

Explanation of “Necessary Bandwidth” Computation

The Necessary Bandwidth is the minimum value of the occupied bandwidth sufficient to ensure the transmission of information at the rate and with the quality required for the system employed.

We have reported necessary bandwidths for the Subscriber and Gateway antennas as 10.4 kHz and 44.0 kHz, respectively. They are computed according to the following formula:

Nec Bandwidth = $2 \times \{(\text{baud rate})/2 \times (\text{filter width}) + (\text{freq. tolerance}) + (\text{max doppler})\}$,
where the baud rates are:

- Subscriber Transmitter = 4,800 baud
- Gateway Transmitter = 28,800 baud

The following apply to both antennas:

- filter width factor = 1.4
- frequency tolerance = 10 Hz
- maximum doppler = +/- 1800 Hz

Thus, the necessary bandwidth for the Subscriber Transmitter is:

$$\text{NB(STx)} = 2 \times (4,800/2 \times 1.4 + 10 + 1,800) = 10.34 \text{ kHz},$$

and for the Gateway Transmitter is:

$$\text{NB(GWTx)} = 2 \times (28,800/2 \times 1.4 + 10 + 1,800) = 43.94 \text{ kHz}$$