Quasi-Zenith Satellite System

Service Performance Report
for 1stH FY2025

Satellite Positioning, Navigation and Timing Service (PNT)

January 21, 2026

Quasi-Zenith Satellite System Services Inc. (QSS)

1. Evaluation Period

From April 1, 2025 to September 30, 2025 (UTC)

However, the period of SVN007 that officially started its operation is after July 18.

2. Evaluation Item

- SIS Accuracy of the ephemeris
- Availability
- Continuity
- Integrity

3. Evaluation Method

3.1. SIS Accuracy of the ephemeris

SIS Accuracy is based on $URE_{All\ Age(0\sim M)}$ calculated with the following method. This evaluation is carried out once a day.

(1) Calculate root-mean-square of SIS-URE (User Range Error) based on ephemeris k at a specified AOD (Age of date) in coverage of QZSS.

$$\overline{URE}_{k,AOD} = \sqrt{\frac{1}{S}\sum_{pos=1}^{S} URE_{k,pos,AOD}^{\ 2}},$$

S : Coverage of QZSS where PNT signal can be received by elevation angle of more than 10 degree

$URE_{k,pos,AOD}$: SIS-URE based on ephemeris k at a specified position pos and a specified AOD (Refer to the following equation)

$$URE_{k,pos,AOD} = \frac{s\mathrm{Pr}_{AOD} - pos}{\left|s\mathrm{Pr}_{AOD} - pos\right|}(sEp_{k,AOD} - s\mathrm{Pr}_{AOD}) - c(dtEp_{k,AOD} - dt\mathrm{Pr}_{AOD})$$

$sEp_{k,AOD}$: Satellite position based on ephemeris k

$s\mathrm{Pr}_{,AOD}$: Satellite position based on rapid product

$dtEp_{k,AOD}$: Satellite clock offset based on ephemeris k

$dt\mathrm{Pr}_{,AOD}$: Satellite clock offset based on rapid product

pos : Evaluation points set by every 5 degree in S

(2) Calculate $URE_{All\ Age(0\sim M)}$ that is 95% value of $\overline{URE}_{k,AOD}$ across all AOD and any ephemeris, where Age(0) is zero AOD and Age(M) is maximum AOD.

3.2. Availability

Constellation Service Availability is a time ratio of the simultaneous transmission of healthy signals from at least three of four QZSs (SVN002, 003, 004,005).

Service Availability by Each QZS is a time ratio of the transmission of healthy signals from each QZS.

The unhealthy conditions of PNT signal are defined as unhealthy in QZSS Performance Standard (PS-QZSS) Table 4.4-1.

3.3. Continuity

Continuity reports unscheduled interruptions that occur during the period.

The unscheduled interruption is the outage without 48 hours or more notice.

3.4. Integrity

Integrity reports integrity risks that occur during the period.

The integrity risk is the unhealthy condition without a timely alarm.

4. Evaluation Result

4.1. SIS Accuracy of the ephemeris

Table 1 shows the monthly 95th percentile values of SIS Accuracy. In addition, Figure 1 shows the distribution of SIS Accuracy during the period.

Table 1 The monthly 95th percentile values of SIS Accuracy of the ephemeris

Satellite	NAV Message	SIS Accuracy (95%) [m]					
		April	May	June	July	August	September
SVN002 (PRN194)	LNAV	0.80	0.98	0.69	0.56	0.52	0.47
	CNAV	0.78	0.84	0.74	0.53	0.49	0.44
SVN003 (PRN199)	LNAV	1.10	1.01	0.95	1.08	1.01	1.34
	CNAV	1.05	0.97	0.93	1.04	1.02	1.31
SVN004 (PRN195)	LNAV	0.85	0.80	0.75	0.74	0.74	0.72
	CNAV	0.67	0.69	0.69	0.71	0.68	0.69
SVN005 (PRN196)	LNAV	0.60	0.63	0.87	0.79	0.60	0.48
	CNAV	0.59	0.62	0.85	0.75	0.55	0.43
SVN007 (PRN200)	LNAV	NA	NA	NA	0.94	0.84	0.86
	CNAV	NA	NA	NA	0.94	0.84	0.85

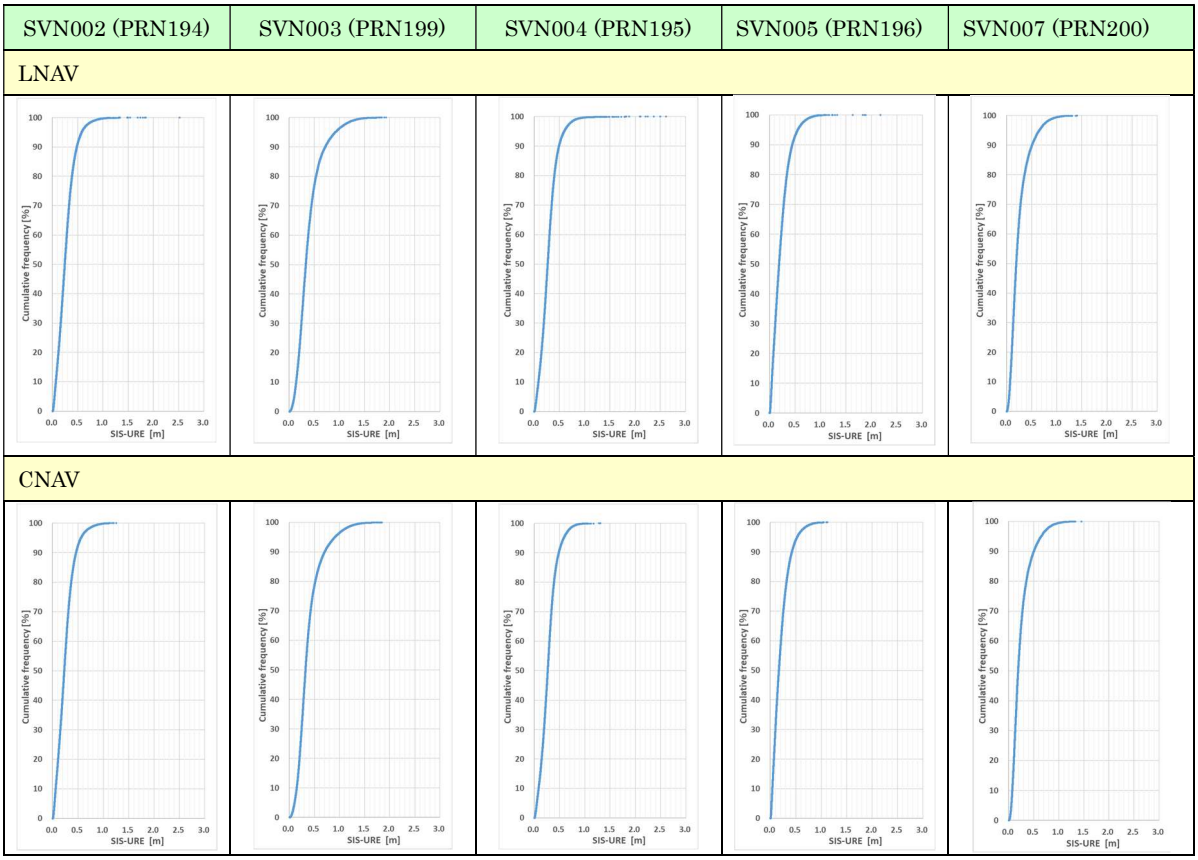

Figure 1 The distribution of SIS Accuracy of the ephemeris

4.2. Availability

Table 2 shows the availability for evaluation period.

Table 2 Availability

Metric			Specification	Availability
Constellation Service Availability			≧0.99	1.000
Service Availability by Each QZS	SVN002 (PRN194)	QZO	≧0.95	0.994
	SVN003 (PRN199)	GEO	≧0.80	0.943
	SVN004 (PRN195)	QZO	≧0.95	0.995
	SVN005 (PRN196)	QZO	≧0.95	0.972
	SVN007 (PRN200)	GEO	≧0.80	0.957

4.3. Continuity

Table 3 shows the continuity for evaluation period.

Table 3 Continuity

Satellite	Continuity
SVN002 (PRN194)	No unscheduled interruptions occurred during the period.
SVN003 (PRN199)	No unscheduled interruptions occurred during the period.
SVN004 (PRN195)	An unscheduled interruption occurred on June 29, 2025 (NAQU 2025222).
SVN005 (PRN196)	No unscheduled interruptions occurred during the period.
SVN007 (PRN200)	No unscheduled interruptions occurred during the period.

4.4. Integrity

Table 4 shows the integrity for evaluation period.

Table 4 Integrity

Satellite	Integrity
SVN002 (PRN194)	No integrity risks occurred during the period.
SVN003 (PRN199)	No integrity risks occurred during the period.
SVN004 (PRN195)	No integrity risks occurred during the period.
SVN005 (PRN196)	No integrity risks occurred during the period.
SVN007 (PRN200)	No integrity risks occurred during the period.