

M12M (STM) GPS WEEK ROLLOVER TEST**M12M (STM) GPS WEEK ROLLOVER TEST****02 Aug 2013****Revision A****CONFIDENTIAL MATERIAL**

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Prepared By	Approved By	
Date: 02-Aug-13	Date: 02-Aug-13	Date: 02-Aug-13
Joseph Pradeeban	Henry Chong	Daniel Lim
Engineer	Engineering Manager	Sales Director



M12M (STM) GPS WEEK ROLLOVER TEST

REVISION HISTORY

Revision	Date	Revision Description	Originator
A	02-Aug-13	Initial Release	Joseph Pradeeban

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M12M (STM) GPS WEEK ROLLOVER TEST**1 Purpose**

The purpose of this report is to show that the M12M (STM) Timing/Navigation oncore receivers are capable of, functioning and adhering to the specifications before, during and after the GPS week roll over events.

2 Scope

The GPS week rollover test covers following M12M (STM), modules.

IL-GPS-010-B	Timing oncore module without battery
IL-GPS-020-B	Navigation oncore module without battery
IL-GPS-030-B	Timing Oncore module with battery

M12M (STM) GPS WEEK ROLLOVER TEST**3 GPS rollover Test Procedure****3.1 Description**

The main goal of the Test is to show that the above mentioned GPS modules' ability to rollover to the corresponding GPS window during GPS week rollover events. The Test is done in three basic conditions.

1. Before GPS week rollover
2. During GPS week rollover
3. After GPS week rollover

The M12M (STM) fresh units starts from the default date 01/01/2005 during the first power up. Three fresh M12M (STM) modules of each kind are received from the store, and subjected to the below mentioned test procedure. A GPS signal simulator Spirent STR4500 in this case, is loaded with GPS week rollover scenario recorded as of 07-Apr-2019, used as a RF signal source for the module. The test setup is shown in Figure 3.1.

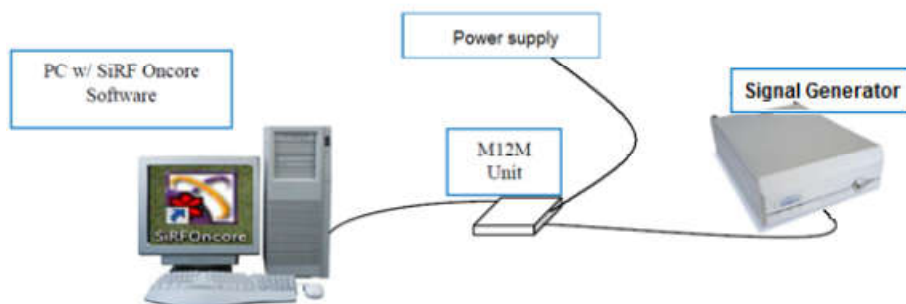


Figure 3.1 GPS Rollover Test setup

Procedure

1. Power up the module
2. Send @@Ha01 command and observe the date output by the module.
3. Connect the RF signal.
4. Observe the date updated from the RF signal.
5. Continue the test until the GPS week rollover occurs.
6. Record the date output by the module before and after the rollover.
7. Power off the module
8. Remove battery and Replace. (IL-GPS-030-B model only)
9. Power up the module
10. Wait until the module receive satellite and update the date and time.
11. Record the date and time output by the module.

M12M (STM) GPS WEEK ROLLOVER TEST**3.2 Sample Size: 3 Units**

IL Model Number	Serial Number
IL-GPS-010-B	CA0007
IL-GPS-020-B	CA0008
IL-GPS-030-B	RA3257

3.3 Electrical Requirement

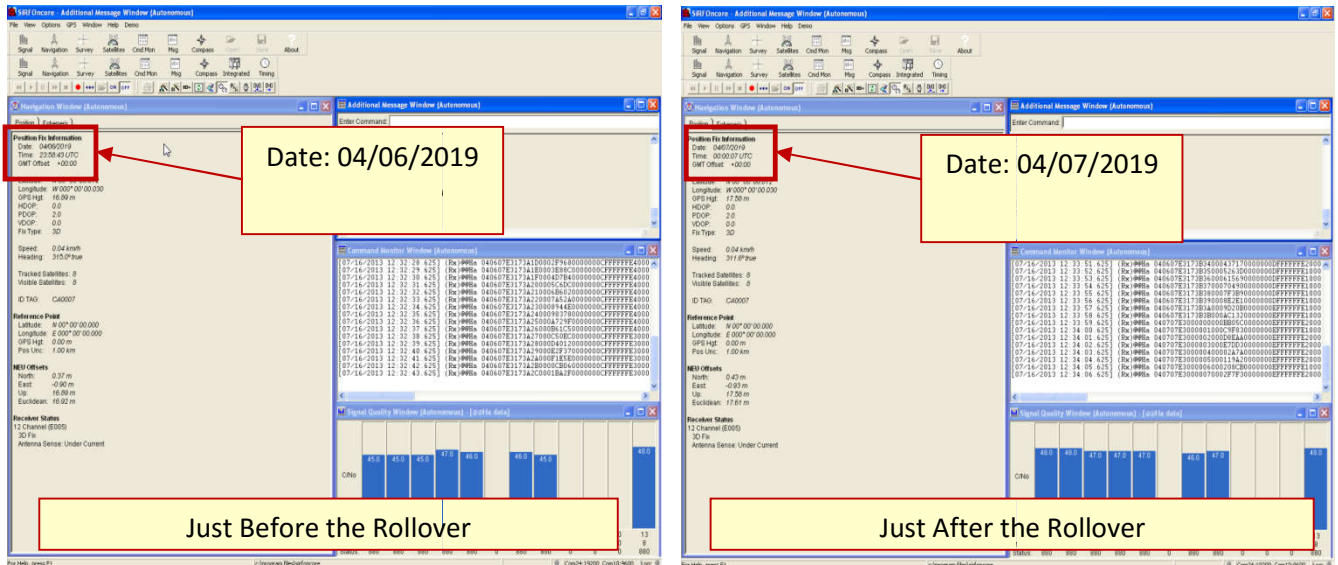
Units under test is powered "ON" with 3V VCC and 5V VAnt, during the entire Test

3.4 GPS Performance Test Requirement.

The Device should react normally during the rollover events without any anomalies.

M12M (STM) GPS WEEK ROLLOVER TEST

4.1.3 Modules Behavior during GPS week Rollover



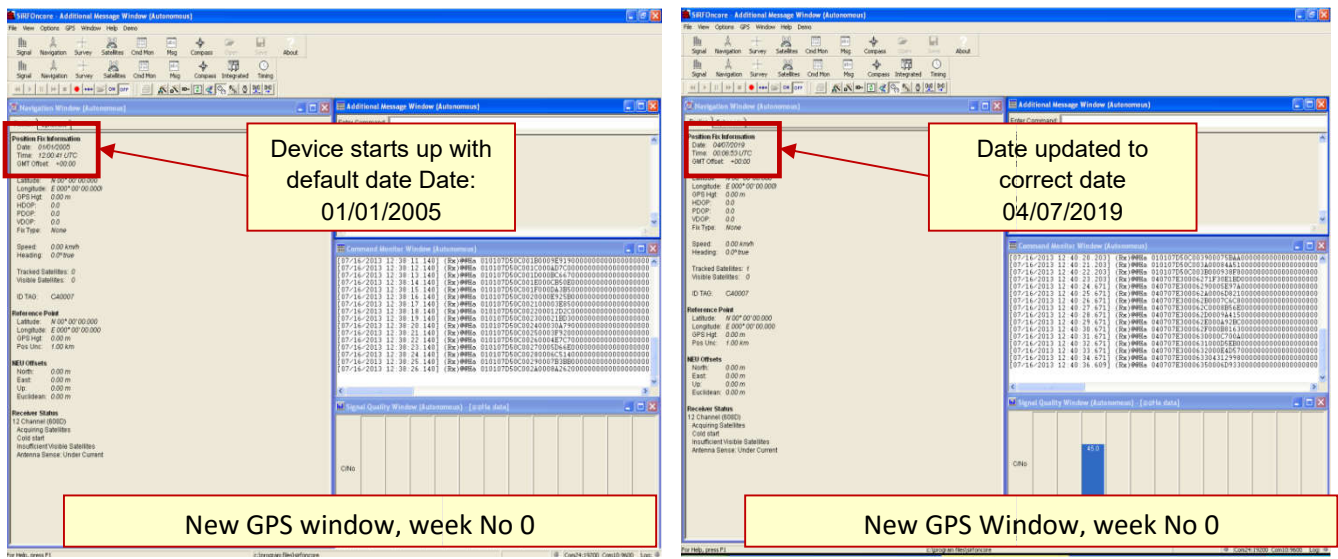
Left Screenshot (Just Before the Rollover):

- Position File Information: Date: 04/06/2019, Time: 23:58:43 UTC, GMT Offset: +05:00
- Position: Longitude: 81°00'00.0000, GPS Hgt: 16.89 m, HDOP: 0.0, PDOP: 2.0, VDOP: 0.0, Fix Type: 3D
- Reference Point: Latitude: 8°00'00.0000, Longitude: 82°00'00.0000, GPS Hgt: 0.00 m, Pos Unc: 1.00 km
- Receiver Status: 12 Channel (8002), Cold start, Acquiring Satellite, Antenna Sense: Under Current
- Signal Quality Window: Shows a bar chart for C/N0 with values ranging from 45.0 to 48.0.

Right Screenshot (Just After the Rollover):

- Position File Information: Date: 04/07/2019, Time: 00:00:07 UTC, GMT Offset: +05:00
- Position: Longitude: 81°00'00.0000, GPS Hgt: 17.00 m, HDOP: 0.0, PDOP: 2.0, VDOP: 0.0, Fix Type: 3D
- Reference Point: Latitude: 8°00'00.0000, Longitude: 82°00'00.0000, GPS Hgt: 0.00 m, Pos Unc: 1.00 km
- Receiver Status: 12 Channel (8002), Cold start, Acquiring Satellite, Antenna Sense: Under Current
- Signal Quality Window: Shows a bar chart for C/N0 with values ranging from 46.0 to 49.0.

4.1.4 Modules Behavior when powered up on new GPS window



Left Screenshot (New GPS window, week No 0):

- Position File Information: Date: 01/01/2005, Time: 12:00:44 UTC, GMT Offset: +05:00
- Position: Longitude: 81°00'00.0000, GPS Hgt: 0.00 m, HDOP: 0.0, PDOP: 0.0, VDOP: 0.0, Fix Type: None
- Reference Point: Latitude: 8°00'00.0000, Longitude: 82°00'00.0000, GPS Hgt: 0.00 m, Pos Unc: 1.00 km
- Receiver Status: 12 Channel (8002), Cold start, Acquiring Satellite, Antenna Sense: Under Current
- Signal Quality Window: Shows a bar chart for C/N0 with a value of 45.0.

Right Screenshot (New GPS Window, week No 0):

- Position File Information: Date: 04/07/2019, Time: 00:00:51 UTC, GMT Offset: +05:00
- Position: Longitude: 81°00'00.0000, GPS Hgt: 0.00 m, HDOP: 0.0, PDOP: 0.0, VDOP: 0.0, Fix Type: None
- Reference Point: Latitude: 8°00'00.0000, Longitude: 82°00'00.0000, GPS Hgt: 0.00 m, Pos Unc: 1.00 km
- Receiver Status: 12 Channel (8002), Cold start, Acquiring Satellite, Antenna Sense: Under Current
- Signal Quality Window: Shows a bar chart for C/N0 with a value of 45.0.

M12M (STM) GPS WEEK ROLLOVER TEST

4.2.3 Modules Behavior during GPS week Rollover

Just Before the Rollover

Just After the Rollover

4.2.4 Modules Behavior when powered up on new GPS window

Device starts up with default Date: 01/01/2005

Date updated to correct date 04/07/2019

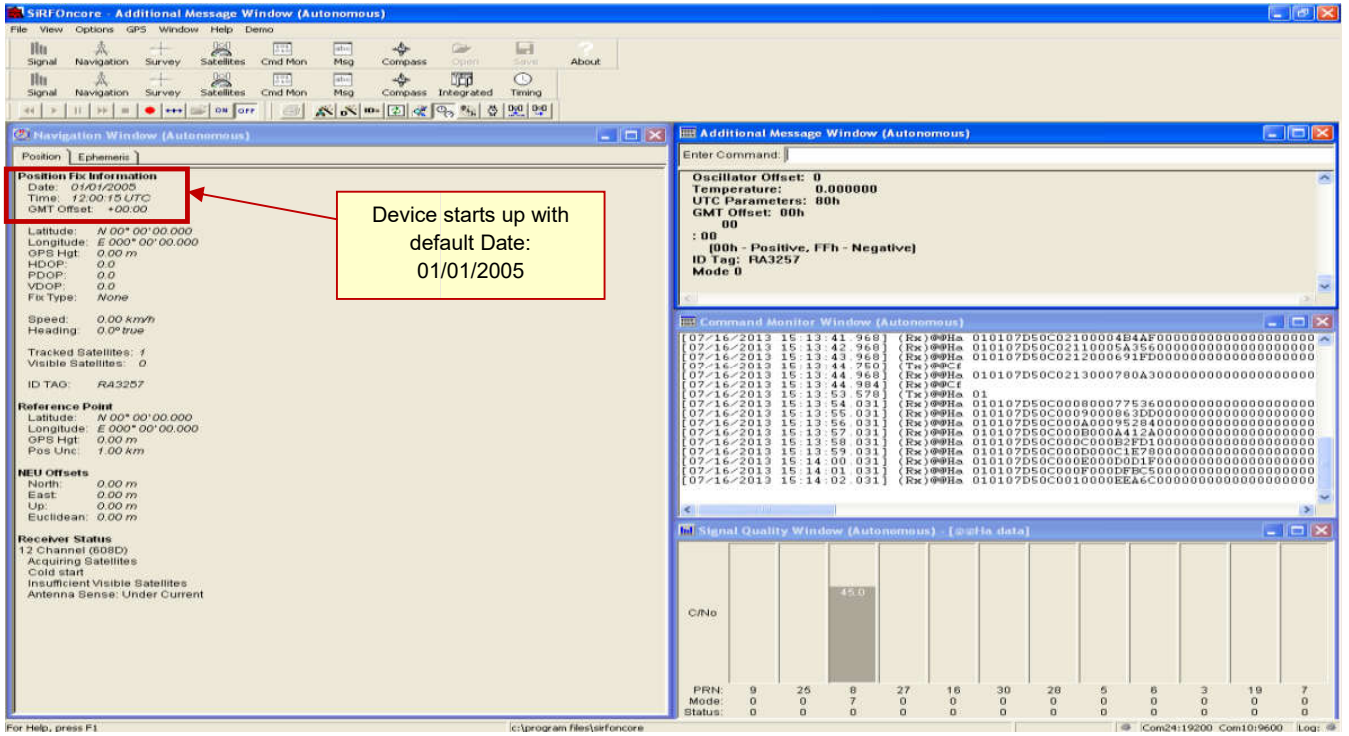
New GPS window, week No 0

New GPS Window, week No 0

M12M (STM) GPS WEEK ROLLOVER TEST

4.3 RA3257

4.3.1 Module's Behavior during Start up



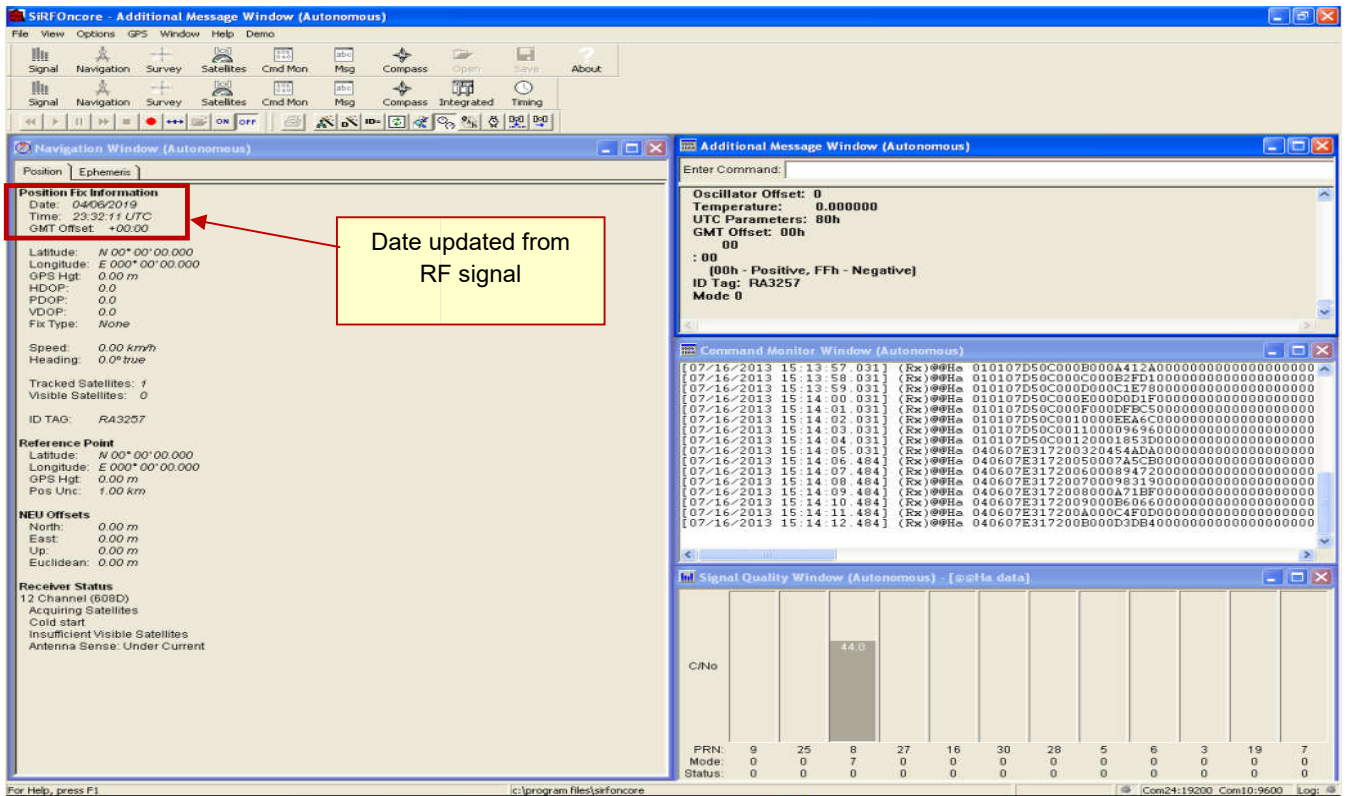
The screenshot shows the SIRFOncore software interface with several windows open. A red box highlights the 'Position Fix Information' window, which contains the following data:

Position Fix Information
Date: 01/01/2005
Time: 12:00:15 UTC
GMT Offset: +00:00
Latitude: N 00° 00' 00.000
Longitude: E 000° 00' 00.000
GPS Hgt: 0.00 m
HDOP: 0.0
PDOP: 0.0
VDOP: 0.0
Fix Type: None
Speed: 0.00 km/h
Heading: 0.0° true
Tracked Satellites: 1
Visible Satellites: 0
ID TAG: RA3257

A yellow callout box with an arrow points to the date field, stating: "Device starts up with default Date: 01/01/2005".

Other windows visible include 'Additional Message Window (Autonomous)' showing oscillator and temperature data, 'Command Monitor Window (Autonomous)' showing a list of satellite commands, and 'Signal Quality Window (Autonomous)' showing a C/N0 graph with a value of 45.0.

4.3.2 Modules Behavior before GPS week Rollover



The screenshot shows the SIRFOncore software interface after a date update. A red box highlights the 'Position Fix Information' window, which now contains:

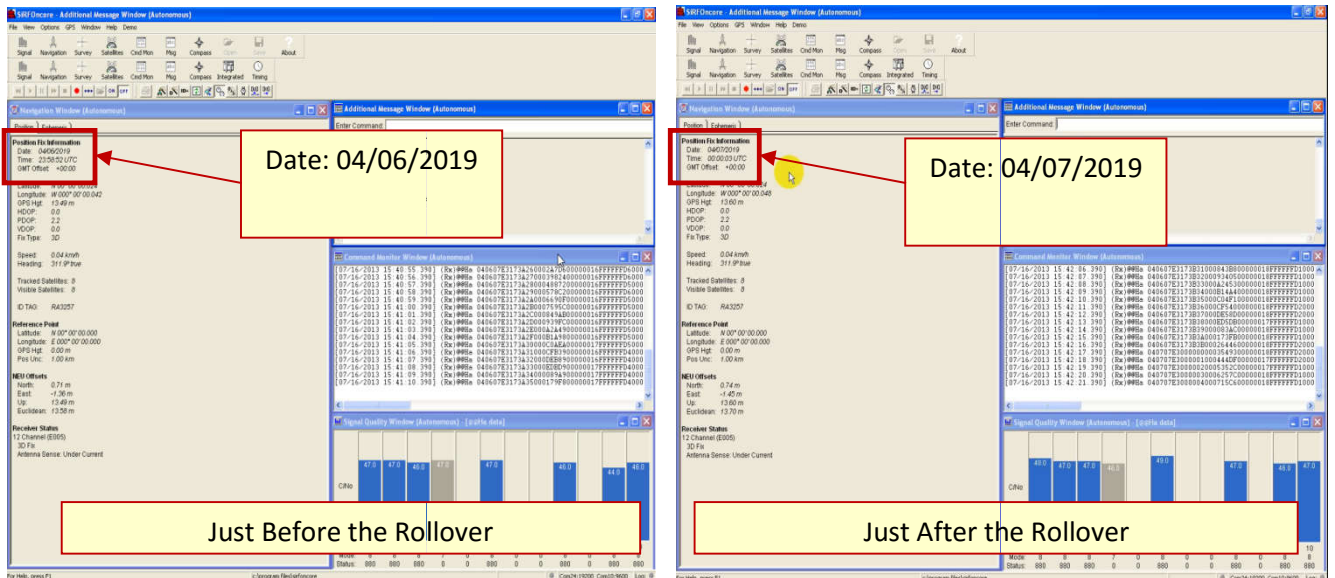
Position Fix Information
Date: 04/06/2019
Time: 23:32:11 UTC
GMT Offset: +00:00
Latitude: N 00° 00' 00.000
Longitude: E 000° 00' 00.000
GPS Hgt: 0.00 m
HDOP: 0.0
PDOP: 0.0
VDOP: 0.0
Fix Type: None
Speed: 0.00 km/h
Heading: 0.0° true
Tracked Satellites: 1
Visible Satellites: 0
ID TAG: RA3257

A yellow callout box with an arrow points to the date field, stating: "Date updated from RF signal".

Other windows visible include 'Additional Message Window (Autonomous)' showing oscillator and temperature data, 'Command Monitor Window (Autonomous)' showing a list of satellite commands, and 'Signal Quality Window (Autonomous)' showing a C/N0 graph with a value of 44.0.

M12M (STM) GPS WEEK ROLLOVER TEST

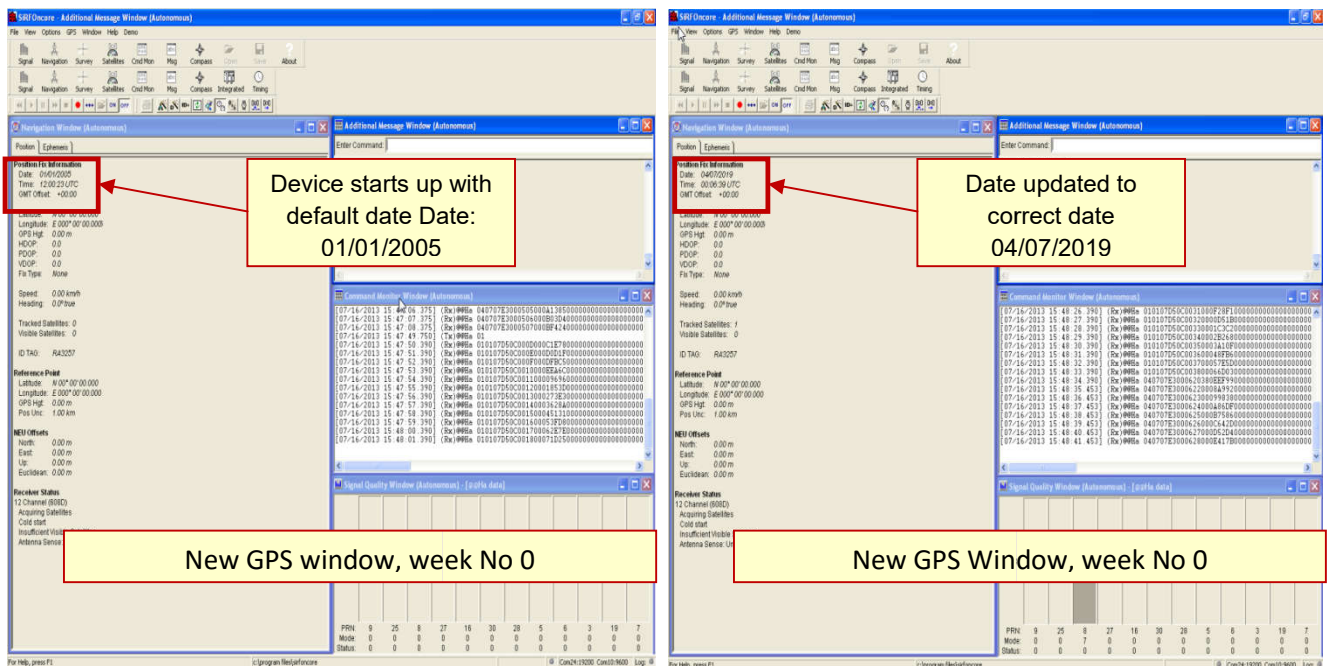
4.3.3 Modules Behavior during GPS week Rollover



Just Before the Rollover

Just After the Rollover

4.3.4 Modules Behavior when powered up on new GPS window



Device starts up with default date Date: 01/01/2005

Date updated to correct date 04/07/2019

New GPS window, week No 0

New GPS Window, week No 0

M12M (STM) GPS WEEK ROLLOVER TEST**4.4 Additional results**

A screen recording of the entire test is provided with this document to observe the modules' performance during every condition. The video references are as follows.

Model	Reference
IL-GPS-010-B	CA0007_IL-GPS-010-B.mp4
IL-GPS-020-B	CA0008_IL-GPS-020-B.mp4
IL-GPS-030-B	RA3257_IL-GPS-030-B.mp4

M12M (STM) GPS WEEK ROLLOVER TEST**5 Conclusion**

Based on The results, it is confirmed that the M12M (STM) Timing / Navigation modules are functioning and adhering without any anomalies during the GPS Rollover events.