

Direct-to-device: the seven-part analysis

What the public record actually shows

Every figure in this report carries its source. Where no verified figure exists, it says so.

29 September 2026

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Part 01

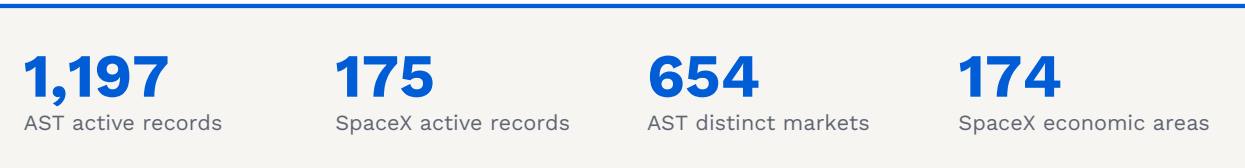
What is actually deployed

Direct-to-device is discussed as though it were one thing arriving soon. The public record shows something more specific: two companies renting American terrestrial spectrum, two very different fleets in orbit, and a set of incumbents who never appear in the rental records at all.

Who has the right to transmit

Filter the FCC’s market licence file to active records and look for satellite operators, and only two of them appear. Almost every record either company holds is a lease rather than a licence — permission written against spectrum that somebody else is licensed to use.

The exception is SpaceX, which holds two market licences granted 26 August 2026 alongside its 173 leases — a distinction part 4 returns to.



FILED · FCC market licence file, snapshot 13 Sep 2026, filtered to active records and to licensee-type entities

The two satellite operators holding American terrestrial rights

	AST & Science	Space Exploration Holdings (SpaceX)
Active records	1,197	175 (173 in the service band)
Licence or lease	All leases	173 of 175 are leases
Spectrum	704–716 / 734–746 MHz (700 MHz lower blocks)	1910–1915 MHz up / 1990–1995 MHz down (PCS G block)
Markets	654 distinct , mostly cellular market areas	174 distinct economic areas
Granted	21 Apr 2026 , all on one day	26 Nov 2024 , all on one day
Expires	9 May 2028 , all on one day	3 Mar 2026 on every record, while every other G-block holder shows 2036 — see part 4

The two satellite operators holding American terrestrial rights

	AST & Science	Space Exploration Holdings (SpaceX)
Character of markets	Florida 2 (Glades) · Texas 4 (Briscoe) · Kansas 3 (Jewell) · Sherman-Denison TX	Eugene-Springfield OR · Bangor ME · Twin Falls ID · Gulf of Mexico

Each block of records was granted on a single day and expires on a single day, which is what an administrative grant looks like rather than a position assembled over time.

Each grant date matches an FCC order to the day. AST’s records trace to the order adopted 21 April 2026, which also covers lease notifications filed with AT&T, Verizon and FirstNet; SpaceX’s trace to the order of 26 November 2024 authorizing supplemental coverage from space in the PCS G block. The orders and the licence file agree with one another, each corroborating the other.

The expiry dates are where the two positions part company. AST’s authorizations all run out on **9 May 2028**, which puts a single date under the whole footprint. SpaceX’s 173 leases carry 3 Mar 2026 on every record, while every other holder in the PCS G block shows 2036 — a discrepancy the file states without explaining, and one part 4 takes up in detail.

Neither company owns the spectrum its consumer service depends on. Both are tenants, on terms with dates attached.

The absences in the file matter as much as the entries. Globalstar, Iridium and Skylo do not appear anywhere in these records, because they operate in mobile-satellite spectrum they already hold. That is a different regulatory path, and it produces a different balance of power: an incumbent with its own spectrum negotiates from a different position than a newcomer renting a carrier’s.

Both have since agreed to be acquired: Globalstar by Amazon on 13 April 2026, Iridium by Rocket Lab on 28 June 2026. Owned mobile-satellite spectrum turned out to be the scarce asset, which is the subject of part 6.

What is actually in orbit

Rights on paper are one thing and hardware in orbit is another, and the four fleets that bear on this market are not variations on a single design. Each has settled on an altitude, an inclination and a fleet size, and those three choices together amount to a commercial position rather than merely an engineering one.

Four fleets, and the bet each one is making

Operator	What the catalogue shows	The bet
Starlink	10,702 catalogued objects. Measured shells: 4,380 at 400–480 km / 53° · 3,235 at 480–530 km / 43° · 1,261 at 400–480 km / 97° · 493 at 530–580 km / 70°. 824 objects (7.7%) below 400 km , consistent with the 340–360 km shells in the 2024 order	Mass and proximity
AST SpaceMobile	Sampled: BlueBird 01 at ~505 km, BlueBird 08 at ~527 km , both 53°. The FCC order describes authorized altitudes near 515–530 km and 680–690 km, and a constellation of 223 to 243 satellites	Fewer, much larger satellites
Lynk	Tower 4 at ~462 km, 97.3° — sun-synchronous, near-polar	Global revisit, not continuous coverage
Globalstar	28 satellites, 1,414–1,830 km, 52°	Incumbent posture: high orbit, owned spectrum, small fleet

CALCULATED · Altitudes computed from CelesTrak two-line elements, epoch 17 Sep 2026. AST and Lynk figures are samples — the catalogue source throttled bulk retrieval.

The four bets are not four answers to the same question. Two of them are: mass and proximity, or fewer and much larger satellites, are competing ways of serving the same consumer service, and each commits its operator to a different kind of fleet. The other two answer different questions entirely — a sun-synchronous fleet is built for global revisit rather than continuous coverage, and a small constellation in high orbit, on spectrum it owns, is an incumbent’s posture rather than a challenger’s.

Inclination is a commercial choice, not just an engineering one. A 53° shell concentrates capacity over populated mid-latitudes. A 97° sun-synchronous orbit passes over everywhere and lingers nowhere — fine for messaging, not for a service that must feel like coverage.

The three-way gap

There is authorized capacity, deployed capacity, and capacity with the right payload. The FCC’s order of 26 Nov 2024 authorizes supplemental coverage across up to **7,500** Gen2 satellites; CelesTrak elements at epoch 17 Sep 2026 put 10,702 Starlink objects in the catalogue, of which 824 — 7.7% — sit below 400 km; and the public catalogue does not identify which of them carry the direct-to-cell payload.

7,500 Gen2 satellites authorized	10,702 Starlink objects catalogued	824 Below 400 km (7.7%)
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The first two figures differ because authorization is granted ahead of deployment, which is ordinary. The gap between the second and the third is of a different kind: nothing in a public catalogue distinguishes a satellite carrying direct-to-cell hardware from one that does not, and no amount of counting objects will close it from the outside.

Those are three different numbers, and press coverage routinely blurs them.

For different readers

Regional carrier — the spectrum being used to serve your market from orbit is rented from a national competitor, and AST's authorizations expire in May 2028. Your question is not whether to partner, but who controls the spectrum underneath the service your subscribers will see.

Vendor or component maker — the bands are now specific and public — 700 MHz lower blocks and the PCS G block for service links. That is a design target, not a rumour.

Investor — spectrum access, its term, and the difference between authorized and deployed are all checkable in public records before anyone's deck is opened.

Method and limits

Method

Downloaded the FCC 1_market bulk file (90 MB) from the public licensing directory; kept active records; filtered entity rows to licensee type (the file also contains contact rows — the most common way this count goes wrong); separated leases from licences by call-sign form; read bands from the market-frequency table.

Orbital figures computed from CelesTrak two-line elements, converting mean motion to altitude.

Limits

A lease is permission, not proof of operation. Public catalogues do not flag direct-to-cell payloads, and the AST and Lynk orbital figures here are **samples** rather than fleet-wide measurements, because the catalogue source throttled bulk retrieval. We have not verified the lessors' identities, so we do not name them.

Data as of: FCC licences 13 Sep 2026 · orbital elements 17 Sep 2026 · Method version 1.0.

Part 02

Why anyone is doing this, and what it costs

Part 1 established what is deployed. The money explains why the deployments look so different — and why one of these companies rents spectrum instead of buying it.

Three business models, three financial shapes

Straight from SEC filings, not from decks.

AST SpaceMobile, Globalstar and Iridium — FY2025 and H1 2026, as filed

	AST SpaceMobile	Globalstar	Iridium
Revenue, FY2025	\$70.9M (from \$4.4M in FY2024)	\$273.0M	\$871.7M
Revenue, H1 2026	—	\$134.8M	\$444.3M
Net income, FY2025	-\$341.9M	-\$8.7M	+\$114.4M
Capex, FY2025	\$1,064.7M (single-digit millions historically)		\$100.3M
Capex, H1 2026	\$859.2M	—	—
Cash, FY2025	\$2,335.7M	\$447.5M	\$96.5M
R&D, FY2025	\$28.1M	\$6.1M	\$19.8M

FILED · SEC XBRL company facts (data.sec.gov), retrieved 17 Sep 2026 — revenue, capital expenditure, cash, R&D and net income read from each company’s filed 10-K and 10-Q tags.

Read across those columns and three different companies appear, not three stages of the same one. Iridium is the profitable incumbent: \$871.7M of revenue in FY2025, the only positive net income on the page, and a mature constellation maintained on \$100.3M of capital expenditure. Globalstar is a wholesale business of another kind again — \$273.0M of revenue, near break-even, R&D of only \$6.1M, and spectrum it already owns rather than rents. AST SpaceMobile is neither of those things: it is a construction project, spending \$1,064.7M in a single year against \$70.9M of revenue as filed in its FY2025 Form 10-K, and funded by a cash balance of \$2,335.7M roughly the size of two years of that spend.

AST's capital expenditure is the line that moves fastest: \$174.1M in 2024, \$1,064.7M in 2025, and \$859.2M in the first half of 2026 alone.

That is a company mid-build, and the build is the strategy rather than a preliminary to it. The rest of AST's column follows from that one fact: the loss is what construction on this scale produces, the \$28.1M of R&D is dwarfed by the hardware spend beside it, and the \$2,335.7M of cash matters chiefly as a measure of how long the build can continue at the current rate. Revenue of \$70.9M set against capital expenditure of \$1,064.7M is not a margin problem. It is a company that has not yet arrived at the point where margin is the relevant question.

The contrast that matters here is therefore not one of size. Iridium and Globalstar are being run; AST is being built. That difference decides which questions are worth asking of each of them — margin, retention and renewal for the two operating businesses, and, for the third, how much construction is left and what pays for it.

One name is missing from the table, and its absence is structural rather than accidental. SpaceX is private and files nothing, so the direct-to-cell economics of the largest constellation in the market are invisible: no revenue line to compare, no capital expenditure to set beside AST's, no cash balance against which to measure a burn rate. The temptation is to fill that space with an estimate, and it should be resisted, because the estimate would be the only unfiled number in an argument built entirely on filings. Any market model that treats all four operators as comparably knowable is wrong at the foundation; the honest version carries three measured companies and one acknowledged blank.

Why rent the spectrum instead of buying it

Part 1 showed that AST and SpaceX hold leases rather than licences, and that neither owns the spectrum its consumer service depends on. Taken alone that reads as a weakness; taken against the capital expenditure line above, it reads as the only route available. Three reasons hold the arrangement in place, and all three are financial rather than technical.

The first is crowding out. American 700 MHz licences of the sort AST leases were sold at auction for sums that would consume the balance sheet of a company already spending \$1B a year on hardware, which makes buying spectrum and building satellites alternatives rather than two lines in the same budget. A lease keeps the capital in the constellation, which is where the commercial case actually sits.

The second is optionality. A lease is reversible and a licence purchase is a commitment, and for a service that has not yet proven consumer demand, the ability to reverse the decision is worth real money. Renting turns an irreversible bet on a market into a recurring cost that can be stopped.

The third reason belongs to the other side of the table, and it explains why the carriers agree to any of this. The carrier lends spectrum it already owns, adds coverage it cannot

economically build, and bills its own subscriber, while the satellite operator gets reach without acquiring customers one at a time. Each side supplies the part of the business it is better placed to supply, which is why these arrangements are structured as wholesale rather than retail. It is also, precisely, the constraint that comes with them: *the satellite operator's revenue depends on a partner who owns both the spectrum and the customer relationship.*

Globalstar shows the same logic working from the opposite end. It owns its spectrum outright and still earns most of its revenue wholesaling capacity to a large consumer partner rather than selling retail itself, which is part of why its accounts show substantial revenue and almost no margin. Owning the spectrum removes the landlord; it does not, by itself, change who owns the customer. *Both it and Iridium have since agreed to be acquired, by Amazon and Rocket Lab respectively; part 6 has the terms.*

The date on the calendar

1,197

AST lease authorizations

21 Apr 2026

All granted

9 May 2028

All expire

The tenancy is not open-ended, and the dates attached to it are unusually exact. All 1,197 of AST's lease authorizations were granted on one day, 21 April 2026, and every one of them expires on one day, **9 May 2028**. A footprint assembled in a single administrative act comes up for renewal in a single administrative act, which puts the whole of the American business on one calendar entry.

Whatever gets built on that footprint has roughly two years to prove itself before commercial terms are renegotiated — and the counterparties in those negotiations are the same carriers whose customers the service serves.

FILED · FCC market licence file, snapshot 13 Sep 2026 — 1,197 active AST lease records, all granted 21 Apr 2026, all expiring 9 May 2028.

For anyone modelling this business, that date is an input rather than a footnote. It bounds the window in which usage, pricing and retention evidence has to be generated, and anything meant to improve the renewal terms has to exist before it. The alternative is to stop being a tenant altogether, which carries a price of its own: part 4 works out what it would cost to own the spectrum instead.

For different readers

Regional carrier — the wholesale model means your subscribers' satellite experience is priced and controlled by an arrangement between two other companies. Ask what your own position is at renewal, and whether it is worth securing terms before the 2028 cycle rather than during it.

Vendor — AST's spend is where the equipment money is right now, and it is concentrated in a build phase with a visible horizon. Iridium's \$100M capex is the steady-state comparison — the difference between selling into construction and selling into operations.

Investor — three checkable questions before the diligence even starts. Does the company own or rent its spectrum? Is capex scaling ahead of revenue, and for how many more quarters does cash cover it? And is the business retail or wholesale — because a wholesale model's growth is bounded by its partner's incentives, not only by its own execution.

Method and limits

Method

All financial figures come from **SEC XBRL company facts** (data.sec.gov), read directly from each company's filed tags rather than from summaries: revenue, capital expenditure, cash, R&D and net income, taken from 10-K and 10-Q filings. Fiscal years are as filed. AST's revenue tagging is inconsistent across periods and tags; the FY2025 figure is the amount filed in its FY2025 Form 10-K.

Limits

SpaceX is private and files nothing; no comparable figures exist. Capex here is cash paid for property and equipment, which is not the same as constellation cost. None of this is investment advice, and none of it forecasts whether any of these companies will succeed.

Data as of: SEC filings retrieved 17 Sep 2026 · Method version 1.0.

Part 03

How the radios actually work

The hard part of direct-to-device is not coverage. It is closing a radio link to a handset that was designed to talk to a tower a few kilometres away, from a satellite hundreds of kilometres up, using spectrum borrowed from a terrestrial network.

There are two ways to buy back the link budget you lose in that distance, and the two leading operators each picked one. They are not variations on a single design. They are opposite bets on where the gain should come from, and almost everything else about each constellation — beam count, fleet size, interference management, replacement cadence — follows from which bet a company made.

Two designs, opposite choices

AST buys the link budget back with aperture. Its authorization order DA-26-391A1 was adopted on 21 April 2026 and describes each satellite carrying a large phased-array antenna operating thousands of electronically steerable beams simultaneously, with the array sized so that the aperture produces narrow primary beams and low sidelobe levels. Those beams are actively shaped to match service-area boundaries, and the same order records that they can be switched off where they would otherwise cause interference. The underlying physics is unremarkable: a bigger antenna concentrates energy into a smaller patch of ground, so there is more signal where you want it and less where you do not. What is demanding is the engineering needed to fly an antenna that large, and to keep it pointed.

SpaceX buys the same link budget back the other way, with proximity and numbers. The FCC's order DA-24-1193A1 of 26 November 2024 authorises supplemental coverage across up to **7,500** Gen2 satellites operating in shells at 340, 345, 350 and 360 km. Flying lower shortens the path; flying a great many of them shortens the wait for one to be overhead. Neither lever asks anything of the antenna, which is what makes the two approaches genuinely opposite rather than merely different.

That is the authorisation. The orbital record shows it being executed: our own figure, computed from CelesTrak two-line elements by converting mean motion to altitude, puts **824 catalogued Starlink objects (7.7%)** below 400 km, which is the altitude band the order describes. Public catalogues do not identify which of those objects carry direct-to-cell hardware, so this is evidence that the low shells are being populated rather than a measure of the service capacity in them.

5–6 MHz the service channel	7,500 Gen2 satellites authorised	340–360 km the SpaceX D2D shells	824 (7.7%) Starlink objects below 400 km
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Neither approach is obviously right; they simply put the cost in different places. Aperture is expensive per satellite and hard to launch, which makes it a capital and manufacturing problem, concentrated before the first satellite reaches orbit. Proximity is cheap per satellite and expensive in fleet size, atmospheric drag and replacement cadence, which makes it an operating problem that never stops. Nothing in the public record settles which of those is the better trade over a decade.

The bands follow the design

Bands by function, as authorised

	AST	SpaceX
Service spectrum	704–716 / 734–746 MHz leased; authorization spans 698–716, 728–746, 758–768, 788–798, 824–849, 869–894 MHz	1910–1915 MHz up / 1990–1995 MHz down (PCS G block)
Gateway / feeder	37.5–42.0 GHz (channel bandwidths of 2.5, 4.5, 0.5 and 2.0 GHz), plus 45.5–47, 47.2–50.2 and 50.4–51.4 GHz uplinks	Ku-, Ka-, E- and V-band, previously authorized
Telemetry and command	2025–2110 MHz up (192 kHz channels) · 2200–2290 MHz down	VHF beacons at the low shells

Service spectrum is where the two designs stop being a matter of engineering taste. Lower frequency is worth real link budget: at 700 MHz a signal penetrates walls and diffracts around terrain far better than at 1.9 GHz, which is why the low-band holdings of AST’s terrestrial partners are the ones being leased rather than anything further up the band plan. The gateway and telemetry bands follow the same logic in reverse, sitting far higher in the spectrum, where bandwidth is plentiful and nothing has to reach a handset through a wall.

The trade is width, and width is the whole capacity story. Those 700 MHz blocks are **6 MHz** wide; the PCS G block is a single 5 MHz pair. Whatever the constellation above is doing, the service link is metered through a narrow pipe shared by everyone under the beam, and neither aperture nor altitude changes that arithmetic.

Satellite count improves availability and revisit; it does not widen the channel.

The capacity story is routinely mistold. Capacity per user comes from bandwidth, spectral efficiency and how tightly beams can be reused, which is exactly why aperture and beam

control matter as much as fleet size. It is also why a headline satellite count is an availability claim rather than a throughput claim: more satellites mean a shorter wait and fewer gaps, not a wider channel.

The constraint nobody puts on a coverage map

Because this spectrum is terrestrial, the binding limits are not really about reaching the handset at all. They are about interference into everyone else who uses the band on the ground, which is a constraint no coverage map has ever shown. AST's order records that it filed power flux-density and maximum EIRP density values with the FCC, and that it can adjust EIRP across operating altitudes and elevation angles to stay compliant. That is a design in which the regulator, rather than the link budget, sets the upper bound on how hard a satellite is allowed to transmit.

On the SpaceX side, one of those limits has not been settled at all. The Commission neither granted nor refused the request to waive the aggregate out-of-band power flux-density limit of **-120 dBW/m²/MHz** for these operations; it deferred the question. That means an authorized service is operating with a significant power-limit question still open.

FILED · The FCC deferred SpaceX's request to waive the aggregate out-of-band power flux-density limit of -120 dBW/m²/MHz for these operations (order DA-24-1193A1).

For an engineering buyer, that is a live risk to plan around rather than a footnote to skim past. For a strategist, it is a reminder that regulatory headroom, not technology, may set the ceiling on how much this service can ultimately deliver. It is also one of the two technical items that belong in diligence on this market and almost never appear there.

A cross-check that costs nothing

None of this requires taking an operator's word for anything, and one check costs nothing at all to run. The SatNOGS database — telemetry logged by volunteer ground stations — records AST BlueBird beacons at 430.5–439.5 MHz (GFSK/FSK, 2.4–19.2 kbaud) and S-band telemetry at 2225 and 2235 MHz (BPSK, 200 kbaud). Those S-band frequencies sit inside the 2200–2290 MHz command-and-telemetry band in the FCC authorization, so the filing and the observed radio agree.

JUDGEMENT · SatNOGS transmitter records at 430.5–439.5 MHz and at 2225 and 2235 MHz fall inside the 2200–2290 MHz command-and-telemetry band in the FCC authorization: two unrelated sources describing the same radio.

Amateur observation cannot see the service payload — beacon observations are telemetry, not service payload — but it does independently confirm that the satellites are where the paperwork says, transmitting what the paperwork says. An unrelated source agreeing with the filing is not a measurement of the service; it is a reason to believe the documents that describe it, and the rest of the record with them.

For different readers

Engineering leader — The design question is aperture versus proximity, and it determines everything downstream — beam count, interference management, replacement cadence. The bands are public, so you can model the link yourself rather than accepting a vendor's chart.

Carrier strategist — Capacity per user is bounded by a 5–6 MHz channel, not by satellite count. Treat “thousands of satellites” as an availability claim, not a throughput claim, and ask what each beam actually delivers to a handset indoors.

Investor — Two technical items belong in diligence and rarely appear — the deferred power-flux-density waiver, and the gap between authorized satellites, catalogued satellites and satellites carrying the payload.

Method and limits

Method

RF characteristics are quoted from the FCC orders linked above, and bands held were read from the FCC licence database's market-frequency records. Orbital altitudes were computed from CelesTrak two-line elements, and beacon frequencies come from the SatNOGS transmitter database.

Limits

We have not independently modelled link budgets here; this describes what the operators are authorized to do, not what they achieve. Beacon observations are telemetry, not service payload. Public catalogues do not identify which satellites carry direct-to-cell hardware. Channel-width arithmetic is a bound, not a throughput estimate — real performance depends on modulation, beam reuse and loading we cannot see from outside.

Data as of: FCC orders as dated · licences 13 Sep 2026 · orbital elements 17 Sep 2026 · Method version 1.0.

Part 04

Rent or own — what the spectrum actually costs

Part 1 established that the two satellite operators with American terrestrial rights are both tenants, and Part 2 explained why renting made financial sense while the money was going into hardware.

What does it cost to stop being a tenant, who is doing it, and what happens to the landlord when the tenant becomes a competitor?

A lease is not a small version of a licence

A lease is fast, cheap and reversible, which is a large part of why both operators hold one. It is also derivative: it is written against someone else’s licence, in someone else’s markets, for a term that cannot outlast theirs. A licence is the opposite on every count — expensive and slow, but yours: national in scope if you buy it that way, renewable, financeable, and sellable. For a service that has to work everywhere, that difference does not colour the business model; it decides it.

What the tenancy looks like in the record

What the distinction looks like in practice is visible in the FCC’s market-based licence file, filtered to active records and to licensee-type entities. Neither operator holds a licence for the spectrum its consumer service runs on: every one of AST & Science’s records is a lease, and all but two of SpaceX’s are as well. The bands, the markets, the landlords and the dates are all on the record.

The two tenancies, as the licence file records them

	AST & Science	Space Exploration Holdings (SpaceX)
Active market records	1,197 — all leases	175: 173 G-block leases, plus 2 licences granted 26 Aug 2026
Spectrum in service	704–716 / 734–746 MHz — 24 MHz	1910–1915 / 1990–1995 MHz — 10 MHz
Markets	654	174
Landlords	The incumbent carriers named in the 21 Apr 2026 order	T-Mobile, via the 26 Nov 2024 order
Expiry on the record	9 May 2028	3 March 2026

1,197

AST records, all leases

24 MHz

AST spectrum in service

173

SpaceX G-block leases

10 MHz

SpaceX spectrum in service

FILED · FCC market-based licence file, snapshot 13 Sep 2026, filtered to active records and to licensee-type entities

SpaceX's expiry date in that last row is out of step with the rest of the G block. Filter the same file to every active G-block record and a pattern appears: T-Mobile License LLC, Nextel West, Trace-Tek, SDF and Tecore all show an expiry of 3 March 2036, most of them re-granted during March 2026, and only SpaceX's 173 lease authorizations still carry 3 March 2026, the pre-renewal term. We cannot see the file jackets, so we will not tell you what it means; it may be nothing more than administrative lag behind a renewal, and we report the discrepancy as it appears in the file without having confirmed its cause. But it illustrates the structural point exactly, and it is checkable in an afternoon: a lease hangs from a licence, and when the licence moved, the leases did not move with it.

What owning costs, in one comparable unit

Price per MHz per person covered — dollars per MHz-POP — is the only way to compare a 2020 auction with a 2025 private deal. The national-equivalent figure divides the total by the bandwidth and then by the US population of **340,110,988**, which puts every transaction on one axis whatever its actual licence footprint. The chart and the table below place four American auctions and the two EchoStar disposals on that axis.

Spectrum in one comparable unit: national-equivalent dollars per MHz-POP

Transaction	Total	Bandwidth	National-equivalent \$/MHz-POP
Auction 107, C-band (2021)	\$81.17B	280 MHz	\$0.852
Auction 110, 3.45 GHz (2022)	\$22.51B	100 MHz	\$0.662
Auction 105, CBRS PAL (2020)	\$4.59B	70 MHz	\$0.193
Auction 113, AWS-3 (2026) — <i>not comparable</i>	\$3.57B	leftover licences in selected markets	\$2.658 , on a different basis — see part 5
EchoStar → SpaceX, AWS-4 + H block	\$17.00B	50 MHz (paired)	\$1.000
EchoStar → SpaceX, AWS-3 unpaired	\$2.617B	15 MHz (uplink only)	\$0.513

Spectrum in one comparable unit: national-equivalent dollars per MHz-POP

Transaction	Total	Bandwidth	National-equivalent \$/MHz-POP
EchoStar → SpaceX, combined	\$19.617B	65 MHz	\$0.887
EchoStar → AT&T, 600 MHz + 3.45 GHz, closed 28 Jul 2026	\$20.25B (plus \$2.4B into an FCC trust)	~50 MHz (≈30 MHz at 3.45 GHz, ≈20 MHz at 600 MHz)	\$1.191

Auction totals are gross winning bids. The Auction 113 row is marked *not comparable* — it sold leftover licences in selected markets on a different basis, and it is excluded from the chart above.

Two things fall out of that table. Paired spectrum went at almost exactly a dollar per MHz-POP, and the unpaired, uplink-only block went at half that. The largest private spectrum purchase in this market, meanwhile, cleared within 4% of the C-band auction — a useful check the next time someone calls a spectrum position mispriced.

Now put AST's tenancy against those benchmarks. Buying its 24 MHz nationwide would cost roughly **\$5.4B to \$7.2B** at the prices above, and low band has historically traded at a premium to mid band, so treat that as a floor rather than an estimate. That is the sum the company would have had to find before a single satellite was built.

It did not have it, and the filings say so without interpretation. AST closed FY2025 with \$2,335.7M of cash while spending \$1,064.7M a year on the constellation, a rate of spend set out in part 2. Buying was never an option, and renting was the only way the business existed at all.

The tenant is buying the room next door

SpaceX's agreements with EchoStar are on the public record in EchoStar's own filings rather than in press coverage, and the detail in them goes well beyond the headline number. Four items define the position SpaceX has contracted to hold, and their sequence matters as much as the total.

- On 7 Sep 2025, an agreement to buy 50 MHz — 2000–2020, 2180–2200, 1915–1920 and 1995–2000 MHz — for \$17B, transferred in two steps: first into Spectrum Business Trust 2025-1, then to SpaceX. SpaceX also lends the trust roughly \$2B to service EchoStar's notes in the meantime.
- On 5 Nov 2025, that agreement was amended to add up to 15 MHz at 1695–1710 MHz for \$2,616,737,853, all in SpaceX stock at \$212 a share, taking the total to \$19,616,737,853.
- Regulatory approval has been granted. The FCC approved both EchoStar transactions on 12 May 2026, and — the part that matters — its waivers let SpaceX use the spectrum “flexibly for terrestrial, space-based, and hybrid network architectures”, subject to performance obligations (FCC; see part 5).

- The second step, the one that actually puts the licences in SpaceX's hands, is expected on or about 30 November 2027.

\$19.6BEchoStar → SpaceX,
total**65 MHz**

what it buys

\$0.887

per MHz-POP

847

licences in the trust

FILED · EchoStar Forms 8-K, 8 Sep 2025 · 6 Nov 2025 · 3 Aug 2026

The 1915–1920 / 1995–2000 MHz pair is the H block, the channel immediately adjacent to the G block SpaceX rents from T-Mobile today. Whatever the reasoning behind the choice, the effect on the record is that the spectrum being bought sits directly beside the spectrum the service runs on now.

The first step, meanwhile, has already happened. The FCC snapshot of 13 September 2026 shows Spectrum Business Trust 2025-1 holding **847 active market licences**, while Space Exploration Holdings still shows the same 173 leases. The structure is executing in public, on schedule, a year ahead of the closing.

So the arithmetic of the pivot is this: 5 MHz rented from a carrier today, 65 MHz owned outright in late 2027 — thirteen times the bandwidth, and no landlord.

You do not need a position of that size to supplement someone else's network; you need it to be one. Trade reporting of SpaceX's Q2 2026 earnings call has executives naming AT&T, T-Mobile and Verizon and expecting to take their customers; we have not verified those remarks independently, and the argument does not rest on them. It does not need to, because the filings say it more reliably than a quote does.

Width is not the same as coverage, and neither is the same as walls

Three constraints survive the purchase. Ownership changes the terms on which SpaceX holds spectrum; it does not change the frequency that spectrum sits at, the geography a lease can reach, or the position of the operators who never needed to rent in the first place. Each of the three is a matter of record rather than a matter of strategy.

Frequency

Everything SpaceX has contracted to own sits at 1.7–2.2 GHz, and everything AST leases sits at 700 MHz. Owning 65 MHz buys width; it does not buy propagation. As part 3 set out, the low-band lease is the one that diffracts around terrain and gets through a wall — and the incumbents' public position, that satellite direct-to-device does not serve indoors, is an argument about frequency and link budget, not about satellite count.

Geography

A lease is granted market by market: 654 areas for AST, 174 for SpaceX. The footprint is whatever the landlord holds and chose to lend, which is why the lease lists read like a patchwork of rural counties. A nationwide licence has no holes in it, and that is most of the difference between “supplemental coverage” and “coverage”.

The incumbents

Globalstar and Iridium appear nowhere in the lease records because they own mobile-satellite spectrum outright — but narrowly, on the order of 10–25 MHz each, which is why their businesses are messaging and wholesale rather than broadband. That leaves three positions available in this market: owned and narrow, rented and wide, or bought and wide at roughly \$2B per 5 MHz pair. Each one produces a different company, which is why the rent-or-own question is not a financing detail.

For different readers

Carrier strategist — you may be renting spectrum to a company that has just spent \$19.6B to stop needing you. Two questions belong on the agenda now, not in 2028: what does our lease say about assignment and competitive use, and what is our position at renewal when the counterparty no longer depends on the relationship?

Investor — three items are checkable before a meeting. Does the target own or rent? If it rents, when does the underlying licence expire — not the lease, the licence. And is the landlord a competitor, a partner, or both?

Vendor — SpaceX owning 1.7–2.2 GHz nationwide is a different equipment roadmap from SpaceX renting 5 MHz of PCS. Band support, handset certification and network architecture all move.

Method and limits

Method

Licence and lease counts, service codes, grant dates and expiry dates come from the FCC's market-based licence file, snapshot 13 Sep 2026, filtered to active records and to licensee-type entities. Deal terms, prices and closing expectations come from EchoStar's own SEC filings rather than from press coverage, and auction totals are gross winning bids as published in the FCC auction results.

National-equivalent dollars per MHz-POP is calculated throughout as the total divided by the bandwidth and then by the US Census population of 340,110,988, applied on the same basis to the auction results and to the prices in EchoStar's filings.

Limits

National-equivalent \$/MHz-POP is a comparison device, not a valuation: real auctions do not sell every licence, licence areas differ in population and value, and paired, unpaired, low-band and mid-band spectrum are not interchangeable.

The AT&T transaction's bandwidth is not stated in EchoStar's filing; the ~50 MHz used here is the FCC's own description of the approved transfer, so treat that row as approximate. The EchoStar–SpaceX closing is **expected**, not completed: the FCC approved the transfer on 12 May 2026, but the second-step financial closing has not occurred.

The expiry-date discrepancy on the G-block leases is reported as it appears in the file; we have not confirmed its cause. Executive remarks referenced above come from trade reporting we have not independently verified. Nothing here is investment advice.

Data as of: FCC licences 13 Sep 2026 · SEC filings as dated · auction results as published · Method version 1.0.

Part 05

Where the rules get written

The first four parts were about companies. The ground those companies stand on is the American regulator, which has already settled much of what the commentary was still treating as open.

Over the last eighteen months the American regulator has quietly settled several questions the commentary is still treating as open, and it has settled them on the public record. What has already been decided is separable from what has only been proposed.

The decision that has already been taken

On 12 May 2026 the FCC’s Wireless Telecommunications Bureau and Space Bureau approved both EchoStar transactions, moving roughly 115 MHz of mid-band spectrum to SpaceX and AT&T in deals the Commission described as “collectively surpassing \$40 billion in deal value” (news release; order GN Docket No. 25-302, DA 26-471). The two purchase prices in the parties’ own filings are \$19.617B and \$20.25B, which is \$39.87B between them, so the Commission’s figure reconciles only once the \$2.4B escrow is included. The reconciliation is not cosmetic: the headline is the number every summary repeats, and it is not the number in the filings.

115 MHz

Mid-band spectrum moving

\$40 billion

Combined deal value

\$2.4B

EchoStar escrow

FILED · FCC news release and order of 12 May 2026 — GN Docket No. 25-302, DA 26-471; the two purchase prices from the parties’ own filings

The headline is the money, but the consequential part of the decision is a single sentence sitting under a heading called *Tech-Neutral Innovation*. It allows SpaceX to use its new spectrum flexibly for terrestrial, space-based and hybrid network architectures, subject to what the Commission calls “first-of-its-kind performance obligations” requiring “meaningful, reliable connectivity to the public — whether D2D, terrestrial, or both — within years”. Neither half of that sentence is written to prefer one architecture over another.

The symmetry is the point. The permission covers three architectures without ranking them, and the obligation attached to it is drafted in the same terms, so the holder of this spectrum is not being told to supplement a terrestrial network and handed a terrestrial option as a courtesy. It is being given a position whose permitted use it determines for itself, measured

against a test that does not specify how the signal reaches the handset. Almost everything still argued about satellite operators entering mobile sits on the other side of that sentence.

From a carrier’s seat, the question of whether a satellite operator is allowed to build a terrestrial mobile network on its own spectrum has been answered, and the answer is yes. The remaining questions are financial and physical, not regulatory.

The rest of the order is conditions rather than permissions. It requires EchoStar to fund the \$2.4B escrow, accelerates AT&T’s 600 MHz build-out, and preserves Boost Mobile through a hybrid MVNO arrangement with AT&T — obligations on the parties to the transaction, set alongside the performance obligations rather than in place of them. The order settles who holds this particular spectrum; where the next tranche comes from had already been answered elsewhere, by Congress.

The auction machine restarted, and spectrum got more expensive

Congress restored the FCC’s auction authority in the reconciliation act signed on 4 July 2025, running it to 30 September 2034 and attaching a mandated pipeline of at least 800 MHz — including at least 100 MHz of upper C-band, at 3.98–4.2 GHz, to be auctioned by July 2027. The FCC’s own auction release credits that statute for both the restored authority and the 800 MHz pipeline. *The pipeline band-by-band detail here comes from secondary summaries of the Act and should be checked against the enacted text before it is relied on.*

The first auction in four years followed quickly. Auction 113 opened on 2 June 2026 and offered AWS-3 spectrum at 1695–1710, 1755–1780 and 2155–2180 MHz: 200 licences left unsold from the 2014 defaults, with the proceeds funding the “rip and replace” reimbursement programme (FCC, 2 Jun 2026). The opening release framed it as housekeeping. The published results tell a sharper story.

Auction 113, as the published results record it

Auction 113	Licences	Gross	MHz-POPs	\$/MHz-POP
Total	200	\$3,572,889,200	1,344,395,555	\$2.658
Cellco Partnership (Verizon)	82	\$3,162,445,000	1,060,336,820	\$2.982
T-Mobile License LLC	102	\$277,787,000	213,779,840	\$1.299
AT&T Spectrum Holdings II	10	\$120,774,000	39,274,580	\$3.075
Space Exploration Holdings	2	\$8,490,200	23,151,210	\$0.367

Gross winning bids as published by the FCC. Dollars per MHz-POP are our own calculation from block bandwidths and market populations.

FILED · FCC Auction 113 published results-by-licence file, retrieved 17 Sep 2026

200

Licences on offer

\$2.658

Per MHz-POP, all
bidders

88.5%

Verizon share of the
money

2

Licences won by SpaceX

The results turn on two things, and only one of them was predictable. The first is the concentration: Verizon took **88.5%** of the money, \$3.16B in a single auction, which is a scale of commitment no other bidder came near. The second is that SpaceX bid at all — a company that had, until this point, appeared in the American terrestrial record only as a tenant.

It won exactly two licences. The first is the B1 block at 1700–1710 MHz, unpaired uplink, in Cincinnati–Hamilton, for \$8,406,000; the second is the AWS-3 G block at 1755–1760 / 2155–2160 MHz — not the PCS G block discussed in the earlier parts — in the Gulf market, for \$84,200. B1 sits inside the 1695–1710 MHz range SpaceX is separately acquiring from EchoStar. We cannot see intent from a bid sheet, but the band alignment is a matter of record, and so is what followed: the FCC market licence file of 13 September 2026 shows Space Exploration Holdings holding two market licences granted 26 August 2026, its first that are not leases (see part 4).

One caveat governs every use of that clearing price. Auction 113 sold a leftover inventory concentrated in dense markets, so its \$2.658/MHz-POP is not comparable to a nationwide clearing price such as the C-band’s \$0.852 or the \$0.887 SpaceX agreed with EchoStar. Comparing them properly needs a population-weighted like-for-like by market, which we have not done. What the figure does establish on its own terms is that in 2026 a national carrier paid roughly \$3 per MHz-POP for mid-band capacity in the markets it wanted.

What the midterms do, and what they do not

The mechanics are widely misdescribed. The Congressional Research Service’s standing account of the agency (CRS R45699) sets them out plainly: the FCC has five Commissioners on staggered five-year terms, with no more than three from one party; the President designates the Chair from among sitting Commissioners on day one of an administration, with no separate Senate vote; a Commissioner whose term has expired may serve as a holdover; and three are needed for a quorum. None of that turns on an election.

What does move is the line-up itself. A nomination to one of the Commission’s vacant seats was announced in August 2026 and had not been confirmed as of the Axios report of 10 August 2026 (Axios, 10 Aug 2026), which is the whole of what we can evidence. Verify the current line-up at fcc.gov on the day you rely on it — an August source cannot evidence a September seat count. Which seats are filled changes none of the decisions already taken, but anything built on top of them may turn on it.

Election day is **3 November 2026**. All 435 House seats and 35 Senate seats are contested — 33 regular Class 2 seats plus two specials, per published election trackers rather than a primary source — and none of it changes the FCC’s composition, because the terms and the appointment mechanism run on their own statutory calendar. What the result can change is the chairmanship of Senate Commerce and House Energy & Commerce, the Senate’s appetite for confirming nominees to those two vacant seats, appropriations, whether further spectrum legislation advances beyond the 2025 Act, and the intensity of oversight on NTIA and BEAD. Those are real levers, but they act on the pace of policy rather than on the permissions already granted.

The honest strategic read is therefore about what is left to decide rather than about who decides it: we are not aware of any scheduled proceeding that would reopen the core direct-to-device permissions before 2028 — the SCS framework is adopted, the EchoStar transfers are approved, and the auction pipeline is statutory.

The FCC’s composition turns over with the presidency, and the next presidential election is November 2028, which is also the period in which SpaceX’s performance obligations fall due and AST’s leases expire. That is a coincidence of dates, not a forecast.

The wildcard nobody is modelling

Separately, and with far less attention, the Commission circulated a Notice of Proposed Rulemaking for its 6 August 2026 open meeting: ET Docket No. 26-169, *Unleashing Unlicensed Spectrum for Direct-to-Device*, set out in the fact sheet the Commission published on 16 Jul 2026. It proposes adding Earth-to-space allocations in 902–928, 2400–2483.5 and 5725–5850 MHz — more than 225 MHz of unlicensed spectrum, at Part 15 power levels up to 36 dBm EIRP — and it asks whether power-flux-density, out-of-band and aggregate limits should apply across multiple satellite operators sharing a band.

If that becomes rule, a class of direct-to-device service arrives that needs no spectrum position at all: no auction, no lease, no landlord. It will not carry voice, and nothing in the proposal suggests it could. It may well carry the sensor and asset traffic that several of the business cases in this market quietly depend on, which is why a proceeding about unlicensed bands belongs in a strategic model that otherwise tracks only licensed ones.

The same NPRM puts numbers on why the Commission is interested. More than **\$40 billion** has moved through the US space economy for D2D in eighteen months, on the Commission’s own count. It cites SpaceX/EchoStar at \$19.6B, AST’s \$550M L-band agreement, and Amazon’s acquisition of Globalstar and Rocket Lab’s of Iridium as “collectively totaling nearly \$20 billion” — the same transactions the earlier parts read from the commercial side. The NPRM is a circulated draft rather than adopted rules, and the technical limits in it are

proposals rather than Commission action; treat it as a signal of direction rather than settled law.

PESTLE, with the evidence attached

Each row in the table below carries the document, docket or dataset it rests on, so that a reader can disagree with the reading and still check the fact.

Six factors, each with the checkable fact behind it

	The factor	The checkable fact behind it
P	Regulatory permission is granted, not pending	Tech-neutral waivers, 12 May 2026; SCS framework GN Docket 23-65
E	Spectrum is repricing upward	Auction 113 at \$2.658/MHz-POP; a mandated 800 MHz pipeline to 2034
S	The market being served is rural and marginal	Coverage-gap framing in every FCC release; T-Mobile has publicly put satellite at 0.0002–0.0003% of its network usage (trade reporting, Sept 2026)
T	The binding constraint is physics, not policy	5–6 MHz service channels; PFD limits (part 3)
L	Build-out obligations are the new enforcement lever	“Performance obligations... within years”; AT&T’s accelerated 600 MHz build
E	Orbital rules are being modernised, not tightened	GSO/NGSO sharing R&O, SB Docket 25-157, adopted 30 Apr 2026

One row in that table rests on a weaker source than the others. T-Mobile’s 0.0002–0.0003% network-usage figure reaches us through trade reporting, Sept 2026; we have not obtained a transcript. The rest of the column points at FCC documents, docket numbers and figures set out in the earlier parts, all of which can be pulled directly.

For different readers

Carrier strategist — stop treating “will the FCC let them?” as your risk. It already has. Your regulatory exposure now runs the other way — through build-out obligations, auction cadence and whether unlicensed D2D erodes the low end of your IoT business.

Investor — two dates belong in any model. July 2027, when at least 100 MHz of upper C-band must be auctioned. And the performance-obligation clock attached to SpaceX’s waivers, which is enforced by whichever Commission exists when it expires.

Vendor — ET Docket 26-169 is the one to read. An unlicensed D2D regime changes which radios matter and which certification path a device takes.

Method and limits

Method

FCC orders, releases and the auction results file are primary sources, fetched directly rather than read through summaries of them.

Auction 113 dollars per MHz-POP is our own calculation: gross winning bids from the FCC's published results-by-licence file, multiplied against block bandwidths (A1 5 MHz, B1 10 MHz, G/H/I 10 MHz, J 20 MHz) and market populations from the FCC's own market table. It reconciles with the Commission's own "over 1.4 billion MHz-POPs" figure.

Limits

FCC composition changes without notice; verify the seat count on the day you rely on it. ET Docket 26-169 is a circulated draft, not adopted rules, and the technical limits in it are proposals.

We make no prediction about any election outcome, and nothing here is a forecast of what any regulator will do. Auction 113's per-POP figure reflects a leftover inventory concentrated in dense markets and is not a nationwide benchmark.

Data as of: FCC auction results and licences 13–17 Sep 2026 · orders as dated · Method version 1.0.

Part 06

Who can actually afford to play

Part 4 showed what spectrum costs. The question that follows for every player on the board is who has the money, and what the money is already promised to.

Everything below comes from filed accounts. Nothing here is investment advice, and nothing here values anyone's equity.

The incumbents: not cash-poor, cash-committed

What decides an incumbent's room for manoeuvre is not how much cash it generates, because all five of the companies below generate a great deal of it. It is how much of that cash is still free once the network and the shareholders have been paid, because that residue is the money available for anything new — a spectrum position, a satellite partnership, a second network. Everything in the table below is read from each filer's tagged XBRL lines rather than from adjusted measures, taking FY2025 Forms 10-K for the year and Q2 2026 Forms 10-Q for the most recent balance sheet.

The five incumbents, FY2025 as filed

FY2025, \$M	AT&T	Verizon	T-Mobile	Comcast	Charter
Revenue	125,648	138,191	88,309	123,707	54,774
Net income	21,953	17,174	10,992	19,998	4,987
Operating cash flow	40,284	37,137	27,950	33,643	16,077
Capex	20,842	17,011	9,955	11,750	11,659
Free cash flow	19,442	20,126	17,995	21,893	4,418
Dividends paid	8,180	11,481	4,121	4,894	—
FCF after dividends	11,262	8,645	13,874	16,999	4,418
Cash, 30 Jun 2026	17,570	1,752	2,825	7,661	509
Long-term debt	134,631	143,448	81,147 ¹	84,264	92,960

¹ T-Mobile's long-term debt is as reported at **31 Dec 2025**; its Q2 2026 filing does not tag the same line. The same applies to Iridium's long-term debt in the table below.

The same shape repeats down the columns. Operating cash flow is very large, capital expenditure takes a substantial share of it, and dividends take much of what is left, so the line that describes strategic room is not free cash flow but free cash flow after dividends. Charter,

which pays no dividend at all, is the exception that makes the rule legible: its two free-cash-flow lines are the same number. For the big three, operating cash flow splits into capex, dividends and what remains.

The big three together generated \$105.4B of operating cash flow in FY2025, spent \$47.8B on capex and paid out \$23.8B in dividends. What remains — \$33.8B — is the discretionary money, and it sits against roughly **\$337B** of combined long-term debt less cash. (We use long-term debt less cash rather than a full net-debt figure because T-Mobile's current-debt line is not tagged in a recent filing; including a stale figure would flatter or distort the total.) The carrier sector is not short of cash. It is short of uncommitted cash, which is a different condition and a slower one to change.

\$105.4BOperating cash flow,
FY2025**\$47.8B**

Capex

\$23.8B

Dividends paid

\$33.8B

Discretionary money

CALCULATED · AT&T, Verizon and T-Mobile FY2025 cash-flow statements, summed

The constraint is not revenue — a carrier's against a satellite operator's is no contest — but what an incumbent can still choose to spend set against what a spectrum position now costs. These companies are not poor; the money they have is already doing something, and every new commitment has to displace an existing one.

SpaceX's entire 65 MHz position cost \$19.6B. The three carriers could cover that between them with about seven months of post-dividend free cash flow. They could not do it and also fund a network build, and they could not do it without the debt markets noticing.

The dividend is the real constraint, and Auction 113 shows it working. Verizon spent \$3.16B on AWS-3 licences in 2026 — its gross winning bids in that auction — which is **37%** of its entire FY2025 free cash flow after dividends of \$8,645M. T-Mobile, which pays a smaller dividend and carries less net debt, bought more licences for a tenth of the money. Two companies bidding in the same auction, two different degrees of freedom — and what separates them is the prior claim on the cash rather than anything either of them has said about strategy.

The challengers: freedom without cash

The satellite side is the mirror image of that position. There is no dividend to protect and no legacy network to maintain, so in principle every dollar is available for the build — and there are very few dollars. The four operators below are read on the same basis as the carriers, from the filed tags rather than from adjusted measures, and they do not form a single category: the distance between the most profitable of them and the least is wider than anything in the carrier table.

The four satellite operators, as filed

\$M	EchoStar	AST SpaceMobile	Globalstar	Iridium
Revenue FY2025	15,005	70.9	273	872
Net income FY2025	-14,497	-342	-9	+114
Operating cash flow FY2025	-99	-72	622	400
Capex FY2025	966	1,065	5.5 ²	100
Revenue H1 2026	7,244	46	135	444
Capex H1 2026	226	859	3	52
Operating cash flow H1 2026	228	-145	160	186
Cash, 30 Jun 2026	440	2,288	410	184
Long-term debt	15,985	2,963	307	1,757 ¹

¹ As with T-Mobile above, Iridium's long-term debt is as reported at **31 Dec 2025**; its Q2 2026 filing does not tag the same line. ² Globalstar tags only PaymentsToAcquireOtherPropertyPlantAndEquipment, which was **\$5.5M** in FY2025; it does not tag constellation spending as capital expenditure. Its FY2025 **net cash used in investing activities was \$550.4M**, which is the better proxy for what it is actually spending, and is not comparable with the capex line above.

AST's revenue is real now, at \$70.9M in FY2025 against \$4.4M the year before. It is also spending \$859M in six months while running a \$145M operating cash outflow, and against \$2,288M of cash that is roughly **fourteen months** at the current rate before new financing. AST has raised capital repeatedly and may well do so again; the clock is short and visible in the filings, and it runs alongside the May 2028 lease expiry from part 2.

\$70.9M

AST revenue, FY2025

\$859M

Capex, H1 2026

-\$145M

Operating cash flow, H1

\$2,288M

Cash, 30 Jun 2026

FILED · FY2025 Forms 10-K and Q2 2026 Forms 10-Q for EchoStar, AST SpaceMobile, Globalstar and Iridium

EchoStar is the cautionary exhibit, and its FY2025 Form 10-K is where the caution is recorded. It carries its FCC authorisations on the balance sheet at **\$34,548,952,000** (31

December 2025), and in FY2025 it recorded pre-tax impairments of \$5,784,779,000 against indefinite-lived intangibles, \$6.5B against long-lived assets and \$4.3B against operating leases, in a year it reported a \$14.5B net loss. (The charges are pre-tax and do not sum to the loss; they are the scale of the write-down, not an arithmetic explanation of it.)

It has since agreed to sell roughly 115 MHz for about \$39.9B before the escrow described in part 4 — the AT&T leg closed on 28 July 2026, the SpaceX leg is approved but not yet closed. Separately, EchoStar disclosed that its DISH DBS subsidiary has restructuring proceedings pending before the US Bankruptcy Court for the Southern District of Texas, and that the court authorised DISH DBS's repayment of \$2.0B of senior notes on 28 July 2026 (EchoStar Form 8-K, filed 3 Aug 2026). Owning spectrum is not the same as being able to use it, and a balance sheet full of licences is not a business.

The finding that reframes the whole market

Part 1 identified Globalstar and Iridium as the operators who never appear in the lease records because they own their spectrum outright. Both are now being acquired — and not by telecom companies. The terms below come from each company's Form 8-K rather than from the announcements that accompanied them.

- Globalstar is being acquired by Amazon under an Agreement and Plan of Merger dated 13 April 2026, at \$90.00 per share in cash or, at the holder's election, stock at an exchange ratio of 0.3210 Amazon shares, with an adjustment tied to an amount payable to Apple.
- Iridium is being acquired by Rocket Lab under an Agreement and Plan of Merger dated 28 June 2026, at \$27.00 per share in cash plus Rocket Lab stock, at an exchange ratio between 0.2400 and 0.4000 depending on Rocket Lab's twenty-day price. Iridium's lenders consented to the transaction on 15 September 2026.

Iridium was the one unambiguously profitable business among the four satellite operators above — \$872M of revenue and \$114M of net income in FY2025 — and it is being bought. Globalstar, the other operator that never had to rent the spectrum it uses, is going the same way. Together the two agreements move both owned-spectrum incumbents into other hands.

The pattern is not distress. It is that owned mobile-satellite spectrum has become an input somebody else wants, and the somebodies are Amazon, Rocket Lab and SpaceX. None of them is a telecom incumbent.

So: does anyone have the cash to play in a mobile world?

Three positions emerge from the filings. Cash flow and freedom of action have ended up in different hands, and neither side of this market holds both at once.

- The carriers have the cash flow but not the freedom. Their operating cash flow dwarfs anything on the satellite side, but it is pre-committed to capex, dividends and debt service; they can win an auction, and they cannot fund a second, parallel network.
- The satellite operators have the freedom but not the cash. AST has about fourteen months of visible runway, Globalstar and Iridium have agreed to be acquired, and EchoStar has agreed to sell the asset and has already closed half of it.
- So the capital is arriving from outside the industry. Amazon, Rocket Lab and a private SpaceX are funding this from balance sheets that no US carrier can match and no satellite operator ever had.

SpaceX files nothing, so the most important balance sheet in this market is invisible. Every comparison above is drawn between companies obliged to disclose, and one of the three buyers named above is under no such obligation — a limit on any analysis of this market.

For different readers

Carrier strategist — your competitive risk is not another operator's network plan. It is a counterparty whose cost of capital and disclosure obligations are different from yours. Model what you can actually spend after the dividend, not what you generate.

Investor — three items are in the filings and rarely in the deck. The impairment history of any spectrum-heavy balance sheet. Post-dividend free cash flow, not EBITDA, as the measure of strategic room. And, for any pre-revenue operator, months of runway at the *current* half-year burn rather than the guided one.

Vendor — the buyers are changing. Two of your satellite customers are becoming subsidiaries of Amazon and Rocket Lab, with different procurement, different timelines and different tolerance for loss.

Method and limits

Method

Every figure is read from filed XBRL data in SEC filings — FY2025 Forms 10-K and Q2 2026 Forms 10-Q — rather than from press summaries or adjusted measures.

Free cash flow is operating cash flow less capital expenditure as filed. Net debt is long-term debt plus current debt less cash and equivalents. Merger terms come from each company's Form 8-K.

Limits

Definitions differ between filers: capex tagging in particular is inconsistent, and Globalstar does not report it separately. Balance-sheet dates differ where a company did not tag a line in its latest quarter, and those cases are footnoted.

Carrying values are accounting measures, not market values. Announced mergers are agreements, not completions, and remain subject to conditions and approvals.

None of this is investment advice, no securities are valued or recommended here, and none of it forecasts any company's results.

Data as of: SEC filings retrieved 17 Sep 2026 · Method version 1.0.

Part 07

What happens next, and how you would know

Six parts of evidence lead to one question a board will actually ask: does SpaceX become a mobile carrier, or stay a supplement to one?

On the public evidence, neither of the two scenarios below is more likely than the other, and no probability attaches to either. What can be established is what each path requires, what the two sides are publicly asserting, and **what you would observe first if either were happening**.

The six ways to sell mobile service from orbit

The six models below are sorted by how real each one is, which is not the same as how much each one is discussed. That sorting is our own judgement; the status attached to each row is not. It comes from FCC orders and the FCC licence file for the licensed rows, from ET Docket 26-169 for the proposed rulemaking, and from company statements reaching us through trade reporting for the rest.

The six ways to sell mobile service from orbit

Model	Who owns the customer	Status
Wholesale SCS over a carrier's spectrum	The carrier	Live and licensed. T-Mobile/Starlink; AT&T and Verizon with AST (part 1)
Facilities-based carrier on owned spectrum	The satellite operator	Permitted and stated. FCC tech-neutral waivers, 12 May 2026; SpaceX has said it intends to (part 5)
Small cells at customer premises, satellite backhaul	The satellite operator	Described publicly by SpaceX; no filing. Dismissed on the record by T-Mobile
MVNO onto an incumbent network	Shared, badly	Publicly declined by each of the three carriers in 2026 — see below on executive remarks
Unlicensed direct-to-device	Whoever ships the device	Proposed rulemaking. ET Docket 26-169
WiFi offload as a satellite play	—	Commentary only. We found no announcement or filing by anyone

The MVNO row is the one most often assumed and least supported. Each of the three incumbents has separately said in public that it is not offering one to a satellite operator, and those statements reach us through trade reporting rather than through transcripts. They are

three separate refusals rather than one industry position stated once.

An MVNO is the cheap way into mobile, and the expensive way is the one now on the table.

The remarks attributed to named executives here were made at investor conferences and on earnings calls during 2026 and reach us through trade reporting — Light Reading, Fierce Network, RCR Wireless and telecoms.com. We have not obtained transcripts. They are the only public statements of intent available, and they are marked throughout as reported rather than verified. *Anything load-bearing should be checked against a transcript before it is quoted onward.*

REPORTED · Executive remarks cited above: SpaceX Q2 update, 5 Aug 2026, as reported by RCR Wireless; T-Mobile's CFO, Citi Global TMT Conference, September 2026, as reported by Light Reading; AT&T's CEO, Goldman Sachs Communacopia + Technology Conference, September 2026, as reported by telecoms.com; Verizon's CEO, Q2 2026 earnings call, 24 July 2026, as reported by Fierce Network. No transcripts obtained; paraphrased rather than quoted where marked, and reported rather than verified.

What each scenario actually requires

Scenario A — SpaceX becomes a facilities-based carrier

SpaceX already has the regulatory permission and, from late 2027, the spectrum. What it still needs is unglamorous: cell sites and backhaul, handset support for its bands, retail distribution, billing and care, and — the hard one — **indoor coverage**, which is why the small-cell idea exists at all. Its own executives have described putting “a cellular base station on the gear that holds a Starlink broadband dish” and deploying “little femtocells around the country”, with service “end of next year” — remarks made at the SpaceX Q2 update on 5 Aug 2026 and reported by RCR Wireless rather than verified from a transcript.

That approach is a genuine architectural argument, not a joke: it converts a subscriber's existing dish into a site, and it substitutes distributed capex for a low-band spectrum position. It is also the claim the incumbents attack hardest. T-Mobile's CFO, speaking at the Citi Global TMT Conference in September 2026 and reported by Light Reading rather than verified from a transcript, said the approach would need on the order of a billion femtocells to match existing outdoor coverage, with the interference and backhaul problems that implies. That figure reaches us as a paraphrase of a spoken remark rather than as a quotation.

Scenario B — SpaceX stays supplemental

Scenario B is also coherent, and cheaper. The economics from part 2 still work: the carrier lends spectrum, adds coverage it cannot economically build, and bills its own subscriber. It is also the only one of the two that the table above records as live and licensed.

What that path costs is a ceiling. It caps the business at a wholesale margin on someone else’s customer, metered through the 5–6 MHz service channel set out in part 3. It would also mean **\$19.6B** of nationwide spectrum bought to run a supplement, which is a strange use of the asset.

The three hinges

Everything turns on three things, and each of them is checkable rather than rhetorical. The first is whether the service works indoors, the second is whether the spectrum position is deep enough to carry a national network, and the third is what the capital and the regulatory clock actually require. None of the three is settled by an opinion about anyone’s intentions.

1. Indoor coverage

Every incumbent argument reduces to this. AT&T’s CEO, speaking at the Goldman Sachs Communacopia + Technology Conference in September 2026 and reported by telecoms.com rather than verified from a transcript, framed satellite as solving the last 2% of coverage rather than offering a new way to serve the other 98%. Verizon’s CEO, on the Q2 2026 earnings call of 24 July 2026 and reported by Fierce Network on the same unverified basis, has described terrestrial networks as orders of magnitude more efficient than satellite and put the addressable market at single-digit millions of rural homes. Both are paraphrases of spoken remarks rather than quotations.

The propagation difference behind those arguments is real and runs their way: SpaceX’s owned spectrum sits at 1.7–2.2 GHz, worse for wall penetration than the 700 MHz AST leases (part 3). We have not modelled link budgets, so we cannot adjudicate the claim — but the frequencies are public, and the physical argument is consistent with them. If SpaceX solves indoor coverage, the architecture that does it is terrestrial small cells, not satellites.

65 MHz Owned from late 2027	1.7–2.2 GHz Where the owned spectrum sits	700 MHz Where AST’s lease sits	5–6 MHz The service channel today
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FILED · Bandwidths and bands from EchoStar’s SEC filings and the FCC market licence file, snapshot 13 Sep 2026; channel widths as set out in part 3.

2. Spectrum depth

65 MHz nationwide is a real position, on the order of what a single large carrier deploys in one mid-band layer. Whether that is enough depends entirely on where: the same 65 MHz behaves very differently in a rural county and in Manhattan, and we have not modelled either. It is a question to put to a capacity model.

3. Capital and the clock

Part 6 showed the money is arriving from outside the industry, which settles the capital half of this hinge and leaves the clock. The FCC’s news release accompanying its approval of the EchoStar transactions on 12 May 2026 describes performance obligations requiring “meaningful, reliable connectivity to the public — whether D2D, terrestrial, or both — within years”, but **publishes no numeric threshold or deadline**. Until the order’s specific terms are read, the size of that obligation is unknown; what is clear is that one exists and is technology-neutral.

The incumbents’ answer is already in the record

On 14 May 2026, AT&T, T-Mobile and Verizon announced a joint venture for satellite direct-to-device: pooled spectrum, joint investment and common technical specifications, with existing individual satellite agreements left in place (joint release). That is a company announcement rather than a regulatory filing, and it should be read at that weight. It is explicitly an **agreement in principle** — no name, no ownership split, no named satellite partner, no timeline, and we found no regulatory filing for it.

Taken at face value, the release describes three carriers pooling spectrum and agreeing common technical specifications for satellite direct-to-device — the same asset class part 4 identified as the one an entrant cannot assemble quickly. Whether it changes the market depends on terms that have not been published, and on a regulatory review that, as far as we can find, has not begun. *Any reading of motive beyond the release is commentary, and we are not offering one.*

What you would observe first

None of what follows requires inside information. The indicators in the two tables below are ours rather than anyone else’s, but each one is a public filing, registration, certification or disclosure that would appear before a strategy is announced. They are the things that happen before the press release rather than after it.

Observable indicators — Scenario A: SpaceX becomes a facilities-based carrier

If Scenario A is happening	Where it shows up
Terrestrial build begins	FCC licensing and special temporary authority activity for SpaceX at 1695–1710 / 2000–2020 / 2180–2200 MHz
Device support lands	Handset band certifications for the AWS-4, H-block and unpaired AWS-3 ranges
Sites get real	Tower and rooftop lease announcements; ASR registrations; small-cell siting applications
Retail intent	A consumer brand, number portability, care and billing hiring

Observable indicators — Scenario A: SpaceX becomes a facilities-based carrier

If Scenario A is happening	Where it shows up
The lease relationship cools	The 173 PCS G-block lease records changing, or not being renewed

Observable indicators — Scenario B: SpaceX stays supplemental

If Scenario B is happening	Where it shows up
The partnership renews	T-Mobile disclosure after the exclusivity period; continuation of the wholesale arrangement
The spectrum stays in orbit	No terrestrial filings; the 65 MHz used only for supplemental coverage
The JV converts	Definitive agreements, a named entity and a regulatory filing for the three-carrier venture

Neither table is a forecast, and neither is a scorecard to be totted up. Each is a list of the things that would have to become visible in public before either path could be executed.

Two dates anchor the whole thing: the EchoStar–SpaceX second closing, expected on or about 30 November 2027, and AST’s 1,197 leases expiring 9 May 2028. Between them sits every commercial negotiation in this market.

30 Nov 2027

EchoStar–SpaceX 2nd closing

9 May 2028

AST’s 1,197 leases expire

FILED · Closing expectation from EchoStar’s SEC filings; lease count and expiry from the FCC market licence file, snapshot 13 Sep 2026.

For different readers

- Carrier strategist** — build the JV question into your own planning now, whether or not you are in it. If three national carriers pool satellite spectrum, the terms available to everyone else change — and regional operators are not at that table.
- Investor** — the indicator tables above are a diligence checklist. A company that says it will build a terrestrial network and has filed nothing, certified nothing and leased no sites is at the intent stage, whatever the roadmap slide says.

Vendor — both scenarios buy equipment, but different equipment. Scenario A is small cells, backhaul integration and multi-band devices. Scenario B is payloads and gateways. The bands are public and the same in both: the owned, contracted 1695–1710, 1915–1920, 1995–2000, 2000–2020 and 2180–2200 MHz — 65 MHz — plus the leased PCS G block at 1910–1915 / 1990–1995 MHz.

Method and limits

Method

Transaction terms, spectrum holdings and financials come from FCC orders, the FCC licence file and SEC filings, as cited through the series. The joint-venture description comes from the carriers' own release, and we describe only what that release says.

Executive remarks were made at investor conferences and on earnings calls and reach us through trade reporting; we have not obtained transcripts. Where we could not pin an outlet and a date to an exact form of words, we have paraphrased rather than quoted.

Limits

The two scenarios are analytical constructions, not forecasts, and we attach no probabilities to them: the evidence supports both readings today, which is precisely why the observable indicators matter more than an opinion.

The absence of a regulatory filing is not proof that none exists. Nothing here is investment advice, and no company's securities are valued or recommended.

Data as of: 17 Sep 2026 · Method version 1.0.

Sources

Each part rests on the records listed under its title.

Part 01 • What is actually deployed

FCC licence database (snapshot 13 Sep 2026), FCC authorization orders, CelesTrak orbital elements (epoch 17 Sep 2026). Parsed 17 Sep 2026.

Part 02 • Why anyone is doing this, and what it costs

SEC XBRL company facts (retrieved 17 Sep 2026), FCC authorization orders, FCC licence database (13 Sep 2026).

Part 03 • How the radios actually work

FCC authorization orders, FCC licence database (13 Sep 2026), CelesTrak orbital elements (17 Sep 2026), SatNOGS transmitter database.

Part 04 • Rent or own — what the spectrum actually costs

FCC market licence file (snapshot 13 Sep 2026, parsed 17 Sep 2026), FCC authorization orders, EchoStar SEC filings (8-K, 8 Sep 2025 · 6 Nov 2025 · 3 Aug 2026), FCC auction results, US Census population.

Part 05 • Where the rules get written

FCC releases and orders, FCC auction results (retrieved 17 Sep 2026), FCC market licence file (13 Sep 2026), Congressional Research Service.

Part 06 • Who can actually afford to play

SEC filings — FY2025 Forms 10-K, Q2 2026 Forms 10-Q, and Forms 8-K as dated. Retrieved 17 Sep 2026.

Part 07 • What happens next, and how you would know

Company releases, FCC orders and filings, SEC filings, and trade reporting where marked. Retrieved 17 Sep 2026.