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DESIGN OF LTE DL (DOWNLINK) CHANNEL SIMULATOR USING MIMO TECHNOLOGY

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Abstract: LTE (Long Term Evolution) is the last advance towards the fourth era of radio advances intended to increment the limit and speed of cell systems. At display, current age of cell innovation commanded by 3G (third era), L TE is set apart as 4G. The third age organization venture (3GPP) at present work for building up the third era versatile and media transmission framework with a future fourth era framework. This venture chiefly concentrates on outline of a LTE DL (downlink) roused channel test system utilizing the AWGN and blurring channel show, here OFDMA is utilized as a numerous entrance plot. The execution of commotion and obstruction in AWGN channel and blurring channel at LTE DL is measured what's more, contrasted with get less loud channel. Both lower and higher request regulation plans are utilized as a part of LTE DL. The parameters utilized for examination in AWGN channel and blurring channel are BER (Bit Error Rate) and Eb/No (db).The proposed work is going to lessen the clamor in AWGN channel and blurring channel.

INTRODUCTION:

Long Term Evolution (L TE) upgrades the weakness furthermore, speed of remote information systems utilizing different sorts of balances (QPSK, 16QAM and so forth.). L TE upgrades and alters the system engineering with considerably weakened exchange inactive period. It delineates a remote correspondence framework which underwrites downlink transmission utilizing Orthogonal Frequency Division Multiple Access (OFDMA) conspire up to 300 mbps of information transmission and 75 mbps throughput for uplink information transmission utilizing Transporter Frequency Division Multiple Access (ScFDMA). OFDMA transmits information over a substantial number of subcarriers [1]. These signs are dispersed in correspondingly opposite pivot gathering at right edges to each another and their summation will be zero which evacuates common obstruction. SC-FDMA totals multipath impedance renunciation and adaptable subcarrier recurrence task which gives just a single transporter at any given moment rather than numerous transporters in transmission. Abdifetah Mohamed Hosien MTech(WMC), Farah Instituteof Technology, Hyderabad. S.Anil, M.Tech Right hand Professor, Farah Instituteof Technology, Hyderabad. Recurrence Division Duplex (FDD) and Time Division Duplex (TOO) are the two most basic Frame Structure that are utilized as a part of L TE where both transmitter and collector work on same recurrence band and same time in FDD, in any case, in TDD both transmitter and collector deals with same recurrence at various time [2]. The reason for this paper is to examination the execution of OFDMA (Downlink transmission) in various sorts of L TE Frame structures with various regulation procedures. We diagnostically infer the OFDMA motions in FDD and TDD mode. The rest of this paper is sorted out as takes after: Section 2 give the short thought regarding the OFDMA framework demonstrate. Segment 3 portrays the L TE Frame Structure Types. Segment 4 portrays the 3GPP LTE System. In segment 5, Simulation comes about are given and we at last finish up in Section 6.

OFDMA SYSTEM MODEL:

LTE (Long Term Evolution) utilizes OFDMA and SC-FDMA at downstream and upstream for downlink and uplink transmission. The OFDMA framework demonstrate is appeared in Figure I. A short depiction of the model is given beneath. transmission. At to begin with, S images/second information are transmitted to the transmitter and the information images are go through a serial to parallel converter and the information rate on each X line is SIX images [3].The input information stream on every transporter is then mapped by utilizing uniquesorts of tweak plan, for example, QPSK, 16-QAM, 64QAM and so forth. At that point Inverse quick Fourier Transform is utilized to locate the relating Time wave frame, which implies that M images are sent to an Inverse Fast Fourier Transform that performs N-point IFFT operation. The yield is N time test [4]. The Guard interim is then presented toward the begin of each example which is known as expansion of cyclic augmentation in the prefix. At that point the length of the yield test is N+LP. The consistently broadened images are gone through a parallel to serial converter and after that transmitted through a channel [5]. A channel show is at that point connected to the transmitted flag. The model permits for thesignal to commotion proportion, channel to be controlled. The flag to commotion proportion is set by including a known measure of repetitive sound the transmitted flag which is known as A WGN Additive white Gaussian commotion [lO].The Receiver fundamentally does the turn around operation of the transmitter. The transmitted signs which go through the channel are then changed over by utilizing Serial to parallel converter and cyclic expansion is additionally expelled. The signals go through a N-point Fast Fourier Transform which changed over time space motion into recurrence area. At that point the flag is demapped and performs parallel to serial change utilizing Parallel to serial change over square what's more, the resultant flag is a M test yield [3].

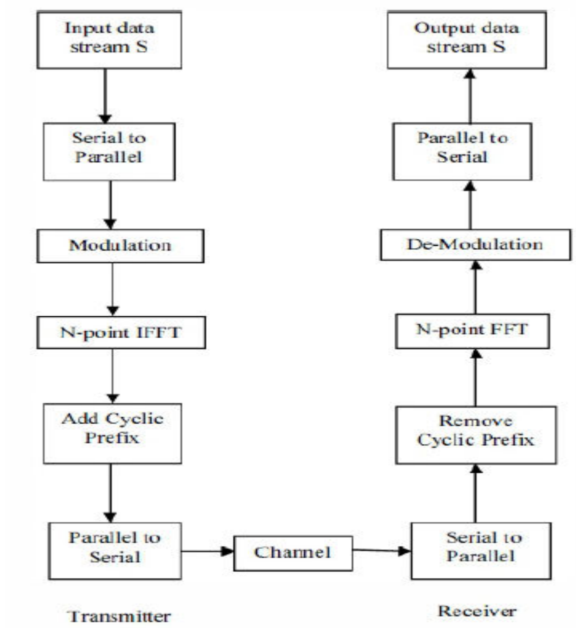

Figure 1: OFDMA System Model

LTE FRAME TYPE:

In L TE, Downlink and uplink transmission are sorted out into radio edge with Tf = 307200 *Ts=I 0 millisecond long where Ts = 1/(30.72 x 106) s ;:::;32.255 ns per clock period [8].Two sorts of Frame structure (I) Frame structure sort 1 that underwrites FDD duplexing plan (LTE FDD) and (ii) Frame structure sort 2 which bolsters TDD duplexing Scheme (LTE TDD) in LTE. In both LTE FDD and LTE TDD, the transmitted flag is composed into subframes of 1 millisecond (ms)span and 10 subframes constitute a radio edge [6]. Each edge is 10 ms in term. Each subframe is further partitioned into two openings, each of 0.5 ms term. Each space comprises of either 6 or 7 ODFM images, contingent upon regardless of whether the typical or broadened cyclic prefix is utilized [7]. Dynamic planning of the uplink and downlink assets is utilized as a part of both LTE FDD and LTE TDD.

A.LTEFDD:

In the event of FDD operation, there are two bearer frequencies, one for uplink transmission (FUL) and one for downlink transmission (FDL). Amid each casing, there are subsequently 10 uplink subframes and 10 downlink subframes and uplink and downlink transmission can happen at the same time inside a frame[6].

B.LTE TDD;

In the event of TDD operation, there is just a single bearer recurrence for uplink and downlink transmissions in the cell are constantly isolated in time. As a similar transporter recurrence is utilized for uplink and downlink transmission, both the uplink and downlink transmission must switch from transmission to gathering. Therefore, as a subframe is either an uplink subframe or a downlink subframe, the quantity of Subframes per radio outline toward every path is under 10 [4]. Two exchanging point periodicities are bolstered by TDD 10ms [9]. For the 5ms exchanging point periodicity, subframe 6 is in like manner an extraordinary subframe indistinguishable to subframeI. For the 10ms exchanging point periodicity, subframe 6 is a normal downlink subframe [8]. L TE underpins seven extraordinary uplink/downlink setups. In each edge, eight of the ten Subframes convey physical signals. Subframes 0 and 5 dependably convey downlink signals. Alternate casings can convey either uplink or downlink physical channels. Subframes 1 and 6 convey synchronization signals.

IV. 3GPP LTE SYSTEM:

In 3GPP L TE framework, downlink and uplink transmissions are sorted out into

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radio casings with 10 ms length. Two radio edge structures are bolstered: Type 1, pertinent to FDD L TE. Sort 2, pertinent to TDD L TE.

A.Frame Structure Type 1:

Each radio edge is long and comprises of 20 openings of length , numbered from 0 to 19.A subframe is characterized as two successive spaces where subframe I comprises of openings 2i and 2i+ l.For FDD, 10 subframes are accessible for downlink transmission and 10 subframes are accessible for uplink transmissions in every 10 ms interim. Uplink and downlink transmissions are isolated in the recurrence space. In halfduplex FDD operation, the UE can't transmit and get in the meantime while there are no such limitations in full-duplex FDD.

B.Frame Structure Type 2:

Casing structure sort 2 is appropriate toTDD. Each radio edge of length comprises of two half-casings of length each. Every half-outline comprises of eight openings of length and three extraordinary fields,DwPTS, GP, and UpPTS. All subframes are characterized as two openings where subframe I comprises of spaces 2i and 2i+ 1. Subframes 0 and 5 and DwPTS are dependably held for downlink transmission. An extraordinary subframe with the three fields DwPTS, OP and UpPTS. Both 5 ms and 10ms switch-point periodicity is upheld. In the event of 5 ms switch-point periodicity, UpPTS and subframes 2 and 7 are saved for uplink transmission. In the event of 10 ms switch-point periodicity, DwPTS exist in both half-outlines while OP and UpPTS just exist in the principal halfframeandDwPTS in the second half-outline has a length equivalent to . UpPTS and subframe 2 are held for uplink transmission and subframes 7 to 9 are held for downlink transmission.

v. SIMULATION DESION AND RESULTS:

In 30PP L TE outline, BER execution with different subcarrier tweak under A WON and blurring channels are reproduced utilizing a transfer speed of 10MHZ of every A WGN channel furthermore, 3MHZ in blurring channel. This outline contains flag source, Noise, Receiver and BER execution. A QPSK and 16 QAM image star grouping is considered. In this reproduction BER vsEblNo is figured utilizing ADS reproduction.

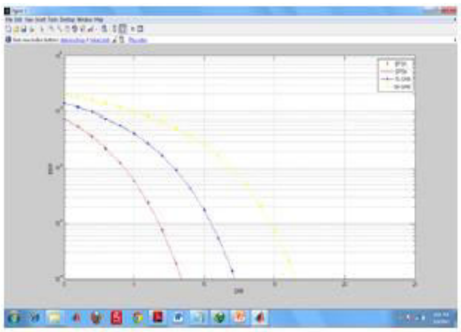

FIGURE1:BER WTH SNR

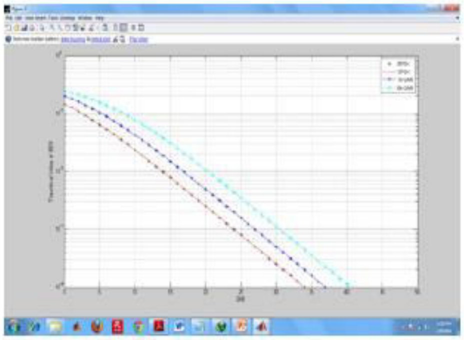

FIGURE2:BER WITH SNR (THEORITICAL VAL-UES)

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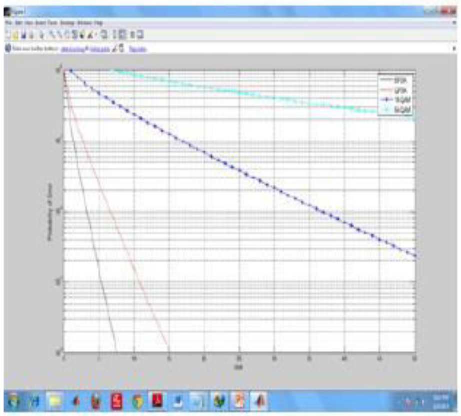

FIGURE3: PROBABILITY ERROR WITH BER

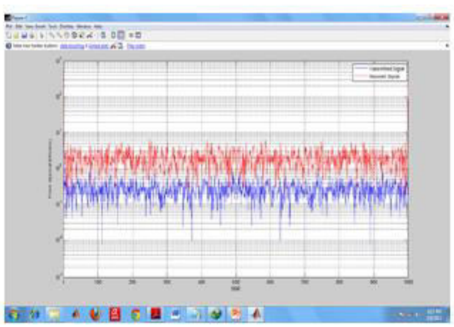

FIGURE4: POWER SPECTRAL EFFICIENCY OF TRANSMITTED SIGNAL AND RECEIVED SIGNAL.

CONCLUSION:

In this paper, we look at the different subcarrier adjustment of 3G L TE downlink of OFDMA. In A WGN channel, QPSK blunder rate is less has contrasted with 16QAM and 64QAM. 16 QAM has bring down blunder rate has contrasted with 64 QAM in A WGN channel. From the chart for BER vsEbl- No in A WG channel for higher request regulation plans like 16QAM and 64QAM as far as vitality utilization continues as before as alluded in table 6. From the diagram, BER vsBblNo for A WGN channel execution as analyzed to blurring channel. As a derivation from the chart for BER vsEblNo higher request balances execution about the same amid downlink situation.

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