

Lab 6

Scanner data analysis

R&S scanner TSME6

- R&S scanner TSME6
- Labtop with software ROMES4

Taltech networks

- GSCN - Global Synchronization Channel Number
 - Channel where the center frequency for SSB transmitted.
- Taltech FR1 network
 - 7840

Date, time, location

Date	Time	UTC	Latitude	Longitude	Altitude	Speed	Heading	x_Sat
04.03.2025	16:28:50.654	1743769730	59.394297	24.672074	29.34	0.11	76.29	16

- Altitude in meters
- Speed in km/h (km per hour)
- Heading shows the movement directions
- X_Sat (# of satellites) 16 means 16 or more satellites

Frequencies and cells

NR_ARFCN	SSRef	Band	PCI	SSBIdx	SSBIdxMod8
632736	3491040000	77	0	0	0

- ARFCN – Absolute Radio-Frequency Channel Number
 - NR Absolute Radio Frequency Channel Number (NR-ARFCN) for NR are specified in 3GPP TS 38.104 section 5.4.2
- SSRef
- PCI –Physical Cell Identifier
- SSBIdx - Synchronization Signal Block index
- SSBIdxMod8 - the beam index modulo 8 of the beam the SS-PBCH block belongs to.

SSB_RSSI	SSS_SINR	SSS_RSRP	SSS_RSRQ	SSS_RePower
-75.59	-5.82	-85.83	-17.08	-79

- SSB_RSSI - There are several SSB blocks and PBCH, DM-RS, SSS and PSS are four signals/channels of those blocks. Each block contains optionally two symbols: Full Symbol (Fs) and Not Full Symbol (NFs).
- SSS_SINR - Signal-to-Interference-plus-Noise Ratio
- SSS_RSRQ - Reference Signal Received Quality
- SSS_RePower - AveRange power, RePower is received power

MCC	MNC	LAC	RNC_CellID_H_	RNC_CellID_D_	ToA_PPS_	ToA_CIR_
248	27	5001	0-43F8	0-17400		0.654235

- MCC - Mobile Country Code
- MNC - Mobile Network Code
- LAC – Location Area Code
- RNC – Radio Network Controller
- CellID_H_
- RNC_CellID_D_
- ToA_PPS_ - Time Of Arrival related to radio frequency grid in millisecond calculated by GPS Pulse Per Second (PPS)
- ToA_CIR_ - Time of Arrival in respect to the Channel Impulse Response (CIR) best peak modulo 10ms

MIB_Sfn	MIB_ScsCommon30or120kHz	MIB_SsbSubcarrierOffset	MIB_DmrsTypeAPositionPos3	MIB_PdcchConfigSib1	MIB_CellNotBarred	MIB_IntraFreqReselectionNotAllowed
690	scs30or120	8	pos2	194	notBarred	allowed

- MIB_Sfn – system frame number in Master information block
- MIB_ScsCommon30or120kHz - subcarrier spacing for SIB1 message
- MIB_SsbSubcarrierOffset - frequency domain offset between SSB and the overall resource block grid in number of subcarriers
- MIB_DmrsTypeAPositionPos3 -
- MIB_PdcchConfigSib1
- MIB_CellNotBarred
- MIB_IntraFreqReselectionNotAllowed

DM_R S_SINR	DM_R S_RS RP	DM_R S_RS RQ	DM_R S_ReP ower	PBCH _SINR	PBCH _RSR P	PBCH _RSR Q	PBCH _RePo wer	PSS_ SINR	PSS_ RSRP	PSS_ RSRQ	PSS_ RePo wer	SSS_ PBCH _SINR	SSS_ PBCH _RSR P	SSS_ PBCH _RSR Q	SSS_ PBCH _RePo wer	SS_P BCH_ SINR	SS_P BCH_ RSRP	SS_P BCH_ RSRQ	SS_P BCH_ RePo wer
-6.78	-86.57	-18.45	-78.96	-6.56	-86.32	-18.2	-78.89	13.55	-80.56	-10.43	-80.37	-6.47	-86.28	-18.04	-78.92	-4.26	-84.76	-16.26	-79.11

- SINR, RSRP, RSRQ, RePower, all are measured on DM-RS, PBCH, PSS, SSS_PBCH and SS_PBCH containing resource elements, respectively
- SSS_PBCH – measured on all elements of SS-PBCH block excluding PSS symbol
- SS_PBCH – all elements of SS/PBCH block

PSS_CI_DtoL	PSS_CI_DtoH	SSS_CI_DtoL	SSS_CI_DtoH	DeviceID	Add_PLMNs
3	12	3	12	1	

- CI - The confidence interval (CI) is related to the power and SINR of the measured signals. The interval is the confidence interval corresponding to 95% of the two-sigma distance in a normal distribution.
- PSS_CI_DtoL - Primary Synchronization Signal, CI Deviation to lower
- PSS_CI_DtoH - Primary Synchronization Signal, CI Deviation to higher
- SSS_CI_DtoL - Secondary Synchronization Signal, CI Deviation to lower
- SSS_CI_DtoH - Secondary Synchronization Signal, CI Deviation to higher
- DeviceID
- Add_PLMNs

Task

- Collect some example data
- Select one signal (RSSI, RSRP, RSRQ, SINR, RePower) to analyze with location data
- Display graphs and evaluate results