

No. BSNLCO-CMQS/22/1/2023-NWO CM II

Dated: 24.07.2026

To

The Chief General Managers,
All Telecom Circles, CNTx & Metro Districts

Subject: Implementation of Standard Operating Procedure (SOP) for BTS Fault Management – reg.

1. Enclosed herewith is the Standard Operating Procedure (SOP) for BTS Fault Management for implementation across all Circles with immediate effect.
2. The SOP has been prepared to establish a uniform and time-bound mechanism for detection, diagnosis, escalation, restoration and closure of BTS faults by clearly defining the responsibilities of all stakeholders involved. The objective is to ensure faster fault resolution, reduction in MTTR and sustained improvement in BTS availability.
3. All Telecom Circles shall ensure that the enclosed SOP is circulated to all BA/OA Heads, Mobile Wings, Transmission Wings, CNOC/BINCC teams, Site In-Charges, FRTs, IaaSPPs and all concerned field units.
4. The SOP shall be followed in letter and spirit by all concerned officers and field units.

Encl.: As above (SOP – BTS Fault Management)


24/07/26
(S. K. Singhal)
PGM (CM-NWO), BSNL CO

Copy to : 1. All Directors, BSNL Board for kind info. Pl.
2. CGM(ITPC) for necessary action.
3. GM(CNO), BSNL CO for necessary action

STANDARD OPERATING PROCEDURE

BTS Fault Management — Ticket-to-Resolution Process with Stakeholder Responsibilities

1. Purpose

This Standard Operating Procedure (SOP) defines a uniform, step-wise method for detecting, diagnosing, escalating, restoring and closing faults at Base Transceiver Station (BTS) sites. It establishes clear ownership and hand-off points across all stakeholders so that every fault moves predictably from ticket creation to verified resolution within agreed timelines.

It further establishes measurable service-level objectives — a target Mean Time To Restore (MTTR) of under 4 hours for service-affecting faults and an absolute cap of 3 days (72 hours) on any outage — and aligns fault-handling accountability and IPMS KPIs are mutually consistent.

2. Scope

This SOP applies to all BTS sites under the mobility network (both DBN and non-DBN / own sites), and to all fault tickets generated through CNMC / ITSM. Three most common fault categories encountered in the field are:

- Power Issues – Battery, Power Plant, Rectifier Module, Diesel Generator, EB supply etc.
- Media / Transmission Issues – CPAN, MAAN, DMW, UBR, Mini-link, OFC and other media failures.
- BTS Hardware Issues – FDU/PDU/RRH/RAC/CEF cards, Antennas, CPRI, RRH power cable and other OEM equipment faults.

Out of scope: planned maintenance, network optimisation/parameter changes, and capacity augmentation, which are governed by their own procedures.

3. Definitions & Abbreviations

Term	Meaning
T0	Fault reference time = time the outage SMS/ticket is generated by CNMC/ITSM.
MTTR	Mean Time To Restore — elapsed time from T0 to verified service restoration.
CNMC / CNOC	Centralised Network Management / Operations Centre.
BINCC	BharatNet Integrated Network Command & Control centre.
ITSM	IT Service Management (TCS ticketing platform).
FRT	Fault Restoration Team (fibre/transmission field team).
IaaS	Infrastructure-as-a-Service Provider (passive infra for DBN sites).
PIA	Project Implementation Agency (BharatNet/BBNL fibre).
OEM / AMC	Original Equipment Manufacturer / Annual Maintenance Contract.
CPAN/MAAN/DMW/UBR	Carrier/Metro aggregation & microwave transmission network elements.
OTDR / VSWR	Optical Time-Domain Reflectometer / Voltage Standing-Wave Ratio.
RCA	Root Cause Analysis.

4. Stakeholders – Roles & Responsibilities

The table below defines responsibility of each stakeholder.

Stakeholder	Primary Responsibility	Primarily Engaged In
Site in-charge / Field Engineer (SDE/JTO)	First responder; physical inspection, first-level troubleshooting, restoration, maintenance & status update on CNMC/ITSM.	All scenarios
CNMC / CNOC / BINCC	Fault detection & ticket generation; remote diagnostics (ping, port/power levels, MAC status); monitoring till closure.	All scenarios
FRT / Transmission Team	Diagnose and restore media / backhaul and link faults; service diversion; coordinate with transport OEM.	Media
Circle NOC	Monitor OFC/CPAN/MAAN dockets, ensure FRT alignment to routes and SLA compliance.	Media
OEM / Vendor	Diagnose, repair or replace faulty active hardware and provide spares under Warranty/AMC.	Hardware
IaaS (DBN sites)	Maintain passive infrastructure — DG, battery, power plant, EB supply, solar etc.	Infra for DBN
PIA / BBNL & CNTx route party	Restore BharatNet / CNTx OFC breaks (OTDR, splicing) within SLA.	Media
VSAT NOC	Restore VSAT software/hardware/modem faults on booked dockets.	Media (VSAT)

5. Incident Priority Classification & Target MTTR

Every fault shall be auto-classified by CNMC/ITSM into a priority from its impact (customers/traffic/sites affected and strategic importance) and urgency. The target MTTR and the escalation clock (Section 11) follow the priority. This ensures a high-traffic hub or multi-BTS outage is actioned faster than a single low-traffic redundant site.

Two SLAs are tracked per fault: a **Response SLA** — time to acknowledge and begin work — and a **Restoration SLA** — time to restore service (by diversion/redundancy where physical repair is longer).

Priority	Typical trigger	Response SLA	Restoration SLA (Urban / Rural)
P1 – Critical	Hub/BSC/aggregation or OFC-ring failure affecting many BTS; total loss of a high-traffic / district-HQ / strategic site; emergency-service impact.	≤ 15 Min	≤ 2 hrs / ≤ 4 hrs
P2 – Major	Single service-affecting BTS down (site/sector), average traffic.	≤ 15 Min	≤ 4 hrs / ≤ 8 hrs
P3 – Minor	Redundancy loss / degradation with service continuing (one carrier, protected link on standby).	≤ 30 Min	≤ 24 hrs
P4 – Low	No service impact (cosmetic alarm, environmental).	≤ 4 hrs	Next working day

Reconciliation rule: where a physical repair legitimately exceeds the SLA (mobile DG, fibre splicing, vendor hardware, VSAT/MW radio), service must first be held or restored by battery + DG, protection-ring diversion, or standby MW/UBR. For single-fed sites with no diversion path (common on rural/DBN), the physical-repair time is the outage — these sites are treated as P1/P2 and need standby backhaul or on-site spares.

Absolute cap (all priorities): no fault shall remain unresolved beyond 3 days (72 hours).

6. Fault Detection, Ticketing & T0

6.1 For each BTS outage an SMS is sent to the concerned Site In-charge through CNMC. TCS is also rolling out ITSM-based ticketing; therefore the circle shall ensure Site In-charge mapping to BTS ID in ITSM to enable app/web-based ticketing. The time the SMS/ticket is generated is the fault reference time (T0). The circle must ensure correct BTS mapping of Site In-charge in CNMC/ITSM. Wherever not updated, the GM/PGM(CM) of the circle is responsible for updating the same in coordination with the CNMC/ITSM team and shall be accountable for any mapping errors.

6.2 For each OFC route / CPAN / MAAN outage the circle shall ensure the ticket/docket is routed to the concerned FRT team and monitored by the Circle NOC, with sufficient FRT alignment to OFC routes to restore faults within the defined SLA. The Site In-charge shall re-assign transport (OFC) tickets to Tx/CNOC/BINCC for further troubleshooting and resolution.

6.3 Acknowledgement: The Site In-charge shall acknowledge the ticket within 15 minutes of T0. Non-acknowledgement auto-escalates to the controlling SDE/DE and triggers a call from CNMC.

7. Localization / Identification of Issue

#	Action	Responsible	Time
1	Generate and assign BTS fault to the concerned Site In-charge through SMS / ITSM.	CNMC / ITSM	T0
2	Acknowledge the ticket.	Site In-charge	T0 + 15 Min
3	Diagnose the fault and update the root cause / status in CNMC / ITSM.	Site In-charge	T0 + 30 Min
4	Classify priority (Section 5) and confirm fault category — Power / Media / Hardware — to route to the correct procedure.	CNMC/CNOC with Site In-charge	T0 + 30 Min

8. Power Issues

Trigger: Mains-fail / Battery-low / DG-fail-to-start / power-plant alarm and site-down alarm.

Note: on a mains-fail alarm the battery backup begins to discharge; the DG must be started and restored before battery exhaustion. The clock that matters is the battery hold-up time — restoration action must complete within it to prevent the site going down.

#	Action	Responsible	Time
1	Site-down detected via CNMC SMS / ITSM mobile app.	CNMC / Site In-charge	T0
2	SDE/JTO Site In-charge queries BINCC/CNOC/EMS to identify nature of fault.	Site In-charge	T0 + 15 Min
3	Analyse fault type (site ping, RAC/CEF card port power level, MAC status) and inform Site In-charge.	CNOC / BINCC	T0 + 30 Min
A) Mains Failure			
4	Activities to perform at site: Inspect Power Plant/SMPS, rectifier output, MCB status, alarm indications, DG auto-start, DG health, fuel availability and EB supply.	Site In-charge	T0 + 90 Min
5	Start the DG if operational,	Site In-charge	T0 + 120 Min.
6	Arrange Mobile DG/Coordinate with Electricity Board/Intimate to vendor/electrical wing incase faulty DG.	Site In-charge	T0 + 3 Hrs (Urban) T0 + 5 Hrs (Rural)
B) Power-Plant / Module Faulty			
7	Rectifier module faulty: replace from spare. Insufficient rectifiers: add modules from spare (Site In-charge / OEM).	Site In-charge with OEM	T0 + 2 Hrs (Urban) / 4 Hrs (Rural)

C) Battery Bank Faulty / Low Backup			
8	Measure cell voltages / backup duration; isolate and replace faulty battery bank/modules from spare; log recurring low-backup sites for battery replacement.	Site In-charge / IaaSP (DBN)	T0 + 4 Hrs (Urban) / 6 Hrs (Rural)
9	Confirm site on mains/DG, battery on charge, alarms cleared in CNMC; update restoration status.	Site In-charge / CNOC	On restoration

9. Media / Transmission Issues

Trigger: link-down / transmission-fail alarm. First action is service diversion / protection-ring reroute to restore traffic while the physical repair proceeds in parallel; restoration is handled by the FRT / Transmission team on priority.

#	Action	Responsible	Time
1	Tx in-charge informed by Site In-charge / CNOC / BINCC if a media issue is identified.	Site In-charge (P) / CNOC-BINCC (S)	T0 + 30 Min
A) Service Diversion — restore first			
2	Tx in-charge checks MAAN/CPAN port status / IOP / critical alarms (loss of signal, link-down) and CPAN MAC for exchange generation.	Tx in-charge	T0 + 45 Min
3	Restore services by diversion / protection ring if a path is available.	Tx in-charge	T0 + 60 Min
B) Circle / SSA OFC Break			
4	If Circle/SSA OFC break, inform the concerned Tx-FRT in-charge; FRT assigns to field team; OTDR to locate; reach site, splice and restore.	Tx-FRT in-charge	Inform T0+45 · assign T0+60 · OTDR T0+120 · splice T0+300 (U)/420 (R) Min
C) CNTx OFC Break			
5	If CNTx OFC break, inform Tx-FRT (CNTx); assign to route party; OTDR locate; splice and restore.	Tx-FRT (CNTx) / route party	assign T0+60 · OTDR T0+120 · splice T0+300 (U)/420 (R) Min
D) BBNL OFC Break			
6	If BBNL OFC break, inform Tx-in-charge (BBNL); assign to PIA; OTDR locate; splice and restore.	Tx-in-charge (BBNL) / PIA	assign T0+60 · OTDR T0+120 · splice T0+300 (U)/420 (R) Min
E) IaaSP OFC Break			
7	IaaSP updates fault reason in CNMC; IaaSP locates by OTDR, reaches site, splices and restores.	IaaSP (P) / Site In-charge (S)	update T0+30 · restore T0+300 (U)/420 (R) Min
F) VSAT Fault			
8	IaaSP performs L1; books docket with VSAT NOC. S/W issue resolved by VSAT team; H/W/modem replaced.	IaaSP / VSAT NOC	L1 T0+60 · docket T0+90 · S/W T0+120 · H/W T0+8 Hrs
G) MW Link (UBR / DMW)			
9	L1 by Site In-charge/vendor; if alignment needed arrange rigger & align dish; if HW/PoE/radio faulty book docket and replace from stock/vendor.	Site In-charge / vendor	L1 T0+60 · align T0+6 Hrs · HW T0+8 Hrs

10. Hardware Issues

#	Action	Responsible	Time
1	Site-down detected via CNMC SMS / ITSM mobile app.	CNMC / Site In-charge	T0 + 5 Min
2	SDE/JTO queries BINCC/CNOC/EMS to identify the nature of the fault.	Site In-charge	T0 + 15 Min
A) RAC/CEF/PSU/FDU/RRH/CPRI/DC power cable			
3	Diagnose and isolate the faulty hardware via alarm analysis and physical verification.	Site In-charge	T0 + 120 Min
4	Replace faulty hardware from available spare; if not in hand, vendor/warehouse provides H/W and Site In-charge replaces.	Site In-charge / Vendor	spare T0+120 Min · vendor H/W T0+6 Hrs · replace T0+8 Hrs
B) VSWR Fault			
5	Arrange rigger / jumper cable / connector / weatherproofing to rectify VSWR; attend fault and restore sector/site.	Site In-charge	rectify T0+4 Hrs · restore T0+6 Hrs

11. Escalation Matrix

If the Site In-charge cannot meet the timelines, escalation is automatic and time-based.

Elapsed from T0	Escalates to	Action
Ack +15 Min / +30 Min	Cluster in charge	On non-acknowledgement or no diagnosis update.
> 4 Hrs	Cluster In charge → OA Head	Mandatory personal intervention by Cluster In charge ; OA Head monitor on priority (OM ladder).
> 24 Hrs	OA Head → BA Head	Mandatory personal intervention by OA Head ; BA Head monitor on priority (OM ladder).
> 48 Hrs	BA Head → GM (CM/Tx) and CGM circle	BA Head personal intervention; GM (CM/Tx) and CGM circle monitors and intervenes for restoration within 3 days.
> 72 Hrs (3 days)	GM(CM/TX) /CGM (circle)	GM (CM/TX) /CGM personal intervention + mandatory RCA. No fault shall remain pending beyond 3 days in any case.

12. Ticket Closure

A fault shall pass through two states — **Resolved** (service restored) and **Closed** (confirmed, categorised and documented). A ticket shall be closed only after all of the following:

- Physical fault completely rectified.
- BTS operational and stable.
- Traffic restored.
- Alarm clearance verified in CNMC / NMS.
- Restoration confirmed by the Site In-charge and the concerned NOC.
- Relevant remarks, restoration details and supporting evidence updated in CNMC / ITSM.
- Fault categorised with a standard closure/fault code (power / media / hardware sub-type) for MIS and trend analysis.
- RCA recorded for every P1, every fault > 24 hours, and every repetitive fault (defined as ≥ 3 faults on the same site in 30 days).

13. Records, Review & Continuous Improvement

- CNMC/ITSM shall retain all ticket, timeline and RCA records for audit and IPMS scoring.

- Circle NOC shall publish a weekly MIS — faults by category, MTTR vs target, SLA compliance %, and faults pending > 24 / 48 / 72 hours.
- Repetitive-fault and chronic-site lists shall feed preventive maintenance (battery replacement, DG health, OFC route hardening, ring-protection completion).
- This SOP shall be reviewed half-yearly and on any change of OEM, network element or organizational structure.