5G NR: Radio Access Networks

INITIAL ACCESS

Cell Search

Hello World

"procedure by which a UE acquires time and frequency synchronization with a cell and detects the Cell ID of that cell. "

5G Cell
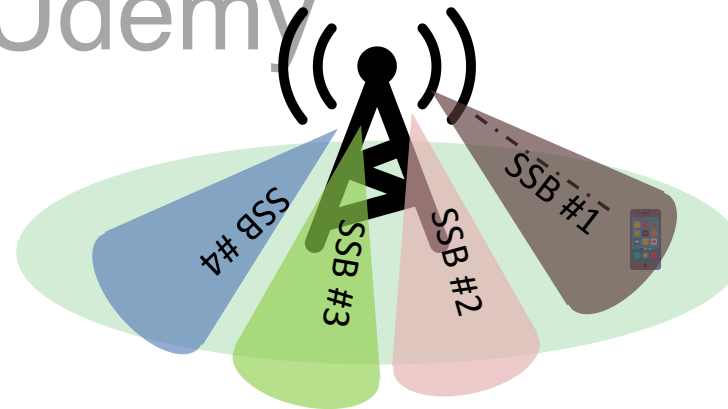
- Primary Synchronization Signal
- Secondary Synchronization Signal
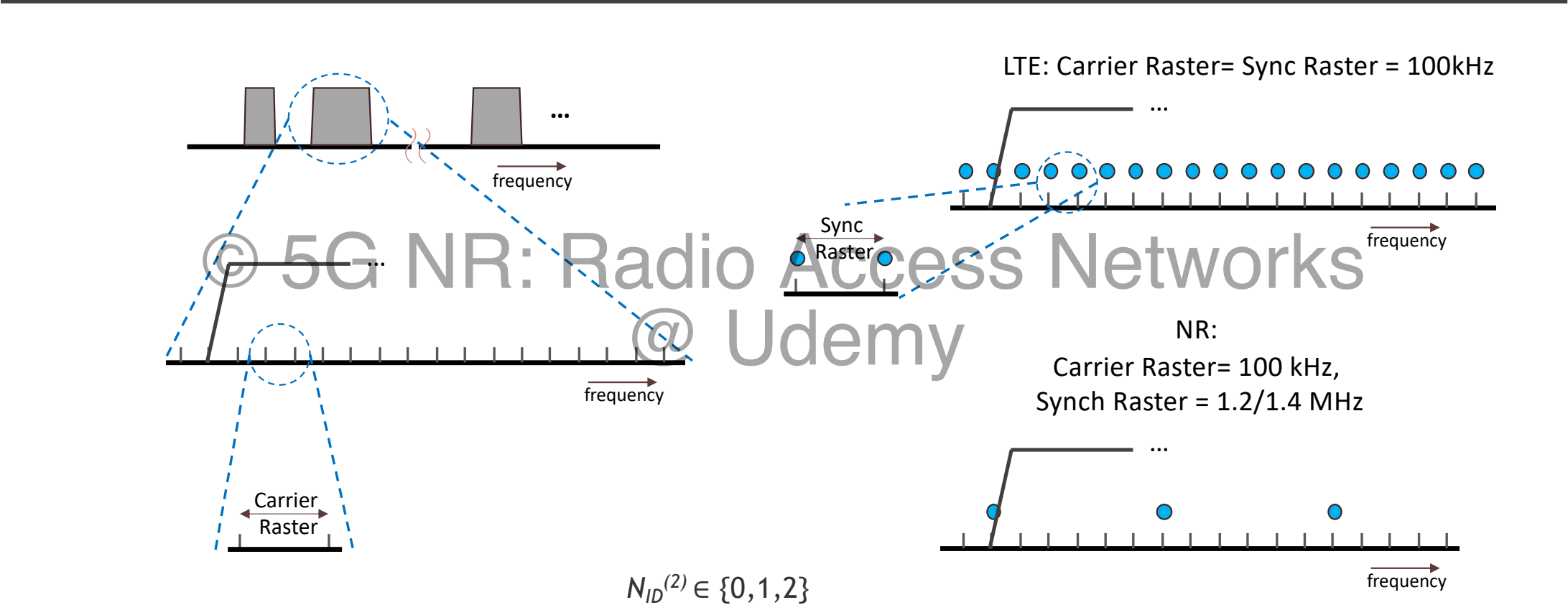
} Cell ID

- PBCH

Sync Signal Block (SSB)

Physical Cell ID

SSB #4
SSB #3
SSB #2
SSB #1

SSB Burst Set

1) Scan for PSS

LTE: Carrier Raster= Sync Raster = 100kHz

frequency

Sync Raster

frequency

Carrier Raster

NR:
Carrier Raster= 100 kHz,
Synch Raster = 1.2/1.4 MHz

frequency

$N_{ID}^{(2)} \in \{0,1,2\}$

$$N_{ID}^{(1)} \in \{0,1, \dots ,335\}$$

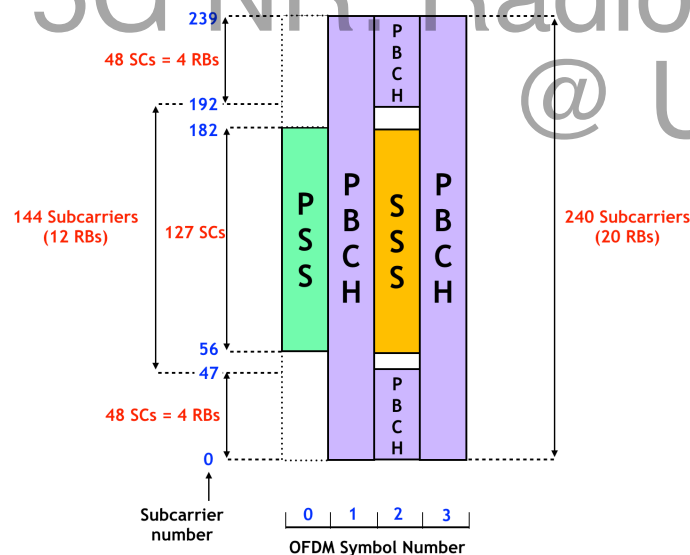$$N_{ID}^{Cell} = 3 * N_{ID}^{(1)} + N_{ID}^{(2)} \ , \ 1008 \text{ different PCIs}$$

3) Decode PBCH for MIB

Minimum System Information
- <mark>MIB (Master Information Block)</mark>
- SIB 1 (System Information Block 1)

MIB:
- System bandwidth
- SFN
- Cell Barred
- SCS
- Parameters for SIB 1 acquisition

Minimum System Information
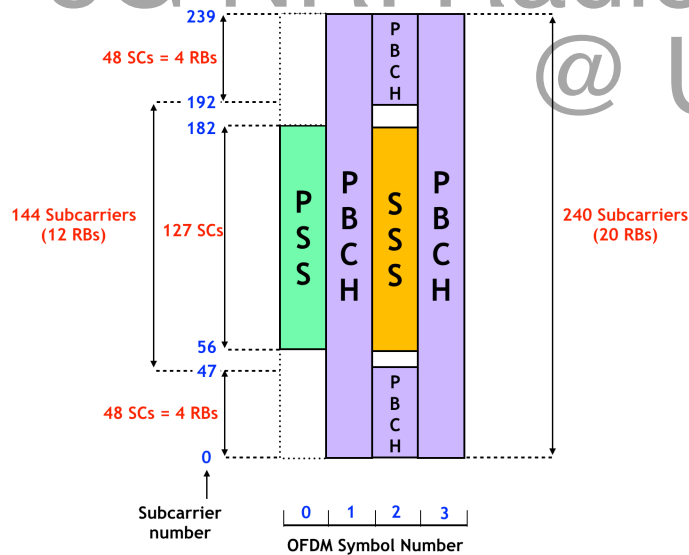- MIB (Master Information Block)
- SIB 1 (System Information Block 1)

RMSI – Remaining Minimum System Information

SIB 1:
- Cell Selection Info
- Cell Access Info
- Info about Other SIBs

4) Other SIBs

"not necessarily need to know"

- Periodic Transmission
- On-demand

SIB2 Contents: Cell re-selection information common for intra-frequency, inter-frequency and/ or inter-RAT

SIB3 Contents: Intra frequency cell re-selection information e.g. PCI, q-Offset, q-RxLev, q-Qual, Black cell list.

SIB4 Contents: Inter frequency cell re-selection information e.g. NR-ARFCN.

SIB5 Contents: Inter system cell re-selection toward LTE e.g. EARFCN

SIB6 Contents: Earthquake and Tsunami Warning System primary notifications

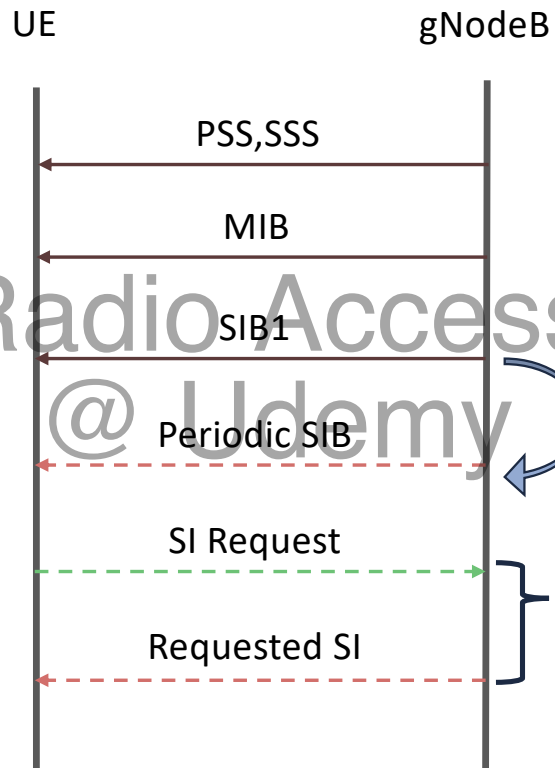**SIB7 Contents:** Earthquake and Tsunami Warning System secondary notifications

SIB8 Contents: Commercial Mobile Alert services (CMAS) notification

SIB9 Contents: Timing information for UTC, GPS and local time

UE decides if to camp

Summary

THANK YOU