

# Commissioning of BTS / Node B

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**Abstract-** This paper demonstrates the commissioning of BTS/NODE B through a Wizard (series of user interfaces), that stores information provided by the user. It also provides another option of commissioning i.e. purely file based commissioning (user has a configuration file and he want to upload this file only).

This Paper proposes File Based Commissioning of BTS/NODE B, which eases the task of uploading the configuration to the BTS/NODE B both from user point of view and maintenance point of view.

**Keywords-** BTS/NODE.

## I. INTRODUCTION

Base Transceiver station is an important element of any wireless or wireline network. A base transceiver station (BTS/NODE B / Node B) is a piece of equipment that facilitates (helps) wireless communication between user equipment (UE) and a network. BTS/NODE B is also referred to as the radio base station (RBS), node B (in 3G Networks). The BTS/NODE B / Node B is the networking component of a mobile communications system from which all signals are sent and received. It is responsible for defining a range of radio frequency for the terminals, known as cell. In this way overall functionality of a network depends on properly configuration of each element and this procedure by which this configuration takes place is known as commissioning. There are different techniques possible that allow 'commissioning of BTS/NODE B' but these vary according to the constraints of workload and time.

Every BTS/NODE B is supported by one or more man machine interfaces applications that ease the task of commissioning. This series of user interfaces is collectively known as Element Manager. It helps in configuring, commissioning and monitoring the BTS/NODE B.

In this scenario there is an attempt to commission a BTS/NODE B, not by feeding all values manually but a combination of manual plus file based approach. File will help by providing the data that is more sensitive and difficult to remember each time. User can select his desired file by providing few options and seeing the description of a file. BTS/NODE B Agent will be given this file (formed by taking values both from the screens and from a file) and now it will perform validations to know the correctness of file and the same is notified to the user. According to the result of these validations commissioning can be declared as successful or failed.

A BTS/NODE B / Node B is controlled by a Base station Controller (BSC). Typically a BTS/NODE B will have several transceivers (TRXs) in 2G and in 3G case System Modules which allow it to serve several different frequencies and different sectors of the cell.

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## II. OVERVIEW

### A. Trx Card

- TRx is a Equipment which handles calls of user
- One TRx can handle 8 calls per second.
- We can Use maximum 12 TRx in one BTS/NODE B.

In one BTS/NODE B max 12 TRx card used. In one TRx there are 8 time slot so max  $12 \times 8 = 96$  channel form but 6 time slot used in control or signalling so max 90 user can connect through one BTS/NODE B simultaneously.

### Alarm Extension System

It collects working status of various units BTS/NODE B and extend them to operation and maintenance(O & M) monitoring stations.

### Duplexer

Duplexer is a device which used in BTS/NODE B to use same antenna for transmission as well as receiver. So antenna has two cables one for Tx and Rx which connect with Duplexer.

### B. Various Parts of BTS/NODE B

Transceiver (TRX): Its function is transmission and reception of signals.

Power amplifier (PA): It amplifies the receiving signal.

Combiner: Its combines receiving signals so that they could be sent out through a single antenna for a reduction in the number of antenna used.

Duplexer: It separates sending and receiving signals to/from antenna. It helps to send and receive signals through the same antenna ports.

Antenna: Used to transmit signals to another entity.

Alarm extension system: It collects working status alarms of various units in the BTS/NODE B / Node B and extends them to operations and maintenance (O&M) monitoring stations.

## III. FUNCTIONS OF BTS/NODE B

- Receives radio waves and converts them to another digital format to transmit to BSC.
- Take digital signals from the BSC and converts them to radio waves which are transmitted to the Mobile Station.
- Monitors quality levels of the radio levels and reports to the BSC so the BSC can decide if the MS needs to receive from another BTS/NODE B.
- Holds configuration and software for itself.
- Report alarm back to BSC.
- Has an interface for staff to configure the BTS/NODE B and monitor it.

## IV. TYPES OF TOWERS IN BTS/NODE B

Majorly the following are the different types of BTS/NODE B towers.

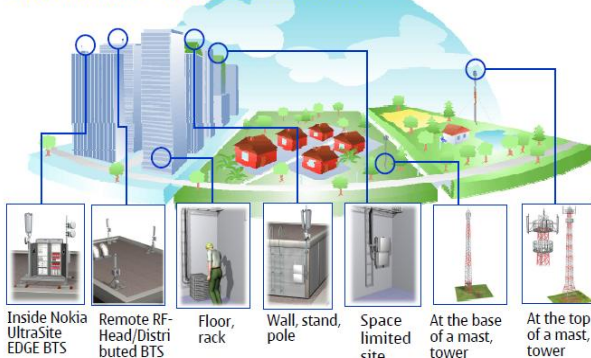
- GBT - ground based tower



## Commissioning of BTS / Node B

- RTT - Roof Top Tower
- RTP - Roof Top Pole
- COW - Cell On Wheels
- IBS - In Built Solution

### Site solutions – Flexi BTS architecture



## V. COMMISSIONING

First you need to install the BTS/NODE B / Node B, then the process of getting it to work and verify the functionality before it is connected to live network traffic /On-Air is called Commissioning.

Bringing something new into a working condition so, if we are bringing new BTS/NODE B / Node B into a network so we need to verify that whether it is functioning according to its planned design objectives or not. Every machine is supported by one or more MMI (Man Machine interfaces) applications that help in configuring and commissioning of BTS/NODE B / Node B.

MMI is the interface between the Local System and the BTS/NODE B /Node B which provides mobile communication services.

## VI. PROCESS FOLLOWS FOR BTS/NODE B COMMISSIONING

- Switch off BTS/NODE B cabinet and disconnect Tx/Abis connectors before offline start.
- Connect the laptop locally with BTS/NODE B.
- Provide user name/password for authentication.
- Set the prerequisite communication port for BTS/NODE B and laptop.
- Provide BTS/NODE B IP address.
- Download BTS/NODE B software in BTS/NODE B from laptop master file with authenticate product license key.
- After completion of BTS/NODE B software, provide necessary information for further process i.e.
  - BCF Id
  - Site name
  - Sector Mapping etc.
- All above inputs need to be uploaded in BTS/NODE B and Restart the BTS/NODE B for proper working.

## VII. SUMMARY OF CONTRIBUTION

Ultra BTS/NODE B(2G) can support max of 12 TRx units while flexi BTS/NODE B(3G) can support max of 24 TRx .Ultra BTS/NODE B has drawback that it has all pin connections on back side, if any of the pin of a particular slot is damaged then that slot is useless while in flexi (WCDMA BTS/NODE B) all connections are on the front side so it is easy to install every equipment.

4G(LTE) Stands for Long Term evolution ,mostly referred as eNB (evolved node B). It is a new air interface for cellular mobile communication system. eNB as BS manage radio resources in flat n/w structure, while 3G uses intelligent and centralized node RNC(Radio Network Controller) which controls all the radio resources.

Goal of LTE is to provide users with mobile data speed they want and need, in a way legacy 3G networks just couldn't do. Before LTE, Radio network controller (RNC) nodes controlled the radio resources and mobility over multiple multiple NodeB (3G) base stations in radio access network. LTE manage radio resources and mobility in the cell and sector to utilize all the UE'S communication in flat radio network structure. It also means the RNC is no longer needed.

## VIII. CONCLUSION

- Less dependency on the information provided by the user.
- Less error prone.
- Monitor major KPIs efficiently

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