Utran Mobility Information In Femtocell

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***Abstract*—In this paper, we talk about information about UTRAN in Femtocell. Today communications are approximately 75% using mobile networks are especially in closed rooms. Which consists of the tiny cellular base station, Femtocell give higher quality and higher performance to its customers after connecting to the operator's mobile network using the broadband connection at home. In UTRAN is a network that allows the mobile phones to connect to the internet. While UTRA is a radio technology which is used between the mobile phone and the internet. UTRAN contains a base station which is known as Node B and RNCS. The Base station transmits radio frames on the certain radio channel and time slot over the transmission link. Transmission over a transmission link is very sensitive. We see some UTRAN functions like mobility management and Lu coordination and specific functions of HNB.**

Keywords*— *Cellular, backhaul, transmission, residentially, base station, gateway, operators,clusters, frequency, uplink, downlink, scalability

I. INTRODUCTION

The Femto cells are popular with the operators, especially in the residential or business units either in clusters or single standalone items. These were called access point base station, using this small Femtocell, the performance of cellular can be improved with supplementary services. To link with the network, user uses the DSL or internet link the scheme of mobile backhaul. So this leads cost effective and wide data link for the Femtocells where we can use for all applications. Actually the Femtocell derived from CELLULAR AND FEMTO**,** the stands for one – Quadrillionth, six orders of magnitude which are smaller than NANO [1]. A Femtocell 3G is known as a home node the main purpose of Femtocell is designed for the home user. The device requires very simple setup with small power plug. Femtocell coverage is bit small, area of range within ten meters of the node. There is a more Femtocell service with a phone contract, those people are facing problem adequate home phone reception. So this Femtocell supplies a full strength signal within range of operation, by this way users never miscalls due to lack of signal. So landline can be replaced with the mobile. [2]. So this cellular base station agrees to providers to extend either indoor coverage or at the cell edge services. All standards, GSM, CDMA2000, TD-SDMA, WIMAX and LTE solutions are applicable for this concept. Femtocell can hold the gap and eliminates the missing of signals through the building, average coverage, capacity will increase by decreasing the number of handsets action to use the main cell of the network. Since base station is placed in the building so consumer get improve the coverage and benefits. These kind of services the phone access the local area network via Femtocell like downloading the content from to home serve to mobile and vice versa. Controlling other devices like (tv,hi) by the mobile, video door bell and home security. Like every design, this paper is structured as follows various architecture designs proposed for the Femtocell and it provides the access control modes.

II. ARCHITECTURE

This technology of the hardware device locates at the customers, which interfaces with mobiles over the air radio interface. Researchers have presented various architectures of Femtocell networks in this section, we discuss 3GPP HNB Femtocell network architecture. Femtocell built on IP technology within the program of action of the core network through the packet switched core network to transmit voice and other real-time services. An architecture makes possible to get different types of Femtocells from manufacturers to work with different operators in the network. So cost reduction and gaining the scale of economies by this way, also a greater fixture between the manufacturers of a Femtocell. The main fundamental requirement for the base station is the station itself should be located in the users building even though some base station locate external also, it will provide the coverages in the area of low /no range. By the figure 3Gpp deals with operators to provide the ideal standard. A new interface is developed by this standard within the architecture. The main key elements to the Femtocell are home node B (HNB) is a 3G UMTS terminology to get the access point for the Femtocell in the home or any particular location, facility of standard Node B and management of radio resource activity with found in Radio controller.

Network (RNC). HNB Gateway (HNB-GW) represents the main point of the core network linked with Iu-Cs and Iu-Ps interface for RNC and remaining core network. The authentication and certification of data to and from official HNBs being are the one of the functions of the gateway.

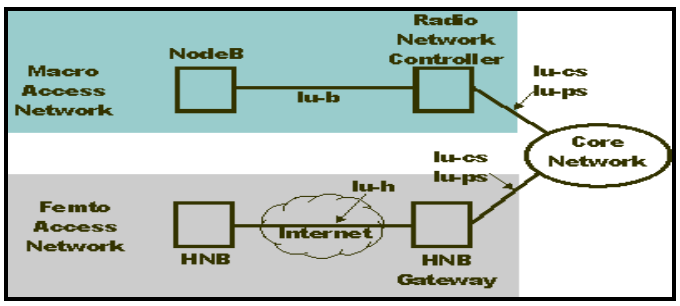

Fig. 1. Architecture.

Mechanism to favor extent qualities like a clock synchronous distribution and IP based distribution [6] and IU-H interface supplies link or interface connects the HNB with HNB-GW along with application protocol. So this interface adds protocol of HNB application, HNBAP to provide high scalability.

III. HOME NODEB SUBSYSTEM ARCHITECTURE

Now we see the Home NodeB Subsystem architecture (HNS) consists of a Home NodeB (HNB) and the Home NodeB Gateway (HNB-FW). Home node B represents as RNS to the core network by connecting to the Iu-CS interfaces to MSC and SGSN.

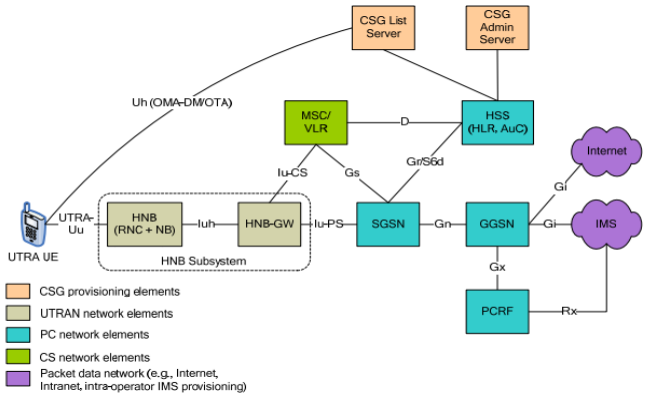

Fig. 2. Home Node B SubSystem Architecture.

Customer premises equipment (CPE) is Home NodeB (HNB) it consists the UTRAM NodeB presenting UTRAN coverage and RAN functions also. This function to give assistances to HNB authentication, HNB-GW discovery, registration of HNB and configuration via OAM [7] Home NodeB accesses the core network by the Home NodeB Gateway (HNB-GW) and which includes the HNB and UE registration functions, to connect the HNB to the core network requires handling functions those are UE access control, and a Lu [8].

The architecture of Femtocells in network [9] IS user equipment, core network and UTRAN are the major knowledge. This paper, we are talking about UTRAN.UTRAN which consists of handless mobility and many radio interfaces. From the shown figure 3. UTRAN is a collective term for the Node B equivalent to the BTS and RNC where the RNC is responsible for controlling the Node B‘s when there are connected to the access network. The Connection establishes between UE (user equipment) and core network by the UTRAN contain with a number of base stations called Node B and RNC (radio network controller). Control functionalities are provided by the RNC to one or more Node B’s so RNC and the corresponding NodeB’s called as RNS (radio network subsystem). So more one RNS can be exists with UTRAN going to keen observation of the shown figure 4 interfaces lu,Uu,lub, and lur are connecting to the UTRAN internally and externally, Lu interface connects RNC to the CN externally, Uu connects the Node B with UE externally, lub connects RNC with NodeB internally and lur connects two RNCs internally.RNC the network element responsible for the UTRAN. It interfaces CN to one MSC and SGSN and RRC terminates protocol that defines the message and procedures between mobile and UTRAN and logically corresponds to the GSM BSC.

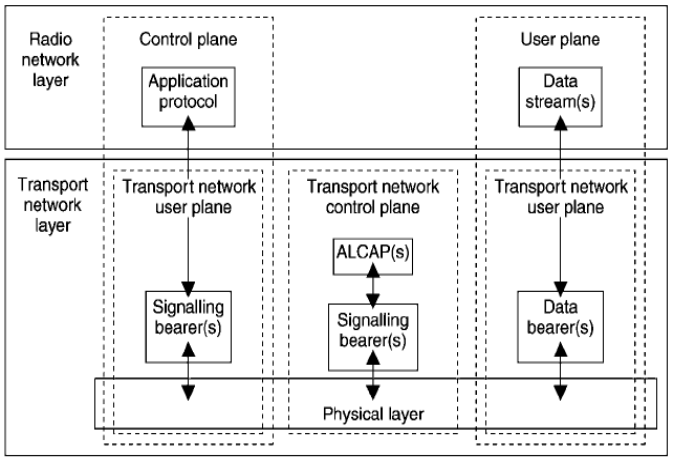

Fig. 3. Handless Mobility from RNL and TNL.

The main characteristics of the UTRAN it supports soft handover and WCDMA specific radio resource management algorithms the main transport mechanism in UTRAN the use of ATM transport and also use of IP based transport as the alternative mechanism.

IV. PROTOCOL MODEL FOR UTRAN TERRESTRIAL INTERFACES

The interfaces are general, horizontal layers and vertical planes.The principle of this structure that layers and planes are logically independent of each other [10]. The design is stated by general protocol model, the structure of the protocol may have chance to chance in the future and remaining parts are same. In horizontal layer structure of protocol consists two more layers Radio network layer (RNL) and Transport network layer (TNL). RNL shows only the Issues of UTRAN and other represents for transport technology, which was used by only UTRAN.

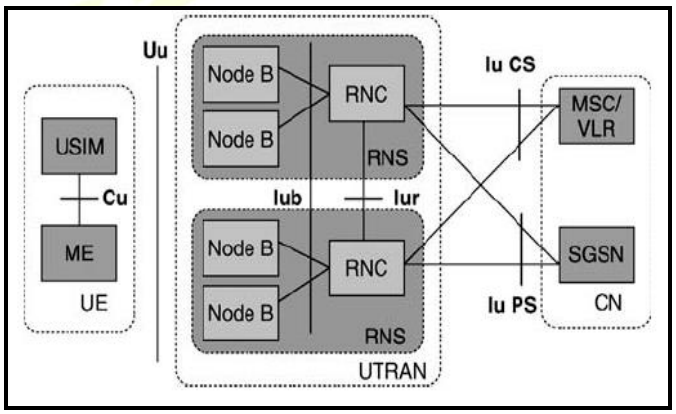

Fig. 4. Horizontal Layer Structure Of Protocol.

Vertical planes consists control plane, which includes application protocol, RANAP and RNSAP or NBAP and others signaling bearer for transport application protocol messages, this control plane used for all UMTS for controlling signals. In

RANAP, RAN is the application part in Iu. RNSAP, RNS is an application part in Iur. NBAP node B application part in Iub where application protocol is used to build setting up bearers in UE that is a radio access bearer in Iu and radio link Iur and Iub.

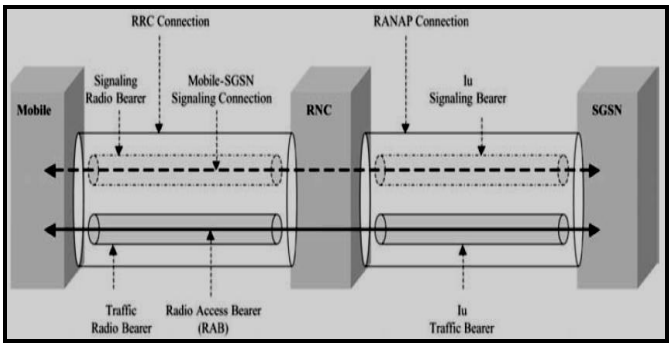

Fig. 5. Vertical layer structure of protocol.

User plane involves the data stream and the data bearer the data stream characterized by more than one frame protocols for the particular interface. In this section all the information sent and received by the user as coded voice in a voice call and packets in an Internet connection. The Transport network control plane used to controlling signaling within transport layer and it doesn't include any information of the radio network layer. And also includes access link control application part (ALCAP) protocol used to set bearers of transport for the user plane those are data bearer. Transport network control plane acts between control pane and user plane and makes it possible for the application protocol in RNCP to completely independent technology for data bearer in the user plane. Transport network user plane here data bearers are in user pane and signaling bearers are in the application protocol.

V. DIFFERENT RNTI USED IN UTRAN

The Radio Network Temporary Identities (RNTI) are used identities of the UE for signaling messages between UE and UTRAN within the UTRAN. There are two types of RNTI. S-RNTI is used to serve RNC and so called serving RNC RNTI. This S-RNTI is located for all UEs having RRC and S-RNTI is relocated always when serving RNC for RRC connection and the other C-RNC used to controlling RNC RNTI in this UE will communicate with DCCH [12]. S-RNTI, D-RNTI, C-RNTI, U- RNTI.

TABLE I. RNTI USES AND VALUES

RNTI	Use	Value
C-RNTI	PDSCH transmission for dynamic scheduling	003D〜FFF3
RA-RNTI	For random access response (RAR)	0001〜003C
SI-RNTI	SIB message transmission for identifying	FFFF
P-RNTI	Transmitting a paging message used to identify	FFFE
TPC-RNTI	User groups are used to identify jointly encoded TPC command transmission	003D〜FFF3
Temp C-RNTI	Transmission for Msg3 of conflict resolution	003D〜FFF3
SPS C-RNTI	For semi-persistent scheduling PDSCH transmissions	003D〜FFF3

RNTI uses temporary IDs. But IMSI /IMEI, used by the UE. IMEI number should avoid to sending to the network, in particular situations. Like SIM does not exist with UE or not confined to a cell and user desires to make the call. These S-RNTI is located with RRC connection setup by SRNC, D-RNTI, C- RNTI, and U- RNTI U-RNTI is used for simply identifying UE so it exists with two parts.

U-RNTI 32 bit = SRNC identity +S-RNTI

The SRNC identity is an identity of RNC, simply identify the RNC is public land mobile network (PLMN) while S-RNTI is allocated by the RNC actually 32 bits are the U-RNTI length and SNRC identity is 12 bits long and SRNC is maximum 12 bits IN the Home NodeB evaluate function of Node B in the network of the RNC, while control pane converge the function by the HNB–GW. One combination of HNB-GW and HNB completed by the different methods of U-RNTI. On HNB network interface Iu RNC-ID is used for identifying the HNB-GW in the core network. When U-RNTI performs allocation the Home nodeB gateway of RNC-ID used ad SRNC identity, so HNB network, realizing of the U-RNTI as

U - RNTI = RNC – ID + S - RNTI

For example UTRAN radio network identity comprises RNCID and S-RNTI namely we follow table 2. If we want to identify HNBS, HNB-GW and UEs under one S-RNTI need to locate.If S-RNTI performing prefix information then identity, location (S-RNTI prefix) and HNB-RNTI. So the relation between the lengths of the information is

U - RNTI = RNC – ID + S – RNTI prefix +HNB-RNTI

Let's take another example the U-RNTI have predetermined value N bits length.then RNC-ID is the first value of n1 bits length so S-RNTI prefix length allocated to HNB by HNB-GW so the relationship namely.

U - RNTI = RNC – ID + S – RNTI prefix + HNB-RNTI

VI. CHANNEL TYPES IN UTRAN

The UTRAN contains specific ranges of those channels are classified into three classes. Logical channel, transport channel and physical channel were created to do independent function level at the interface of radio. The logical channel information carried by the UTRAN protocol this called is very limited, but wide information travel by the radio interface, again this logical channel divided into 2 faces one for control and traffic channels. Where logic control channels are BCCH (Broadcast

Control Channel) - Downlink only. Broadcast. PCCH (Paging Control Channel) - Downlink only. Unicast Which Carries paging requests. CCCH (Common Control Channel) - Downlink/uplink. Unicast Messages related to RRC connection setup. DCCH (Dedicated Control Channel) - Downlink/uplink. User-specific control plane traffic. DTCH (Dedicated Traffic Channel) - Downlink/uplink. Carries user plane traffic. Transport channels.

Inform to the radio interface, it transfers the data format. Channel exist with some attributes called transport format set (TFS). List of channels in transport is BCH (Broadcast Channel) - Downlink only. Which Carries the BCCH, PCH (Paging Channel) - Downlink only. Carries the PCCH, FACH (Forward Access Channel) - Downlink only. Carries the downlink CCCH, DCH (Dedicated Channel) - Downlink/uplink. Carries the DCCH, RACH (Random Access Channel) - Uplink only. Carries the uplink.

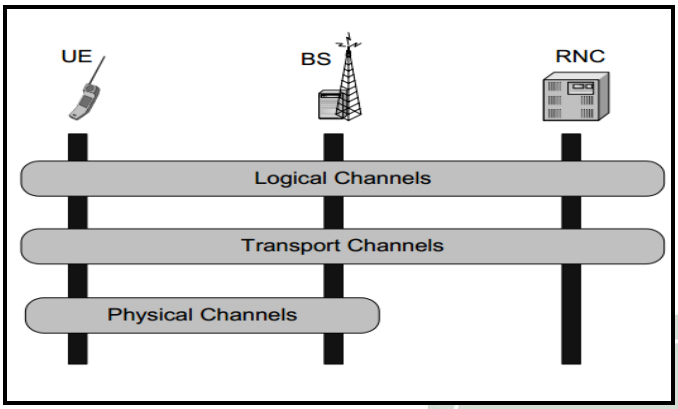

Fig. 6. UTRAN channel types.

Physical channel supports different transport channel transport channel is separates the logical and physical channel and also supported by two more physical channels applied to interface and channel coding and main thing in this channel protect data from the transmission errors [18]. P-CCPCH (Primary Common Control Physical Channel) - Carries the BCH. S-CCPCH (Secondary Control Control Physical Channel) - Carries one or more FACHs and the PCH. PICH (Paging Indication Channel) - Carries a bit mask of reduced paging information. It does not carry any higher-layer data. P-SCH (Primary Synchronization Channel) - Supports first stage of cell synchronization: word sync. S-SCH (Secondary Synchronization Channel) - Supports the second stage of cell synchronization: frame sync. PRACH (Physical Random Access Channel) - Carries the RACH. And some other channels.

A. Frequency Channel Number In UTRAN

UARFCN ("UTRA Absolute Radio Frequency Channel Number ") purpose of using in UMTS/WCDMA system to convert the frequency in different bands to UARFCN number, UARFCN exist with 5MHz carrier channel number in UMTS . The central frequency and frequency of the uplink and frequency of downlink will be calculated from this channel [16].

$$N_U = 5 * (F_{UL} - F_{UL\_Offset}), \text{ with } F_{UL\_low} \le F_{UL} \le F_{UL\_high}$$

$$N_D = 5 * (F_{DL} - F_{DL\_Offset}), \text{ with } F_{DL\_low} \le F_{DL} \le F_{DL\_high}$$

B. UTRAN FDD Frequency Band

TABLE II. UTRAN FDD FREQUENCY BAND

Band	Name	Downlink (MHz)			Bandwidth (MHz)	Uplink (MHz)			Duplex Spacing (MHz)	Equivalent GSM band
		UARFCN : Associated Freq MHz[1]				UARFCN : Associated Freq MHz[1]				
		Low	Middle	High		Low	Middle	High		
1	2100	211010562 : 2112.4	214010700 : 2140	217010838 : 2167.6	60	19209612 : 1922.4	19509750 : 1950	19809888 : 1977.6	190	
2	1900 PCS	19309662 : 1932.4	19609800 : 1960	19909938 : 1987.6	60	18509262 : 1852.4	18809400 : 1880	19109538 : 1907.6	80	14
3	1800 DCS	18051162 : 1807.4	1842.51338 : 1842.6	18801513 : 1877.6	75	1710937 : 1712.4	1747.51113 : 1747.6	17851288 : 1782.6	95	13
4	AWS-1	21101537 : 2112.4	2132.51638 : 2132.6	21551738 : 2152.6	45	17101312 : 1712.4	1732.51413 : 1732.6	17551513 : 1752.6	400	
5	850	8694357 : 871.4	881.54408 : 881.6	8944458 : 891.6	25	8244132 : 826.4	836.54183 : 836.6	8494233 : 846.6	45	8
6	2600	26202237 : 2622.4	26552400 : 2655	26902563 : 2687.6	70	25002012 : 2502.4	25352175 : 2535	25702338 : 2567.6	120	
7	900 GSM	9252937 : 927.4	942.53013 : 942.6	9603088 : 957.6	35	8802712 : 882.4	897.52788 : 897.6	9152863 : 912.6	45	10
8	AWS-1+	21103112 : 2112.4	21403250 : 2140	21703388 : 2167.6	60	17102887 : 1712.4	17403025 : 1740	17703163 : 1767.6	400	
9	1500 Lower	14763712 : 1478.4	1485.93750 : 1486	1495.83787 : 1493.4	19.8	14283487 : 1430.4	1437.93525 : 1438	1447.83562 : 1445.4	48	
10	700 a	7293842 : 731.4	737.53873 : 737.6	7463903 : 743.6	17	6993617 : 701.4	707.53648 : 707.6	7163678 : 713.6	30	5
11	700 c	7464017 : 748.4	7514030 : 751	7564043 : 753.6	10	7773792 : 779.4	7823805 : 782	7873818 : 784.6	-31	~6
12	700 PS	7584117 : 760.4	7634130 : 763	7684143 : 765.6	10	7883892 : 790.4	7933905 : 793	7983918 : 795.6	-30	~6
13	800 DD	7914512 : 793.4	8064575 : 806	8214638 : 818.6	30	8324287 : 834.4	8474350 : 847	8624413 : 859.6	-41	
14	1500 Upper	1496862 : 1498.4	1503.4887 : 1503.4	1510.8912 : 1508.4	14.8	1448462 : 1450.4	1455.4487 : 1455.4	1462.8512 : 1460.4	48	
15	3500	35104662 : 3512.4	35504850 : 3550	35905038 : 3587.6	80	34104437 : 3412.4	34504625 : 3450	34904813 : 3487.6	100	

CONCLUSION

UTRAN network shows benefits for a couple of years like operations, administration, accuracy and handovers the voice like GSM GPRS, UMTS to high data rate by depend on packet data.

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