

Quectel UC20 GPS Week Number Rollover Statement

April, 2019

GPS Week Number Rollover Background



GPS system has its date and time scale for computing satellite coordinates and time biases, based on system time: weeks and seconds within a week.

GPS SVs transmit a 10-bit week number in the range 0-1023 that rolls over every 1024 weeks or roughly 19.7 years. To report the current time, GPS receivers normally compute extended GPS weeks or cumulative GPS weeks. Extended GPS weeks are computed from the start of GPS time, that is, 00:00:00 UTC on Sunday, January 6, 1980.

The first GPS week number rollover from 1023 to 0 occurred at 00:00:00 GPS time on Sunday, August 22, 1999.

The second GPS week number rollover occurred at 00:00:00 GPS time on April 7, 2019 (Extended GPS week 2048, 10 bit week 0).

The next GPS week number rollover will occur on November 21, 2038 (Extended GPS week 3072, 10 bit week 0).

UC20 GPS Week Number Rollover Calculation







Quectel UC20 module uses the default minimum GPS week number of 1054 (=1024+30 weeks), so it will not be affected by the second GPS week number rollover.

The GPS week number rollover of UC20 module will occur on **November 3, 2019**, rather than on **April 7, 2019**, by that time, devices with Quectel UC20 modules may experience the side-effects of such an event.

Potential Behavior of the Devices with UC20 Module



	Emergency mode		LBS/Automotive			
	AGPS MS-A	AGPS MS-B	AGPS MS-A	AGPS MS-B	XTRA	Standalone (no assist)
WCDMA	Green	Green	Green	Yellow	Teal	Orange
GSM	Green	Green	Not used	Yellow	Teal	Orange

-  No issue anticipated
-  Single constellation(*), XTRA assisted performance and incorrect time stamp
-  Single constellation(*), A-GPS performance and incorrect time stamp
-  Single constellation(*), Standalone (no assist) performance and incorrect time stamp

(*) intermittent multi-constellation position fix with strong signal

Solutions for GPS Week Number Rollover Event



1. For customers who do not use the timestamp generated by the GPS, no remedy action is required.

2. For customers who use the timestamp generated by the GPS, the following countermeasures can be applied to handle the GPS week number rollover event:
 - Time Synchronization via NITZ (Network Identity and Time Zone).
 - Time Synchronization via NTP Server.
 - Using new firmware to be provided by Quectel to fix this issue (the new firmware is under development).

For time synchronization via NITZ and NTP, please refer to UC20_Time_Synchronization_Application_Note

Thank you!

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