Mitigating the effect of COVID lockdown period on Channel and Bandwidth Utilization in Mobile Communication Network in North Western Rajasthan (India)

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Abstract

The COVID – 19 lockdown has led all the citizens (mobile subscribers) of India to stay at home and rather work from home. The people have started consuming more channel utilization (in mobile communication) through a continuous long duration conversations and more internet data through more streaming content as well as logging on to work from home. It was also reflected in how data demand from residential areas rose as compared to commercial areas. Consequently the bandwidth and channel saturation has evolved out to be a severe problem thereby affecting the work performance of all online offices and multi-national companies. This research paper proposes the simulation based experimental study of DITMC technique for mitigating this effect with a special concern in North Western Rajasthan part of India. The simulation results show that significant enhancement of 60.52% in channel utilization and bandwidth optimization is possible with negligible overhead of 0.23%. This technique also enables the telecom operators to ponder research in this field that will promisingly lead to manage augmented number of mobile subscribers (independent of any lockdown period) in limited bandwidth thereby using the spectrum efficiently.

Full Text

Due to technical limitations, full-text HTML conversion of this manuscript could not be completed. However, the latest manuscript can be downloaded and [accessed as a PDF](#).

Figures

Figure 1

Wi-Fi and Internet Speed (Mbps) [1,22]

Symbols : S1, S2= Repetitive Speech Bytes
 *= Speech Byte (S)
 D= Data Byte (S)

Figure 2

Concept of Data Interleaving

Figure 3

State Transition Diagram for DITMC at mobile station [3]

Channel Allotted to Voice & Data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Number of data channels (due to interleaving)
Channel available for S1	V	V	V	D	D	D	V	V	V	D	D	D	D	D	V	D	9
Channel available for S2	V	V	I	D	D	D	I	V	V	D	D	D	D	D	V	D	11
Channel available for S3	V	I	I	D	D	D	V	I	I	D	D	D	D	D	V	D	13
Channel available for S4	V	I	V	D	D	D	I	I	V	D	D	D	D	D	V	D	12
Channel available for S5	V	V	V	D	D	D	V	V	V	D	D	D	D	D	V	D	09
Channel available for S6	I	I	I	D	D	D	I	I	I	D	D	D	D	D	I	D	15
Channel available for S7	V	I	I	D	D	D	I	V	I	D	D	D	D	D	I	D	14
Channel available for S8	V	V	V	D	D	D	V	V	I	D	D	D	D	D	V	D	10

Figure 4

Increased channels for data due to the data interleaving concept. V: voice channel, I: interleaved channel available for data traffic, D: data channel [7]

Figure 5

Interleaving and Overhead Bytes v/s samples

Figure 6

Interleaving, Overhead and Overall samples (in %)