# *WAAS Technical Report*
## *William J. Hughes Technical Center*
## *Pomona, New Jersey*
## *1/28/13*

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## *DR#112: Loss of Satellite Tracking and Coverage at Iqaluit due to RFI*
## *GPS Week/Day: Week 1711 Day 6 (Oct 27, 2012) to Week 1712 Day 5 (Nov 3, 2012)*

**Discussion**:
From October 27th to November 3rd, 2012 intermittent RFI at the Iqaluit WRS caused loss of satellite tracking and service outages. There were no GPS or WAAS GEO satellite navigation signal problems that would have affected LPV/LPV200 service at the time of the RFI events. Three RFI events on Oct 27th, Oct 31st, and Nov 3rd are investigated and impacts to performance are reported.

The number of satellites tracked by each WAAS reference receiver, WRE-A, WRE-B, and WRE-C and the vertical protection level (VPL) were plotted in figures 1, 3, and 5. In addition, each receiver L1 frequency signal to noise ratio (C/No) for GEO CRE (PRN138) were analyzed and the drop in the received signal levels were observed to correlate with loss of receiver satellite tracking for each event in figures 2, 4, and 6..

On Oct. 27th, 2012, the WAAS reference receiver WRE-A (thread 1) dropped 11 tracked SVs in a span of 25 seconds. The vertical protection level (VPL) jumped from 22m to 215m before all SVs were dropped from the navigation solution as shown in figure 1. WRE-B and C receivers had a similar loss of service. PRN138 was dropped from tracking at the Iqaluit WRS on all three WREs as shown on Figure 2.

**Figure 1 - Iqaluit VPL and Valid Satellites, Oct 27, 2012**

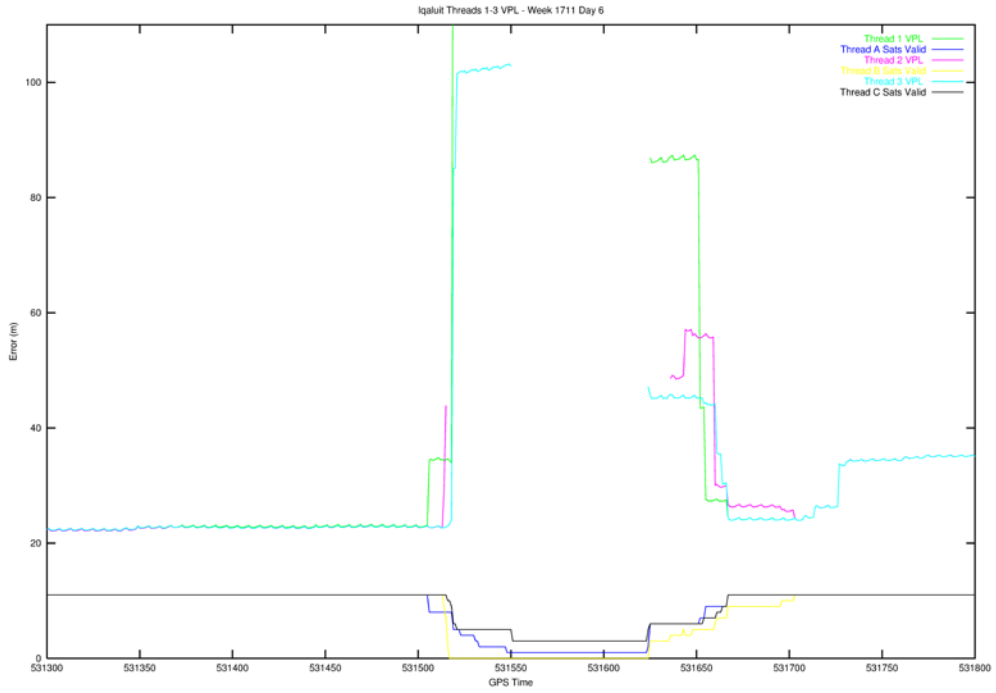
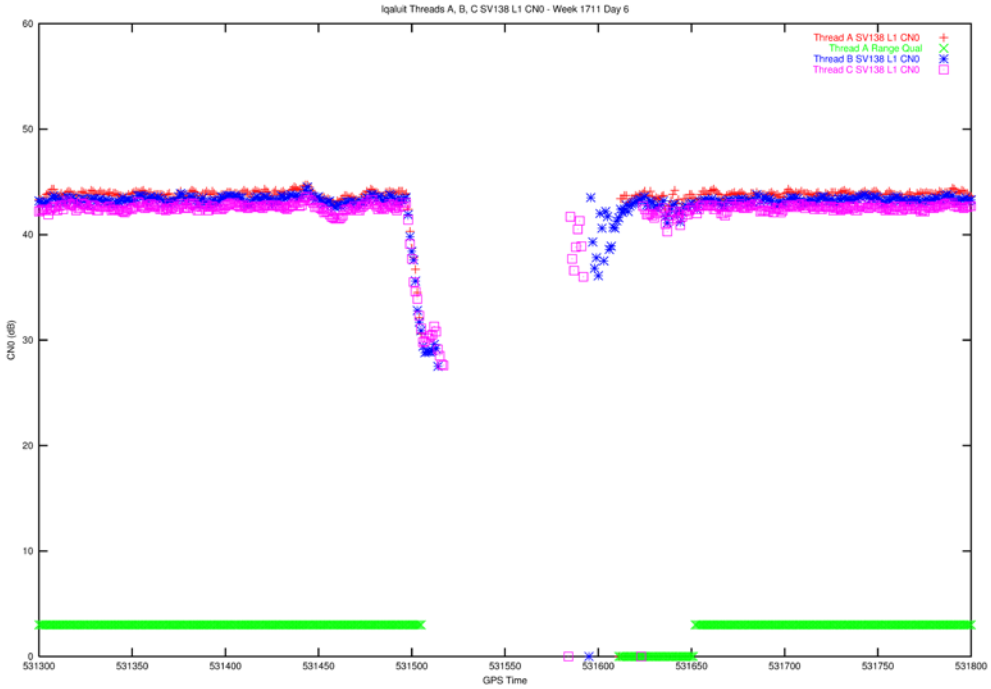


**Figure 2 - Iqaluit PRN138 CN0 and Selected Thread Quality (90c3) View, Oct 27, 2012**




On Oct. 31st, 2012, WAAS reference receiver WRE-C (thread C) dropped from 13 to 4 tracked SVs in a span of 52 seconds. The vertical protection level (VPL) jumped from 19m to 57m as shown in figure 3. WRE-C had an LPV/LPV200 service outage. WRE-A and B dropped all SVs from the navigation solution. PRN138 was dropped from tracking at the Iqaluit WRS on all WREs as shown on Figure 4.

**Figure 3 – Iqaluit VPL and Valid Satellites, Oct 31, 2012**

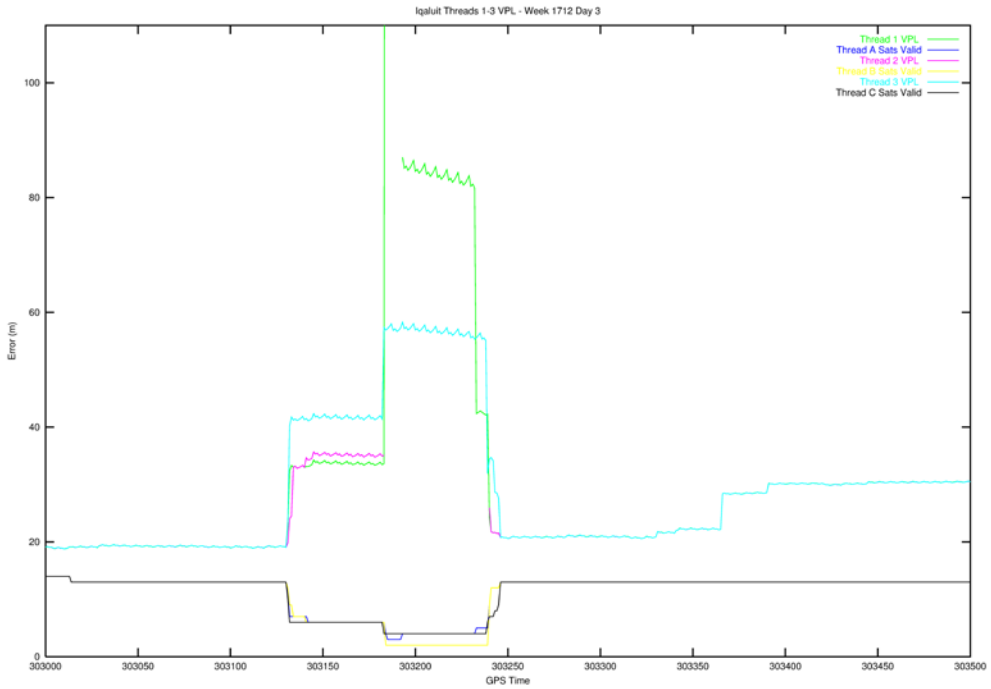
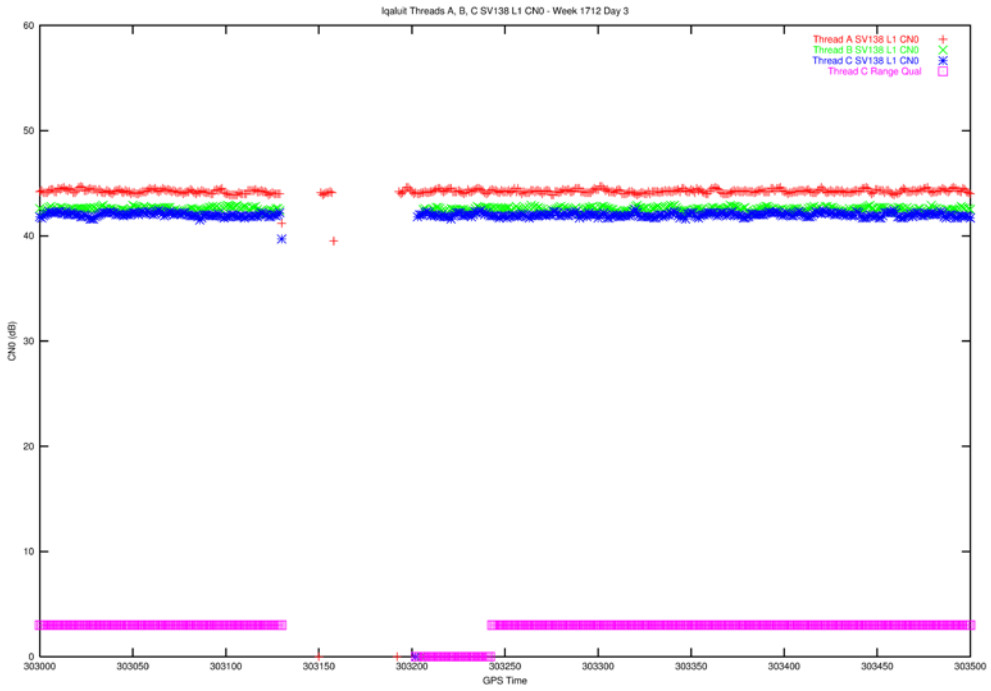


**Figure 4 – Iqaluit PRN138 CN0 and Selected Thread Quality (90c3) View, Oct 31, 2012**




On Nov. 3rd, 2012, WAAS reference receiver WRE-A (thread A) dropped 12 tracked SVs in a span of 2 seconds. The vertical protection level (VPL) jumped from 19m to >100m before all SVs were dropped from the navigation solution as shown in figure 5. WRE-B and C had a similar loss of service. PRN138 was dropped from tracking at the Iqaluit WRS on all three treads as shown on Figure 6.

**Figure 5 - Iqaluit VPL and Valid Satellites, Nov 3, 2012**

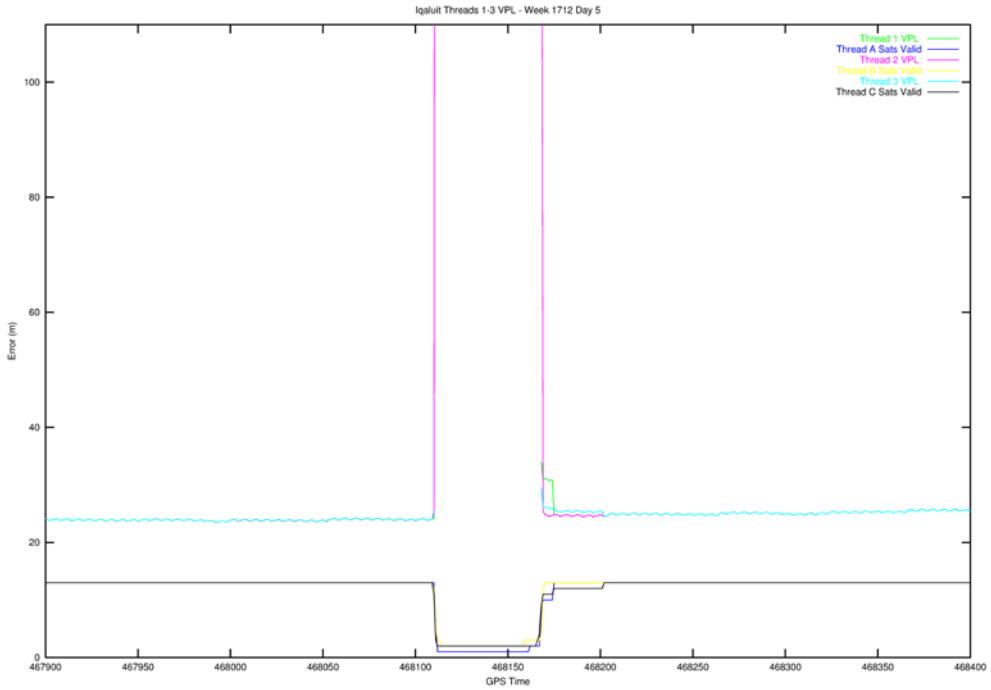
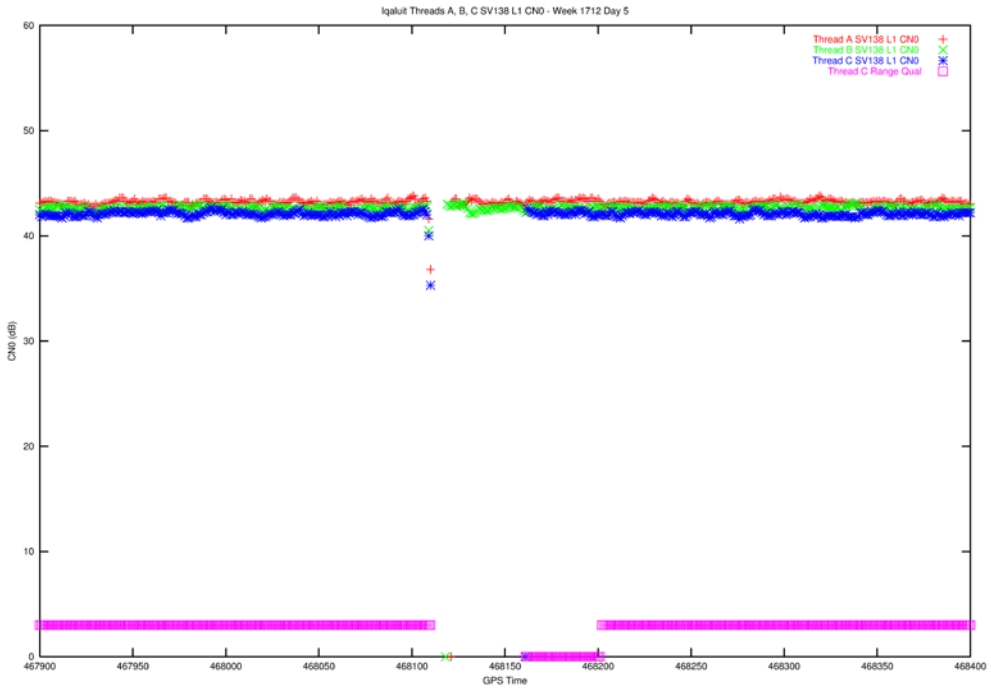


**Figure 6 - Iqaluit PRN138 CN0 and Selected Thread Quality (90c3) View, Nov 3, 2012**




Conclusion:

Local RFI in the vicinity of WAAS Iqaluit WRS affected receiver ability to maintain track of GEO and GPS satellites for 1 to 3 minutes causing the calculated VPL at each receiver (WRE-A, B and C) to exceed the LPV threshold of 50 meters and/or dropping all satellites from tracking. RFI at Iqaluit caused a decrease in LPV and LPV200 coverage in northeast Canada during the times of each event.