

MNO & SNO Ecosystem Commercial Opportunity Map

Terrestrial–satellite convergence after 3GPP TSG#112 · A 24–36 month view for operator executives

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Bottom line: At 3GPP TSG#112 (Singapore, June 2026), satellite stopped being a parallel industry and became **part of the operator P&L**. Release 19 NTN Phase 3 is deployment-ready; Release 21 locks the first 6G specification timeline through 2029. For MNOs, the commercial question is no longer *whether* to integrate NTN — it is **which revenue lines, partnership models, and capex cycles convert standards into funded services** before competitors and emerging SNOs claim wholesale, enterprise, and direct-to-device attach.

Why this matters to operator economics

Mobile network operators face flat terrestrial ARPU, rising coverage costs in rural and maritime markets, and enterprise buyers demanding **guaranteed connectivity** beyond macro footprints. Satellite network operators and LEO constellations need **terrestrial distribution, billing relationships, and device ecosystems** to reach smartphone-scale volumes. The convergence creates three simultaneous commercial motions:

- **Wholesale & roaming** — MNOs buy satellite capacity; SNOs sell through MNO brands
- **Direct-to-device (D2D)** — spectrum and service bundles on standard smartphones; new attach and upsell logic
- **Enterprise & industrial** — private 5G + satellite backhaul; SLA-driven contracts with validation evidence

Rel-19

NTN PHASE 3 · DEPLOYMENT-READY

Rel-21

6G NORMATIVE TRACK · 2027–2029

24–36 mo

OPERATOR INVESTMENT WINDOW

Segment leader implication: Separate *technology interest* from *funded workflows*. Budget attaches to pilots with acceptance criteria, device certification paths, and partner interoperability — not slide decks.

Who sits at the table — and who captures value

Terrestrial–satellite convergence is an **ecosystem play**, not a single-vendor sale. Operator executives allocate budget across a multi-party value chain; segment strategy must map influence and revenue pools at each node.

ECOSYSTEM ACTOR	COMMERCIAL ROLE	2026–2028 PRIORITY
Tier-1 MNO	Brand, billing, device distribution, regulatory relationship	D2D service bundles; rural/maritime fill-in; enterprise SLA offers
Emerging SNO / constellation	Capacity, ephemeris, gateway, wholesale economics	MNO partnerships; interoperability proof; regulatory landing rights
Chipset & modem supplier	NR-NTN modems, RedCap-NTN, reference designs; GCF/PTCRB conformance	Release-stacked modem validation; MNO acceptance sign-off; OEM integration kits
Handset OEM	NTN-capable smartphones; radiated performance; operator SKU variants	Launch readiness vs. Apple/Samsung D2D baseline; MNO co-marketing bundles
Open RAN / integrator	Multi-vendor RAN, brownfield economics, energy efficiency	Displace legacy single-vendor capex; O-RAN acceptance under live traffic
Enterprise & vertical	Private 5G, industrial OT, aviation/maritime	Campus + satellite backhaul; production-continuity business case
Hyperscaler / cloud	Core offload, AI-RAN, edge compute, service assurance	Cloud-native core trials; AI ops — funded where opex savings are measurable
Standards & regulatory	3GPP releases, spectrum, emergency services (PWS)	Rel-19 pilot alignment; Rel-21 6G positioning; cross-border roaming rules

Partnership lanes & ecosystem risk

MNO ↔ **SNO wholesale** · **MNO** ↔ **handset OEM** (NTN SKU roadmaps) · **chipset** ↔ **OEM** ↔ **MNO** (modem integration, acceptance, launch bundles) · **MNO** ↔ **enterprise** (private 5G + satellite) · **MNO** ↔ **integrator** (O-RAN brownfield). *Risk*: failed pilots destroy partnership momentum — operators fund acceptance evidence that de-risks launch.

Named players & alliances (public map)

Representative ecosystem roster for segment planning — public affiliations and announced NTN/D2D/O-RAN postures (2025–2026). Not exhaustive; no endorsement implied. Partnerships evolve — validate before account planning.

Tier-1 MNOs — mobile network operators

REGION	NAMED OPERATORS	NTN / CONVERGENCE POSTURE (PUBLIC)
Americas	Verizon · AT&T · T-Mobile US · Rogers · América Móvil · Telefónica Brasil	D2D trials; satellite fill-in; enterprise private 5G; wholesale SNO deals
Europe	Vodafone · Deutsche Telekom · Orange · Telefónica · BT/EE · TIM · Swisscom	AST/OneWeb/Kuiper partnerships; O-RAN brownfield; EU 5G Advanced pilots
Asia-Pacific	NTT Docomo · KDDI · SoftBank · SK Telecom · KT · Reliance Jio · Bharti Airtel · Singtel · Telstra	6G national programs; NTN R&D; device ecosystem co-development; maritime coverage
Middle East & Africa	e& (Etisalat) · STC · MTN · Vodacom	Rural coverage economics; satellite backhaul; RedCap / IoT-NTN for verticals

SNOs & constellation ecosystem

CATEGORY	NAMED PLAYERS	COMMERCIAL LANE
LEO broadband	SpaceX (Starlink) · Amazon (Project Kuiper) · Eutelsat OneWeb · Telesat Lightspeed	Wholesale to MNOs; enterprise; maritime/aero; gateway infrastructure
D2D / smartphone NTN	AST SpaceMobile · Lynk / Omnispace · Globalstar · Iridium	MNO-branded satellite texting/data; standard smartphone attach; spectrum partnerships
GEO / MEO legacy + evolution	SES · Intelsat · Viasat · EchoStar/DISH	Backhaul; broadcast; government; 5G backhaul integration; IoT-NTN

Chipsets, handsets & collaborations

Chipset & modem suppliers

CATEGORY	NAMED PLAYERS	NTN / COLLABORATION LANE
Cellular modem leaders	Qualcomm · MediaTek · Samsung LSI	NR-NTN & RedCap-NTN modems; GCF/PTCRB reference; MNO + OEM integration programs
OEM-integrated silicon	Apple (in-house) · Google (Tensor)	Device-native satellite stack; emergency SOS; Android/iOS NTN APIs
IoT / module	Sequans · Quectel · Telit Cinterion · u-blox · Fibocom	IoT-NTN modules; enterprise & government; RedCap attach for verticals

Handset OEMs (smartphone manufacturers)

TIER	NAMED OEMS	COMMERCIAL HOOK
Global tier-1	Apple · Samsung · Google (Pixel)	NTN-capable flagships; MNO launch bundles; radiated acceptance at scale
APAC volume	Xiaomi · OPPO · vivo · Honor · Transsion (TECNO/Infinix)	Chipset-partner roadmaps; operator co-marketing; cost-sensitive NTN SKUs
Americas / enterprise	Motorola · TCL · Nokia (HMD)	Satellite messaging; rugged & public-safety; wholesale MNO variants

Announced collaborations — chipset · OEM · MNO · SNO

Public partnerships (representative): Apple ↔ Globalstar (Emergency SOS) · T-Mobile ↔ SpaceX Starlink (Direct to Cell) · AT&T ↔ AST SpaceMobile (broadband D2D) · Vodafone ↔ AST / satellite partners · Qualcomm ↔ Iridium + OEMs (Snapdragon Satellite) · MediaTek / Samsung LSI ↔ MNO + OEM (NR-NTN pilots) · NTT Docomo · KDDI · SK Telecom ↔ NTN / 6G consortia (chipset-device-network co-validation)

Alliances, standards & supplier ecosystem

Alliances, standards & industry programs

BODY / ALLIANCE	ROLE IN TN-NTN CONVERGENCE
3GPP (RAN · SA · CT)	Rel-17/18/19 NTN specs; Rel-20 5G Advanced; Rel-21 6G timeline (TSG#112, Jun 2026)
ITU-R	IMT-2030 (6G) framework; spectrum / satellite service coordination
O-RAN Alliance	Open RAN interoperability, testing, brownfield economics (WG4/WG5)
GSMA	Operator industry body; Open Gateway; roaming; NTN commercialization forums
NGMN	Operator-led 5G/6G requirements; green networks; NTN operator guidance
5GAA	Automotive V2X; NTN-V2X overlap; cooperative perception / smart mobility
GSA	Global mobile supplier ecosystem; NTN device and deployment tracking
GCF · PTCRB	Global device certification; NTN conformance and field-supplement expectations
ETSI · ATIS · TIA	Regional standards; ORI; US telecom interoperability

RAN, core & validation ecosystem (selected)

RAN vendors: Ericsson · Nokia · Samsung Networks · Mavenir · Rakuten Symphony · NEC · Fujitsu · **Cloud:** Microsoft (Azure for Operators) · AWS (Telco) · Google Cloud · **T&M / validation:** Keysight · Rohde & Schwarz · Anritsu · Viavi · LitePoint · NI (Emerson).

Where operator budgets attach (24–36 months)

Post-TSG#112, operator capex and opex follow **funded service hypotheses**. The table below maps commercial opportunities to the validation and acceptance workflows that unlock purchase decisions — aligned to converging MNO/SNO investment.

BUSINESS OPPORTUNITY	MNO / SNO REVENUE LOGIC	BUDGET TRIGGER · “FUNDED WORKFLOW”
D2D & satellite smartphone services	New ARPU tier; churn reduction in coverage gaps; emergency upsell	Device interoperability proof; radiated acceptance; launch readiness vs. competitor D2D
Rural / maritime / aero fill-in	Lower \$/km ² coverage vs. macro build; wholesale margin on SNO capacity	Handover stability under LEO cadence; service assurance SLAs; ephemeris-aware KPIs
Enterprise private 5G + satellite	B2B contracts; stickier than consumer; OT/industrial premiums	Latency/jitter evidence for control loops; campus + NTN backhaul acceptance
Wholesale & roaming extension	SNO reaches retail via MNO; MNO extends footprint without capex	Multi-constellation interoperability; partner acceptance testing; billing integration
5G Advanced brownfield	Energy saving; capacity without full rip-and-replace; opex reduction	Live-traffic regression; slicing and dual-steer TN/NTN under SLA
6G research & national programs	Future spectrum; government co-funding; innovation brand	Rel-21 study-to-spec trials before Stage-2 freeze (Jun 2028); publishable methodology
AI-RAN & service assurance	OpEx automation; fewer truck rolls; predictive maintenance	Operational KPI correlation; executive dashboards tied to network P&L

Investment horizon — executive planning view

HORIZON	OPERATOR EXECUTIVE FOCUS	COMMERCIAL OUTCOME
0–12 mo	Rel-19 NTN pilots; D2D launch readiness; strategic SNO deals	First revenue from satellite-augmented plans; partnership MOUs → contracts
12–24 mo	Scale device attach; enterprise verticals; O-RAN displacement	Margin improvement; strategic account penetration; competitive wins
24–36 mo	Rel-21 6G positioning; AI-native ops; ecosystem consolidation	Next-gen spectrum narrative; funded national programs; platform preference

Winning the operator vertical — displacement & growth levers

Three questions MNO / SNO executives ask vendors

1. **Will this de-risk our launch?** — Acceptance evidence operators can show boards and regulators, not lab-only conformance.
2. **Will this compress time-to-revenue?** — Pilot → scale without re-deriving methodology per partner or release.
3. **Will this improve unit economics?** — Capex avoidance (satellite vs. macro), opex reduction (AI-RAN, energy), or new ARPU (D2D tiers).

Segment growth levers (24–36 month operator vertical)

LEVER	BUSINESS ACTION	SUCCESS MEASURE
Strategic account penetration	Executive relationships at tier-1 MNOs and emerging SNOs; engineering + procurement + partnerships	Order growth, revenue, gross margin on priority accounts
Use-case-qualified funnel	Opportunities tagged to funded workflows (D2D, wholesale, enterprise, 6G) — not generic “5G platform”	Funnel quality, win rate, sales cycle compression
Competitive displacement	Replace lab-bound or single-release vendors with end-to-end acceptance methodology	Preference expansion; new use-case creation at incumbent accounts
Ecosystem orchestration	Chipset–device–network narratives that align MNO, SNO, and OEM roadmaps	Partner co-sell; multi-party pilot wins; standards influence
Executive narrative quality	POVs that translate TSG#112 outcomes into operator P&L language for sales and R&D CoEs	Adoption of segment plans; roadmap influence; faster executive decisions

Where the validation partner wins (without owning the network)

Operators do not buy instruments — they buy **launch confidence**. The commercial position that scales across MNO and SNO accounts sits at the intersection of:

- **3GPP NTN & D2D acceptance** — from device pre-certification through operator sign-off
- **Lab-to-field correlation** — one methodology from R&D to service assurance
- **Chipset–device–network workflows** — reduce finger-pointing in multi-party launches
- **Release-stacked regression** — Rel-17/18/19 deployed together; economics fail on interaction bugs

90-day segment priorities: Tier-1 MNO D2D launch accounts · SNO wholesale acceptance plays · Rel-21 6G executive POV for national programs · Package TSG#112 insight for sales and R&D CoEs.

About this brief

This executive brief translates post-TSG#112 standards momentum into **MNO/SNO commercial language** — ecosystems, partnership economics, funded workflows, and segment growth logic. Companion technical brief: *Mobile & Satellite Operator Segment POV* (validation architecture). Distilled from *The 6G Sovereign Framework* (Ronna-X, 2026).

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Selected public references

- 3GPP TSG#112 outcomes — Singapore, June 2026 · Rel-21 timeline · TR 38.914
- 3GPP Rel-19 Summary — NTN Phase 3, 5GSAT Phase 3
- Public operator and ecosystem reporting on NTN/D2D commercialization (2025–2026)

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