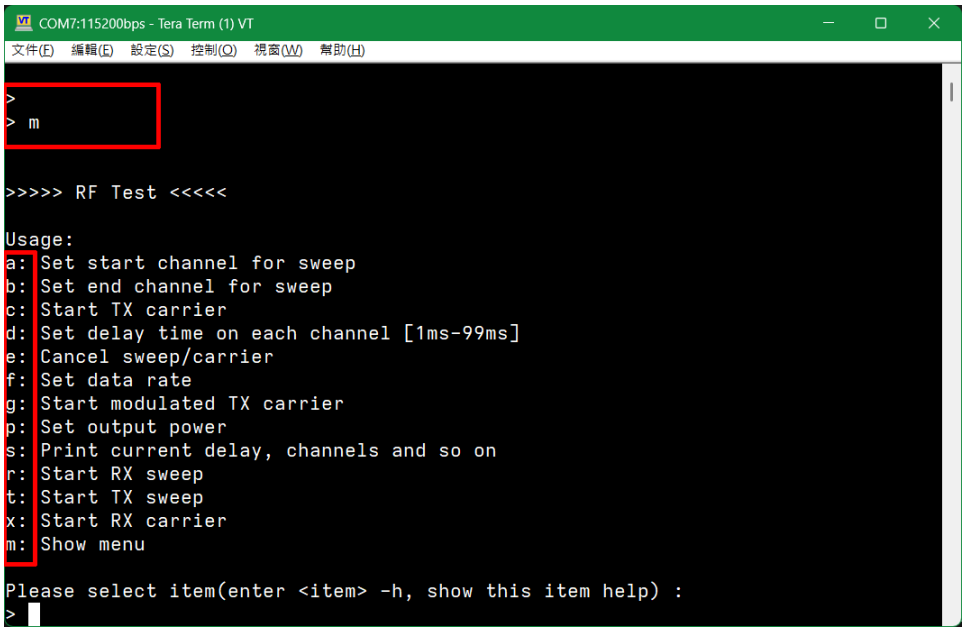
Step 3. Menu item

(a) Sending \r (0x0D) will display the "> " prompt, indicating that the system is ready to receive commands.

(b) Sending m (0x6D 0x0D) will display the menu.

(c) You can input a, b, c, d, e, f, g, p, s, r, t, x to configure or execute commands.

(d) Some configuration commands require additional <sub cmd> parameters to be provided.

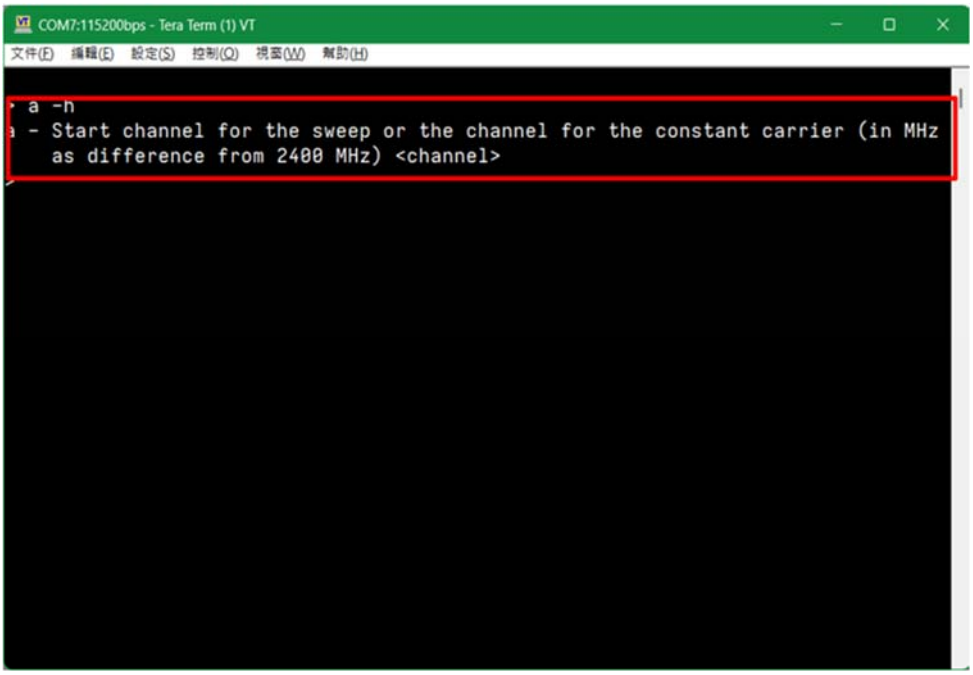


Step 4. Item help

(a) Typing an item followed by -h (separated by a space) will display a description of that command.

Example: a -h (0x61 0x20 0x2D 0x68 0x0D)

This will show the description: "**Set start channel for sweep**"

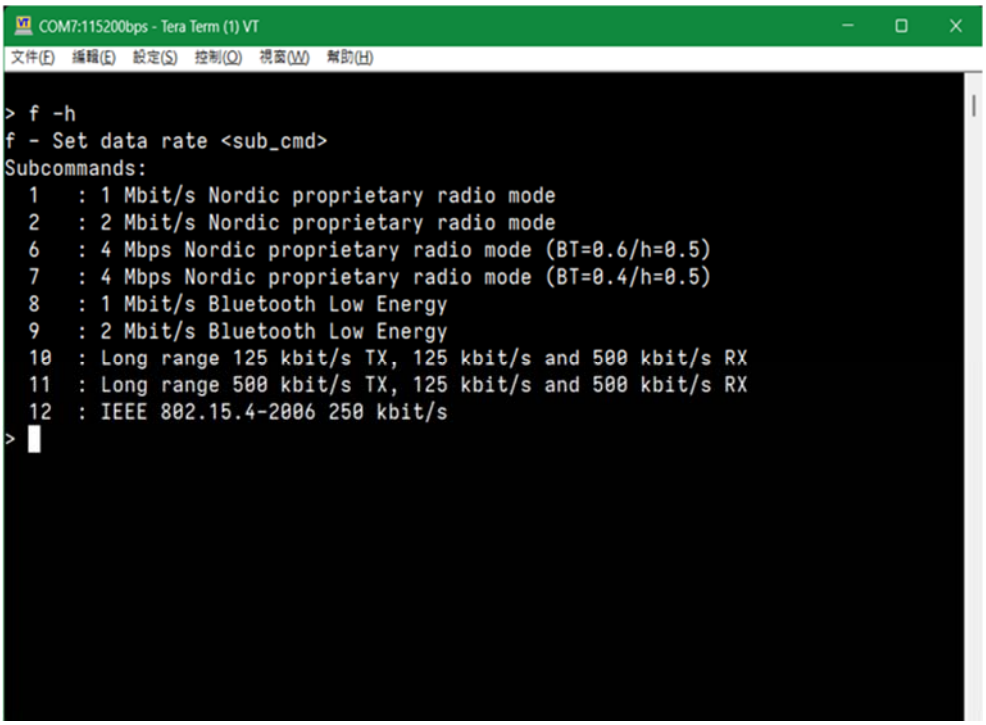


(b) If the help message shows **<sub cmd>**, it indicates that the command requires parameters when executed.

Example: f -h (0x66 0x20 0x2D 0x68 0x0D)

This will display the description: **"Set data rate"**

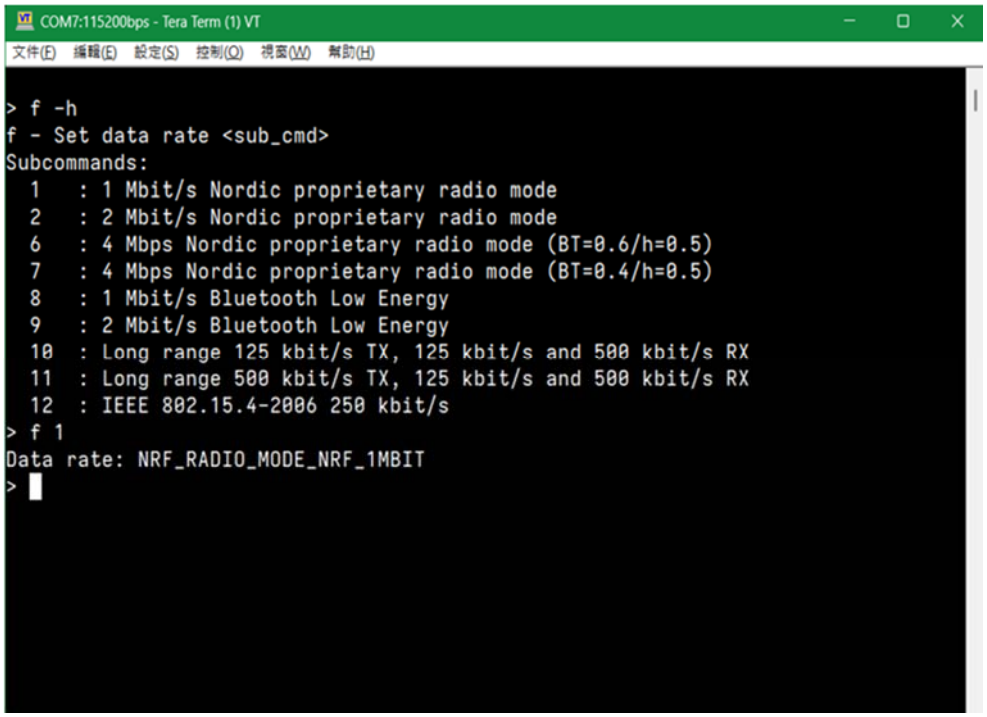
Available parameters: **1, 2, 6, 7, 8, 9, 10, 11, 12**



(c) Example: f 1 (0x66 0x20 0x31 0D)

This sets the **data rate to 1 Mbit/s** using **Nordic proprietary radio mode**.

A confirmation message will be displayed if the setting is successful.

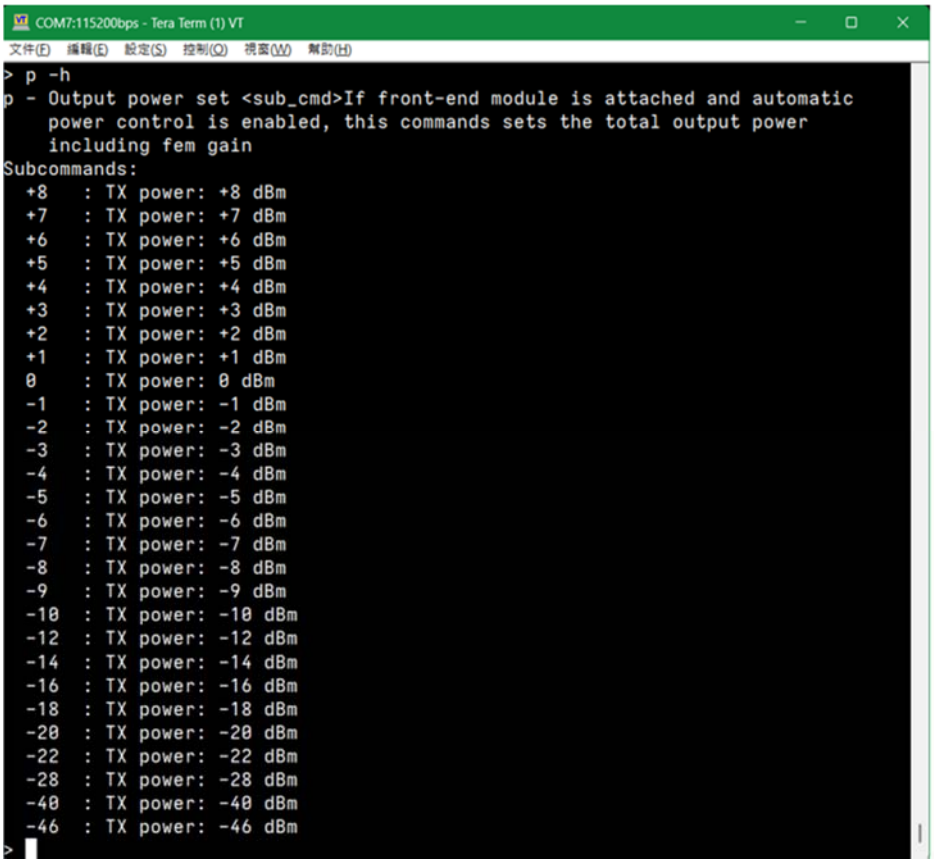


(d) Example: P - h

This displays the **output power** command description.

Available parameters:

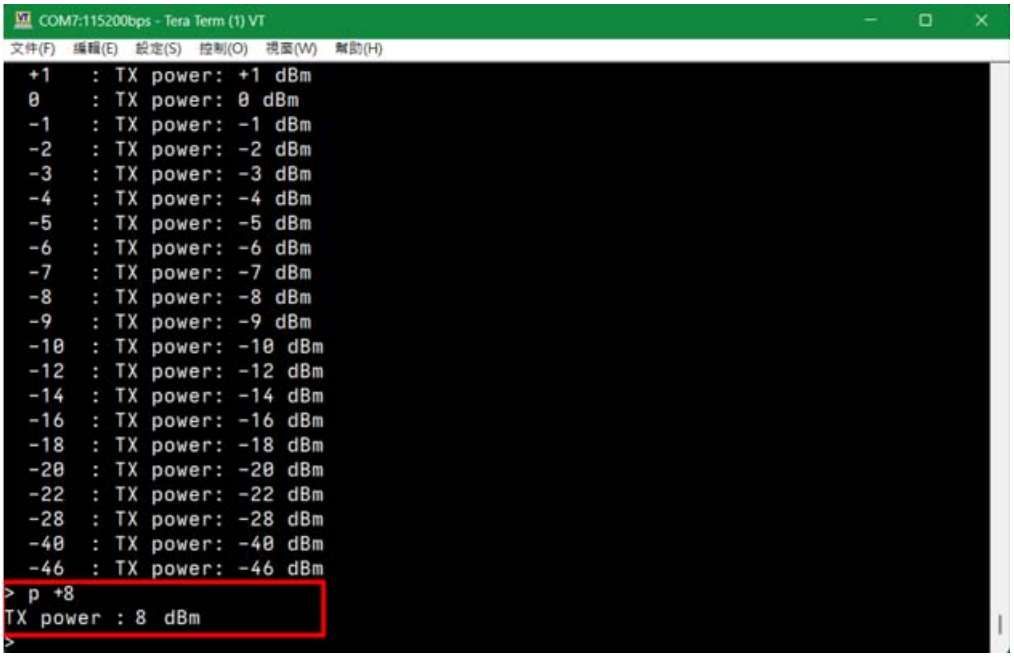
+8, +7, +6, +5, +4, +3, +2, +1, 0, -1, -2, -3, -4, -5, -6, -7, -8, -9, -10, -12, -14, -16, -18, -20, -22, -28, -40, -46



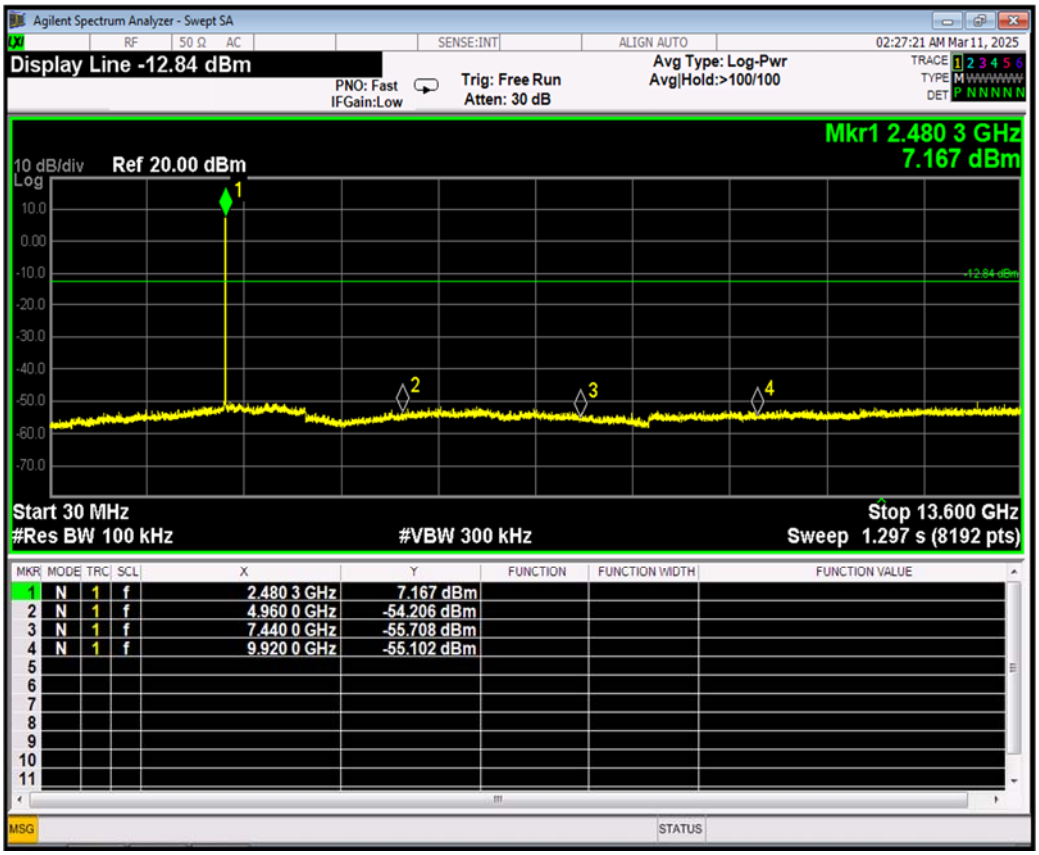
(e) Example: p +8 (0x70 0x20 0x2B 0x34 0x0D)

This sets the **output power to +8 dBm**.

A confirmation message will be displayed if the setting is successful.

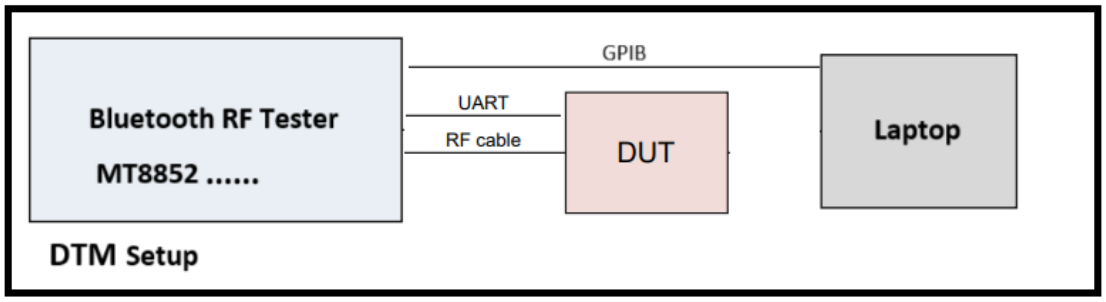


Step 5 : Use a Spectrum Analyzer to Test the RF Characteristics of the PCBA.



DTM (Direct Test Mode)

Step 1. Test Setup



Step 2. Uart setting

P0.00: UART_TX

P0.01: UART_RX

P2.09: LED status

H/W flow ctrl: none

Parity: none

Buadrate: 19,200 bps

Step 3. Run the MT8852 PC tool to enter Direct Test Mode and begin testing.