EXHIBIT 3-1 CFSDL5809EN

5809EN Duty Cycle Calculation

Message protocol, timing and duty cycle calculation.

The data output is phase encoded Manchester that has inherent 50% duty cycle and consists of 64 bits per word. A supervision transmission is six identical words separated by (start to start) by nominal 125mS (100mS min. to 150mS max). Each message has a nominal data rate of 3.7 kb/s (3.2 kb/s min. to 4.2kb/s max). Therefore the duty cycle is calculated as follows:

The word format consists of 64 bits,

The duration of each bit is 312.5 uSec max.

The duty cycle over a 100 mSec measuring period is calculated as follows:

Duty cycle = Actual RF transmission ON time / 100 mSec

Actual transmission ON time = 64 bits X 50% X 312.5 uSec = 10 mSec

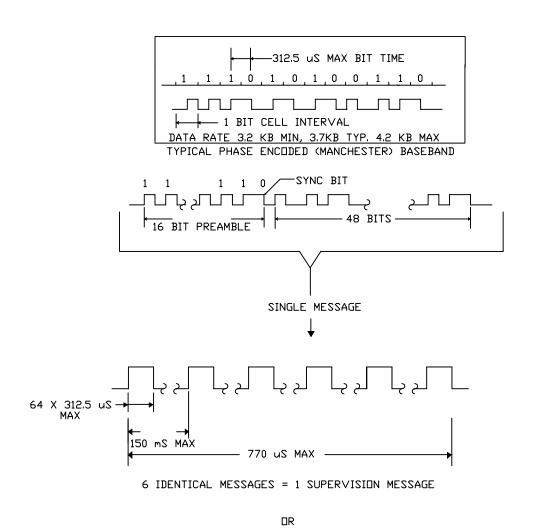
Therefore duty cycle = 10 / 100 mSec = 0.10 = 10%, peak to average field strength is 20 dB.

Total on-air time for a supervision transmission is:

 $64 \times 312.5 \text{ uSec} + (5 \times 150 \text{ mSec}) = 0.77 \text{ seconds}.$

Summary:- Duty cycle = 10%

On-air time = 3.54 seconds.



2 SEC. — 2 SEC. — 2 SEC. — 12 IDENTICAL MESSAGES = 1 ALARM MESSAGE