

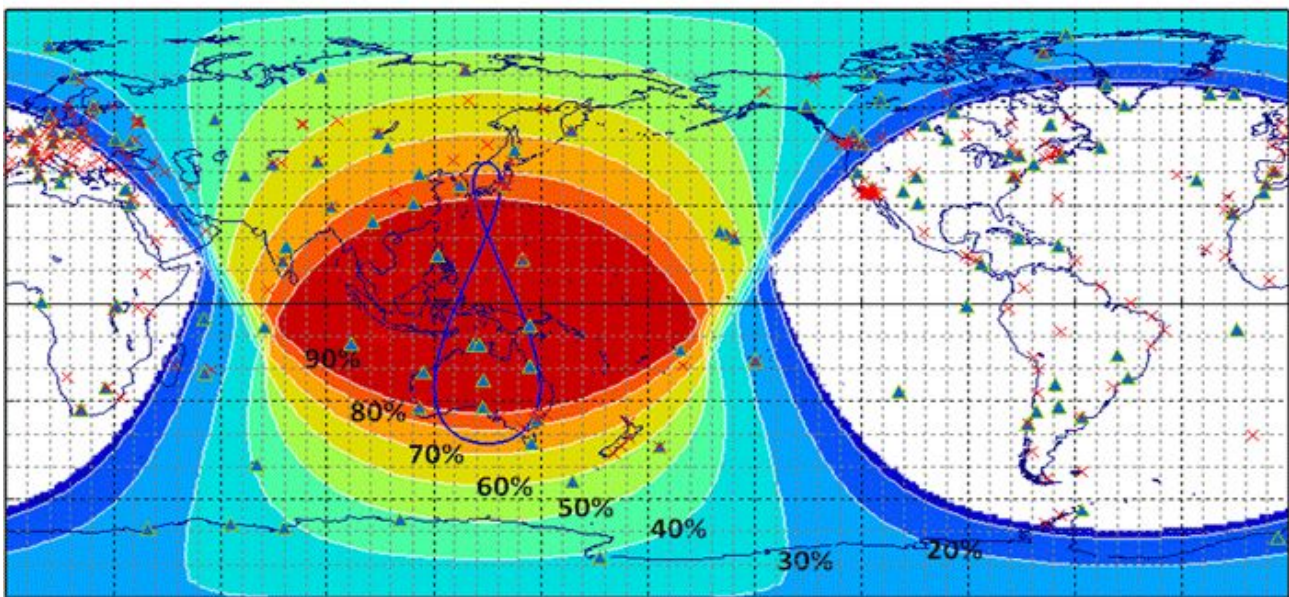
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UP-501	Error in handling of QZSS SV194 Trimble Res SMT 360 Firmware v1.03 or earlier	1.05	

## **TRIMBLE Resolution SMT 360 Multi-GNSS Receiver Error in handling of QZSS SV194 Firmware v1.03 or earlier**

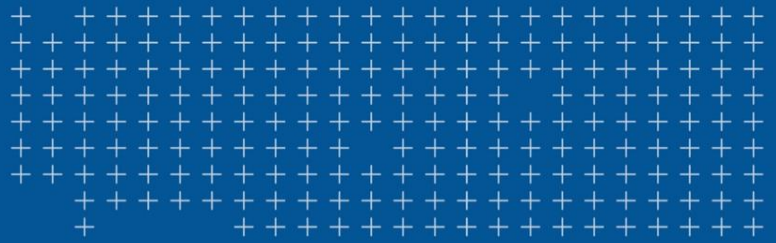
Trimble has announced that the Res SMT360 Multi-GNSS module's firmwares 1.01, 1.02 and 1.03 have a bug when operating in the visibility of the new QZSS (Japanese) satellite system. According to the orbits of the satellites their coverage will mainly affect GPS operations in

- South East Asia
- East Russia
- East China
- Australia
- West Pacific

regions, but can also extend to all other areas that are not colored white in the below graph.



- **Please contact us at [mail@planevision.de](mailto:mail@planevision.de) to obtain upgrade files and instructions.**
- **Please indicate your device serial number on contact.**



# **Resolution SMT 360 Multi-GNSS Receiver**

## **Error in handling of QZSS SV194**

### **Firmware v1.03 or earlier**

### **Root Cause Analysis**

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## Problem Description

QZSS is a Japanese regional satellite system mainly use as augmentation system for GPS. The Cabinet Office of Japan that runs the system started the trial service of second QZSS satellite (SV ID194) on September 15<sup>th</sup>.

Trimble RES SMT 360 receivers with TSIP firmware version 1.03 or earlier were working normally with the existing QZSS satellite (SV ID193). With the start of the trial service for SV ID 194 on Sep-15, some RES SMT 360 receivers are getting reset.

## Failure Mode

The RES SMT 360 with firmware v1.03 or earlier starts normal operation, tracking all available satellites but after few hours of operation gradually lose the useable satellite count and recover after a reset.

This behavior is not present in TSIP firmware v1.04.

## Root Cause

In the normal operation, the RES STM 360 downloads the almanac data of QZSS constellation from whichever QZSS satellite they track. Before Sep-15 the QZSS almanac had only one satellite (SV ID 193). When the trial service started, the almanac contained information about the new satellite (SV ID194).

Trimble RES SMT 360 (TSIP v1.03) receivers were tracking the QZSS SV ID 193. When the receiver started to get an updated Almanac with new SV ID, it tried to estimate the elevation/azimuth angle of the new SV ID.

The function to estimate the elevation/azimuth angle were not able to use the new SV #194 and got stuck. With this function stuck, the receiver was only able to use satellites that were already on the tracking list and was not able to add new satellites.

The elevation validation function can check/update one satellite elevation angle at a time, and with problem in estimating the elevation angle of SV194 it was not able to validate other satellites.

The problem is random because it depends on the receiver's qualification criteria to use or not use a satellite. For example, one parameter is range of TOA, when SV194 is out of our defined TOA range the problem does not happen.

### The Fix

The current production TSIP firmware version 1.04 of RES SMT 360 has complete range of QZSS SV IDs defined in all functions including elevation estimation function. It can process the elevation angle of QZSS SV ID194 and future QZSS satellites (SV ID 195-199).