Agenda Item:

Source: **Mitsubishi Electric Corporation**

Title: Simulation results for compressed mode impacts on non-compressed voice data depending on TGL

Document for: Discussion

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1. Introduction

In [1], we showed the impact of a data terminal, which enters in compressed mode, on a non-compressed voice user. In this document, we will provide additional results.

2. The impact of transmission gap length

In [1], we showed preliminary results. So far, adhoc 8 recommended 3 transmission gap lengths for monitoring GSM cell without prior knowledge of the timing[2]. We evaluated the impact of transmission gap length in 2 cases. In figure 4, the compressed frame overlaps with a single frame of non-compressed user. This case is denoted as worst case, where required Eb/Io is averaged at BER=1e-3 through 3 successive frames. In figure 5, the compressed frame overlaps with two frames of non-compressed user. This case is denoted as average case where required Eb/Io is averaged through 2 successive frames. Table 2 shows results. In that table, 7(S) corresponds to TGL=7 with single frame method, 7(D) corresponds to TGL=7 with double frame method, 11(D) corresponds to TGL=11 with double frame method, and 15(D) corresponds to TGL=15 with double frame method. Note that we evaluated with 16 slots per frame and then TGL is selected considering ratio between TGL and whole slots per frame, for in the current assumption of monitoring GSM cell, TGL=7/10/14 slots. Results shows that required Eb/Io as transmission gap length is bigger both for 4 slots and 7slots for recovery length.
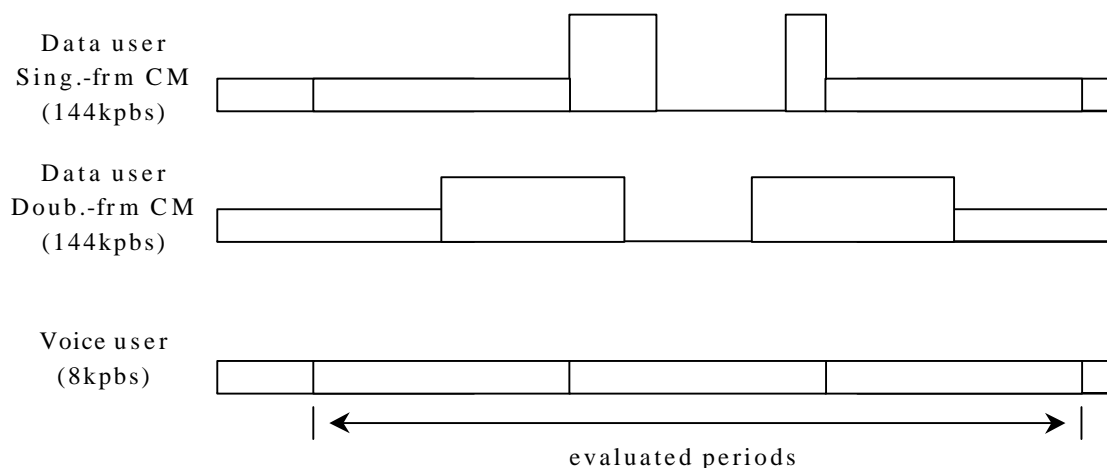

Figure 4 : Worst case : A transmission gap of data user is overlapped with a single frame of voice user for both single frame and double frame mode. Required Eb/Io @ BER=1e-3 is evaluated during successive 3 frames.

TPC step size	Worst case			
	7S	7D	11D	15D
2dB(4slots)	4.870	5.405	5.468	8.132
2dB(7slots)	5.138	5.762	6.158	8.495

Data user Sing.-frm CM (144kpbs)

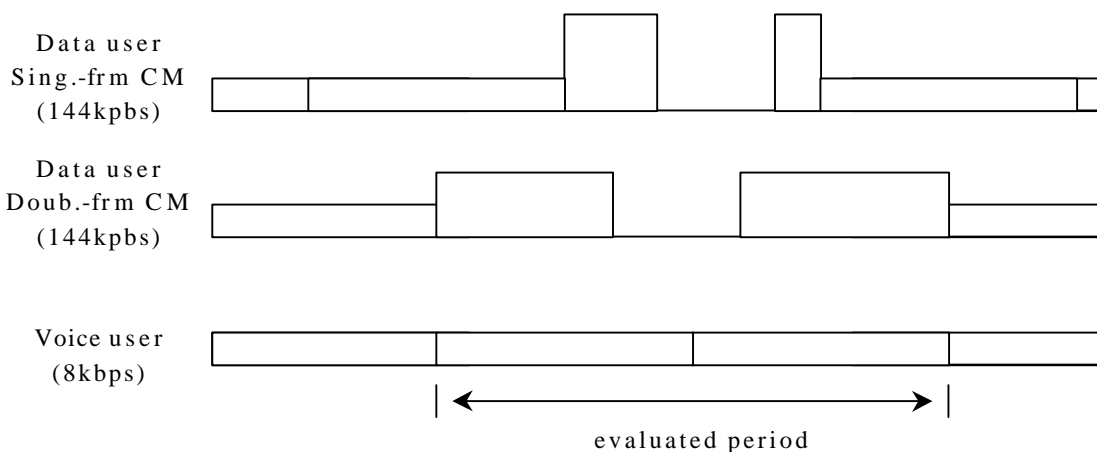Data user Doub.-frm CM (144kpbs)

Voice user (8kbps)

evaluated period

Figure 5 : Average case : A transmission gap of data user is overlapped with successive 2 frames of voice user in each single frame and double frame mode. Required Eb/Io @ BER=1e-3 is evaluated those frames.

TPC step size	Worst case			
	7S	7D	11D	15D
2dB(4slots)	6.302	6.520	8.535	13.034
2dB(7slots)	7.518	7.936	10.662	14.081

3. Conclusion

In this document, we simulated the impact of TGL onto the other non-compressed voice user. The results show that in order to compensate the degradation due to the lack of energy, the larger the compressed data user makes the transmission gap, the higher the other non-compressed voice user receives interference. This is opposite result from search performance of the compressed user, where total search time for IFHO is smaller as transmission gap length is larger. Thus, we conclude that parameters of compressed mode, especially TGL, should be decided considering both performance of a compressed mode user itself and the impact on the other non- compressed user.

[1] TSGR#4(99)443 "Impact of compressed users on non compressed users"   Mitsubishi, ITE
[2] TSGR#6(99)a50 "Adhoc8 meeting report"   Adhoc 8 chair