

# N10/N20\_EVB User Manual

**GPS Module Series**

**Version:** V1.1

**Date:** 2017-10-16



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# Version History

Date	Version	Modify records	Author
2016-09-11	V1.0	First release	Jason.liao
2017-10-16	V1.1	Optimized layout format Change company logo	Jason Liao

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# 1. Overview

This document defines and specifies the usage of N10/N20 EVB. You can know how to use N10/N20 EVB and GPS demo tool from this document.

## 1.1 EVB Top View

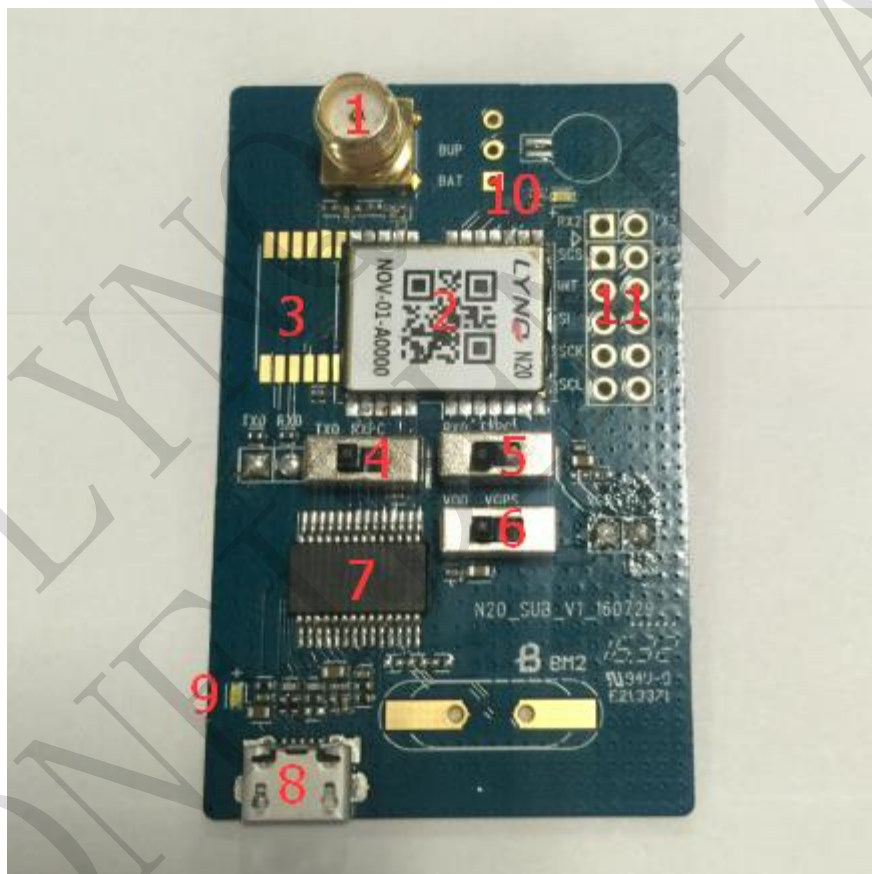


Figure 1-1 N10/N20 EVB Top View

- 1: Antenna Interface
- 2: N20 Module
- 3: N10 Module
- 4: TX Switch
- 5: RX Switch
- 6: Power Switch

- 7: USB to UART IC
- 8: 5pin Micro USB
- 9: USB Power Indication LED
- 10: PPS Indication LED
- 11: Test Points

## 1.2 EVB Accessories



Figure 1-2 EVB Accessories

- 1: USB Cable
- 2: GPS active antenna (3.3V)

## 2. Application

### 2.1 GPS Module



Figure 2-1 GPS Module

The EVB board can support two kinds of GPS Modules (N10 and N20) to test. Each GPS module has different match circuit position seen as the arrows.

## 2.2 Switch

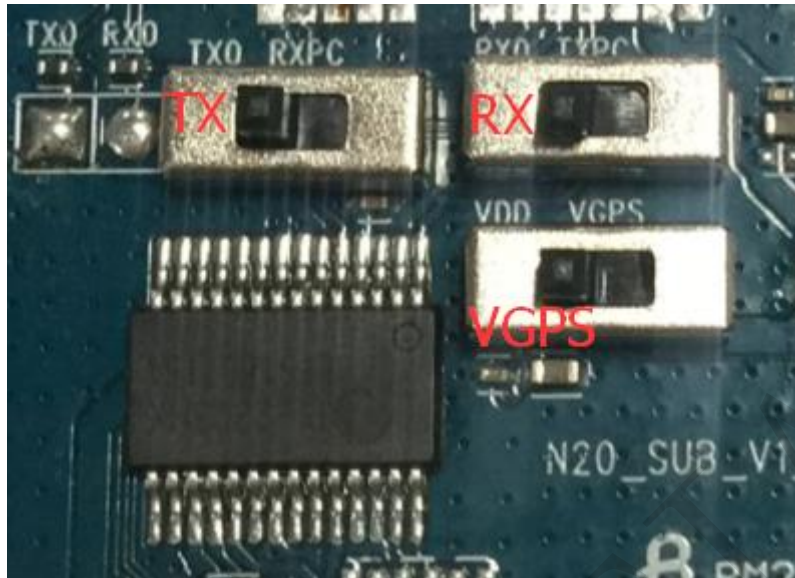


Figure 2-2 Switch

The EVB board has three switches for the UART and Power of GPS module. All these three switches should turn left when connect the module to the computer through the Micro-USB, like getting the NEMA data or downloading the software.

## 2.3 USB Interface

The EVB board only provides one way for data communication. Micro-USB interface can also supply the main power for the EVB, not need another power. You can cut the UART communication via the switch (4, 5) and the power supply of GPS module via the switch (6).

## 2.4 Antenna Interface

Both the active antenna and passive antenna can be selected for the external antenna. Please note the N10 and N20 have the different match circuits.



## 2.5 Status LEDs

The EVK board has two indication LEDs. One is USB power indication (9) and another is PPS indication (10). USB power indication led will light on when USB cable plugging. PPS indication led will on when the GPS module outputs the PPS signal.

## 2.6 Test Points

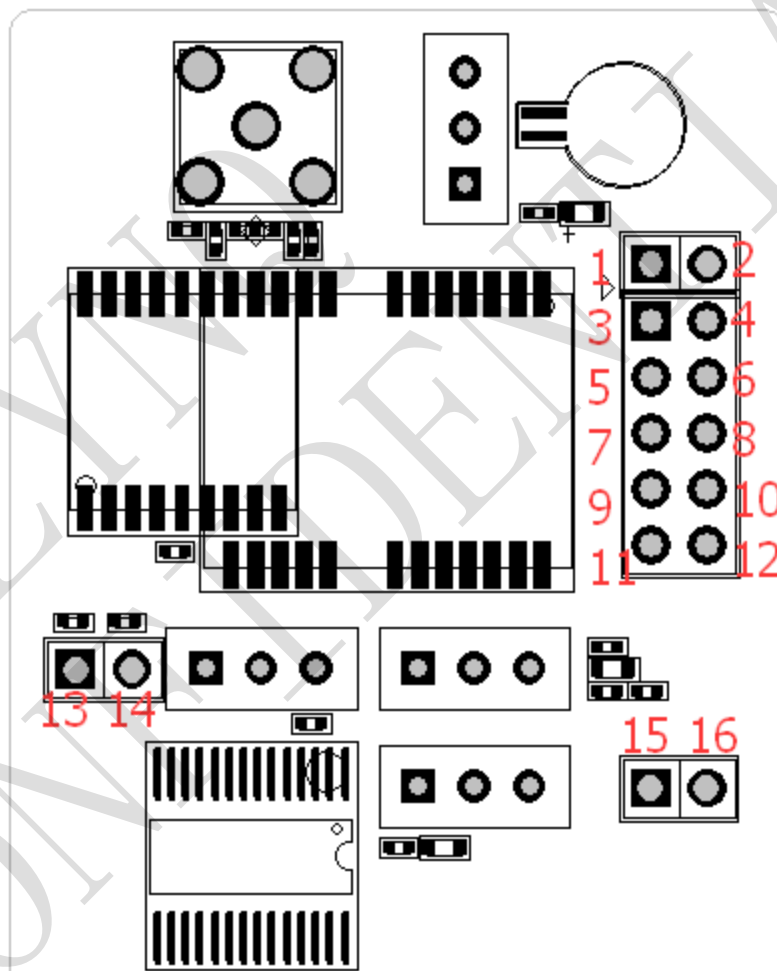


Figure 2-3 Test Point

Table 2-1: Pins of Test Point

Pin	Pin Name	I/O	Description
1	RX2	I	Receive data2
2	TX2	O	Transmit data2
3	SCS	O	Select signal of SPI
4	PPS	O	1 pulse per second
5	INT	I	Interrupt signal
6	RST	I	System reset
7	MOSI	I	Master output slave input of SPI
8	ANT_ON	O	External LNA control pin
9	SCK	O	Clock of SPI
10	MISO	O	Maser input slave output of SPI
11	SCL	O	Clock of IIC
12	SDA	O	Data of IIC
13	TX0	I	Transmit data2
14	RX0	O	Receive data2
15	VGPS	I	GPS Module Power Supply
16	GND	I	GND

### 3. EVB and Accessories

The EVB and its accessories are showed as follow figure which tell user how to connect them.



Figure 3-1 EVB and Accessory Equipments

## 4. USB Driver

You need to install the driver of Micro-USB, when use Micro-USB for data communication. Please get the driver from our FAE of Mediatek Company or download them from internet.

We have two different driver ICs for the Micro-USB. These download paths are as below:

[http://www.ftdichip.com/Drivers/CDM/CDM21218\\_Setup.zip](http://www.ftdichip.com/Drivers/CDM/CDM21218_Setup.zip)

[http://www.prolific.com.tw/US/ShowProduct.aspx?p\\_id=225&pcid=41](http://www.prolific.com.tw/US/ShowProduct.aspx?p_id=225&pcid=41)

## 5. PowerGPS

### 5.1 PowerGPS panel

The PowerGPS version is V2.3.3. The PowerGPS tool can help customer to view the status of GPS&GLONASS&BDS receiver. When the tool is opened, the following window will be displayed:

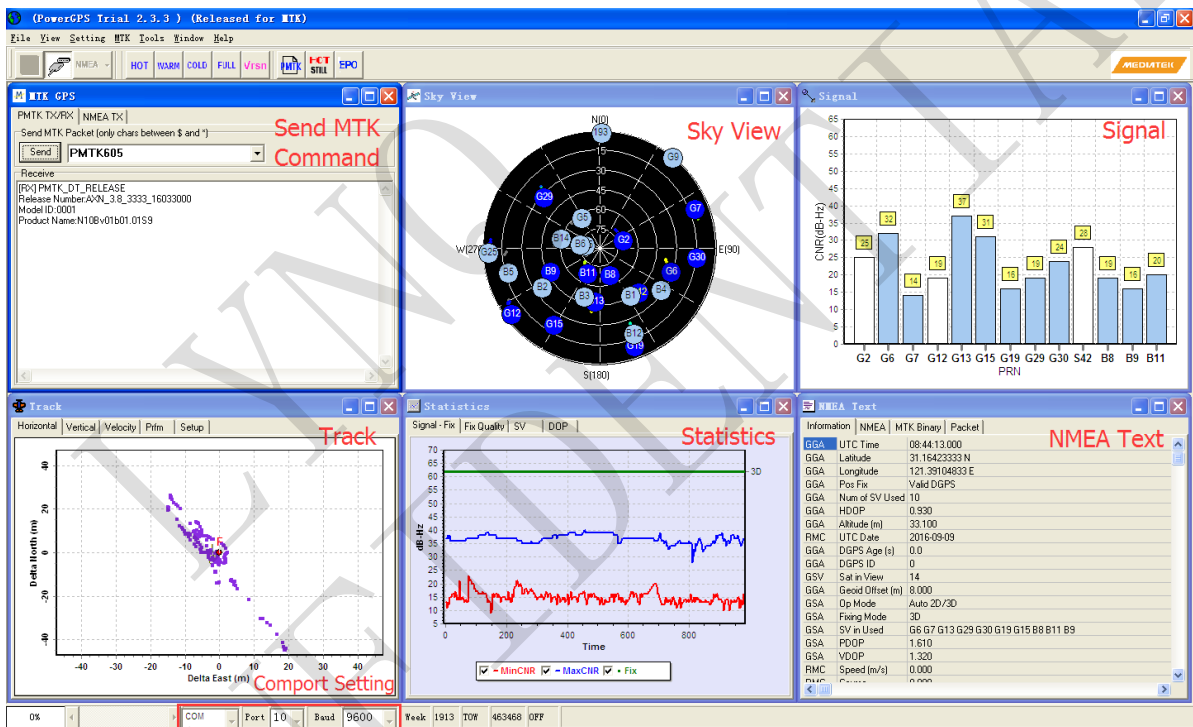
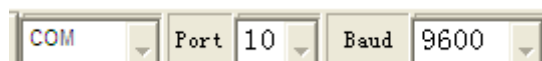




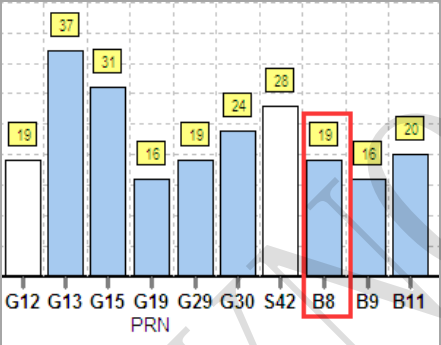
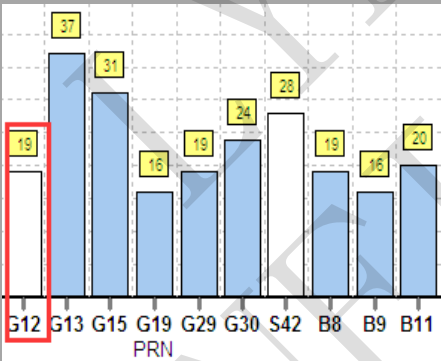
Figure 5-1 PowerGPS

Assemble the EVB accessories, supply power to the module, start up the PowerGPS, select a correct COM port and baud rate (N10 module supports 9600bps by default), then click the button “Create Connection”



From the window, customer can find CNR message, time, position, speed, precision and so on. More detail information are listed in Table 5.

Table 5 Explanations of PowerGPS Window

Icon	Explanation																
	SV with PRN G19. If the position of SV is near to the centre of the Sky View, the elevation angle of SV is close to 90°. Dark blue means this satellite is in tracking.																
	Light blue means this satellite is not in tracking.																
	The CNR of PRN B8 is 41dB/Hz. Light blue column means the navigation data of this satellite is in use.																
	The CNR of PRN G12 is 27dB/Hz. White column means the navigation data of this satellite is not in use.																
<table border="1"> <tr><td>UTC Time</td><td>08:44:13.000</td></tr> <tr><td>Latitude</td><td>31.16423333 N</td></tr> <tr><td>Longitude</td><td>121.39104833 E</td></tr> <tr><td>Pos Fix</td><td>Valid DGPS</td></tr> <tr><td>Num of SV Used</td><td>10</td></tr> <tr><td>HDOP</td><td>0.930</td></tr> <tr><td>Altitude (m)</td><td>33.100</td></tr> <tr><td>UTC Date</td><td>2016-09-09</td></tr> </table>	UTC Time	08:44:13.000	Latitude	31.16423333 N	Longitude	121.39104833 E	Pos Fix	Valid DGPS	Num of SV Used	10	HDOP	0.930	Altitude (m)	33.100	UTC Date	2016-09-09	UTC time Latitude degree longitude degree Positing fix Using the number of satellites Horizontal Dilution of Precision Altitude based on WGS84 Datum UTC date
UTC Time	08:44:13.000																
Latitude	31.16423333 N																
Longitude	121.39104833 E																
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Num of SV Used	10																
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Altitude (m)	33.100																
UTC Date	2016-09-09																
<table border="1"> <tr><td>Fixing Mode</td><td>3D</td></tr> <tr><td>SV in Used</td><td>G6 G7 G13 G29 G30 G19 G15 B8 B11 B9</td></tr> <tr><td>PDOP</td><td>1.610</td></tr> <tr><td>VDOP</td><td>1.320</td></tr> <tr><td>Speed (m/s)</td><td>0.000</td></tr> </table>	Fixing Mode	3D	SV in Used	G6 G7 G13 G29 G30 G19 G15 B8 B11 B9	PDOP	1.610	VDOP	1.320	Speed (m/s)	0.000	Fix type: No-Fix, 3D or 2D SPS Using satellite Position Dilution of Precision Vertical Dilution of Precision Speed of receiver						
Fixing Mode	3D																
SV in Used	G6 G7 G13 G29 G30 G19 G15 B8 B11 B9																
PDOP	1.610																
VDOP	1.320																
Speed (m/s)	0.000																

## 5.2 PMTK Command

You can send PMTK command by PowerGPS, for example PMTK605. For more PMTK command, Please refer to the related documents.

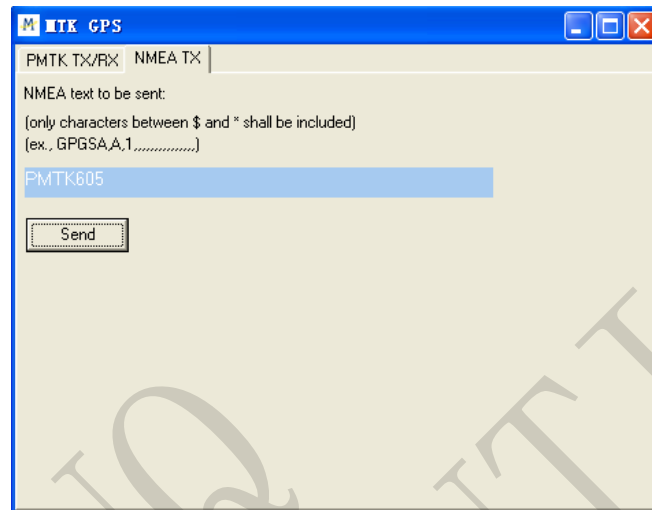
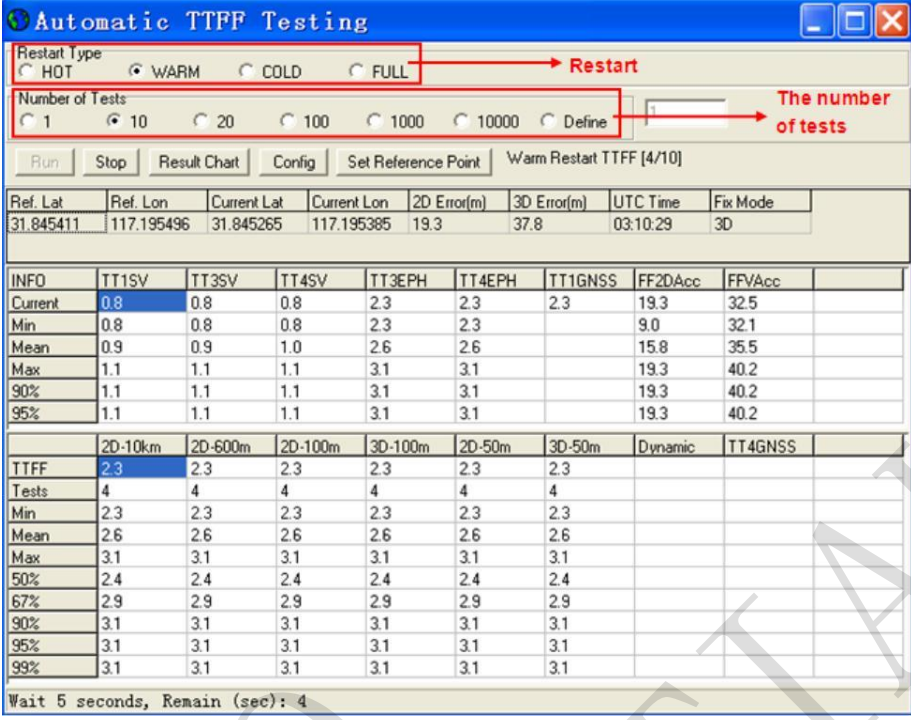


Figure 5-2 PMTK Command

## 5.3 Automatic TTFF Testing

This tool can measure the TTFF (Time to First Fix) under different testing conditions, like full start, cold start, warm start and hot start. And the number of tests can be chosen from 1, 10, 20, 100, 1000 and 10000. Click the Run button to start the test and click the Stop button to stop. The configuration is as below. Start “MTK” menu, and click “Static TTFF Testing”, then “Static TTFF Testing”.



**Automatic TTPF Testing**

Restart Type: ☐ HOT ☒ WARM ☐ COLD ☐ FULL → Restart

Number of Tests: ☐ 1 ☒ 10 ☐ 20 ☐ 100 ☐ 1000 ☐ 10000 ☐ Define → The number of tests

Run Stop Result Chart Config Set Reference Point Warm Restart TTPF [4/10]

Ref. Lat	Ref. Lon	Current Lat	Current Lon	2D Error(m)	3D Error(m)	UTC Time	Fix Mode
31.845411	117.195496	31.845265	117.195385	19.3	37.8	03:10:29	3D

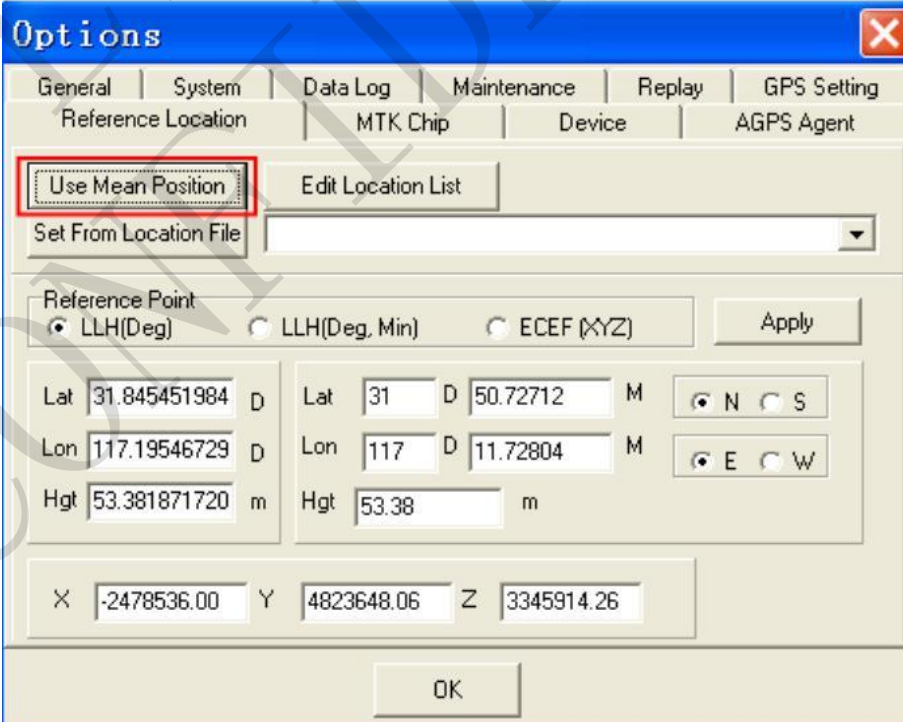
INFO	TT1SV	TT3SV	TT4SV	TT3EPH	TT4EPH	TT1GNSS	FF2DAcc	FFVAcc
Current	0.8	0.8	0.8	2.3	2.3	2.3	19.3	32.5
Min	0.8	0.8	0.8	2.3	2.3		9.0	32.1
Mean	0.9	0.9	1.0	2.6	2.6		15.8	35.5
Max	1.1	1.1	1.1	3.1	3.1		19.3	40.2
90%	1.1	1.1	1.1	3.1	3.1		19.3	40.2
95%	1.1	1.1	1.1	3.1	3.1		19.3	40.2

	2D-10km	2D-600m	2D-100m	3D-100m	2D-50m	3D-50m	Dynamic	TT4GNSS
TTPF	2.3	2.3	2.3	2.3	2.3	2.3		
Tests	4	4	4	4	4	4		
Min	2.3	2.3	2.3	2.3	2.3	2.3		
Mean	2.6	2.6	2.6	2.6	2.6	2.6		
Max	3.1	3.1	3.1	3.1	3.1	3.1		
50%	2.4	2.4	2.4	2.4	2.4	2.4		
67%	2.9	2.9	2.9	2.9	2.9	2.9		
90%	3.1	3.1	3.1	3.1	3.1	3.1		
95%	3.1	3.1	3.1	3.1	3.1	3.1		
99%	3.1	3.1	3.1	3.1	3.1	3.1		

Wait 5 seconds, Remain (sec): 4

Figure 5-3 TTPF Test

Click “Set reference point”, and “Reference location”. After start positioning, click “Use Mean Position” and “OK”.



**Options**

General System Data Log Maintenance Replay GPS Setting

Reference Location MTK Chip Device AGPS Agent

Use Mean Position Edit Location List

Set From Location File  

Reference Point  
☒ LLH(Deg) ☐ LLH(Deg. Min) ☐ ECEF (XYZ) Apply

Lat <span style="border: 1px solid gray; padding: 2px;">31.845451984</span> D	Lat <span style="border: 1px solid gray; padding: 2px;">31</span> D <span style="border: 1px solid gray; padding: 2px;">50.72712</span> M	<input checked="" type="radio"/> N <input type="radio"/> S
Lon <span style="border: 1px solid gray; padding: 2px;">117.19546729</span> D	Lon <span style="border: 1px solid gray; padding: 2px;">117</span> D <span style="border: 1px solid gray; padding: 2px;">11.72804</span> M	<input checked="" type="radio"/> E <input type="radio"/> W
Hgt <span style="border: 1px solid gray; padding: 2px;">53.381871720</span> m	Hgt <span style="border: 1px solid gray; padding: 2px;">53.38</span> m	

X -2478536.00 Y 4823648.06 Z 3345914.26

OK



Figure 5-4 Static TTFF Testing Configuration Options

Click “Config”, set “TTFF Time-out (sec)”, then click “OK”:

Generally, if you want to choose hot start, warm start or cold start, “TTFF Time-out (sec)” sets 10s, 50s or 100s. “TTFF Time-out (sec)” can help you judge TTFF and save time.

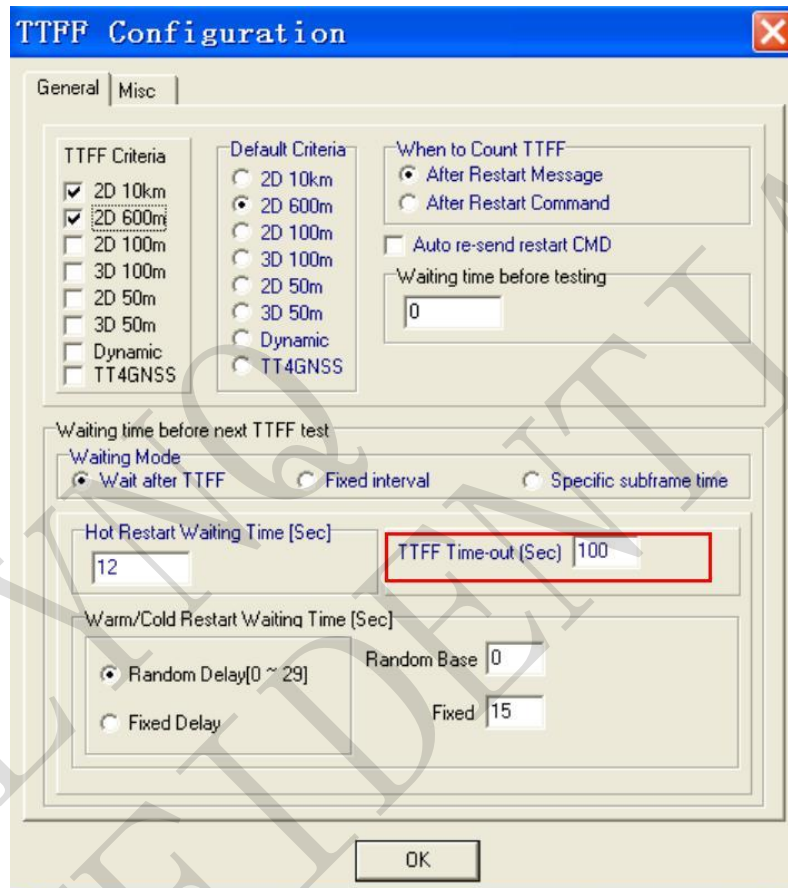


Figure 5-5 Static TTFF Testing Configuration

After completed, click on the Run button to start the test and click on the Stop button to stop. After finishing the testing, you can see the testing result charts. The result will be stored in the tool installation path, and you can view the corresponding log.