



Network Quality of Service Report and Challenges

RF DEPARTMENT , 2023-03-08



Content

1 NETWORK PRESENTATION

2 KPI ANALYSIS

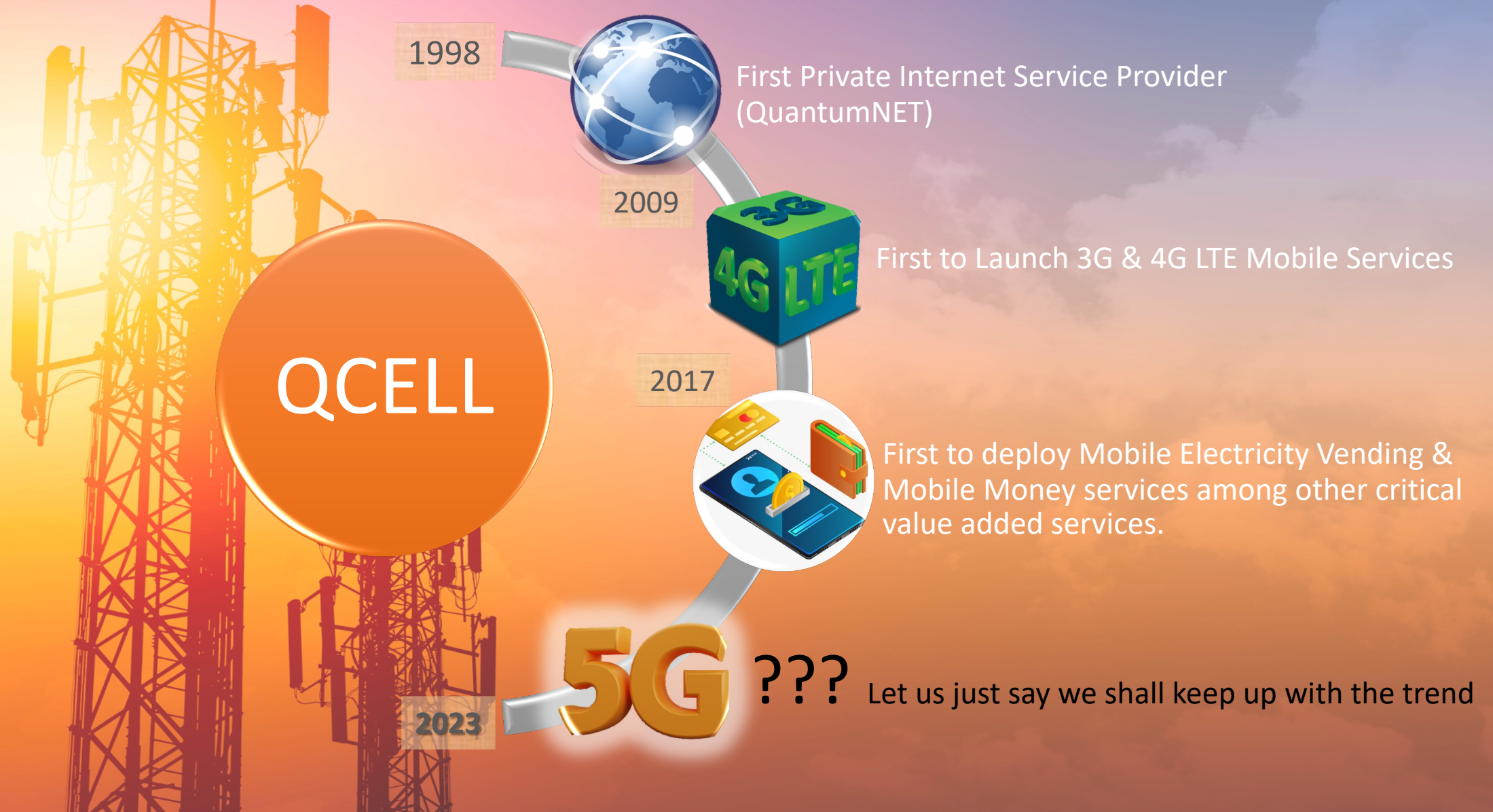
3 CHALLENGES

1 NETWORK PRESENTATION

2 KPI ANALYSIS

3 CHALLENGES

Innovation and Technology Adoption Leadership





Widest

Coverage
Nationwide

250+ sites

**Largest
Private
Shareholding**

ACE Internet
Capacity

4G+

Coverage GBA
and several
rural locations

2G&3G

Coverage
Nationwide

- ❖ Due to the lack of enough Frequency, we Continue to Move more traffic to 3G to reduce load , congestion
- ❖ With the existence of grid instability and voltage problems, must Stabilize TRX , RRU , cells ,sites , MW transmission
- ❖ Retune the frequency plan and RF design for better radio condition (good RXLEX , good RXQUAL)
- ❖ Reduce transmission packet loss

1- Analysis

We can see that SDCCH and TCH availability is following cells availability



QoS Regions



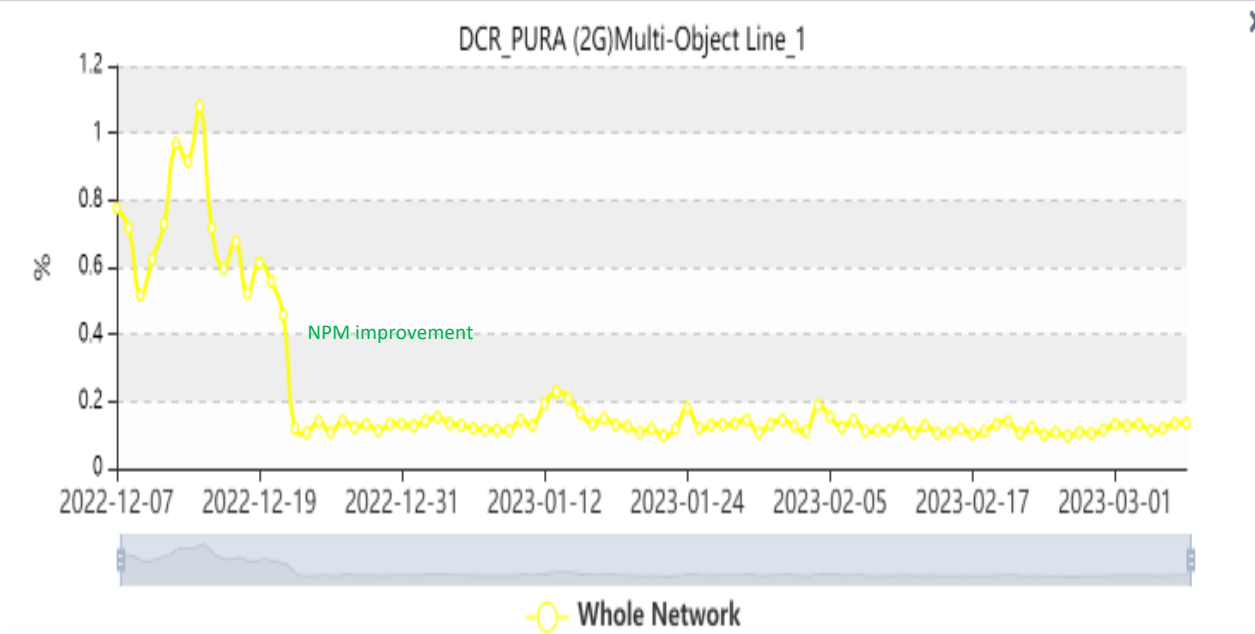
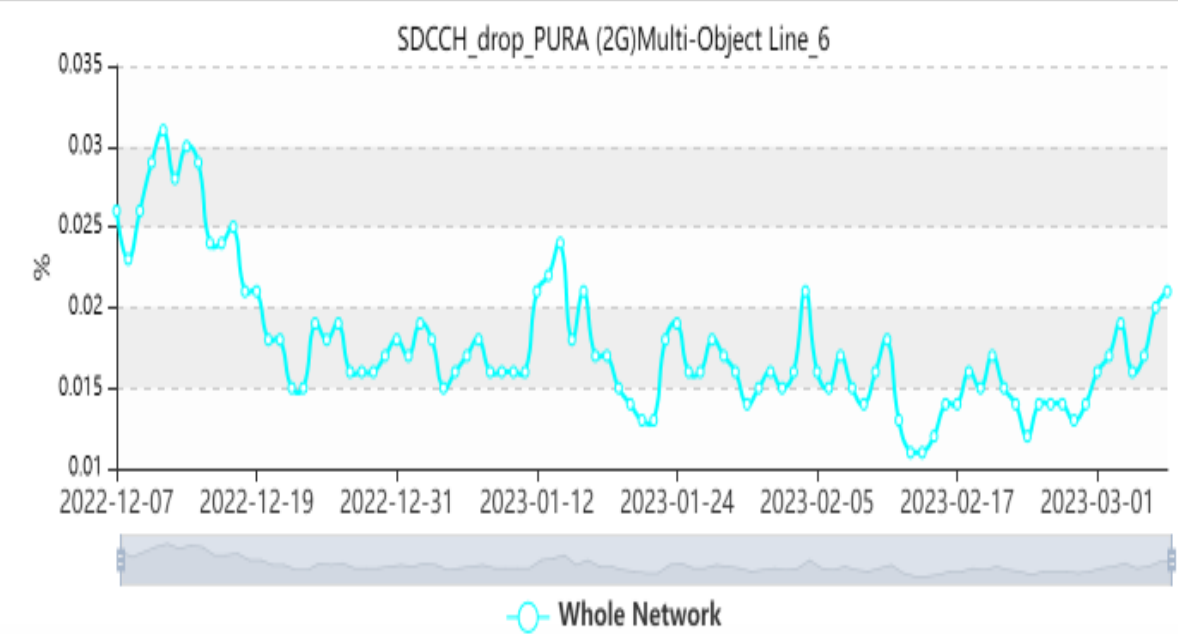
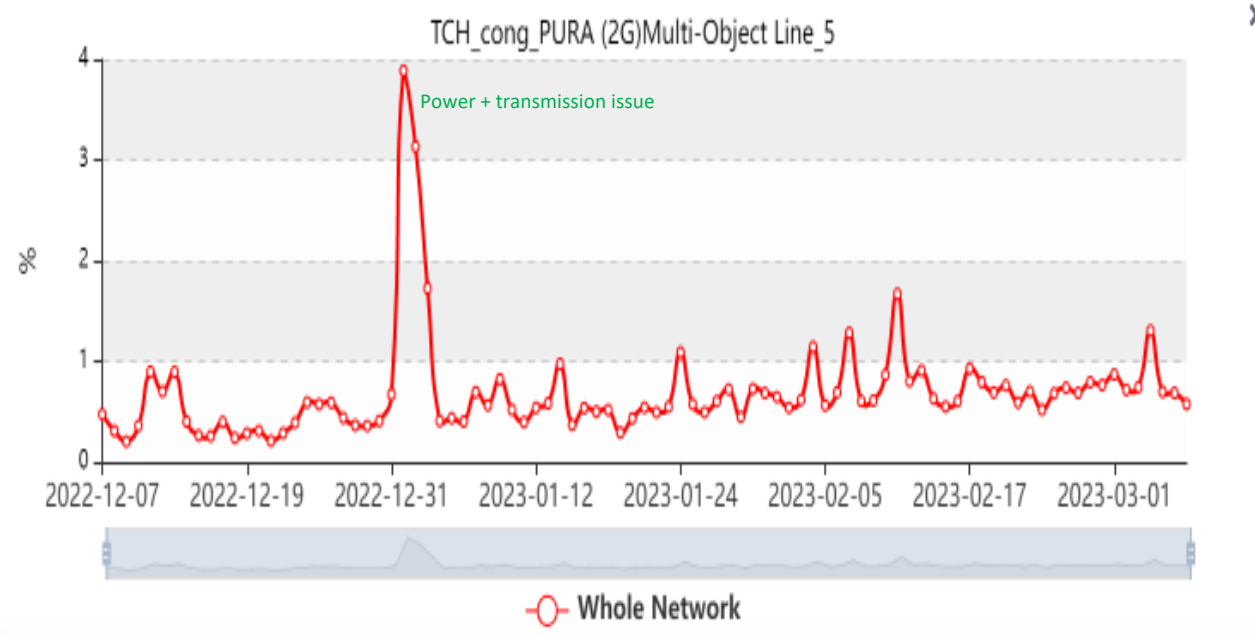
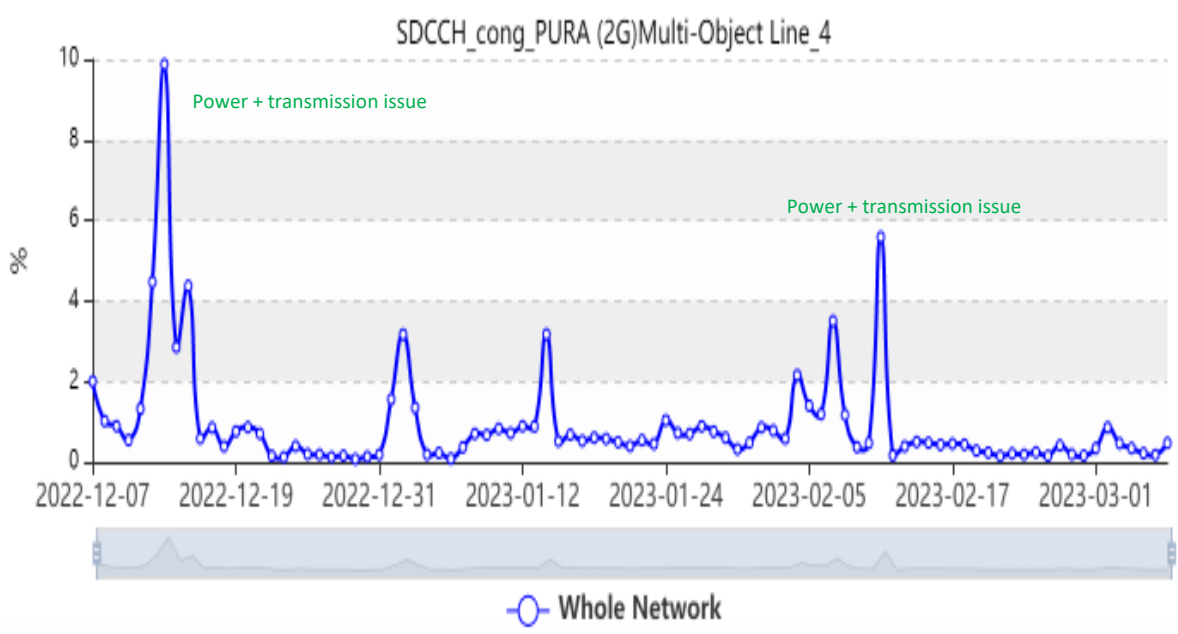
- ❖ the 2G network is congested and frequency reuse is very high
- ❖ The TRX down has a big impact on KPI degradation (mostly caused by power grid fluctuation)
- ❖ MW fluctuation and National Fiber instability also impact the KPI

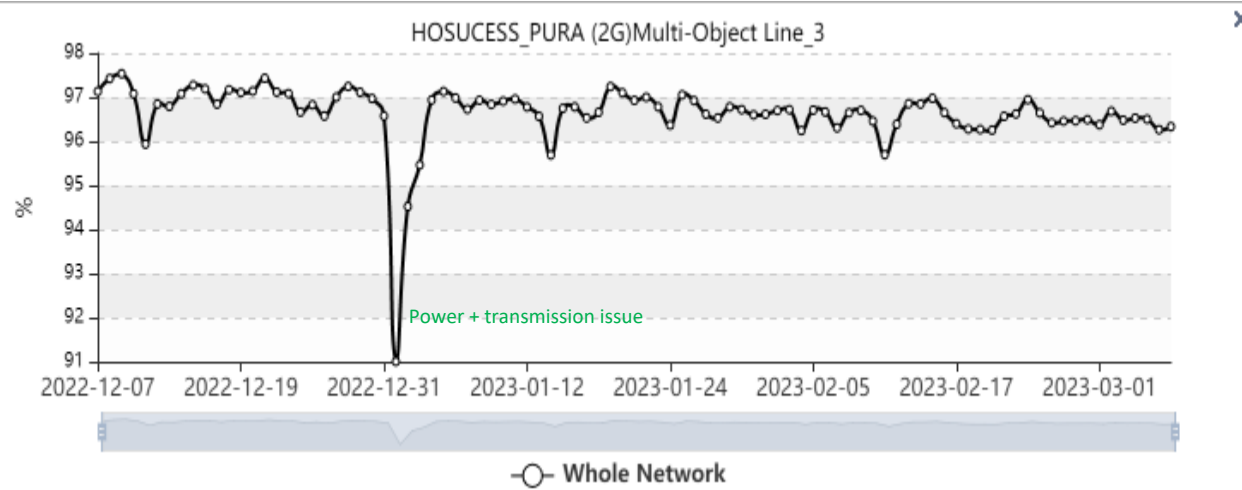
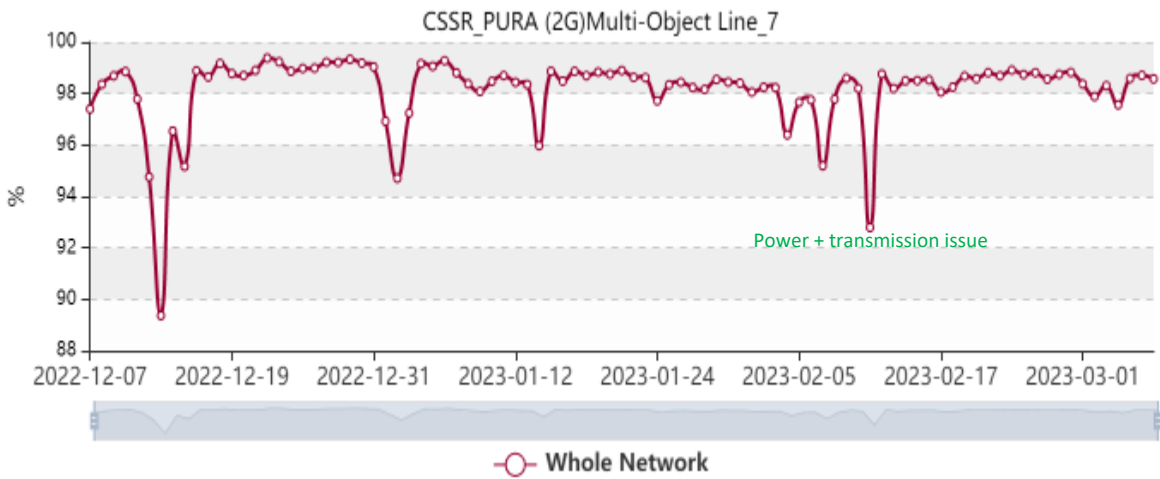
Regions	Cell Availability Rate	TCH Availability Rate	SDCCH Availability Rate	Call Setup Success Rate	TCH Congestion Rate	SDCCH Congestion Rate	SDCCH Drop Rate	Call Success Rate	Call Drop Rate	HO Success Rate	Data Availability
Threshold	<96.0	<96.0	<96.0	<96.0	>2.0	>2.0	>1.0	<96.0	<2.0	<96.0	<95.0
CRR	98.69	97.09	97.79	99.14	0.46	0.24	0.01	99.02	0.12	94.83	97.61
GBA	96.20	95.45	94.56	99.10	0.31	0.11	0.01	99.02	0.08	98.23	89.46
LRR	99.17	96.63	97.06	99.44	0.05	0.10	0.01	99.31	0.13	96.54	97.61
NBB	99.86	98.26	99.55	98.98	0.40	0.05	0.01	98.83	0.15	97.27	96.59
URR	99.69	98.95	99.53	98.04	0.35	1.35	0.00	97.93	0.11	96.89	97.61
WCR	98.82	98.34	98.61	96.81	1.22	1.27	0.01	96.69	0.12	96.25	86.06

Data availability is not an RF KPI (FTP server between QCELL and PURA)

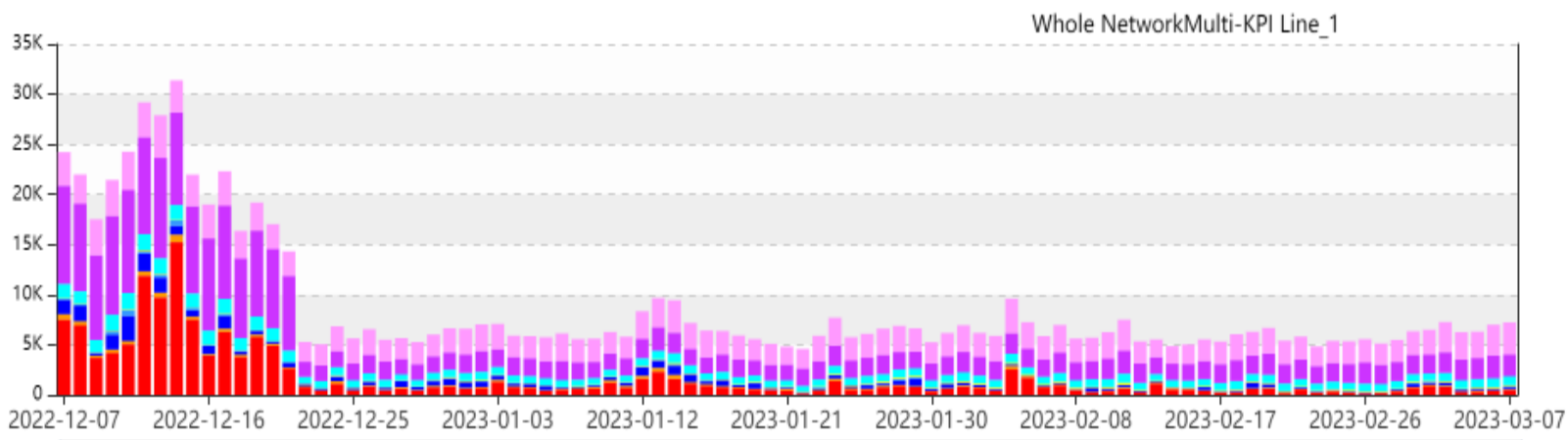
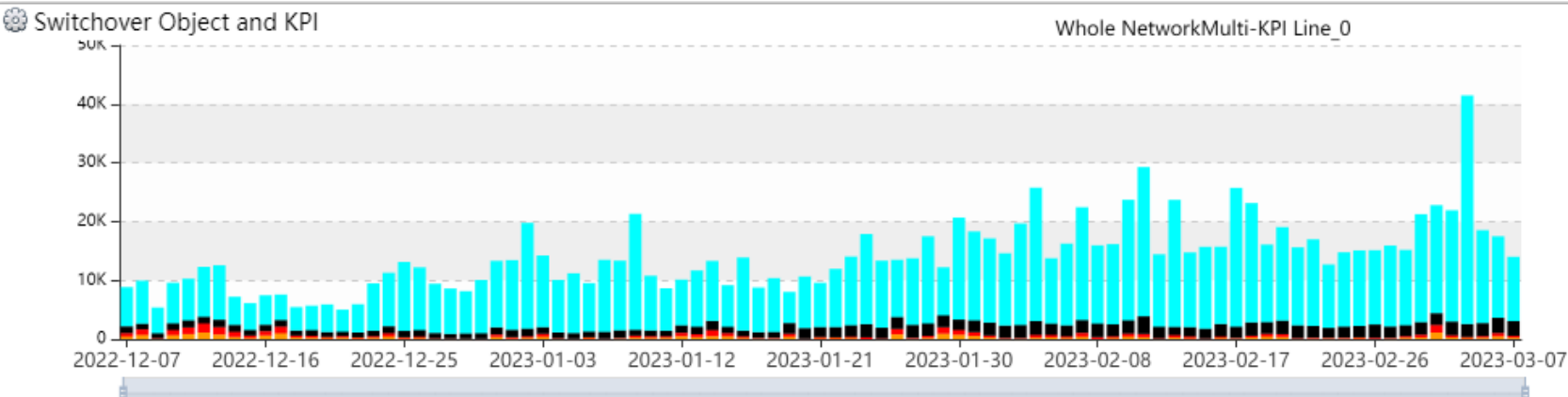
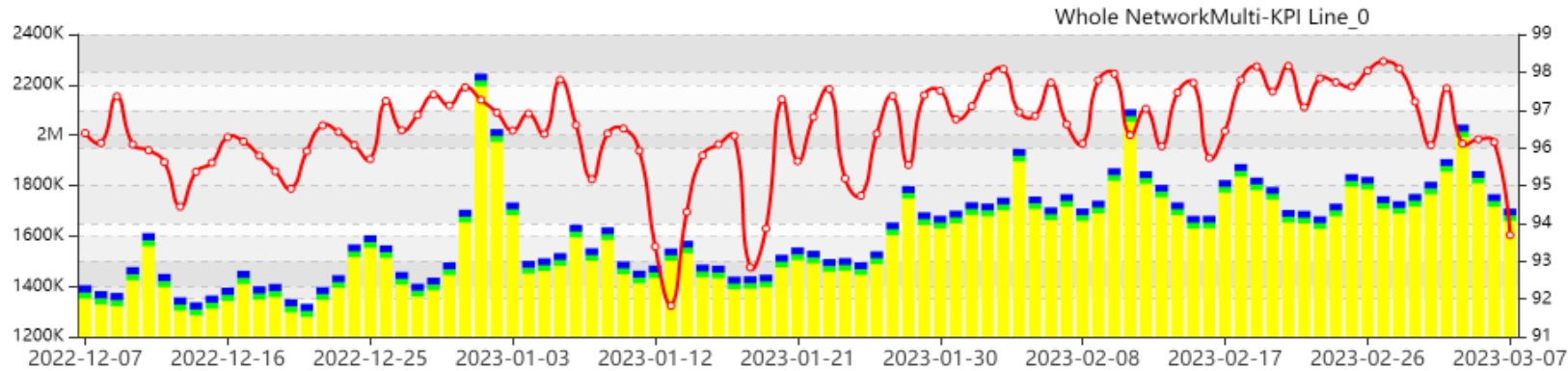
KPI from PRS

Date	GCell Group	Integrity	TR373:Cell Availability(%)	RR307:TCH Availability(%)	RR300:SDCCH Availability(%)	CSSR_PURA (2G)(%)	TCH Congestion Rate(%)	SDCCH Congestion Rate(%)	SDCCH Drop Rate(%)	call success rate(%)	FT_2G CS CDR	RH303:Handover Success Rate(%)
2023-02	CRR	100%	98,66	97,54	97,86	99,17	0,45	0,25	0,02	99,04	0,13	94,91
2023-02	GBA	99%	96,99	96,46	95,61	99,28	0,29	0,14	0,01	99,20	0,08	97,57
2023-02	LRR	100%	98,87	97,04	97,25	99,41	0,05	0,15	0,02	99,28	0,13	96,57
2023-02	NBR	100%	99,50	95,57	99,52	98,98	0,41	0,08	0,03	98,83	0,15	97,23
2023-02	URR	100%	99,32	99,09	99,42	98,03	0,31	1,47	0,01	97,93	0,11	96,94
2023-02	WCR	99%	98,63	97,91	98,41	96,78	1,22	1,37	0,01	96,65	0,13	96,22





2G NETWORK FAILURE ANALYSIS



2- Solutions

- ❖ Stabilize cells ,sites , MW transmission , fiber
- ❖ Retune cells selection and reselection parameters for better transition between F1 F2 F3 to improve QoE
- ❖ Plan more capacity upgrade to improve 4G to 3G handover (according to HUAWEI recommendation)

1- Analysis

3G KPI are normal in general and any failure is related to the region stability (transmission + power)

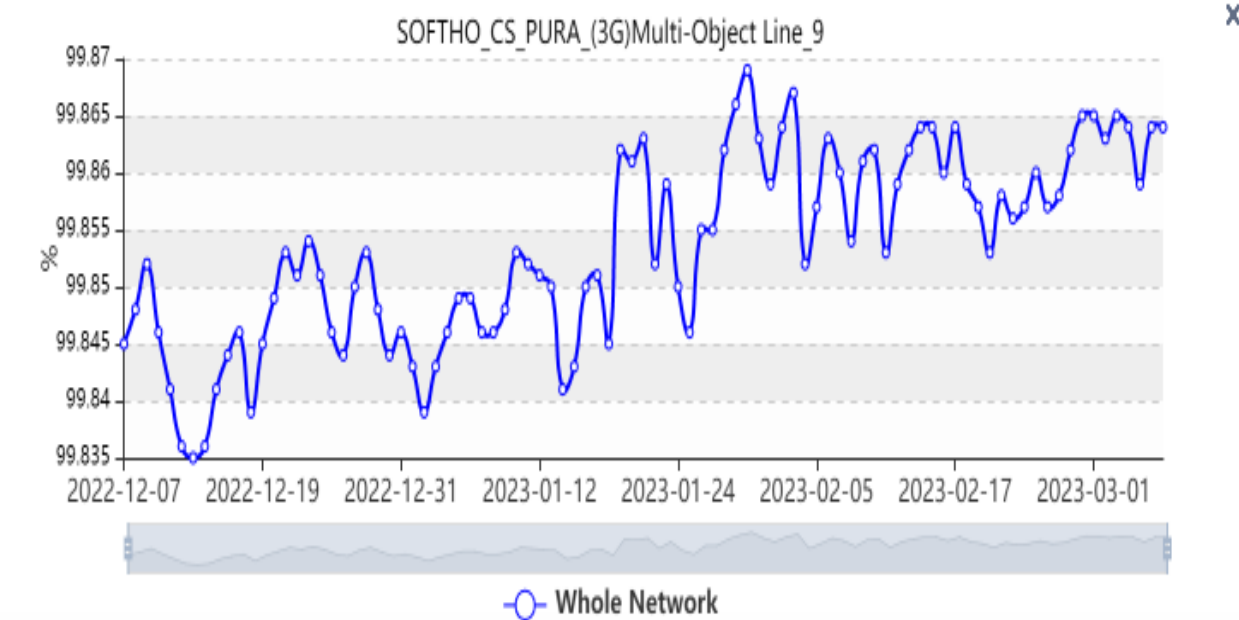
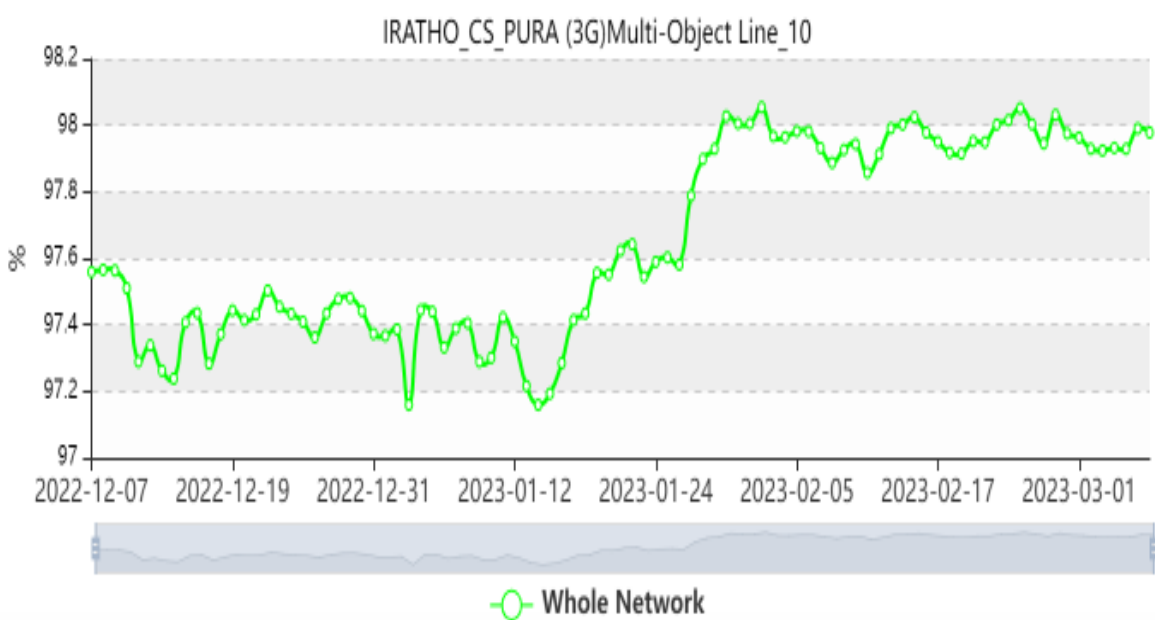
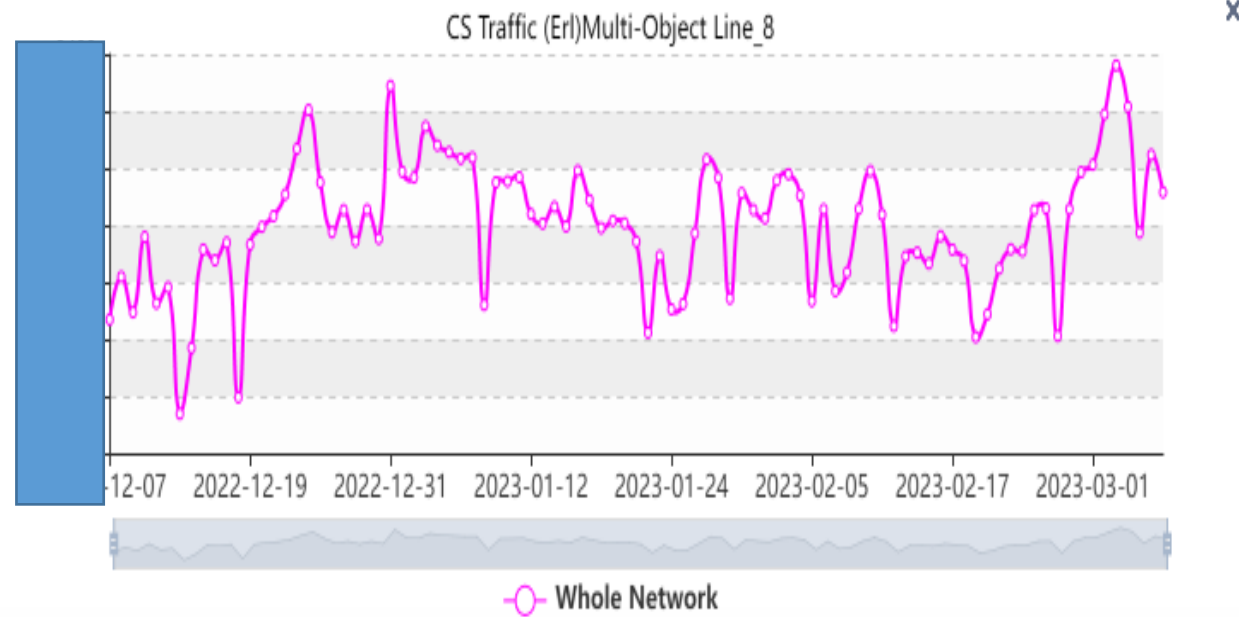
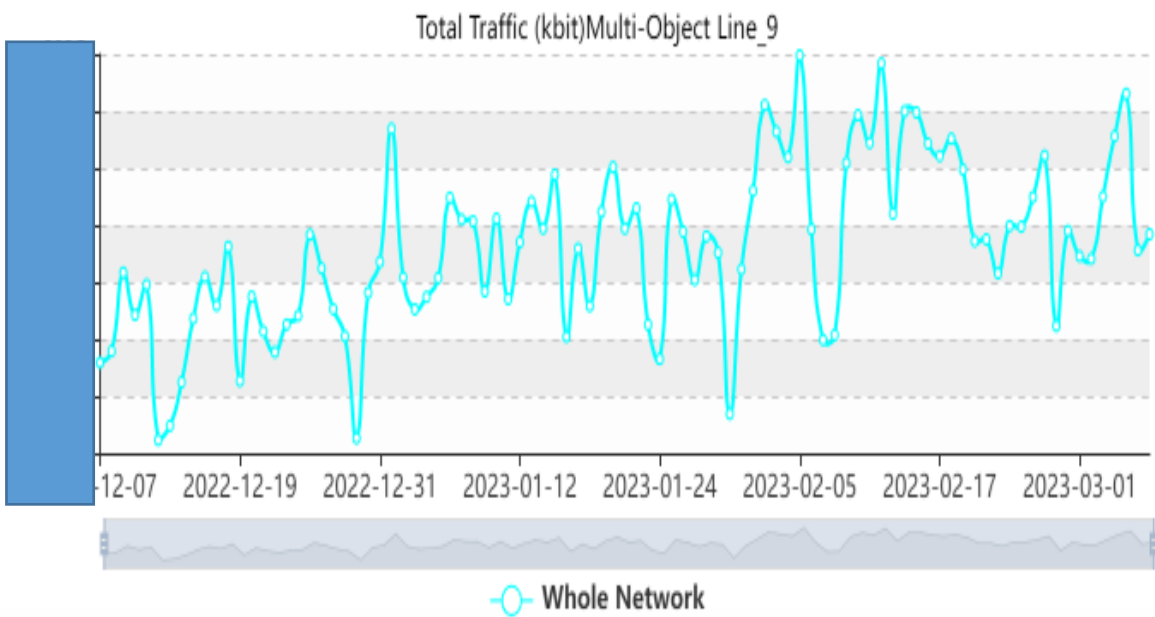
❖ Only URR fails for CSSR (sites stability)

Regions QoS												
Regions	CellAV	CS RRC CSSR	PS RRC CSSR	CS RAB SSR	PS RAB SSR	CS Voice CSSR	PS CSSR	CS Voice CDR	PS CDR	Soft HO SR	CS HO 3G to 2G	DataAV
Threshold %	<96.0	<96.0	<96.0	<96.0	<96.0	<96.0	<96.0	>2.0	>2.0	<96.0	<96.0	<95.0
CRR	100.00	98.68	99.49	98.09	99.76	96.80	99.25	0.20	0.19	99.83	98.75	97.32
GBA	100.00	99.87	99.85	99.96	99.94	99.83	99.79	0.07	0.10	99.91	98.05	94.97
LRR	100.00	99.80	99.83	99.51	99.89	99.31	99.72	0.13	0.11	99.80	98.84	97.32
NBB	100.00	99.03	99.77	98.23	99.71	97.28	99.48	0.12	0.14	99.83	97.80	96.00
URR	100.00	96.47	98.04	97.67	99.57	94.22	97.62	0.68	0.52	99.79	98.68	96.88
WCR	100.00	99.80	99.78	99.86	99.89	99.66	99.67	0.16	0.23	99.85	97.83	96.84

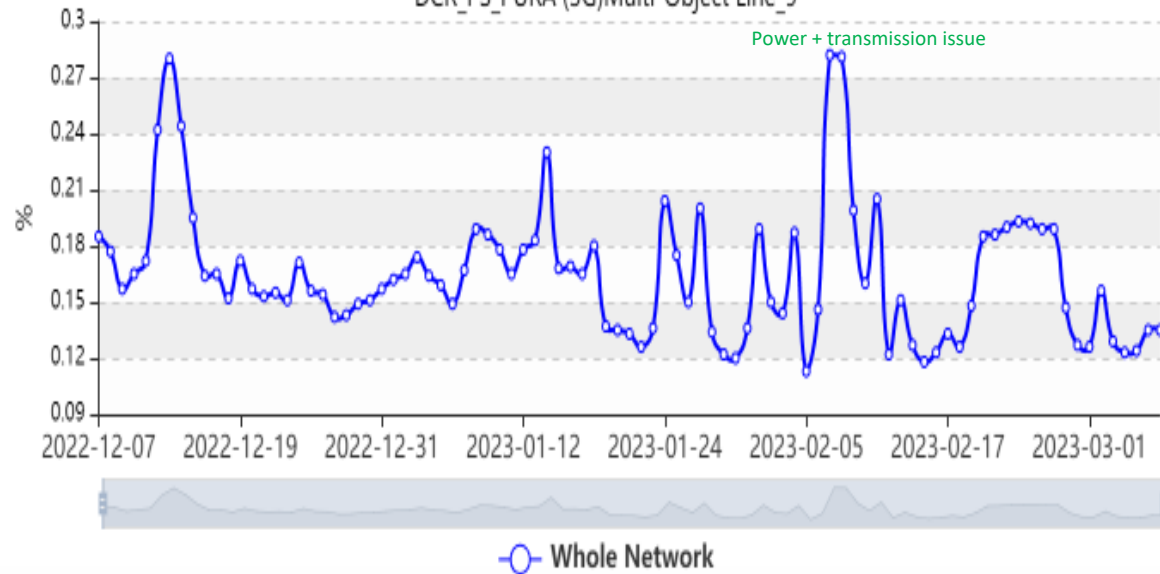
Data availability is not an RF KPI (FTP server between QCELL and PURA)

KPI from PRS

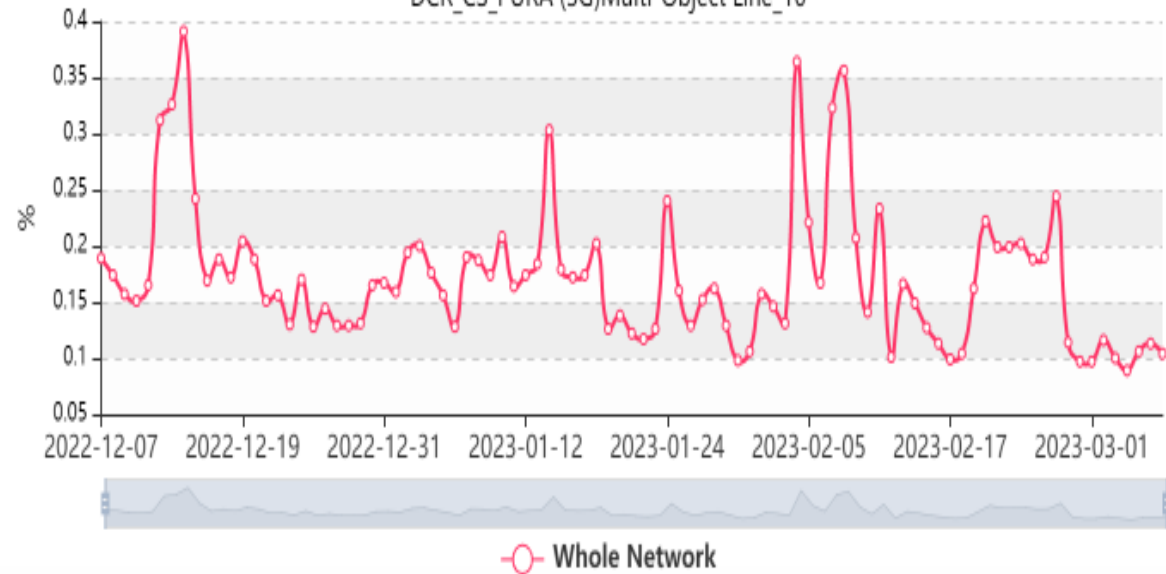
Date	UCell Group	Integrity	Cell Availability_PURA (3G)(%)	CS RRC Setup Success Rate(%)	PS RRC Establishment Success Rate(%)	CS RAB Setup Success Rate(%)	PS RAB Setup Success Rate(%)	CSSR_CS_PURA (3G)(%)	CSSR_PS_PURA (3G)(%)	DCR_CS_PURA (3G)(%)	DCR_PS_PURA (3G)(%)	SOFTHO_CS_PURA_(3G)(%)	IRATHO_CS_PURA (3G)(%)
2023-02	CRR	100%	100,00	99,11	98,14	97,55	98,80	96,55	99,16	0,21	0,15	99,84	98,76
2023-02	GBA	100%	100,00	99,89	99,65	99,97	99,78	99,93	99,80	0,08	0,08	99,92	98,03
2023-02	LRR	100%	100,00	99,87	99,66	98,18	99,44	97,47	99,64	0,14	0,10	99,81	98,75
2023-02	URR	100%	100,00	95,48	91,29	94,90	97,57	92,27	96,90	0,78	0,34	99,79	98,61
2023-02	NBR	100%	100,00	99,65	99,51	97,68	98,58	96,75	99,45	0,13	0,13	99,84	97,73
2023-02	WCR	99%	100,00	99,81	99,32	99,77	99,48	99,66	99,66	0,17	0,18	99,85	97,79



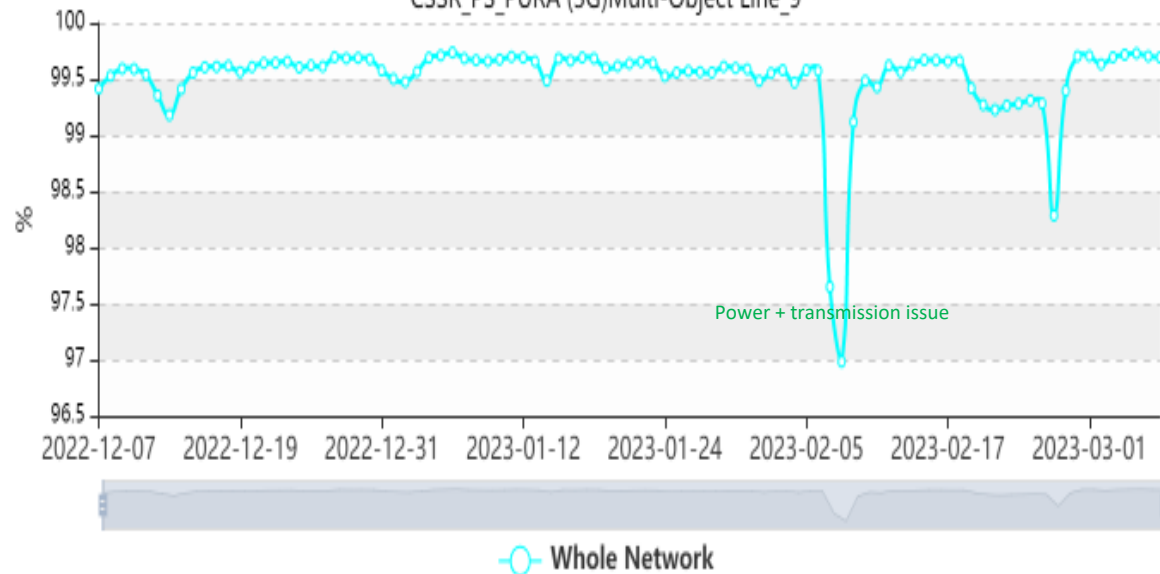
DCR_PS_PURA (3G)Multi-Object Line_9



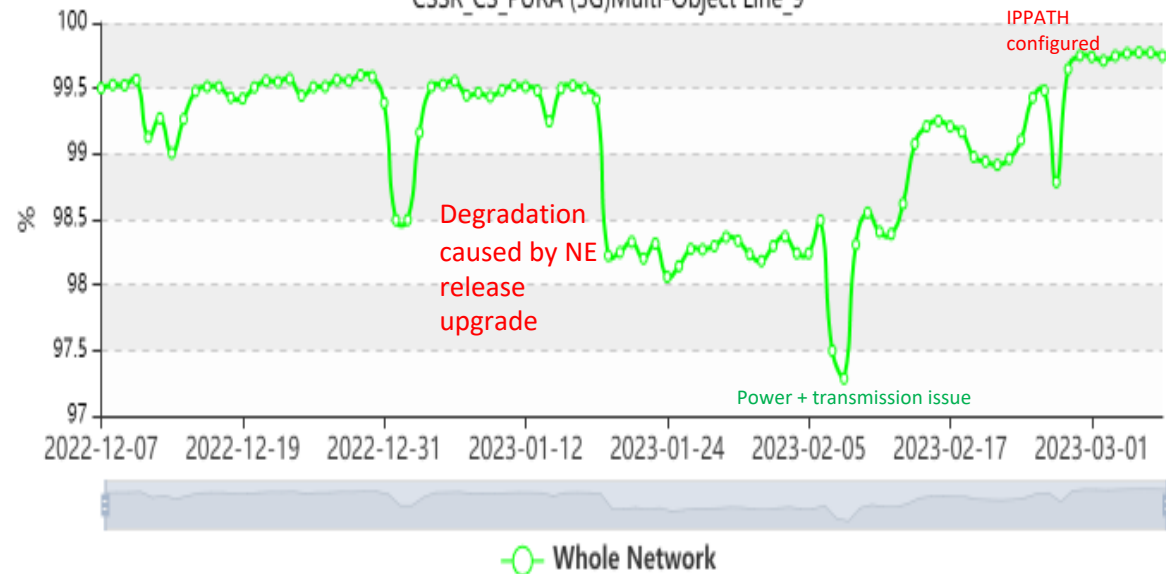
DCR_CS_PURA (3G)Multi-Object Line_10



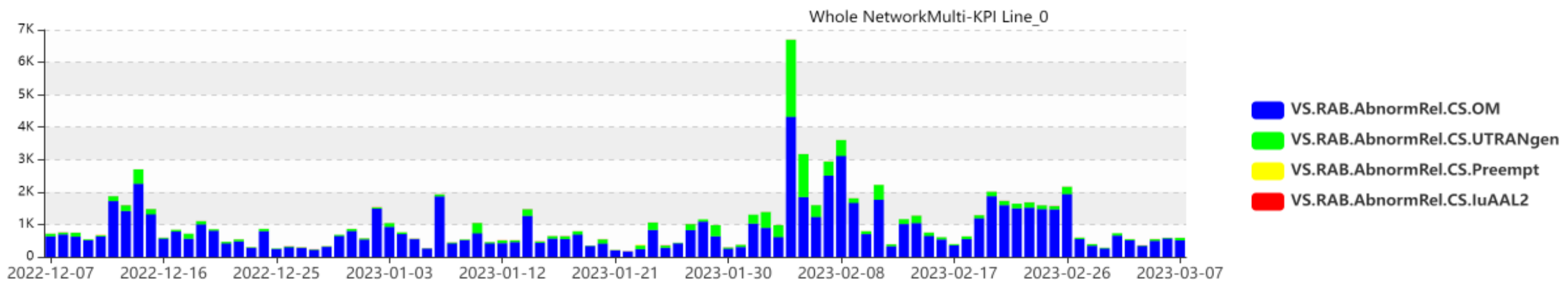
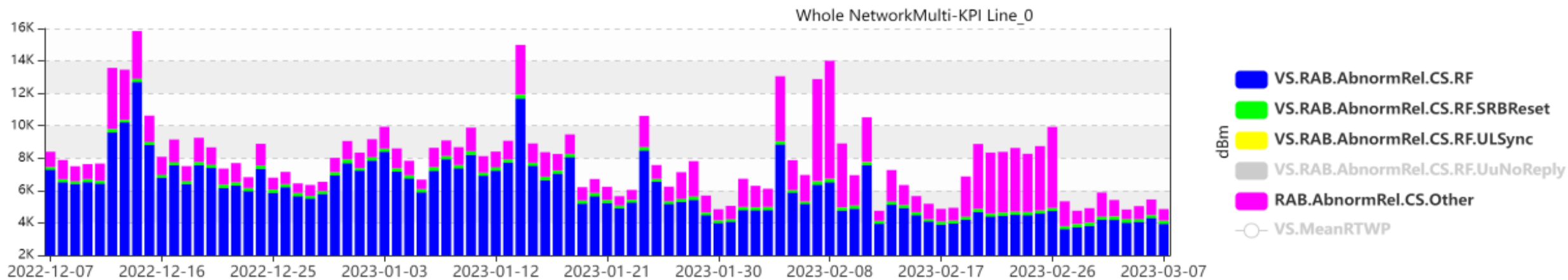
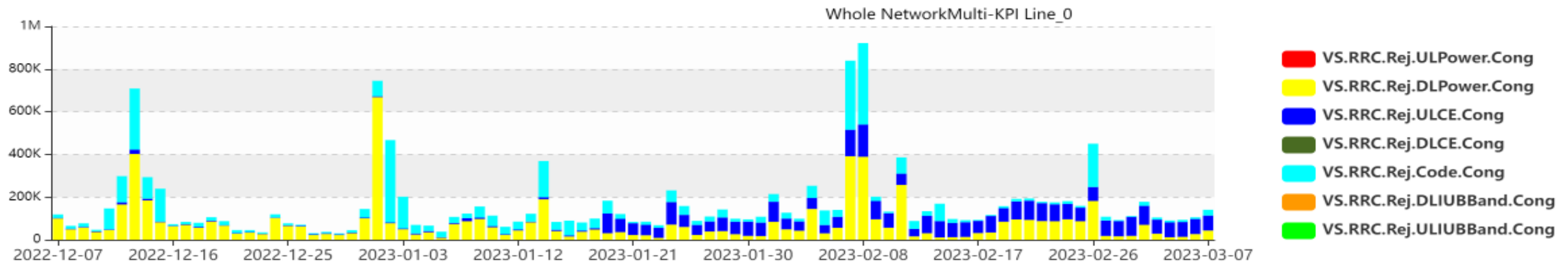
CSSR_PS_PURA (3G)Multi-Object Line_9



CSSR_CS_PURA (3G)Multi-Object Line_9



3G NETWORK FAILURE ANALYSIS



2- Solutions

- ❖ Reduce packet drop to improve user QoE
- ❖ Retune cells selection and reselection parameters for better transition between L800,L1800,L2600 to improve QoE
- ❖ Increase the number of 4G sites to cover all greater Banjul

1- Analysis

All KPI are OK , except 4G to 3G handover



Regions QoS



Region	Cell Av	SG RRCSSR	SR RRCSSR	ERAB SSR	CSSR	ERAB Drop	CSFB Success	INTER FREQ HO	INTRA FREQ HO	INTERRAT HO SR	Data Availability
Threshold %	< 96.0	<96.0	<96.0	<96.0	<96.0	> 2.0	<96.0	<96.0	<96.0	<96.0	<95.0
CRR	100.09	99.34	99.89	99.85	99.74	0.13	99.83	99.01	99.78	97.78	95.13
GBA	98.37	99.85	99.91	99.81	99.72	0.20	99.88	99.56	99.82	95.82	94.87
LRR	100.00	99.65	99.95	99.97	99.92	0.00	99.91	100.00	96.82	97.36	95.09
NBB	100.10	99.41	99.89	99.76	99.65	0.15	99.82	99.11	99.85	97.05	95.09
URR	96.04	99.39	99.89	99.66	99.55	0.16	99.67	99.96	98.83	93.54	95.09
WCR	96.96	99.55	99.84	99.69	99.53	0.10	99.70	99.68	99.89	92.44	94.18

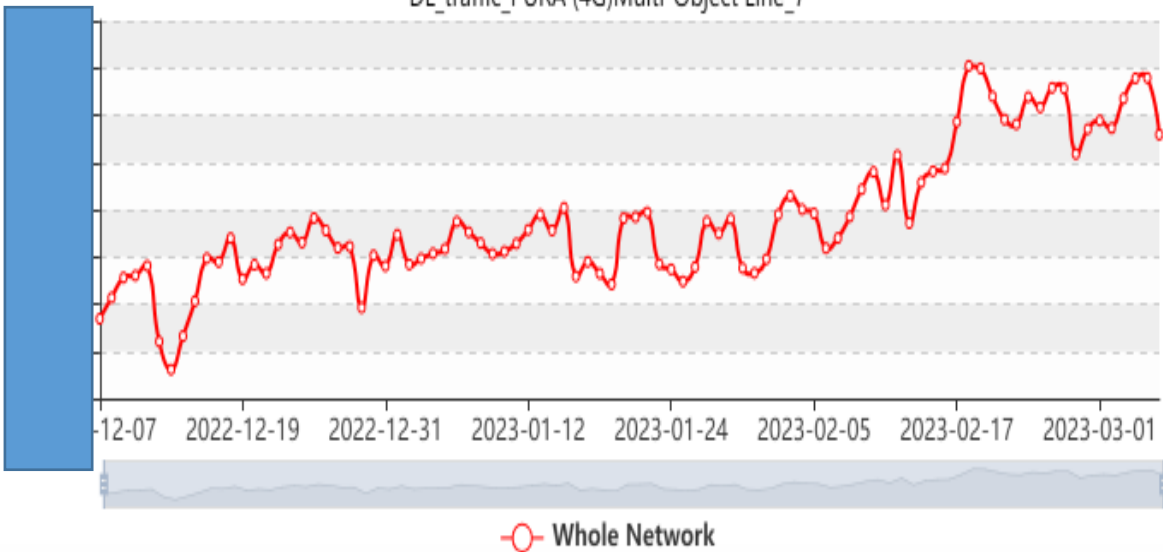
Data availability is not an RF KPI (FTP server between QCELL and PURA)

KPI from PRS

Date	LTE Cell Group	Integrity	Cell Availability_NPM	Service Setup Success Rate (ALL)	RRC Connection Setup Success Rate (other)(%)	FT_ERAB_4G_SR	FT_CSSR_4G	eRAB_DCR_PURA (4G)(%)	FT_CSFB_4G	INTRAFREQHOOUT SR_PURA (4G)(%)	INTERFREQHOOUT SR_PURA (4G)(%)	Inter-RAT Handover Out Success Rate (LTE to WCDMA)(%)
2023-02	CRR	100%	100,00	99,89	99,36	99,98	99,09	0,17	99,72	99,74	100,00	97,96
2023-02	GBA	99%	99,89	99,46	99,88	99,53	98,94	0,23	99,50	99,87	99,63	96,43
2023-02	LRR	100%	100,00	99,93	99,65	99,97	99,46	0,01	99,65	96,83	100,00	97,36
2023-02	NBR	100%	100,00	99,18	99,07	99,35	98,80	0,00	99,62	98,53	/0	/0
2023-02	URR	98%	98,01	99,41	99,25	99,53	98,47	0,11	99,15	98,57	99,97	96,09
2023-02	WCR	99%	99,26	99,65	99,48	99,81	98,78	0,09	99,55	99,84	99,67	91,81

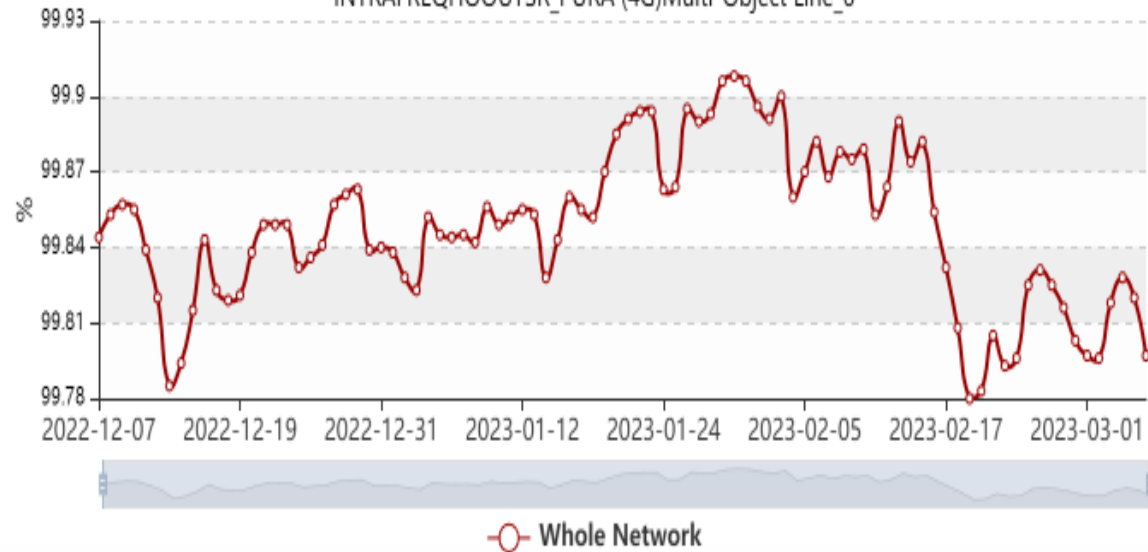
DL_traffic_PURA (4G)Multi-Object Line_7

X



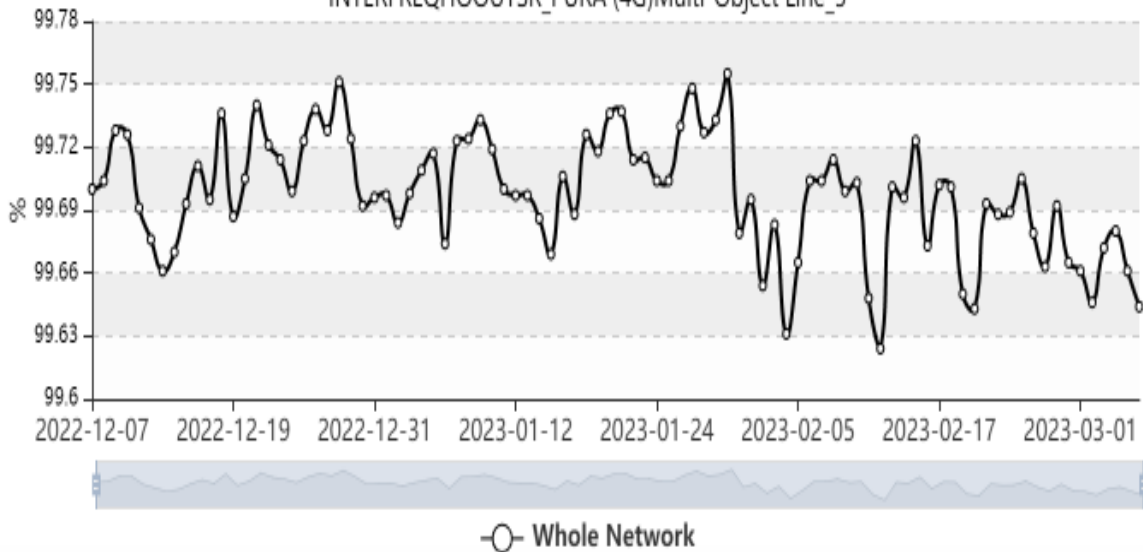
INTRAFREQHOOUTSR_PURA (4G)Multi-Object Line_6

X



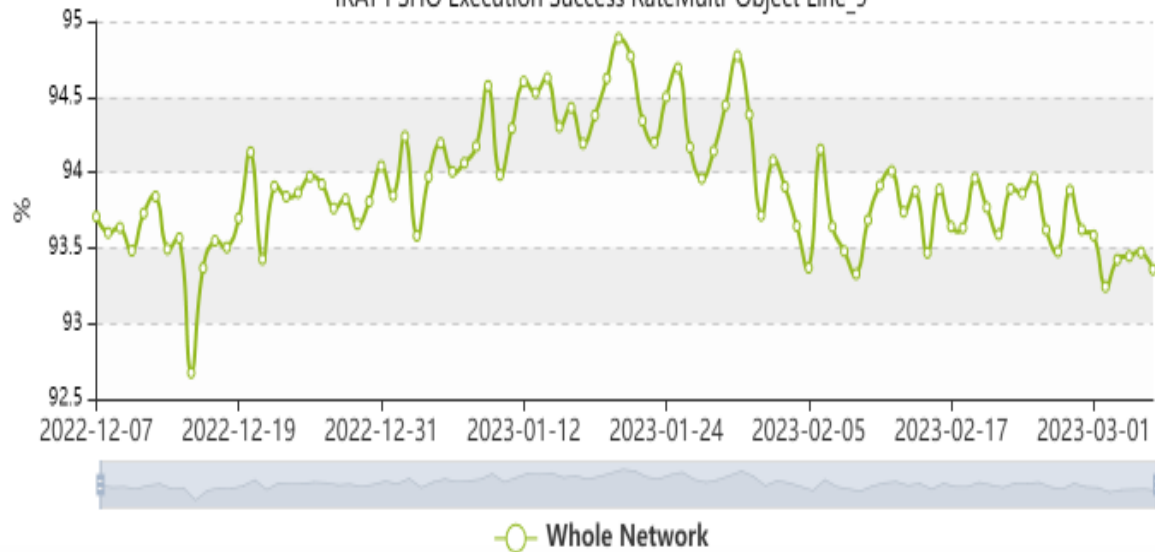
INTERFREQHOOUTSR_PURA (4G)Multi-Object Line_5

X

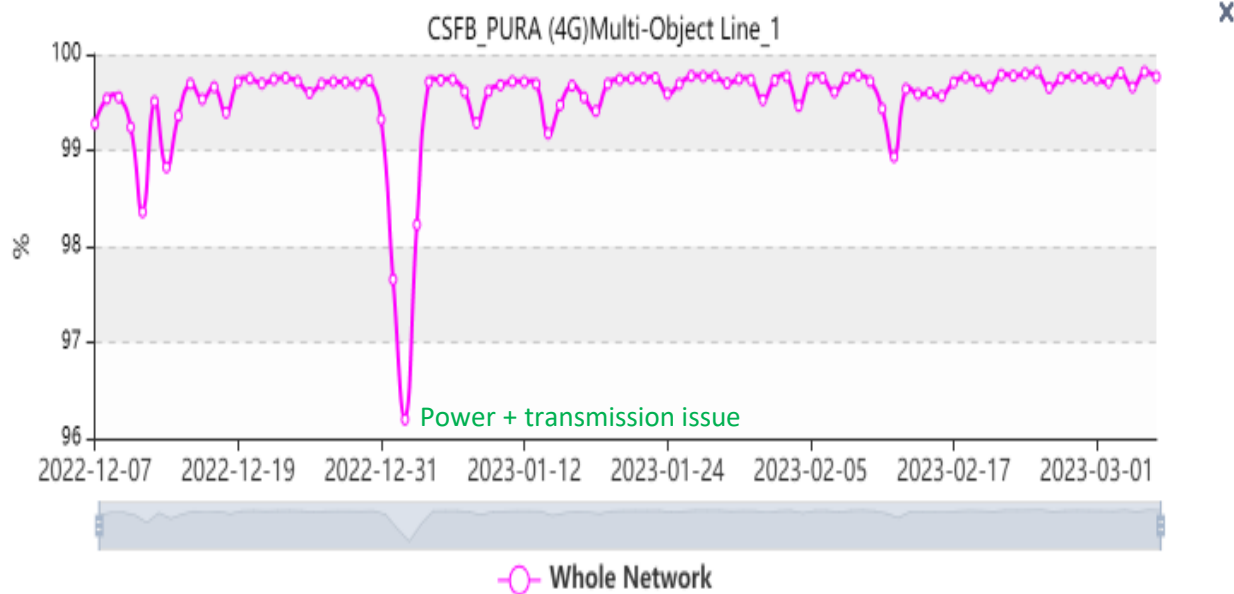
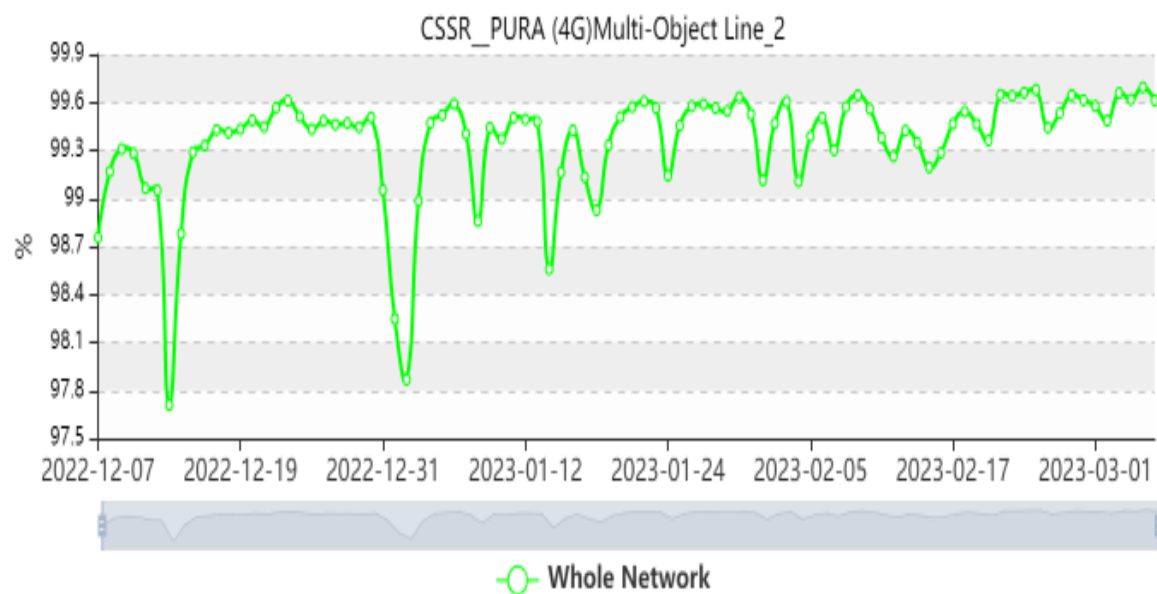
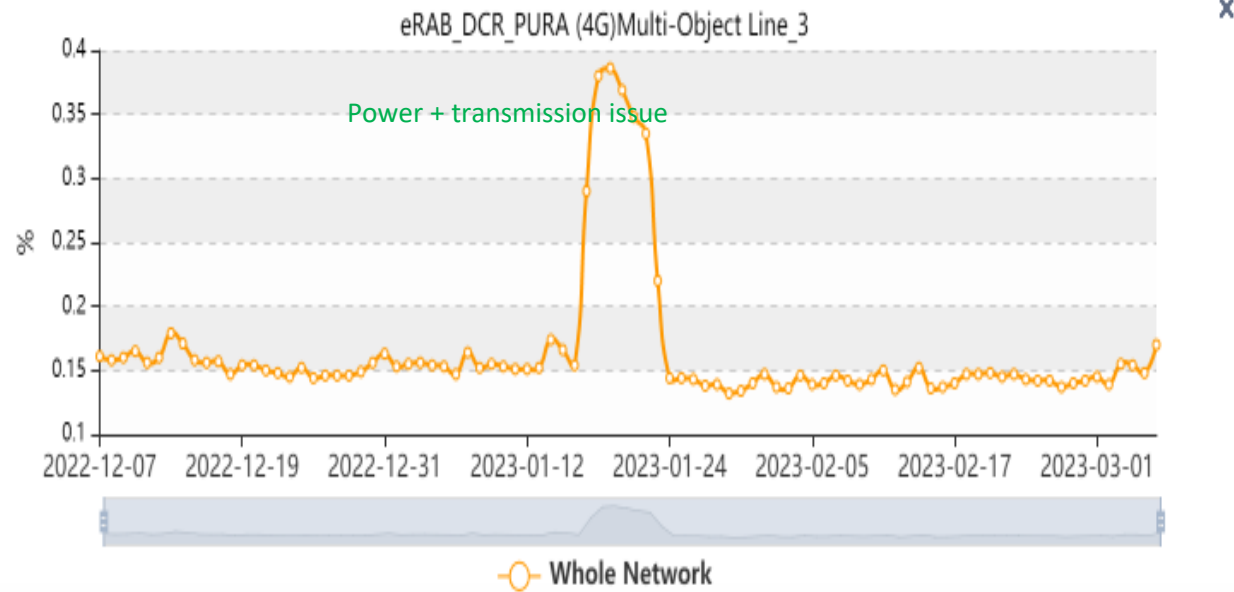
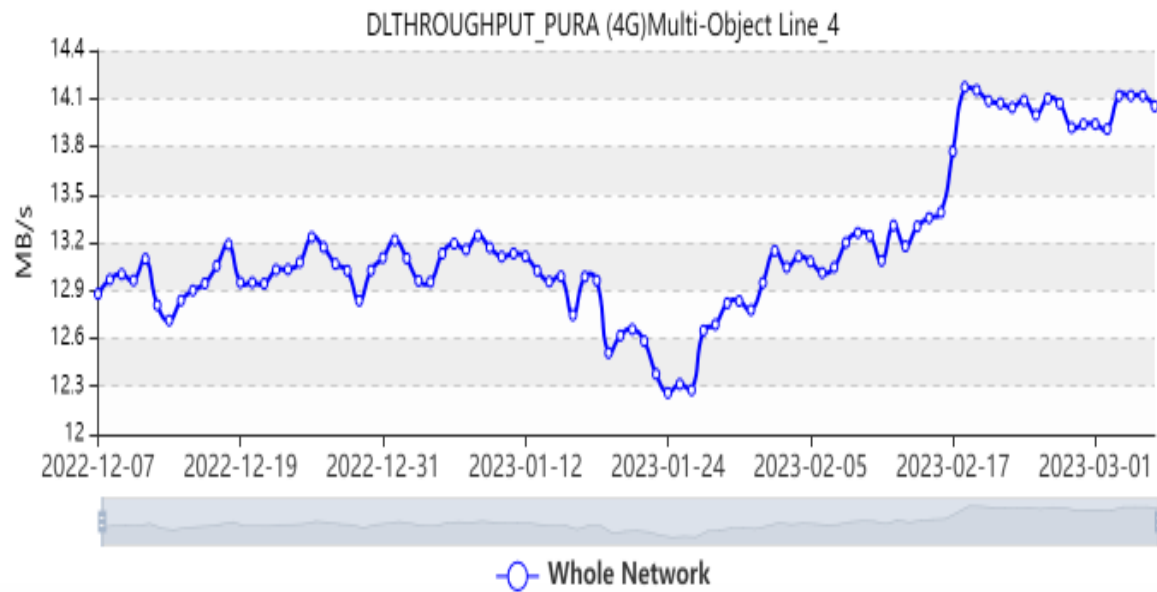


IRAT PSHO Execution Success RateMulti-Object Line_9

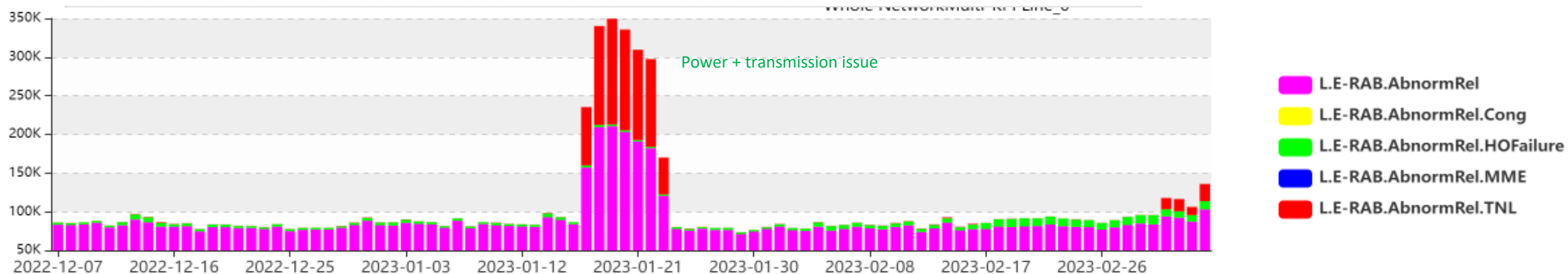
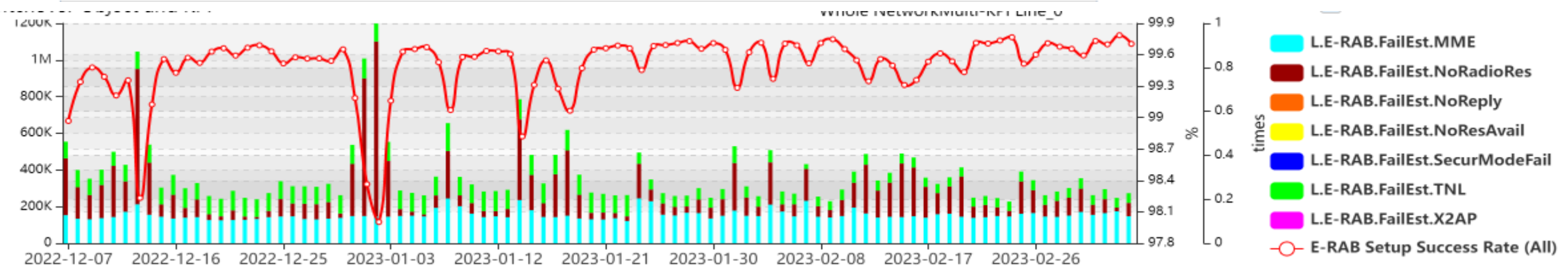
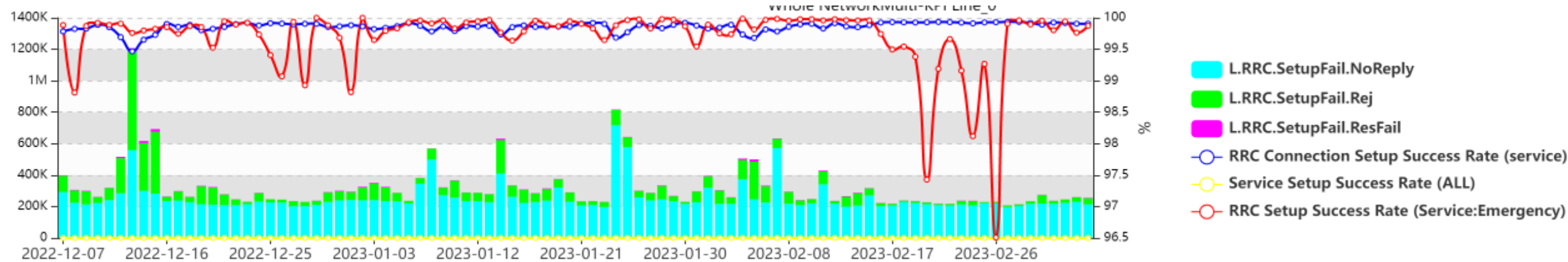
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LTE



LTE NETWORK FAILURE ANALYSIS



1 NETWORK PRESENTATION

2 KPI ANALYSIS

3 CHALLENGES

CHALLENGES

• MAJOR CHALLENGES

- National Grid Stability and Low voltage issues.
- National Fiber backbone infrastructure instability and inappropriate physical cable route design for better ring topology designs.
- Fast adoption and increased rate of data consumption requirements by end users.
- Global and National logistical issues causing delays for timely delivery of equipment.
- Global equipment production delays.
- Adequate market control for efficient spectrum use to support enhanced data rates.
- Interference caused by neighbor country operator using similar frequencies (SENEGAL)