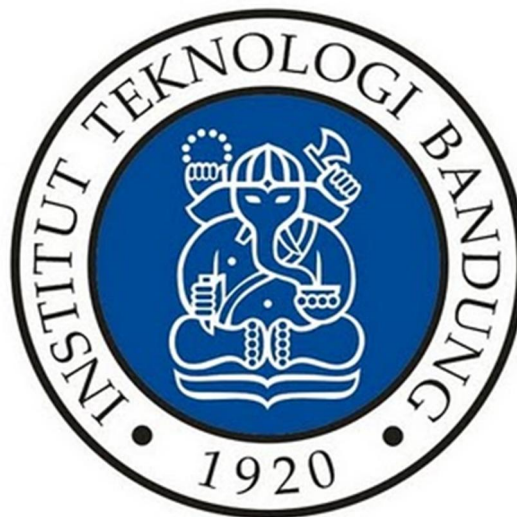


**RUMUS DAN PARAMETER YANG MENGACU PADA SIGNALLING
LADDER DIAGRAM**

KINERJA JARINGAN DAN KUALITAS LAYANAN

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**PROGRAM STUDI TEKNIK ELEKTRO
SEKOLAH TEKNIK ELEKTRO DAN INFORMATIKA
INSTITUT TEKNOLOGI BANDUNG
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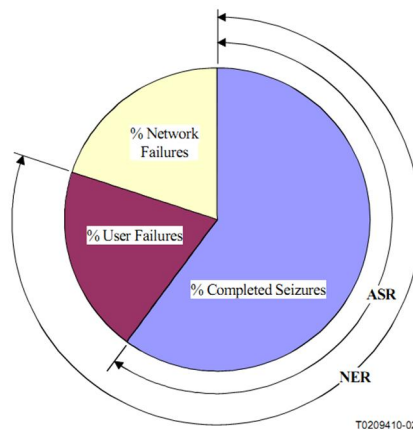
Tuliskan rumus parameter indikator sebagai berikut, dengan mengacu pada signalling diagram

1. NER (Network Effectiveness Ratio)
2. Telephone Service non accesibility
3. Telephony setup time = PDD
4. Telephony cut off call ratio = drop call ratio
5. Flowchart signaling ladder diagram 3G

1. NER (Network Effectiveness Ratio)

Network Effectiveness Ratio is a measure of the quality of the network without applying the A-party error and B-party busy [3]

NER is designed to express the ability of networks to deliver calls to the far-end terminal. NER expresses the relationship between the **number of seizures** and the sum of the number of seizures resulting in either an **answer message**, or a **user busy**, or a **ring no answer**, or in the case of ISDN a **terminal rejection/unavailability**. Unlike ASR, NER excludes the effects of customer behaviour and terminal behaviour. [4]



$$\text{NER} = \frac{\text{Seizures Resulting in Answer message or User Failure}}{\text{Total Seizures}} \quad [4]$$

Or

$$\text{NER} = 100 \frac{\text{Answer call} + \text{User Busy} + \text{Ring no Answer} + \text{Terminal Reject}}{\text{Seizures}} \quad [5]$$

Remarks: [4]

- Accurate measurement of NER is more complex than that of ASR.
- Accurate measurement of NER requires more complete signalling than does ASR.
- Cause values provided by ITU-T Signalling System No. 7 TUP and ISUP can be basis for the measurement of NER. This type of data is usually available from sy capture signalling information. It may also be available on Call Detail Records.

2. Telephone Service non accesibility

Telephony Service Non-Accessibility calculate the probability of an end-user who can not access cell phone service when making the request when the network indicator on the display of End User (EU) [1]

The telephony service non-accessibility denotes the probability that the end-user cannot access the mobile telephony service when requested if it is offered by display of the network indicator on the UE. [2]

The probability that the end user cannot access the Mobile Telephony Service when display Of the network indicator on the mobile device is in good condition, which suggests that the availability and accessibility network is good. Terms of QoS measurement, it must take into account that the B-party is not in the busy state, and no A-error. [3]

$$\text{Telephony Service Non – Accessibility}[\%] = \frac{\text{unsuccessful call attempts}}{\text{all call attempts}} \times 100$$

3. Telephony Setup Time [s] = PDD (Post Dial Delay)

Telephony Setup Time describes the duration *between customer presses the send button on UE = sending of complete address information* and receipt of call set-up notification = connect established. [3],

Telephony Setup Time describes the time period between the completion send address information and receive notification about the call setup [1]

Abstract Equation of Telephony Setup Time:

$$\text{Telephony Setup Time}[s] = (t_{\text{connect established}} - t_{\text{Sending of complete addressing}}) [s]$$

or

$$\text{Telephony Setup Time}[s] = (t_{\text{connect established}} - t_{\text{user presses send button on UE}}) [s]$$

The telephony setup time describes the time period between sending of complete address information and receipt of call [2]

4. Telephony Cut-off Call Ratio [%] = Drop Call Ratio

Telephony Cut-off Call Ratio calculation of the probability of a successful call is not terminated by the termination is done both party A and party B. [1] [3]

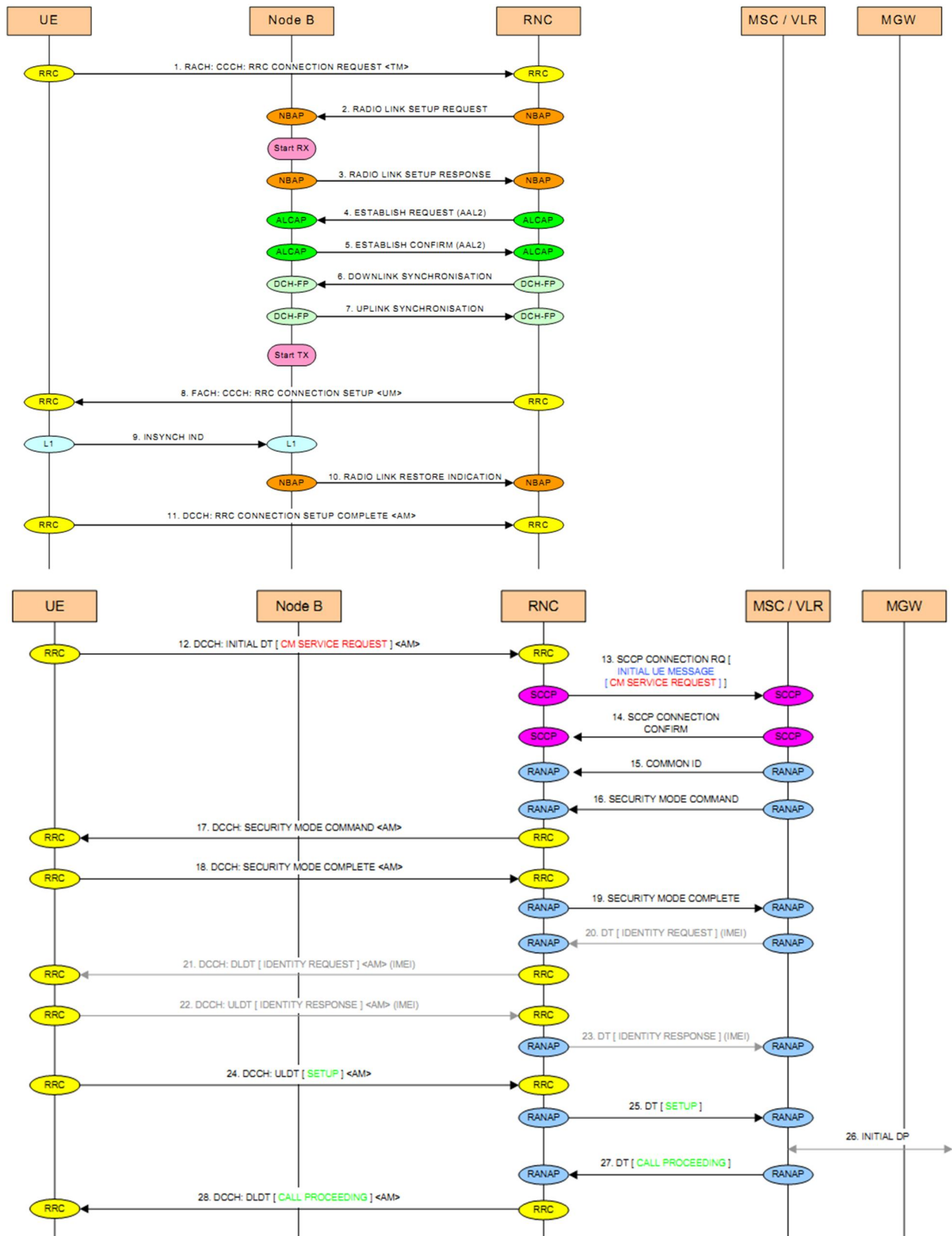
The telephony cut-off call ratio denotes the probability that a successful call attempt is ended by a cause other than the intentional termination by A- or B-party. [2]

Abstract Equation of Telephony Cut-off Call Ratio:

$$\text{Telephony Cut – off Call Ratio} [\%] = \frac{\text{unintentionally terminated telephony calls}}{\text{all successful telephony call attempts}} \times 100$$

5. 3G telephony signalling flow chart: mobile originated call establishment procedure

Preconditions for measurement:



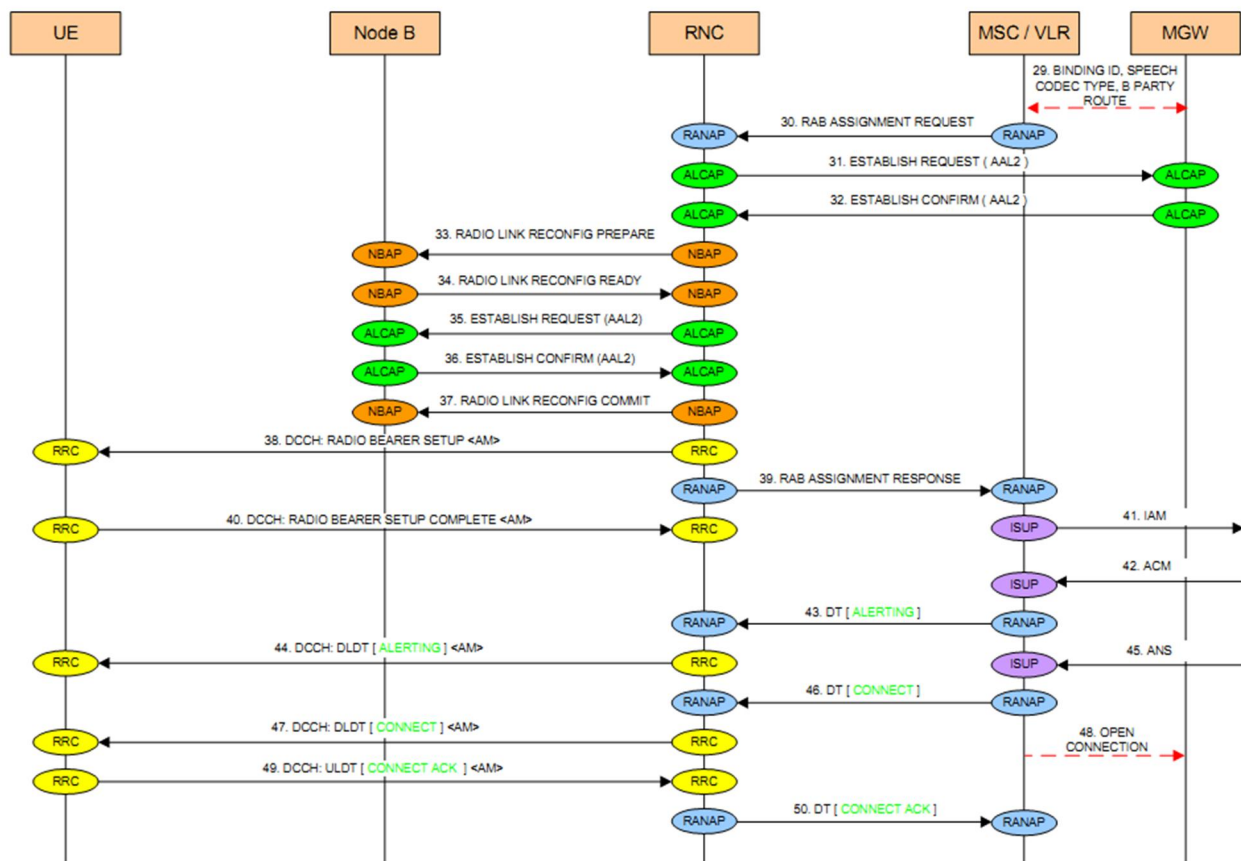


Figure 1: 3G telephony signalling flow chart: mobile originated call establishment procedure

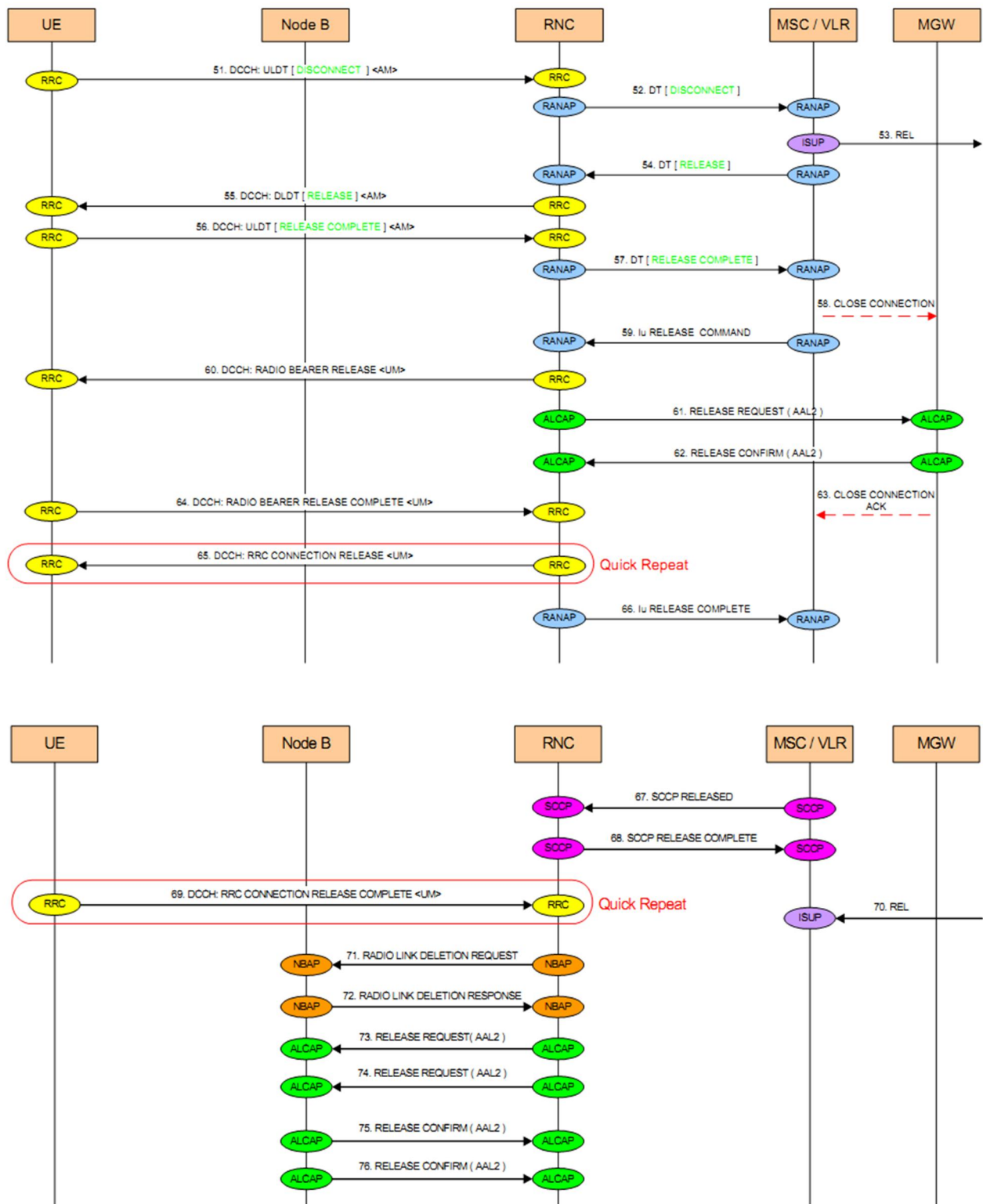


Figure 2: 3G telephony signalling flow chart: mobile initiated call disconnection procedure

Referensi

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- [2] **ETSI** *“Speech and multimedia Transmission Quality (STQ);QoS aspects for popular services in mobile networks;Part 2: Definition of Quality of Service parameters and their computation”* ETSI TS 102 250-2 V2.2.1 (2011-04)
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- [5] *“Network Effectiveness Ratio”* https://en.wikipedia.org/wiki/Network_Effectiveness_Ratio