a. Pulse-to-Pulse Amplitude Tolerance

When compared using Equation (2.6), the amplitude of the smallest pulse in a group does not differ from the amplitude of the largest pulse in the same group by more than the limits specified in Table 4.

$$D = \%\,Droop = \left[\frac{I_{pk}(Max) - I_{pk}(Min)}{I_{pk}(Max)}\right] \times 100 \qquad (2.6)$$

where

$I_{pk}Max$ is the value of i(t) at the peak of the largest pulse.

$I_{pk}Min$ is the value of i(t) at the peak of the smallest pulse.

	Category 1	Category 2
Single Rate	5 %	10 %
Dual Rate	10 %	20 %

TABLE 4 – PULSE–TO–PULSE AMPLITUDE TOLERANCE, OR PERCENT DROOP (D).

b. Pulse-to-Pulse ECD Tolerance

The pulse-to-pulse ECD tolerance accounts for the pulse-to-pulse leading-edge differences (Chapter 2.A.1) and the pulse-to-pulse zero-crossing differences (Chapter 2.A.3). The ECD of any single antenna-current pulse does not differ from the average ECD of all pulses contained in both Group A and Group B by more than the values given in Table 5.

	Category 1	Category 2
Single Rate	0.5 us	1.0 us
Dual Rate	0.7 us	1.5 us

TABLE 5 – PULSE–TO–PULSE ECD TOLERANCES.

c. Pulse-to-Pulse Timing Tolerance

Pulses two through eight of a group are referenced in time to the first pulse of each group. The timing relationship and tolerances of the standard zero crossings of pulses two through eight with respect to the standard zero crossing of pulse one are indicated in Table 6 below. Due to design limitations, Category 2 transmitters may also exhibit a small fixed offset (C) on negatively phase coded pulses.

	Category 1	Category 2
Single Rate	(N–1) 1000 us $\pm$ 25 ns	(N–1) 1000 us $\pm$ 50 ns + C
Dual Rate	(N–1) 1000 us $\pm$ 50 ns	(N–1) 1000 us $\pm$ 100 ns + C

N is the pulse number (2 thru 8) of the pulses which follow the first pulse within each group. C is 0 for positively phase coded pulses; $|C| \leq 150$ ns for negatively phase coded pulses. The standard zero crossing of pulse one is the time reference within each group.

TABLE 6 – PULSE–TO–PULSE TIMING TOLERANCES.

The ninth pulse of a master signal group is spaced 2000 microseconds from the eighth pulse of the group. This pulse is used primarily as a visual aid to master group identification and not for navigation.

C. Blink

Blink is a repetitive on-off pattern (approximately 0.25 second on, 3.75 seconds off) of the first two pulses of the secondary signal which indicates that the baseline is unusable for one of the following reasons:

- TD out of tolerance
- ECD out of tolerance
- Improper phase code or GRI
- Master or secondary station operating at less than one half of specified output power.

Blink continues until the out-of-tolerance condition is eliminated.

The ninth pulse of the master signal can also be blinked, but master blink is not an indicator of out of tolerance. Master blink is used only for internal Loran-C system communications. If used, the master's ninth pulse will be blinked in accordance with the code shown in Figure 4. There is no ninth pulse blink sequence defined for victor secondaries. For master ninth pulse blink purposes only, victor secondaries are co-designated as whiskey secondaries. The master ninth pulse blink receiving equipment at each secondary can be remotely disabled allowing communications with either the whiskey or the victor secondary.

D. Two-Pulse Communications

Two-Pulse Communication (TPC) is a synchronous communication system which uses two Loran-C pulses to transmit information. Pulse position modulation is used on the seventh and eighth pulses. A balanced modulation code is used to ensure that the transmission of a TPC message does not cause gross offsets in a Loran-C receiver. Each pulse is advanced and retarded once in each Phase Code Interval (PCI); therefore the net change of position for each pulse is zero.

Synchronization (sync) bits are essential since TPC uses synchronous transmission. Sync bits reset the timing chain and define the next PCI as the first PCI of a new character. Sync bits are not sent when data is being transmitted. They are only sent during the last PCI of the programmed sync interval. The sync interval can be either 4, 8, 12, or 16 character periods. Sync bits are distinguished from data bits by the amount they are modulated (2.4 usec) and by the transmission code.

Data bits (either 0 or 1) are determined by advancing or retarding the pulses by 1 usec according to table 7. It requires one PCI to transmit one bit once. Data bits may be sent between 1 and 16 times as determined by the operators.