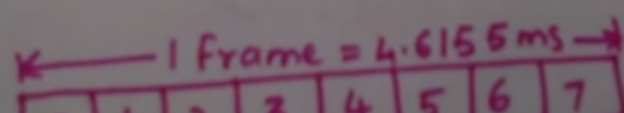


\* Frame structure of GSM  
System :-

$$1 \text{ Frame} = 8 \times 577 \mu\text{s} \\ = 4.6155 \text{ ms}$$

$$1 \text{ TS} = 577 \mu\text{s}$$



$1 \text{ TS} = \underline{\underline{577 \mu\text{s}}}$

← 1 Frame = 4.6155 ms →

0	1	2	3	4	5	6	7
---	---	---	---	---	---	---	---

T	Data	F	Train	F	Data	T	Guard
3	57 bits	1	26 bits	1	57 bits	3	8.25 bits

← 1 time slot →

F = Flag bit  
T = Tail bit

- The no. of bits corresponding to each time slot can be calculated as follows:-

$$57 \times 2 + 2 + 8.25 + 3 \times 2 + 26 \\ = 156.25 \text{ bits}$$

- The no. of bits corresponding to each time slot can be calculated as follows:-

$$\begin{array}{ccccc} \text{Data} & F & \text{Guard} & T & \text{Train} \\ \boxed{57 \times 2} & + \boxed{2} & + \boxed{8.25} & + \boxed{3 \times 2} & + \boxed{26} \\ = 156.25 \text{ bits} \end{array}$$

- The no. of bits corresponding to each time slot can be calculated as follows:-

$$\begin{array}{cccccc} \text{Data} & & F & \text{Guard} & T & \text{Train.} \\ \boxed{57 \times 2} & + & \boxed{2} & + & \boxed{8.25} & + & \boxed{3 \times 2} & + & \boxed{26} \\ \text{each } \boxed{Ts = 156.25 \text{ bits}} & \rightarrow & 114\text{-bit} \rightarrow \text{Data} & & & & & & \\ & & 40.25 \rightarrow & & & & & & \end{array}$$

... of GSM

$$57 \times 2 + 2 + 8.25 + 3 \times 2 + 26$$

each  $T_s = 156.25 \text{ bits}$   $\rightarrow 114 \text{ - bit} \rightarrow \text{Data}$   
 $40.25 \rightarrow \text{overhead bits}$

- Hence the efficiency of GSM is given by :-

$$\eta = \left( 1 - \frac{40.25}{156.25} \right) \times 100$$

$$\eta = 74.24 \%$$

### Frame Structure for GSM

- Each user transmits a burst of data during the time slot assigned to it. These data bursts may have, one of five specific formats.
- Normal bursts are used for TCH and DCCH transmissions on both the forward and reverse link.
- FCCH and SCH bursts are used in TS 0 of specific frames to broadcast the frequency and time synchronization control messages on the forward link.
- The RACH burst is used by all mobiles to access service from any base station, and the dummy burst is used as filler information for unused time slots on the forward link. <sup>10</sup>



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