CHC FAQ Series

Filename:FAQ_iBaseRadioRange_001.docx

Copyright © 2025, iGage Mapping Corporation

DESCRIPTION

How far can you expect to get with an iBASE 5-watt radio?

An iBase will transmit a usable signal further than the signal is useful. However, you need to first make sure there is no one else on the same frequency. You can use a handheld radio tuned to the frequency you plan to use to check:

Press and hold the MONI button on the side of the radio to listen for interference on the frequency with the squelch held open.

You can check the output power of an iBase with an inexpensive RF SWR / Power Meter. In this test configuration:

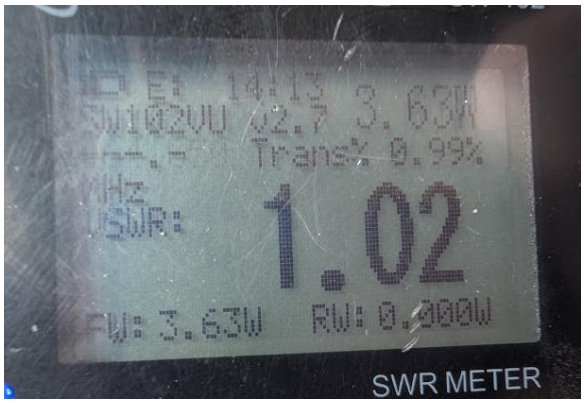
The iBase output is run into a Surecom SW-102 (Amazon: https://a.co/d/0dJueS7) then into a 50 watt dummy load with N-Type Male connector (Amazon: https://a.co/d/49F9ZpF). A TNC to N-TYPE Male adapter (Amazon: https://a.co/d/41B8kqg) or cable (shown above) will be needed to connect the receiver to the SW-102.

The meter reading shows SWR: 1.00 (this means that all the output power FW=4.04 watts, reaches the 50 ohm load with none reflected RW=0.00 watts); with a measured power of 4.04 watts. Because

each connector introduces a ½ dB of loss and even the short cable length shown has significant loss, the stated power of 5-watts won't be measured.

Note: to make this measurement, you need to have the highest duty cycle possible. RTCM3.2 at 9600 baud, Satel 9600, FEC=OFF is reasonable.

You can test the antenna by removing the dummy load and attaching the UHF antenna to the output of the SW-102. A cable is shown; however, a NTYPE Male to TNC male adapter (Amazon: https://a.co/d/jaVMNNd) could also be used:



With the antenna connected the output power is slightly less and the SWR is not exactly 1.00. This is fine.

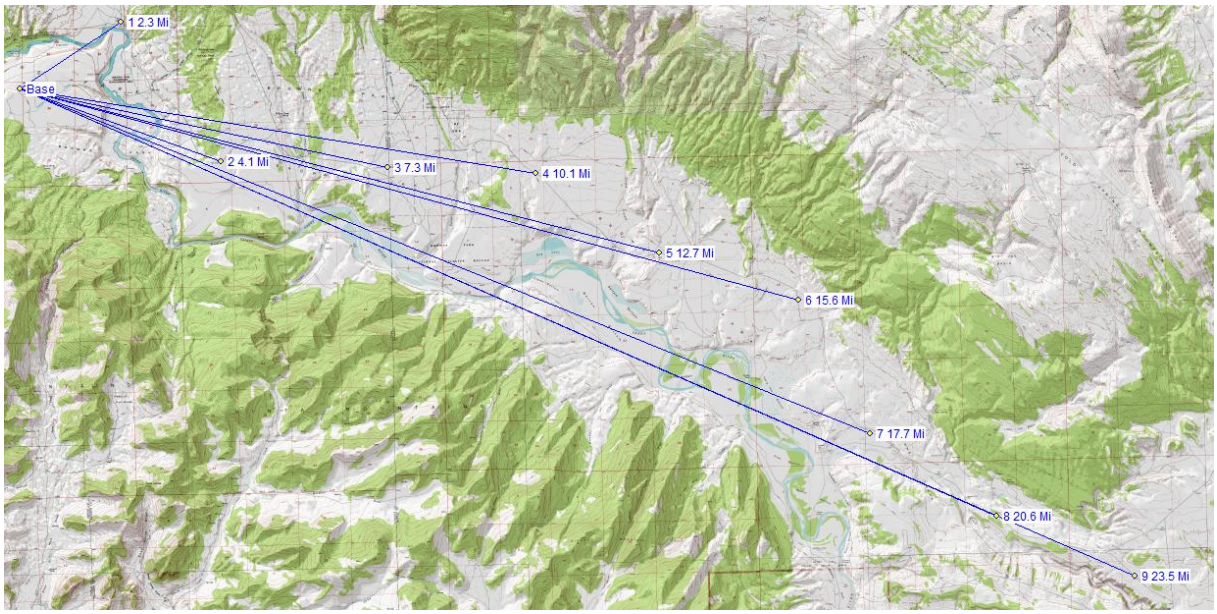
Actual range testing

Set up the base at a standard height, with a network derived position using these radio parameters:

Satel 9600 baud, FEC OFF, 464.7250, 12.5 KHz

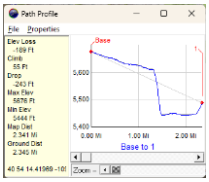
The plan was to stop every 3 miles (determined by highway mile markers) and see if the rover will FIX on a 1.8 meter high rover rod. The end point is 'somewhere over the horizon' at the red arrow tip above. The path was along UT 1364 and CO 318:

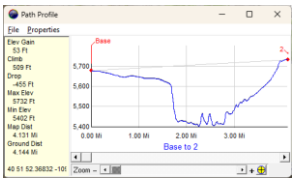
 · Copyright © 2025, iGage Mapping Corporation

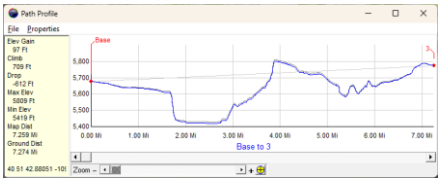


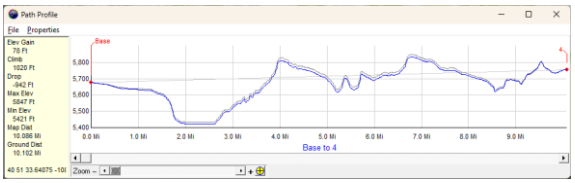
The i83 initialized instantly at each test point and the radio signal latency (age) was 1 or 2 seconds.

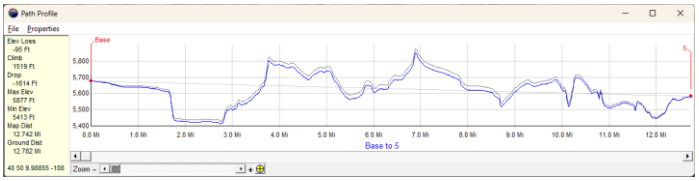
Each of the 9 paths are shown below. The gray topo surface line is adjusted for earth curvature:

1 

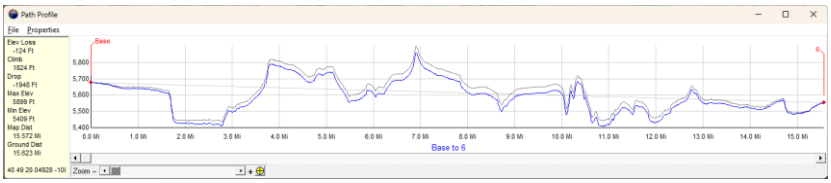
2 

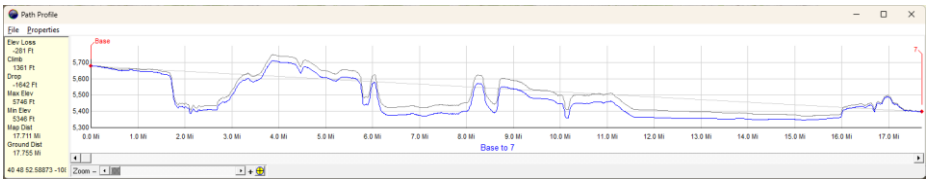
3 

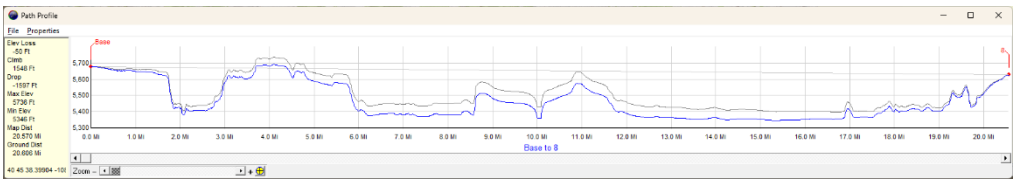
4 

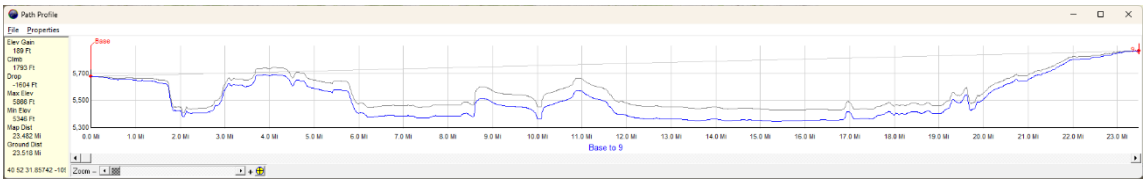
5 

 · Copyright © 2025, iGage Mapping Corporation

6 

7 

8 

9 

Conclusion

At every stop, the rover fixed immediately when removed from the vehicle after the pole extended to 1.8 meters. The radio signal was solid with the LED flashing once per second and the age toggling between 1 and 2 seconds.

There was no other users on this frequency at anytime during the test.

At 23.5 miles, the reported Hrms was 0.09 feet which is 0.7 PPM.

Equipment used for test

i83 Rover:

```
TYPE:I83
SN:4021230
PN:A19318980901070002
Date:2024-05-09
RADIO(0):hx2005d+4.04
RadioVersion: 04.04.06

GNSSBOARD type: UM980
GNSSBOARD hw ver:  ff3bc796681e6c5e
GNSSBOARD sw ver:  14259
GNSSBOARD SN:   MD22A4224717020
BT(0):BROADCOM
WIFI(0):BROADCOM
BtVersion: GOCBA2021:06:3:17:41:13
GPRS(0):EG25
IMU: CHCNAV
MainbordVersion:1.1.0
ImuType:ICM42688
CoreVersion:1.1.0
```

 · Copyright © 2025, iGage Mapping Corporation

```
ReceiverVer:1.3.8.1DEMOchenjunT
LibTiltMeasureVer:Tilt_I90DERIVATIVE_3.2.0
```

iBASE Base:

```
TYPE:IBASE
SN:3738992
PN:A10510980903070005
Date:2023-10-08
RADIO(0):hx_5w_oversea
RadioVersion: 04.04.06

GNSSBOARD type: UM980
GNSSBOARD hw ver:  ff27929cf6378f1e
GNSSBOARD sw ver:  14259
GNSSBOARD SN:   MD22A0224010227
BT(0):BROADCOM
BTVersion:GOCBA2021:06:3:17:41:13
WIFI(0):BROADCOM
GPRS(0):EG25
IMU: CHCNAV
hc_imu_install:0.219684,0.125809
fss_imu_install:0.000000,0.000000
ImuType: ICM42688
ImuSupportSecondCalibration: NO
ImuSecondCalibrationSucceed: NO
MainbordVersion:1.2.0
CoreVersion:1.2.0
ReceiverVer:2.3.7.4DLchenjunT
LibTiltMeasureVer:Tilt_I90DERIVATIVE_3.2.0
ForsenseVersion:ForsenseLib:220919
RegDate:2099/12/31
Com1BaudRate:9600
mfg_version:2.0.3
SIM ICCID:89103000000031644616
```


 · Copyright © 2025, iGage Mapping Corporation