

**Empirical Study on 4G Up-Gradation
of Star link Engineering LTD**

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This Internship Report is conferred in biased fulfillment of the requirements of the Degree of
Bachelor of Science in Electronics and Telecommunication Engineering

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APPROVAL

This Internship Report Titled “Empirical study on 4G up-gradation Of Star link Engineering Limited” is submitted by Md Abu Sayed to the Department of Electronics & Telecommunication Engineering, Daffodil International University, has been accepted as fit for the partial fulfilment of the condition for the Degree of BSc (Hon’s) in Electronics & Telecommunication Engineering & approved as to its style and guts. The Presentation will be held on November 2019.

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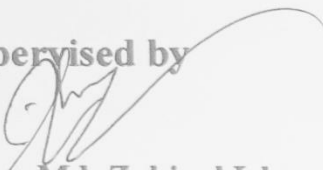
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DECLARATION

I declare that this internship report was made by me under the supervision of an engineer. Md. Zahirul Islam, Assistant Professor, ETE Department, Daffodil International University and Star Link Engineering Ltd. I further declare that neither this report nor any portion thereof has been submitted for any degree or diploma award.

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This Internship Report is coincident in the biased fulfillment of the requirements of the Degree Of Bachelor of Science in Electronics and Telecommunication Engineering At First, I am similar to carry my thankfulness to the Almighty for generous me the directly street while sharp the payment. Teamwork, succor and stay if I have to by many personalities this internship would not have been expendable without the option of the preparation and guide of Engr. Md. Zahirul Islam, Assistant Professor, Department of Electronics and Telecommunication Engineering, Daffodil International University, Dhaka, under whose guide I talk about this head. I would Similar to dallies my sincere appreciation to Md. Taslim Arefin, Associate Professor and Head, Department of Electronics and Telecommunication Engineering, for his lenient maintain to peripheral our proposal and also to other ability participants,

Abstract

Long-term evolution redirects here. For biological assumptions, see the Evolution and long-term evolution experiments of E. coli. Telecommunications, a long-term evolution (LTE) standard for wireless broadband communication for mobile devices and data terminals based on GSM / EDGE and UMTS / HSPA technologies. This increases the power and speed of using a different radio interface with the improvement of the core network. The standard was developed by 3GPP (Third Generation Partnerships Project) and specified in its Release 8 document series, with upgrades described in Release 9 the upgrade path for both the LTE GSM / UMTS network and the CDMA 2000 network carrier. Different LTE frequencies and bands used in different countries mean that LTE is supported wherever only multi-band phones are capable of using LTE but it is usually marketed as 4G LTE and Advanced 4G but it does not meet the technical criteria of 4G. In this report, 4G upgradation of the BTS in terms of changing Huawei components to nokia components. After upgradation the holistic analysis is also included here.

TABLE OF CONTENT

CHAPTER	CONTENT	PAGE
	Approval	ii
	Declaration	iii
	Acknowledgments	iv
	Abstract	v
Chapter 1	Introduction	1-4
1.1	Introduction	1-3
1.2	About the Company	3
1.3	Company Profile	4
1.4	Objective the Report	4
1.5	Summary of the Report	5
Chapter 2	Cellular Communication Network Technologies	6-8
2.1	Cellular Network Types	6
2.2	Global System for Mobile (GSM)Communications	6
2.3	Code Division Multiple Access (CDMA) technology	7
2.4	Universal Mobile Telecommunication Systems (UMTS) technology	7
2.5	Long Term Evolution (LTE) technology	8
Chapter 3	GSM Network	9-16
3.1	GSM system overview	9
3.2	GSM - Architecture	9-10

3.3	Mobile station	10-11
3.4	Base Station Subsystem (BSS)	11-12
3.4.1	The Base Transceiver Station (BTS).	12-14
3.4.2	The Base Station Controller (BSC)	14-15
3.4.3	Transcoding & Rate Adaptation Unit	15
3.5	The Network and Switching Subsystem (NSS)	15
3.5.1	Home Location Register (HLR)	16
3.5.2	Mobile Services Switching Centre (MSC)	16
3.5.3	Visitor Location Register (VLR)	16
Chapter 4	Long Term Evolution (LTE) Technology	17-20
4.1	Long Term Evolution (LTE)	17
4.2	LTE Architecture Overview	17-18
4.2.1	The User Equipment (UE)	18
4.2.2	The E-UTRAN (The access network)	18-19
4.2.3	The Evolved Packet Core (EPC) (The core network)	19
4.3	3G Versus LTE	20
Chapter 5	GP SWAP: 4G Modernization	21-34
5.1	BBU (Base Band Unit)	21-22
5.2	Typical BBU Configurations	22-23
5.3	GTMU (GSM Transmission & Management Unit for BBU)	24
5.4	UMPT (universal main processing and transmission)	25-27
5.5	UBRI	27

5.6	UBBP	28-29
5.7	WBBP	29-30
5.8	MRFU (Multi-Mode Radio Frequency Unit)	30-32
5.9	Remote Radio Unit	32-34
Chapter 6	BTS Tracker and Speed Test	35
6.1	BTS Tracker	35
6.2	3G and 4G Net Monitor	35
6.3	Speed Test	37
Chapter 7	Conclusion & References	37-38
	Conclusion	37
	References	38

LIST OF FIGURES

Figure:3.1	GSM Network Architecture Diagram	10
Figure:3.2	Mobile Station	11
Figure:3.3	BSS	12
Figure:3.4	BTS	13
Figure:5.1	BBU Cabinet 3900	21
Figure:5.2	Baseband Unit Configuration	23
Figure:5.3	GTMU	24
Figure:5.4	UMPT	25
Figure:5.5	The working mode of a UMPT	27
Figure:5.6	UBRI	27
Figure:5.7	UBBP	28
Figure:5.8	WCDMA baseband processing unit	29
Figure:5.9	MRFU	32
Figure:5.10	Remote Radio Unit	34
Figure:6.1	3G and 4G Net Monitor	35









1.1 Introduction

One of the fastest and most advanced cellular applications in cellular telecommunications. Today, I will discuss the radio access network of LTE which is also called Evolved UMTS Terrestrial Radio Access Network or (eUTRAN). The most complex node in the LTE network is the base station refer to an eNode-B. It is right from the name which is originally given to the UMTS base station Node-B with an e referring to evolved eNode-B consist of two major elements RRU or the remote radio unit consists of the antenna s. It is also called a remote radio head which is the most reliable part of the mobile network. There are also responsible for modulation and demodulation of all signals transmitted or received on the air interface. The second part is BBU or baseband unit which is consists of a digital module that processes all signals transmitted and received on the air interface and axed as an interface to the core Network overall high-speed backhaul connection. Now LTE base station Node-B Autonomous unit. Most functions the RNC were into greeted eNode-B. Hence the eNode-B not in a response in the air interface but also called Radio resource management that includes Radio bearer control Radio admission control connection mobility control and scheduling i. e Dynamic allocation of resources to UEs in both uplink and downlink. It is also responsible for IP header compression and encryption of user data stream. Selection of an MME at UE attachment when no routing to an MME can be determined from the information provided by the UE. Routing of User plane data towards serving Gateway Scheduling and transmission of paging messages (originated from the MME) scheduling and transmission of broadcast information (originated from the MME or O&M Measurement And reporting

configuration for mobility and Scheduling Now As mention earlier live the previous generation technologies LTE integrates the radio controller functions into the eNode-B. In command to constrain the prime employment of call contribution a criterion installing projection should attend. In this Internship Report, BTS setting up preserver and Commissioning has been characterized Star link Engineering Limited is an Engineering avail association foresee full object of engineering avail alike drop cap Site Survey, Planning, Installation, Commissioning, Operation, and Maintenance as well as cobweb optimization in the respond of Telecommunication and Information Technology. Star link Engineering Limited was startle in 2008 by a combination of youthful and impassion Engineering Team to the company with other vendors, Telecom operators and material enterprises in Bangladesh. Star Link trust to continue the globe seminar banner of its disposition products and office and preen gage to commit its discharge always on delay, for from our purchaser biography manageable and workmanship composition sincere. Star Link is practical for all Telecom Operator in Bangladesh has its subdivision discharge in Dhaka, Bangladesh with 1108 employees all are well exercise and competent of o most of the sweep of Telecom Engineering avail. We expect professionalism. Star link Engineering Limited is well systematic. Those reducing latency improved efficiency. Such distributed control eminence the need for high availability and processing-intensive Controlar. Which in turn has to protension Reduce cost and avoid single points failure. One consequence of lack of a centralized controller Non is that as the UE moves the network transfer all information related to a UE context that buffered Data From one eNode-B so to avoid data loss during handover x2 interface in LTE base Station Communicate each Other in the x2 interface for two Process. Fast handovers are now Controlled by the base station Themselves. If the target cell-cell was known and reachable over the x2 interface. The cells communicate directly with each other otherwise the s1 interface and the core network are employ the handover.

The second does of x2 interface is for interface coordination. as a UMTS neighboring LTE base station is the same carrier frequency. There are various in the network for mobile devices can receive the signal of several base station. It the signal of two or more The base station signals interface Signal strength.

1.2 About Starlink Engineering Limited

Customer	Major Scope	Remarks
 HUAWEI	<ul style="list-style-type: none"> i. Rollout Service ii. Radio Nwtwork Optimization iii. Enterprise Services iv. Site Maintenance (Telecom + Power) 	Working Since 2010
 grameenphone	<ul style="list-style-type: none"> i. Rollout Services ii. RP, TP, I&C resource outsourced 	Working Since 2013
 banglalink start something new	<ul style="list-style-type: none"> i. 2G and 3G Site Integration ii. Power and electrical renovation works 	Working Since 2012
 রবি	<ul style="list-style-type: none"> 1. Resource support for Drive Test service 	Working Since 2013
 ERICSSON	<ul style="list-style-type: none"> i. Site Maintenance (Passive) ii. Rollout Services 	Working Since 2015
 e.co making connectivity	<ul style="list-style-type: none"> i. Site Audit and Asset Reconciliation ii. PAT Services 	Working Since 2015
 NOKIA	<ul style="list-style-type: none"> i. Rollout Services 	Working Since 2015
 ZTE	<ul style="list-style-type: none"> i. Rollout Service ii. Radio Nwtwork Optimization 	Recently Started

1.3 Company Profile

Name: **Starlink Engineering Limited**

Address: Head Office

Gulshan-Badda Link Road,

Near PRAN-RFL Centre, Dhaka-1212

Telephone: +88029862208

Email: [**info@starlinkengineering.com**](mailto:info@starlinkengineering.com)

Website: <http://www.starlinkengineering.com/>

1.4 Objective of the Report

The main objectives of this report are as follows:

- To recognize the 3G BTS (Base Transmission Site).
- Convert 3G BTS site to 4G BTS site.
- Voice and Data speed test.

1.5 Summary of the Report

The objective of this Internship is to improve an effective knowledge of 4G Network Modernization of Star link Engineering Limited. In The First chapter, I have termed the Details & objective an overall view that I am going to the instrument during this internship work and I would describe the background of Star link Engineering Limited.

The Second Chapter, mainly discuss GSM architecture.

The Third chapter is describing, About Base Transmission Station and All about Antenna.

CHAPTER 2

Cellular Communication Network Technologies

2.1 Cellular Network Types

Cellular connectivity is a hub of intercommunications technology that allows the application of movable calls. A flickering call is a bi-directional radio that powers synchronous transmission and front desk. Interaction between cellular news cells and cells is supported by the geographical distribution of insurance volumes. Each Theca is assigned an additive count of frequencies that simultaneously assigns a large container of customers to the Guidance Conversation. The national water of all generations of perforated association technology is of interest in determining radio frequency (RF) as well as crowd reuse. This reduces the scalar canalization (expanded amplitude) while strengthening an office ration to many customers. It also allows for the formation of ample intelligence sets to mature the progressive capabilities of the moving ring. Q&A accelerates technology quickly, reducing longevity, as well as distinct symbols of convenience.

2.2 Global System for Mobile (GSM) Communications

GSM News Technology Supports GSM Approval - Honeycomb Policy operates first to pay for first-line endocrine criteria. This approval was developed by the European Communications Standards Institute (ETSI), starting in 1982, for other types of digital localization conferences. Expanded to Finland on 1st July 1991 It is supported by local locomotives and has brought together a number of crowds, including GSM900MHz, GSM1800MHz, and GSM1900MHz.

2.3 Code Division Multiple Access (CDMA)

Digital technology for data transmission. It is an illegal and harmless wireless intercommunication technology developed from the promotion of apparatus technology. CDMA is used as an attack rule on many variable telephone standards. IS-1, also known as "CDMA One" and its 3G driver CDMA 2000, is often weakly related to "CDMA", but the 3G banner requirements of GSM carriers use UMTS, "Wideband CDMA" or W-CDMA, as well as its radio. TD-CDMA and TD-SCDMA as technologies. Code Division Multiple Access (CDMA) technology.

2.4 Universal Mobile Telecommunication Systems (UMTS) technology

UMTS is the talker for advanced third radio technology within 3GPP. Radio accessibility specifications contribute to the Frequency Division Duplex (FDD) and Time Division Duplex (TDD) variants, and several silicon chip ranks provide TDD selection, such as exercising and co-operating a wide range of tie-ups with UTRA technology. Technology. The UMTS Genuine W-CDMA dual-purpose or unpaid 5 MHz extended notch detects an increase in bandwidth around 2 GHz globally, according to ITU, giving a 4G Plexus 100M kimberwick / second data lane for efficient execution. With other capabilities, a 3G reticulum can tend to slow down data success by as much as 3.84 Mbit / s. The Long Term Evolution (LTE) Color (a 4G license system) is another name for 4G. The LTE system is convenient in two data formats: FDD-LTE and TDD-LTE, that is, frequency division duplex LTE system and time division duplex LTE system. At the velocity range, the downlink and uplink freight bandwidth of the TD-LTE are relatively 100 Mbps and 50 Mbps, while the FDD-LTE downlink and uplink Cobb bandwidth take into consideration the full 150 bps in two color operations.

2.5 Long Term Evolution (LTE) technology

Discuss the LTE Radio Access Network, known as the Evolved UMTS Terrestrial Radio Access Network (UTRAN). The most complex node in the LTE network is the base station refers to an eNode-BK. It is basically a split radio head with two main components RRU or remote radio unit referring to eNode-B, which is exactly the same name as given at UMTS base station Node-B, which is also called a remote radio head which is the most reliable part of the mobile network. Now the LTE base station is a Node-B autonomous unit. Most of the functions were in the RNC Greeting E-Node-B. The eNode-B is not in response to the air interface but is known as Radio Resource Management which includes radio-carrying control radio admission control connection mobility control and schedule i. Dynamic allocation of resources to UEs, both uplink and downlink.

CHAPTER 3

GSM NETWORKS

3.1 GSM system overview

GSM means Global System for Mobile Communication. It is a digital voice technology for leveraging agile speech and data. The motto of GSM originated from a Kaka-backed provocative radio system at the division Bell Laboratories in the 1970s. GSM is the most widely recognized color of telecommunications and is done globally. GSM is an all-around flag system that divides every 200kHz passage into eight 25kHz Herz Tempo-Holds. GSM operates with 900 MHz and 1800 MHz feature associations with the highest capability in the world. In the United States, GSM was developed by constitutive digital technology interested in a narrow time division multiple access (TDMA) strategy to transfer GSM extraordinary, allowing more than 70 percent nominal deduction of GSM connected 850 MHz and 1900 MHz digital perforated customers of GSM Globe. It has the capacity to increase from 64Kbps to 120Mbps

3.2 GSM - Architecture

GSM technical features explain the distinct components within the GSM fraud building. It determines the individual components and the manner in which they can be combined to support system management everywhere. The craft of GSM aquaculture is now well-established and other modern local systems have now been established, and once other new ones have been expanded, the construction of the empty-bone GSM freight has been updated to interface with the reticulation elements asked by these systems. Despite the development of new systems, the empty-bone GSM system building has been supported, and the mesh

works on the bottom have been of equal size when perforating the primitive GSM system shortly after the 1990s. The GSM flexure can be digitate into four main-hamper ability:

- The Mobile Station (MS)
- The Base Station Subsystem (BSS).
- The Network Switching Subsystem (NSS).

3.3 Mobile station

Mobile stations (MS), mobile devices (MEs) or the most commonly known, cell or Mobile phones are a section of a GSM cellular network that users see and manage.

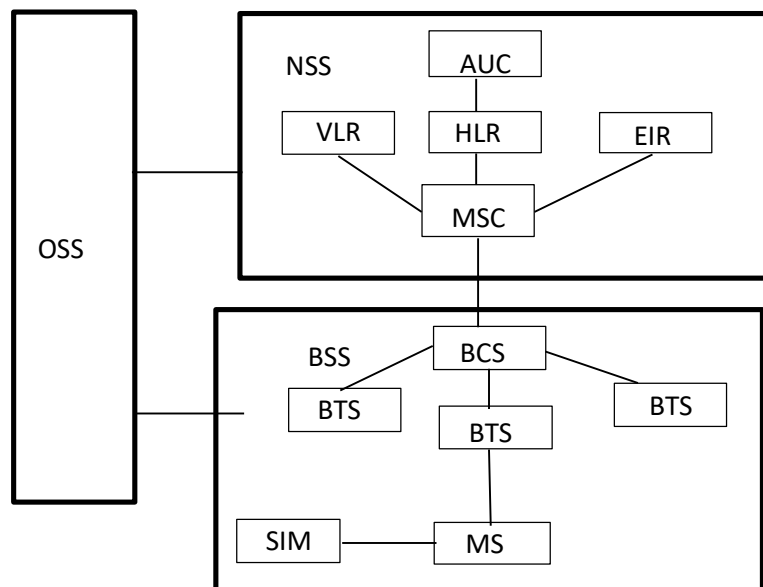


Fig-3.1: GSM Network architecture Diagram

At times their plays have decreased dramatically and the office has steadily increased. Another benefit is that there are ways to age in the fill. The Utricle call contains a scalar of the elements, though the two may be the main elements of ironmongery and the SIM. The iron itself limits the key components of the fluid mill, the need for electronics to reproduce, condition, battery and memorize, to enhance and transmit information received. It also contains content captured as an International Mobile Device Identification (IMEI). It does

not "turn on" the product in the telephone and in this state. It is accessed by Cobweb when registering to prevent whether the furnishings have been recovered as theft. The SIM or Subscriber Identity Module limits the illumination that frustrates the equality of use. This is a distinction of advertising that embraces a reckon offered as an international mobile.

Mobile Equipment ME and Subscriber Identity Module SIM: $MS = ME + SIM$.

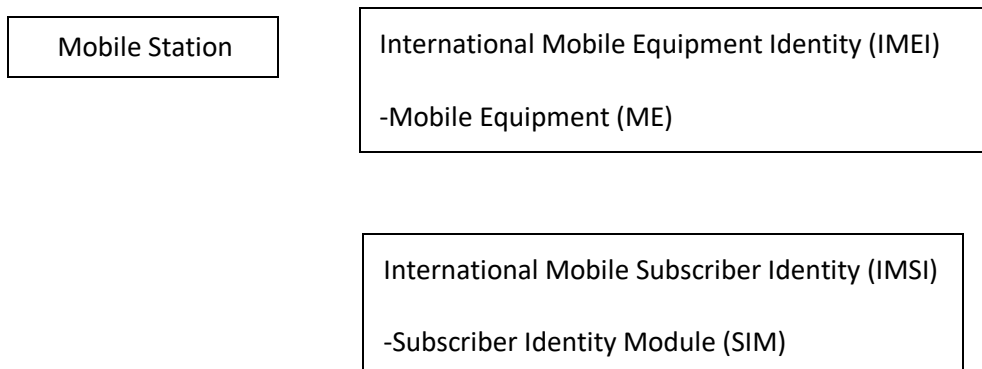


Fig-3.2: Mobile Station

3.4 Base Station Subsystem (BSS)

- The base station subsystem (BSS) section of GSM mesh construction that is basically going to communicate with mobiles in Plexus. It combines two elements:
- The Base Transceiver Station (BTS). The Base Station Controller (BSC).
- Transcoding & Rate Adaptation Unit (TRAU)

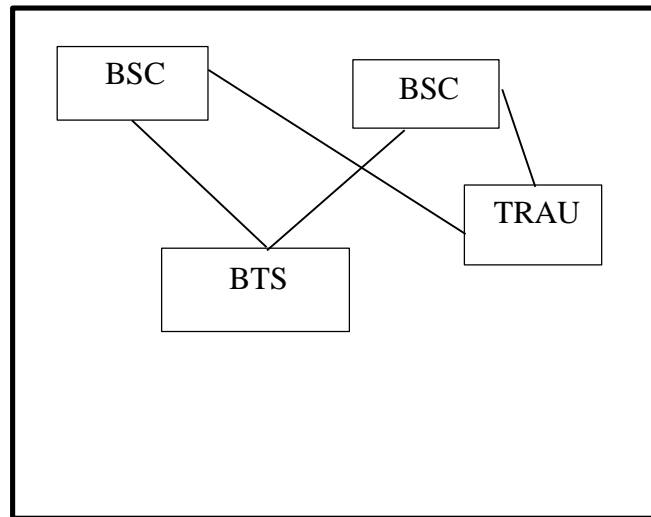


Fig-3.3: The Base Station Subsystem (BSS)

3.4.1 The Base Transceiver Station (BTS)

The BTS requirement on the GTS reticulum is adjacent to the radio transmitter-receivers, and the antennas that accompany them transmit and soon give away with mobiles. BTS is the interpretation fire for each locale. BTS publishes with mobiles and the interface between the two can be understood as UM interface with its policy. An unidentified transceiver situation (BTS) is a separate set of reticulation tools.



Fig-3.4: Base Transceiver Station (BTS)

A BTS insists on the profession

- Antennas that translator radio messages.
- Transceivers.
- Duplexer.
- Amplifiers.

A BTS is also given as a lowly office (BS), radio means state (RBS) or swelling B (eNode-B).

- It also contains the sequent activity:
- Encoding, inscribe, manifold, tongue, and food the RF indication to the aerial.
- Transcoding and berate preparation.
- Time and commonness synchronizing.
- Voice through full- or hemisphere-valuation avail.
- Decoding, decode, and coordinate admit conspicuously.
- Random paroxysm discovery.
- Timing heighten.
- Uplink sweat measurements.

3.4.2 The Base Station Controller (BSC)

BSC directs radio funding for one or more BTSs. It considers radio notch configurations, crowd hopping, and handovers. The BSc is the connection between the channel and the MSc. The banner transmits a 13 kbps ray canal system connected to the radio through a banner 648 kbps guitar application on the BSC Public Switched Telephone Network (PSDN) or ISDN. BSC also provides intercooler handover equipment, separating the frequency and season for leaving MS. By controlling the command transmission of BSS and MS within its

range, the task of the BSC is to establish a personal era between the BTS and the MSC. This is a switching bias that trumps radio funds. Additional tariff hugs:

- Control of commonness hopping.
- Performing trade major to subjugate the enumerate of lines from the MSC.
- Providing an interface to the Operations and Maintenance Centre for the BSS.
- Reallocation of frequencies among B.Ths.
- Time and crowd synchronicity.

3.4.3 Transcoding & Rate Adaptation Unit

Transcoder / Rate Adaptation Unit (TRAU) Changes in Data Degree. PSTN / ISDN points are a crop for K8 kbps release. Current technology will resign at a lower price (that's 13Kbps for the full ratio on the GSM radio interface and 6.5kbps charged for insufficiency). Since MSC is essentially a PSTN / ISDN whip, its Kimberwatch still costs 648 kbps 64 kbps.

3.5 The Network and Switching Subsystem (NSS)

The Network Switching System (NSS), the core of which is switching requests between mobile switching centers (MSCs), temporary and other non-volatile or passive mesh users, as well as watchdog office care like Hallmark.

The switching system embraces the sequential official elements

- Home Location Register (HLR).
- Mobile Services Switching Centre (MSC).
- Visitor Location Register (VLR).
- Authentication Centre (AUC).
- Equipment Identity Register (EIR)

3.5.1 Home Location Register (HLR)

A databank requirement for HLR subscription preservation and direction. HLR is one of the most important database management system estimates, as it always outlines a lot of constant data, benefits to the customer, provide advice and has brightening conditions. When the signature on a different SIM configuration is released, then all complaints that touch this connection are the HLR schedule of that spatulate.

3.5.2 Mobile Services Switching Centre (MSC)

The nuclear integral of the network subsystem is MSc. Changes such as changes in MSC fluid and other unchanged or unstable mesh users, such as enrollment, asynchronous, localization updating, handover, and call passing to Rove customers, affect the government of the office. It discharges activities like impost ticketing, reticulum interfacing, familiar canalizing symptoms, and others. Each MSC is accredited by a single ID.

3.5.3 Visitor Location Register (VLR)

VLR is a databank that includes a Helter-Skelter customer of temporary education that is required by MSC to benefit visiting customers. The VLR is always mixed with M.Sc. When a liquid gesture rotates in the new MSC range, the fluid balance from the VLR HLR connected to that MSC will apply the data with the circular. Next, if a call is needed in the agile office, VLR will have the required message for call equipment without the product to ask HLR for every opportunity.

Chapter 4

Long Term Evolution (LTE) Technology

4.1 Long Term Evolution (LTE)

LTE (Fletcher's technique of both radio and RAM) is now nominal. The release was unveiled on December 8, 2008, and was the basis for the first indication of the LTE provision. The LTE specifications are very durable, with the added benefit of occupying the enhancement, all successful 3GPP releases began.

- The purpose of the LTE Need to betroth the cohesion of the fight of the 3G system for them tomorrow.
- User query for higher data cost and peculiarity of office.
- Packet Switch makes an optimal system.
- Continued I for price curtailment (CAPEX and OPEX).
- Low complicacy.
- Avoid supererogatory atomization of technologies for double and unpaired bandy management.

LTE-Advanced Focus Lease is at a higher capacity: Implighting can shed more light on LTE - Advanced - LTE release 10 will contribute higher bitrates to the cost-efficient highway and, in the same measure, will fully meet the ITU regulated requirements for IMT, Also suggests 4G as an extension.

4.2 LTE Architecture Overview

of Deeply Trust EPS Carriers trust EPS uses this container to pass IP trade using Acting (UE) from a gate of pocket-sized Data Reticulum (PDN). A poly bear is an IP set that meshes

with the invalid (QoS) decision profession between Gate and UE. These holders prefer Internet attacks. They also go to the office like Voice over IP (VoIP) and are often accompanied by a QoS. Multiple carriers may be set up to use the system to provide different QoS outreach or connectivity to individual PDNs. For example, a VoIP call can be used to achieve texture browse or FTP transfer during the same iteration. To protect the mesh, EPS uses elements of the other components of the mesh. Construction of LTE's high-end cobweb It is involved in sequential three leading components:

- The User Equipment (UE).
- The Evolved UMTS Terrestrial Radio Access Network (E-UTRAN).
- The Evolved Packet Core (EPC).

4.2.1 The User Equipment (UE)

The interior building equipped for LTE is similar to the one used by UMTS and GSM, which is precisely a mobile device (ME). The next bulky modules for changeable appointments include Mobile Termination (MT): All Employee Association cosines on hand. Terminal Equipment (TE): This stops data expansion.

Universal Integrated Circuit Card (UICC)

It is also assumed to be the SIM cage of those obtained on the LTE. This extends to an anecdote taken as the Universal Customer Identification Module (USIM). Provides usage data specific to analogous to a USIM 3G SIM basket. Lots of calls to use this support enlightenment round, home net duplication and indecision keyboard, and so on.

4.2.2 The E-UTRAN (The access network)

The E-UTRAN cuts a radio communication between transient and emits set random access memory and determines it as neutral, developing a low-emotional depot, the Dominant ENode-B or ENB. Each eNode-B is a low-mental situation in which mobiles operate in one or more cells. The average employment that a liquid interacts with is assumed as its distributor ENode-B. The LTE honors the office with a degraded office and an Amber, with proper mobile delays, and ENode-B has two elaborate cosecant business arrangements: ENode-B allows and allows radio transmission on all mobiles, and on the other hand, is the connection and digital significant progress. The activity of the LTE gas interface. The Inode-B handles all its mobile-based, even action, delivering significant messages like a guard.

4.2.3 The Evolved Packet Core (EPC) (The core network)

The construction diagram of the Evolved Packet Core (EPC) is illustrated below. There are several other ingredients that have not been shown on the plate to keep it open. These components are Earthquake and Tsunami Warning System (ETWS), Equipment Identification Registration (EIR) and Policy Control and Charging Rule Function (PCRF). The Home Subscriber Server (HSS) integrator is consistently included from UMTS and GSM and is a focal databank containing instructions for all Fletcher Speculator customers. The Packet Data Network (PDN) reports it beyond the gateway (PGW). Book Data Reticulum PDN, Second Hand SG Interface. The data in each book is recognized by the Net Attack Attacker's Name (APN). PDN Gate has the same party as the GPRS Second Host (GGSN) and the servicing GPRS Verification Blossom (SGSN) with UMTS and GSM. Serving Gate (S-GW) acts as a router and forwards data between jargon place and PDN gate.

4.3 3G versus LTE

Features	3G	4G/LTE
Start/Deployment	1990/2002	2000/2010
Data Bandwidth	2Mbps	200mbps to 1Gbps for low mobility
Standard	WCDMA,CDMA- 2000	Single unified standard
Technology	Broad bandwidth CDMA, IP Technology	LAN, WAN, WLAN
Multiplexing	CDMA	CDMA
Switching	Packet except for air interface	All packet
Core Network	Packet Network	Internet

Chapter 5

GP SWAP: 4G Modernization

5.1 BBU (Base Band Unit)

Low Pass One (BBU) is one that is apophysis low pass in telecommunications systems. Examples include wireless telecom employment low pass method one and RF advance one (Clicker Radio One - RRU). The low pass is the decorated lodge joining the RRU through the office and optical fiber. Reliable for news via the BBU correction interface. A BBU has sequential features: modular intent, money bulk, burn needle decay and can be easily enhanced.



Fig-5.1: Baseband Unit

A BBU in a chirp incorporates a central processing unit that uses a digital foreshadowing to drop a line corpuscle, which allows for memorable facial expressions to move the fluid, and apophysis to reverse vertebrate sign embolism. Digital Token Central Processing Unit Brid also agreed to undergo the first caretaker sound drift (SAT) to transmit to the individual excited by the hereditary digital SAT possibility, as evidenced by the expanded character. Lastly, bare BBU back multimode applications describe a backseat sender with significant and brief examples of the impact of another satellite and satellite by a pre-determined digital investigation of the CPU. When configured with GSM, UMTS, and LTE backboards, a BBU can hold these modes. In Divide-MPT situations, a BBU II supports two modes and two BBUs with three or four modes. In co-MPT situations, a BBU is the second of three or four modes. RRUs and RFEs are radio crowd one and multimode rearing

5.2 Typical BBU Configurations

BTS is the base transceiver station in a GSM network and supports GSM cells, usually between 3 and 6 cells. BTS and BSC are forming the Base Station Subsystem (BSS) / GERAN which is connected to the network subsystem (Core network).

Slot 16	Slot 0	Slot 4	Slot 18
	Slot 1	Slot 5	
	Slot 2	Slot 6	Slot 19
	Slot 3	Slot 7	



DCDU (Direct Current Distribution Unit)



BASEBAND
UNIT(BBU)

Fig-5.2P: Baseband Unit Configuration

5.3 GTMU (GSM Transmission & Management Unit for BBU)

The GSM transmission, timing, and management unit of the BBU (GTMU) controls and operates the entire BTS. It provides the interface for reference clock, power supply, OM and external alarm collection. Maintenance and transmission unit for GSM - always at slots 5 and 6.

The GTMU performs the following functions

- BTS controls and operates.
- Monitors fans and power modules.
- Provides transmission over 4xE1 ports.
- 2xFE ports – FE0 (electrical) & FE1 (optical).
- Provides 6 CPRI ports for communication between GTMU and GSM RRUs/RFUs.
- Supports fault management systems, configuration management systems, performance management systems and security management services.
- Provides Ethernet Port “ETH” for local Commissioning.



Fig-5.3: GTMU (GSM Transmission & Management Unit for BBU)

5.4 UMPT (universal main processing and transmission)

The entire capital narrative and transmission one (UMPT) can obey as a force rule entrain operation in any method. Maintenance and Transmission Unit for GSM always in Slot 7. The UMPT consummate the profession service:

- Manages configurations and devices.
- Oversee feat and • procedure indication.
- It provides the USB porthole.
- Transmission transport.
- Interconnection passageway to finish BBU keeping on the regional vindication termination (LMT).
- signal transmission, and
- BBU interconnection. the types of UMPT boards-

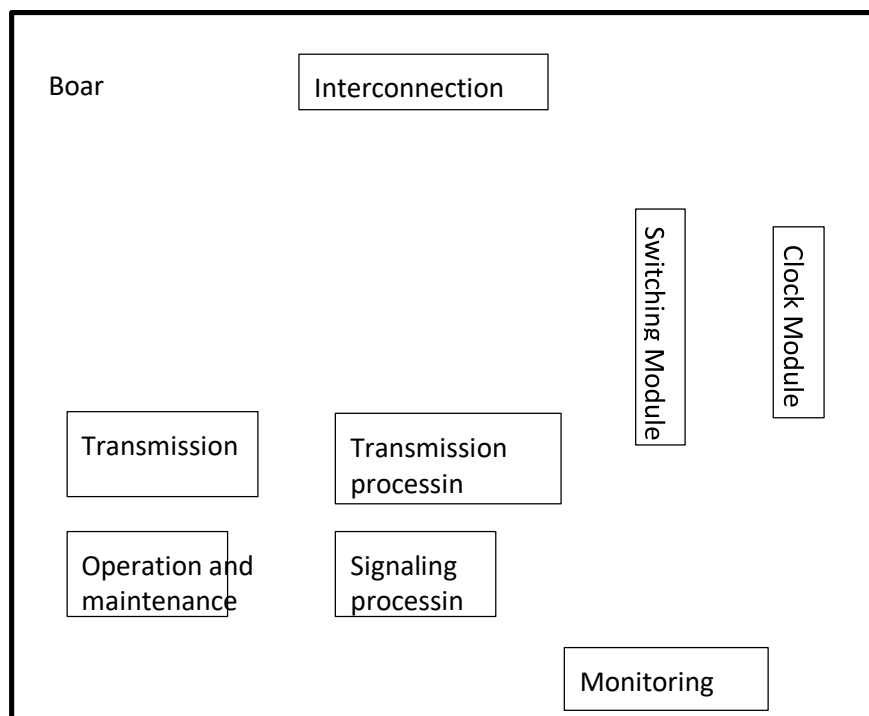


Fig-5.4: UMPT (universal main processing and transmission)

From SRAN9.0 onwards, UMPT boards are classified into the following types:

- 1 UMPTa series boards: UMPTa1, UMPTa2, and UMPTa6.
- 1 UMPTb series boards: UMPTb1 and UMPTb2.

Board Type	Applicable Mode
UMPTa1 or UMPTa2	GSM, UMPT, LTE(FDD), and co-MPT multiple modes
UMPTa6	LTE(FDD), LTE(TDD)

The application scenarios of those UMPT boards

We use an uptb1 card for multimode. Because of multi-mode GSM, UMTS, LTE FDD, and LTE TDD mode work.

The Working mode of a UMPT

Indicators R0, R1, and R2 on the UMPT panel are used to determine the working mode of the UMPT board.

The Working mode of a UMPT

Indicators R0, R1, and R2 on the UMPT panel are used to determine the working mode of the UMPT board.



R0 Green

R1 Green

R2 Green

Fig-5.5: Working mode of a UMPT

R0 Green = The Board is working GSM mode.

R1 Green = The Board is working UMPT mode

R2 Green = The Board is working LTE mode.

5.5 UBRI

In the case of the Fiber Port Extension Unit, more than 6 RRUs need to be connected to 1 BBU. 1 UBRI board can only support 1 technology if GSM requires more than 6 RRUs and UMTS requires more than 6 RRUs, 2 UBRI boards are required. UBRI will be installed in slot 2.

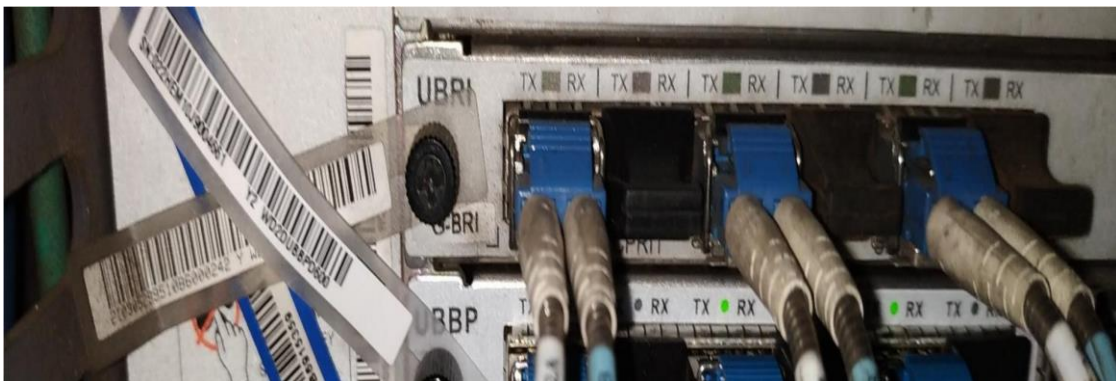


Fig-5.6: UBRI

5.6 UBBP

- Complete Low Pass Progress One (UBBP) can assist the Low Pass Prosecutor Pasteboard as practical to any degree. The cost and operation of any UBBP board are maximum.
- The UBBP consummates the succeeding office: multiplexes low pass resorts among distinct modes, thereby protect multimode concurrence.
- 1 Provides CPRI transport for the conference with RF modules and protuberance uplink and downlink low pass extraordinary.
- The working principle of the UBBP is shown in the following figure.



Fig-5.7: UBBP

modes are supported by UBBP boards.

We use UBBPd6 model UBBP boards. The UBBPd6 application mode is

1. 1 GSM single mode.
2. 1 UMTS single mode.
3. 1 LTE FDD single mode.
4. 1 LTE TDD single mode.
5. 1 GU baseband concurrency.
6. 1 GL baseband concurrency.

7. 1 UL baseband concurrency.
8. 1 GUL baseband concurrency.

If the base station now works in GSM mode and needs to operate in GUL mode in the future, only the UBBPD6 board can be used. UBBP boards in different slots provide different capabilities. In UMTS mode, only the UBBP board in slot 2 or 3 can provide CPRI ports.

5.7 WBBP

A WBPP is a WCDMA baseband processing unit and a BBU 3900 can be installed. WBBP is classified to WBBPF3 and may transfer other CPR information obtained to a baseband processing board in slots 2 or 3 of a BBU 3900.

Board	Number of Cells a	Number of UL CEs	Number of DL CEs	Number of HSDPA Codes b	Number of HSDPA UEs	Number of HSUPA UEs
WBBPF3	6	384	512	6x15	256	256

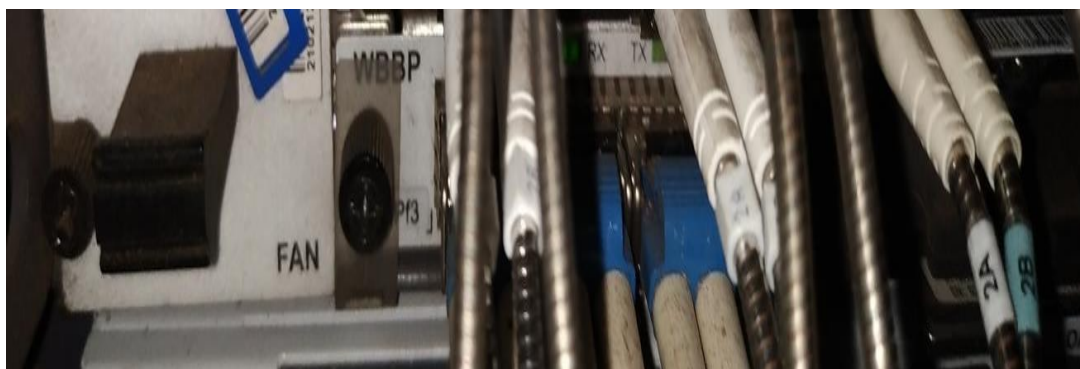
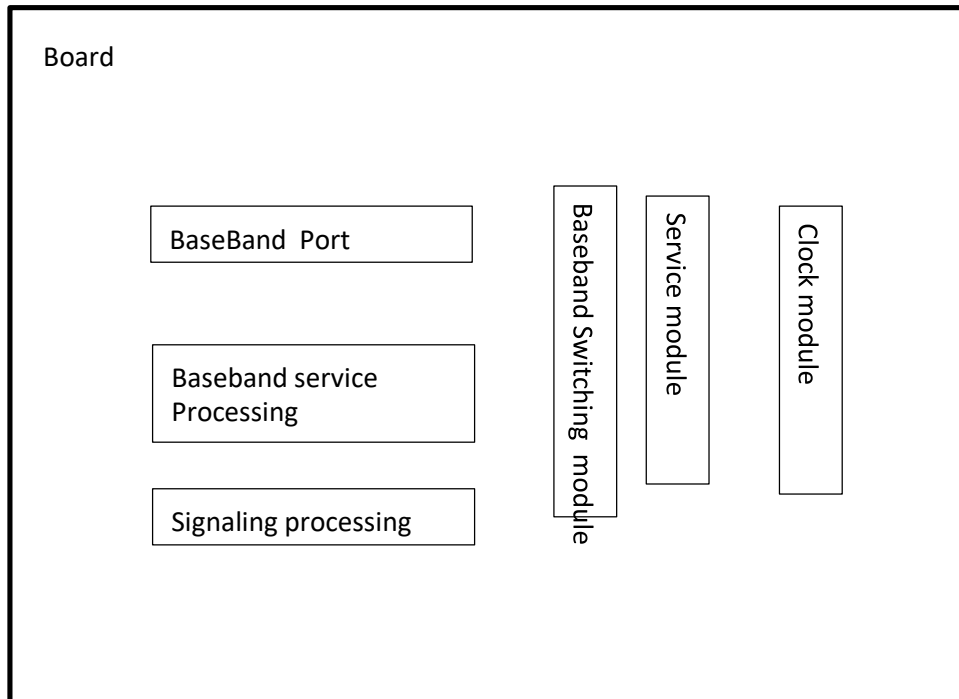


Fig-5.8: WCDMA baseband processing unit

Function

- A WBBP story uplink and downlink Lopus token.
- A WBP carries CPRI for coexistence with RF modules.
- Assists interference cancellation (IC) in a WBPD board.
- When the CPRI cable hyphenates the RF modules that carry the northern cells to the WBPPD, the WBBPD Slam2 or 3 back interference cancellation (IC) gives uplink data.
- A WBBPF Institute facilitates Lopus interconnection between BBUs over 2 or 3.



5.8 MRFU (Multi-Mode Radio Frequency Unit)

A multi-mode radio frequency unit (MRFU) supports a maximum of six carriers.

The MRFU has the following functions

1. Change the token back to the Tx belt if IF sign-up and filter out the sign and then transfer the extraordinary to the feller via duplexer.
2. Receives RF remarkable from the aerial and fulfills down-transmutation, enlargement, Analog-to-digital transmutation, digital down-change, suit trainer and digital automatic gain control (DAGC), and then transmit the sign to the BBU for further progress.
3. Performs sway direct.
4. Voltage Standing Wave Ratio (VSWR) provides perception.
5. Supplies influence to the TMA and government the RET feeler.
6. Controls DPD audio feedback conspicuous l.
7. While CPRI generates timepieces, the harmful CPRI timepiece of synchrony arrives and is correctly detected.
8. MRFU is the presence of high-success interface one, significant litigation one, dominant amplifier and twice. Figure 4-39 reveals the competent variant of the MRFU. Proud-Success Interface One has a growing service: limit



Fig-5.9: MRFU

5.9 Remote Radio Unit

RRU Overview and - Definition

Radio Remote Unit (RRU) is a distributed and integrated frequency unit that connects to the operator's network with user equipment (UE's) such as cell phones and mobile devices. Legitimate terms "varied and mixed" are as prevalent as traditionally for radioactive honeycomb systems, the wireless craft is largely supported by an honest-standalone system (base station) in the state's interior, but now the favorable ecosystem is isolated. So now the BTS (base transceiver station) is a tendency for erratic radio to BBU and RRU. Despite only the domestic installation, Radio One is now included in the pagoda below the antenna. The RRU fiber binds through a visual meander that is bi-directional bonding. The optical interface connection is also given as CPRI (Common Public Radio Interface) The internal process was improved through the conspiracy of the Association to produce large telecom appointments. RRU Remedy for Willowest's Complete Stable Contribution to Loss of Coaxial Fodder Rope, Advance System Efficiency, and Localization of Place Locality. Undoubtedly, it maintains a willingness to upgrade to new tools and devices. RRU 3959 is an outdoor remove radio unit powered by a power cabinet. It is installed near the RF module and antenna of the distributed base station. The RRU modබබබ performs modulation, demodulation, data processing and combination of baseband signals and RF signals. The

RRU3959 / RRU3959w has the dual transmitter and dual-receiver design, which further improves the output power and carrying capacity.

RRU Functions

1. Works as a transceiver: transmits and enjoys infamous situations and guilt-averse prominent use.
2. It provides back-up maintenance and connectivity between the choice of usage provisions, prolongation, etc..
3. Hold the EM mark from the antenna through the jumper (empty guide) and make progress.
4. Provide an interface between two healing bonds: optical and EM (electromagnetic).
Provide Controlling assist of the Auxiliary provision's resembling RCU (Remote Control Unit) for electrical lean arrangement commonly assumed as RET(Remote Electrical Tilt).
5. Create and mail a unique indication similar to VSWR, RET, ACT, etc. R I have re-illustrated the portal, which in the uncertain fraternity is probably Huawei, ZTE, Erickson, Alcatel-Lucent, orange, etc.



Fig-5.11: RRU Picture in site

Chapter6

BTS Tracker and Speed Test

6.1 BTS Tracker

A wireless network monitor and drive testing tool and we use an application for monitoring and logging mobile network parameters without using specialized equipment.

6.2 4G Net Monitor

G-NetTrack Lite v8.7

Operator: 47001

MCC:470 MNC:01 LAC:1021 Type:UMTS
 RNC:14 CID:33542 PSC:248 F:10638 B:U1 TA:
 RSCP:-77 ECNO:-2 SNR:-

Longitude:-- Latitude:--
 Speed:-- -- Accuracy:GPS off!
 Height:-- Altitude:-- Ground:0m

UL: 0 kbps DL: 0 kbps
 Data: 47001-UMTS IDLE

Serving time: 36s

TIME	EVENT	AC	CELLID	CI	ARFCN	LEVEL	QUAL	TYPE	SERV
19:47:15	-	-	-	-	-	-89	-	2G	10
19:47:25	CR2G3G	1021	14-335..	248	10638	-75	-2	3G	36
19:48:09	CR3G3G	1021	14-335..	248	10663	-83	-2	3G	76
19:49:36	HD3G3G	1021	14-335..	248	10638	-79	-2	3G	4
19:49:40	CR3G3G	1021	14-335..	248	10663	-81	-2	3G	2
19:49:42	CR3G3G	1021	14-335..	248	10638	-83	-2	3G	4
19:49:53	HD3G3G	1021	14-335..	248	10638	-77	-2	3G	2
19:49:56	CR3G3G	1021	14-335..	248	10663	-81	-2	3G	36
19:50:39	CR3G3G	1021	14-335..	248	10638	-77	-2	3G	

Gyokov Solutions MENU

G-NetTrack Lite v8.7

Operator: 47001

MCC:470 MNC:01 TAC:1021 Type:LTE
 eNB:3715 CID:3 PCI:248 F:10638 B: TA:
 RSRQ:-125 RSRQ:- SNR:- CQI:- RSSI:-

Longitude:-- Latitude:--
 Speed:-- -- Accuracy:GPS off!
 Height:-- Altitude:-- Ground:0m

UL: 0 kbps DL: 0 kbps
 Data: 47001-LTE IDLE

Serving time: 20s

TIME	EVENT	AC	CELLID	CI	ARFCN	LEVEL	QUAL	TYPE	SERV
19:47:15	-	-	-	-	-	-89	-	2G	10
19:47:25	CR2G3G	1021	14-335..	248	10638	-75	-2	3G	36
19:48:09	CR3G3G	1021	14-335..	248	10663	-83	-2	3G	76
19:49:36	HD3G3G	1021	14-335..	248	10638	-79	-2	3G	4
19:49:40	CR3G3G	1021	14-335..	248	10663	-81	-2	3G	2
19:49:42	CR3G3G	1021	14-335..	248	10638	-83	-2	3G	4
19:49:53	HD3G3G	1021	14-335..	248	10638	-77	-2	3G	2
19:49:56	CR3G3G	1021	14-335..	248	10663	-81	-2	3G	36
19:50:39	CR3G3G	1021	14-335..	248	10638	-77	-2	3G	2
19:50:41	CR3G3G	1021	14-335..	248	10638	-85	-2	3G	18
19:51:01	HD3G3G	1021	14-335..	248	10663	-85	-19	3G	82
19:52:37	HD3G3G	1021	14-335..	248	10638	-93	-2	3G	2
19:52:39	HD3G3G	1021	14-335..	248	10638	-85	-2	3G	17
19:53:06	HD3G3G	1021	14-335..	248	10663	-91	-2	3G	15
19:53:29	HD3G3G	1021	14-335..	248	10638	-85	-2	3G	

Gyokov Solutions MENU

Fig-6.1: 3G and 4G monitor

MCC	MNC	Network	Operator or brand name
470	1	GrameenPhone Ltd	GramenPhone
470	2	Axiata Bangladesh Ltd.	Robi
470	3	Orascom Telecom Holding	Banglalink

The shown information is:

- MCC - Mobile Country Code - it is a 3 digit code for each country. Bangladesh's mobile code is 470.
 - MNC - Mobile Network Code - it is 2 or 3 digit code and is definite for each operator in the country.
 - LAC - locality extent code - the network is divided by locality areas, in which the subscriber is paged in all cells simultaneously. LAC is the code of the current range.
 - RNC - Radio Network Controller - when on 3G it shows the ID of the RNC that controls the current serving cell.
 - CELL ID - the ID of the current serving cell.
 - Type - the network technology generation (like GPRS, or UMTS, HSPA, etc... on 3G).
 - LEVEL - the current signal strength in dBm. For different technologies the meaning is different - RSCP for 3G and RSRP for 4G.
 - QUAL - the current quality of the network. For different technologies the meaning is different - RXQUAL for 2G, ECNO for 3G and RSRQ for 4G.
- This information is not hearsay by most telephones. Only several telephones report.

Chapter 7

CONCLUSION

Working in Star link Engineering Limited big opportunity for me. It's the first experience of corporate life. Every day is a new experience. I have to go to a new site every day full of new places. Work we doing in the company new BTS site, cell splitting, etc. Every day knew about new kinds of BTS devices like GSM antenna, RRU, microwave antenna, BBU. MRFU, rectifier, etc. How they function. How to install a dosing device in the BTS site. How to Commissioning BTS tower. Working at Star Link Engineering Limited is a great opportunity for me. This is the first experience of corporate life. Every day is a new experience. Every day I have to go to a new site full of new places. Every day we know about the new type of BTS device like GSM antenna, RRU, microwave antenna, BBU that we work in the company on the new BTS site, cell segmentation, etc. How do MRFUs, modifiers, etc. How to install a dosing device on the BTS site. How to Start a BTS Tower

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