

EFFICIENT WIRELESS COMMUNICATION IN CELLULAR NETWORK BY USING $\kappa-\mu$ FADING MODEL

¹Prof. R.R.Karhe, ²Ms. Mayuri. R.Patil

¹Associate Prof. & Head of Department, Electronics and Telecommunication, S.G.D.C.O.E., Jalgaon
²PG Student, Electronics and Telecommunication, Shri. Gulabrao Deokar College of Engineering, Jalgaon

Abstract: In this paper we propose to encourage Mobile to Mobile communication by a Device-to-Device (D2D) that works as a cellular network. Utilizing gadget to-gadget communications as an underlay for the cell communication will give an energizing chance to expand the system limit and in addition enhancing phantom productivity. It is normal that nearby administrations may use portable distributed communication rather than focal server based communication for rich numerous administrations. In this framework we send the message from sender to recipient inside system association through wifi. The principle test of that when collector not in range then for that we actualize the new case, that the sender send message to closest middle of the road portable which impart the hotspot association with beneficiary versatile. At that point through base station message send to the beneficiary. In this paper the shadowed $\kappa - \mu$ fading model is proposed, which is fit for portraying in remote communication channels. In this model, the insights of that got signs are showed by the bunching of multipath hubs. A gadget speaking with the base station and two gadgets that speaks with each other. The outcomes show that the D2D radio, having indistinguishable assets from the cell net-work, can give higher limit contrasted with immaculate cell communication where every one of the information is transmitted through the base station. We are exchange message inside system and furthermore other system. Generally speaking, the $\kappa - \mu$ fading model is utilized to give a solid match to the field information and in addition giving a valuable understanding into the qualities of the Received signal.

Keywords: D2D communications, channel modeling, $\kappa-\mu$ distribution, Wireless channel modeling, cumulative distribution function, cellular communications, fading model.

I. INTRODUCTION

In this paper the expanding interest for high information rate applications are moving has implied that the cellular network and versatile equipment architects

keep on vigorously push the limits on the most extreme rates at which the data can be transmitted over remote Communication channels. One strategy for supplementing cell Communication, which is as of now increasing critical through is IMT-Advanced [1], is to utilize arrange clients themselves as transfers by that gadget to-gadget (D2D) communication [2]. In this gadget to-gadget display, existing cell framework can be utilized to setup. In this paper Device to device Communication is done over remote system. One technique for supplementing cell communications is to utilize arranges clients themselves are transfers by the gadget to-gadget (D2D) communications [3]. In this device-to-device model, existing cell framework can be utilized to setup, control and oversee short direct communications interfaces between cellular device users inside an administrator's system. It has been recommended that the genuine level of contribution of the cell administrators may extend from full control of D2D communication [9]. What's more, where the cellular network has duty to control plane and information plane capacities through to inexactly controlled D2D communication. Diminishing obstruction in D2D communication will require versatile power control that is decrease impedance with different clients, as well as considers fading and User Equipment (UE) portability [4]. This will be basic to guaranteeing that D2D connections can be essentially kept up and information rerouted through another UE to the base station (BS).

In Existing framework, the general measurable model is utilized as a part of which the resultant prevailing segment is liable to arbitrary fading [10]. This model for portraying signal gathering in D2D communication. What's more, this is then approved through the field estimations. In this model groups of multipath are accepted to have scattered waves with indistinguishable forces. This situation is indistinguishable to that $\kappa - \mu$ fading [16]. The $\kappa - \mu$ dissemination is a to a great degree adaptable fading model which contains as extraordinary cases. Furthermore, the other essential appropriations, for example, the One-Sided Gaussian,

While this model proposed here which acquires the greater part of this simplification, the basic contrast between this model and that of $\kappa - \mu$ fading is that the predominant segment, shaped by Phasor expansion of the individual overwhelming components is thought to be random [2]. So this model called here is the $\kappa - \mu$ fading model. Soon after, in a free work as of late distributed in this diary [16], a $\kappa - \mu$ fading distribution was proposed with regards to device-to-device communications. Beginning from a basic factual model which can be viewed as a speculation of the one proposed in [4], shut frame expressions minutes and mgf of the fading envelope were given, and furthermore approved with field estimations acquired for a scope of various situations. In any case, the creator of [3] neglected to give Monte Carlo recreations of the proposed fundamental factual model which would have distinguished the error which frames the primary inspiration of this contribution [17]

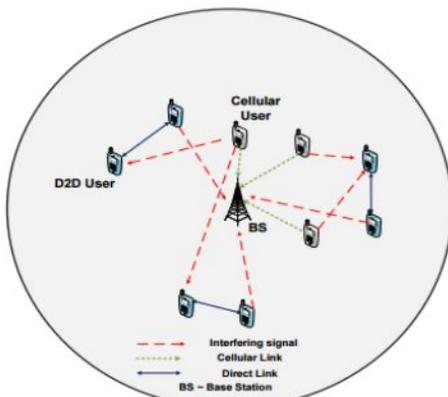


Figure 1: An interference scenario in D2D under laid cellular network.

D2D communication inside a cell systems has a major risk of impedance to the cell connects in the network. D2D connections can bring about impedance between cell clients and D2D clients, bringing about an expansion in intra-cell obstruction. Inter cell obstruction is likewise conceivable with D2D communication under laying cell communication. Obstruction can be moderated through mode the choice, this ideal asset distribution, control. Setting the most extreme transmit control points of confinement of the D2D transmitter is a powerful system of restricting the interference. A general situation of impedance in D2D under laid cell systems is portrayed. An extremely basic term identified with obstruction shirking is mode selection. Generally, remove between the D2D clients

are considered for mode choice Cellular User D2D User Coordinate Link Interfering sign Cellular Link BS Base Station. An impedance situation in D2D under laid cellular network. Additionally, separate between cell client and the BS is a critical parameter for determination of the mode in the system, in this way maintaining a strategic distance from impedance. In versatile to portable transmission plans are presented for impedance evasion, bringing about an extraordinary improvement of D2D. Because of meddling signs, contain three segments: Received Signal= Desired flag + Outside impedance signal+D2D obstruction flag Interference at the beneficiary must be limited. This can be accomplished by adjustment and coding plan, which underpins error free gathering of information. In our system we are make the system and system makes distinctive hubs as mobiles. this mobiles are associated with each other inside network which are likewise associated with base station. We realize that the single cell situation comprising of a gadget speaking with the Base Station and these two gadgets that speak with each other. In D2D communication, the empower different transfers in cell systems. Later the works in explored the capability of D2D communications for enhancing ghostly effectiveness of cell systems. What's more, after other potential D2D utilize cases were presented in the writing, for example, multicasting, distributed communication, video dispersal, portable to versatile (M2M) communication, cell offloading, et cetera. The most well known instances of D2D communication. We consider three methods of op on the off chance that the immediate communication between the sender and receiver is not gainful, the two gadgets convey through the BS of the cellular network. In semi-investigative reviews we demonstrate that the D2D communication, can give higher limit than the cellular communication through the Base Station. In this paper we execute the new approach, that the sender sends the message to the collector in other network through transitional mobile era: D2D communication can impart assets to the cell system or utilize elite resources.

II. EXISTING SYSTEM

In Existing system, the general measurable model is utilized as a part of which the resultant predominant segment is liable to arbitrary shadowed fading. this model for describing signals are gathering in D2D communication is then approved through field measurement. In this model bunches of multipath are expected to have scattered waves with indistinguishable

forces, nearby the nearness of the elective flag parts. a situation which is indistinguishable to the scene in $\kappa - \mu$ fading 0. The $\kappa - \mu$ conveyance is a to a great degree flexible fading model which is contains the extraordinary cases for other imperative dispersions, for example, the One-Sided Gaussian, Rice, Nakagami-m and Rayleigh distributions0.

In this piece of the range, D2D clients should contend with different remote clients, for instance those utilizing Bluetooth, Wi-Fi, these are and furthermore other restrictive advances to communicate0.As highlighted in 0, another potential downside of utilizing set up specially appointed systems administration conventions for D2D communication is that they are may require guide client intercessions to the buildup system associations, an element which is probably going to demonstrate disliked with end clients. Interestingly, completely controlled D2D communications are nearly used as cell frequencies, as the system administrator should manage all parts of the D2D connection 0. One of the key points of interest of utilizing authorized cell recurrence portions for D2D communication that they can viably oversaw, and utilizing current foundation to restrict the potential impedance from other adjacent users0. A design for this was proposed in 0, where gadget to-gadget communication were are considered as an underlay for Long Term Evolution (LTE) Advanced system. Utilizing devoted motioning for session setup and the programmed handover to the system steered traffics to the D2D joins, it was demonstrated that notwithstanding for the most dire outcome imaginable of impedance constrained D2D communication an expansion in the aggregate throughput in a nearby cell territory can be achieved 0.

For little changes in partition separate (i.e., on the request of wavelengths), Fig. highlights the primary spread components experienced at ultra-high frequencies for device-to-device communication interfaces in which the immediate connections between UEs is shadowed by the human body**Error! Reference source not found.** In the event that we at first consider the connection between clients, here both gadgets are situated in pocket at that time the particular client's waist As should be obvious the principle LOS flag way from U1 to U2 is darkened by the second client's body. In this case, on the off chance that we at first disregards the specular and multipath signals that these segments produced by the neighborhood environment, the D2D connection will be shaped by a blend of reflected, diffracted, surface wave engendering 0 and non homogeneous diffusing from the second client's body in

which none, at least one of these procedures may momentarily overwhelm that the signs have reception**Error! Reference source not found.** To entangle matters further, because of physiological and biomechanical procedures are related with the people body, the shadowing impact created by the body will frequently be non-deterministic and must be dealt with as an arbitrary process.

III. PROPOSED SYSTEM

We propose this framework to conquer the a few downsides of the current framework. What's more, increment the productivity of our system 0 Utilizing device-to-device communications for cellular communications. Furthermore, this will give a chance to expand organize limit and also that enhancing ghostly proficiency. In our framework we are make two cases 0. By utilizing these two cases we are send the message from sender versatile to recipient portable inside system or in other network0.

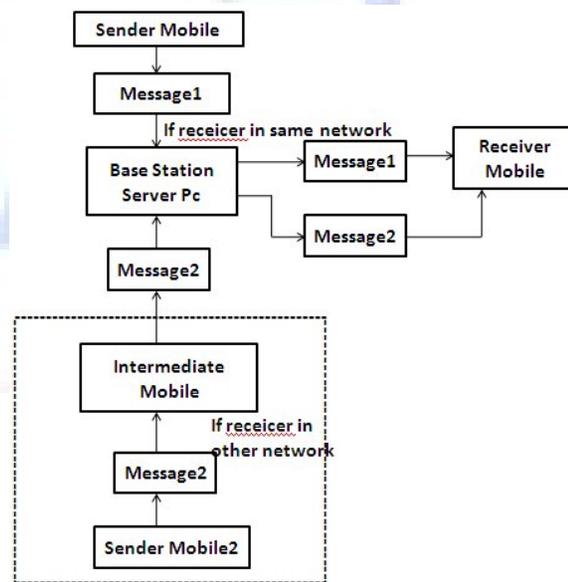


Figure 2: Block Diagram of D2D communication over Wireless Network.

Above figure 2 demonstrates that the D2D communication between gadgets in remote system. In this framework there are sender and receiver 0 in this framework first make the system then make diverse hubs inside system. In that we appoint IP delivers and weights to these hubs for access 0 in the sense the mobiles are associated in the system. We are actualizes

the two cases in our framework. In first case there is system and sender needs to send message to the beneficiary in same network. For this situation we are utilize the base station as a server pc for message transmission. So the sender portable and recipient mobiles are associated with the base station. sender send message to the base station, then base station send this message to the best possible destination(Receiver mobile)[12].like this work is done in first case 0we concentrate that the gadget speaking with the base station and two gadgets that speak with each other. In that two gadgets are spoken with each other toss the base station (BS) 0

In second case we are additionally make alternate systems. at the point when receiver not in system then there is Sender gadget need to send message to recipient yet condition that the beneficiary not in range or not inside system, around then we are utilize the $\kappa - \mu$ fading model is appeared to give a solid match to the field information and additionally giving a helpful understanding into the qualities of the got signal0in this condition sender hub select the closest moderate portable of recipient, sender send the message to the halfway mobileError! Reference source not found.. This portable impart their hotspot to beneficiary mobile. After that this halfway versatile send this message to the base station and after that this message send by base station to receiver.

IV. RELATED WORK ON D2D COMMUNICATION IN WIRELESS NETWORKS

Atta ur Rahman, Syed Ali Hassan had cleared up about Analysis of Composite Fading in a Single Cell Downlink Cooperative Heterogeneous Networks0. In that Shadowing and multipath fading there are two principal channels have qualities that effect the execution of a remote communication framework. In this paper, we dissect the execution of gadget to gadget (D2D) agreeable heterogeneous systems and this where sit still clients can be locked in to give better scope to a macro cell client utilizing open up and-forward helpful procedure. We consider the multipath fading with way misfortune and model their impacts on the execution of the system. Shut shape expressions for the flag to-clamor proportion (SNR) and blackout probabilities are determined and it has been demonstrated that the downlinks execution of the macro cell .that client can be upgraded by utilizing fem to client collaboration. Explanatory outcomes are approved through recreations.

Simon L. Cotton had illuminated about A Statistical Characterization of Device-to-Device Communications in an Indoor Environment 0.in This paper exhibits the consequences of an estimation at the portraying and demonstrating the indoor radio channels between two speculative cell handsets. The device-to-gadget channel estimations were made at 868 MHz and researched various different ordinary situations, for example, the gadgets being held at the client's heads, set in a pocket and one of the gadgets put on a desktop. The as of late proposed $\kappa - \mu$ fading models was utilized to portray these channels and was appeared to give a decent depiction of the deliberate information. It was additionally obvious from the trials, that the gadget to-gadget communications channel is powerless to shadowing brought about by the human body.

Xiaofan Wang, Xue Jun Li, Hnin Yu Shwe, Ming Yang, Peter Han Joo Chong had ordered that Interference-Aware Resource Allocation for Device-to-Device Communications in Cellular Networks 0.In this Device-to-gadget (D2D) communications was proposed basic cell systems to build framework ability to bolster high-information rate interactive media administrations. Be that as it may, D2D communication is unavoidably carries alongside co-channel impedance to ordinary cell clients. In this paper, we propose obstruction mindful asset assignment (IARA) plot for cell systems with the hidden D2D communications. The proposed IARA plan depends on the two-way channels pick up estimations and obstruction level estimations. Related works are returned to. Its execution is researched through the broad PCs recreations. IARA plot beats irregular allotment (RA) conspires. We additionally propose to utilize versatile transmission of force for D2D clients need to shield the cell clients from serious co-channel obstruction. Recreation comes about demonstrate this takes into account longer connection separate for D2D clients, prompting to better assets reuse.

Wei Jiang, Hanwen Cao, Leonardo Goratti, Michael Wiemeler, Thomas Kaiser had ordered that Relaying over Aerial-to-Terrestrial and Device-to-Device Radio Channels 0. To empower the quick sending for an open wellbeing is communication organize, a novel framework design incorporating an elevated construct station mounted in light of a low-height stage has drawn numerous considerations. Notwithstanding, the flag scope is given by a quickly sent systems is sketchy and temperamental, which struggle with the high necessity on connection unwavering quality on account of fiasco help and crisis occasions. Artful of handing-off is a basic however it is successful technique to

procure the spatial differing qualities in agreeable frameworks. It can be utilized to expand the connection flexibility and enhances the frameworks strength in such a quickly sent it and exceedingly dynamic system. As of recently, the hypothetical examinations and execution assessments in regards to the artful transferring are only in light of that the glorified little scale fadings, i.e., Rayleigh or Rician, without considering the way misfortune and shadowing. To close that crevice, accordingly, we concentrate the current channel models and that picks the most proper ones mirroring the sensible attributes of Aerial-to-Terrestrial and Device-to-Device channels. In this paper, the effects of force assignment methodologies, that transporter the frequencies, number of transfers, and heights of low-elevation stage and separations among terminals on ghostly efficiencies of entrepreneurial is transferring over the Aerial-to-Terrestrial and Device-to-Device radio channels are researched.

Pekka Janis, Chia-Hao Y.U, Klaus Doppler, Cássio Ribeiro, Carl Wijting, Klaus Hugl, Olav Tirkkonen, had characterized that Device-to-Device Communication Underlying Cellular Communications Systems 0. In this paper encourage nearby shared communication by a Device-to-Device (D2D) radio that works as an underlay system to an IMT-Advanced cell organize. It is normal that the nearby administrations are may use portable shared communication rather than focal server based communication for rich multimedia administrations. The principle test of the underlay radios in a multi-cell situation is as far as possible the difference between the cells arrange while accomplishing a sensible connection spending plan for the D2D radio. We propose a power control component for D2D associations that shares the cell uplink assets. As far as possible the most extreme D2D transmit control using cell control data of the gadgets in D2D communication. In this way it is empowers that under laying D2D communication even in impedance constrained systems with full load and without corrupting the execution of the cell organize. Furthermore, we concentrate that a solitary cell situation comprises of a gadget speaking with the base station and two gadgets that speak with each other. The outcomes show that the D2D radio, here having similar assets is as the cell network can give higher limit (aggregate rate) contrast with immaculate cell communication where every one of the information is transmitted through the base station.

V. K-μ DISTRIBUTION

The κ-μ distribution is bound to show homogeneous conditions, where the disseminating for each bunch can be displayed with a circularly symmetric irregular variable 0. The inference of the κ-μ circulation from Lemma 1 is given in the accompanying culmination.

End product 1: Let $\gamma_1 = \bar{\gamma}_1 \omega_1 / \Omega - 1$, with $\bar{\gamma}_1 = E[\gamma_1]$, be the immediate SNR of the model in eq. (1), i.e., $\gamma_1 \sim S_{\kappa\mu}(\bar{\gamma}_1; \kappa, \mu, m)$.

On the off chance that $m \rightarrow \infty$, $\gamma_1 \sim S_{\kappa\mu}(\bar{\gamma}_1; \kappa, \mu)$.

Confirmation: By taking the breaking point $m \rightarrow \infty$ in eq. (4) and applying the accompanying properties

$$\lim_{a \rightarrow \infty} {}_1F_1\left(a; b; \frac{1}{a} z\right) = {}_0F_1(b; z) \quad (1)$$

$$\lim_{a \rightarrow \infty} \left(1 + \frac{1}{a} x\right)^{-a} = e^{-x} \quad (2)$$

Where the equation (2) is the notable furthest reaches that characterizes the exponential capacity. Conclusion 1 is deciphered as takes after: the κ-μ conveyance is inferred by taking out totally the shadowing of every predominant segment, which should be possible by taking $m \rightarrow \infty$, so that the prevailing part of each group gets to be distinctly deterministic. Really, as the parameter m develops, the pdf of every prevailing part is steadily compacted and, at the point of confinement $m \rightarrow \infty$, it turns into a Dirac delta work. Along these lines, the model is characterized by a circularly symmetric complex arbitrary variable with some non-zero mean in each bunch, so we get the κ-μ demonstrate, though on the off chance that that $\mu = 1$ we have the Rician fading model. Next, we determine the Nakagami-m physical model from the physical model in equation (3)

End product 2: Let $\gamma_1 = \bar{\gamma}_1 \omega_1 / \Omega - 1$, with $\bar{\gamma}_1 = E[\gamma_1]$, be the immediate SNR of the model in eq. (9), i.e., $\gamma_1 \sim S_{\kappa\mu}(\bar{\gamma}_1; \kappa, \mu, m)$. In the event that $\kappa \rightarrow 0$, $\gamma_1 \sim \Gamma(\mu, \mu)$. Confirmation: By taking the utmost $\kappa \rightarrow 0$ in eq. (4) and applying the accompanying property

$$\lim_{c \rightarrow 0} pFq(a_1 \dots ap; b_1 \dots bq; cz) = 1. \quad (3)$$

we acquire the pdf in eq. (3). See that eq. (3) can be completed by just abusing the arrangement articulation of the hyper geometric capacity of scalar contention,

where the principal term has the unit esteem and whatever remains of the terms are forces of the scalar contention, with the goal that they get to be distinctly zero when taking the farthest point. We give the accompanying translation about Corollary 2. By tending $\kappa \rightarrow 0$, we kill all the prevailing segments of the model, notwithstanding the estimation of the shadowing parameter m , so that we just have dispersing segments in each group, i.e., we get a model which takes after a Nakagami- m dissemination or one of its specific cases, Rayleigh or uneven Gaussian, contingent upon the estimation of μ .

A) THE $\kappa - \mu$ FADING MODEL

The κ - μ Fading dissemination is one of the different instances of the κ - μ dispersion, which is a general blurring conveyance that can be utilized to better speak to little scale varieties of the blurring signal under a LOS condition. The κ - μ dissemination incorporates as uncommon cases essential different appropriations, for example, Rice and Nakagami- m (In this way, One Sided Gaussian and Rayleigh are likewise exceptional instances of it). As its name hints, it is characterized regarding two physical parameters, to be specific κ and μ . The parameter $\kappa > 0$ alludes to the proportion between the aggregate force of the predominant parts and the aggregate force of the scattered waves, though the parameter $\mu > 0$ is identified with the multipath grouping. The κ - μ fading conveyance is acquired by controlling these physical parameters for a specific measure of Fading. In particular, the Nakagami- m parameter m is acquired when $\kappa \rightarrow 0$. In such case, $\mu = m$. For a κ - μ Fading signal with envelope R and a standardized envelope $P = R/r^{\hat{}}$, with $r^{\hat{}} = p E(R^2)$, the κ - μ Fading PDF, $f_p(p)$, is composed as

$$f_p(p) = \frac{2\mu(1+k)^{\frac{\mu+1}{2}}}{k^{\frac{\mu-1}{2}} \exp(k\mu)} p^{\mu} \exp[-\mu(1+k)p^2] \times$$

$$I_{\mu-1} [2\mu\sqrt{k(1+k)}p] \quad (4)$$

for which $\mu > 0$ is given by 0

$$\mu = \frac{E^2(R^2) (1+2k)}{\text{var}(R^2) (1+k)^2} \quad (5)$$

I_v is the adjusted Bessel capacity of the main kind and request v , $\text{Var}(R^2)$ and $E(R^2)$ signify the difference and the desire administrators, separately. Besides, it is known from 0 that κ and μ can be communicated as far as the standardized change of the force of the blurring signal, typically characterized as m . At the end of the day, 0

$$m = \frac{\mu(1+k)^2}{1+2k} \quad (6)$$

Given that $\mu > 0$ and $\kappa > 0$, and that a relationship among κ , μ and m is found through Equation 3, for a settled m , as $\mu \rightarrow 0$ then $\kappa \rightarrow \infty$. In such case, it can be demonstrated that the κ - μ extraordinary PDF is given by

$$f_p(p) = \frac{4mI_1(4mp)}{\exp[2m(1+p^2)]} + \left[1 - \frac{\sqrt{2m\pi}}{\exp(m)} I_{0.5}(m)\right] \delta(p) \quad (7)$$

B) Security Challenges for D2D Communication via WiFi Direct

Not with standing every one of the advantages of the rising WiFi Direct convention, security is one of the significant worries that should be very much tended to before this procedure is generally acknowledged and implemented. In any case, the open get to and the communicate way of remote channels; Wi-Fi Direct is undermined by an assortment of attacks 0.

VI. CONCLUSION

Exhaustive information of the D2D communication channel will be fundamental for D2D communications. This paper has concentrated on a little, however critical, some portion of this examination issues. For this factual model of shadowed fading in the remote communication channels has been proposed, in particular the shadowed $\kappa - \mu$ fading model. In this new model the potential grouping of multipath segments are considered as nearby the nearness of elective predominant flag parts, a situation which is like that saw in conventional $\kappa - \mu$ fading. In this article, we have proposed a protected WiFi Direct convention that can be utilized for secure D2D communications. We have initially dissected the potential security dangers and difficulties for the developing WiFi Direct convention. At that point we have examined how to effectively set up a cryptography key to secure the WiFi

Direct communications. In that this model was determined for the demonstrating shadowed fading in D2D communication, it will discover application in numerous communications situations in which the flag is liable to shadowed fading in this framework we effectively send the message from sender to recipient inside system and furthermore in other network. The D2D communication id is done by utilizing base station. So we reason that in first case mobiles in same system then sender send message to base station and after that base station to recipient. What's more, in second situation when beneficiary not in range or system then sender discover the halfway portable of receiver. At that point this versatile impart their hotspot association with receiver. In this idea sender send message to moderate portable, then this versatile send message to base station and finally this message send from base station to recipient.

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