

Miami International Airport

Venue Network Intelligence Report — Deep Edition

Rev 2 — VNIR-standard restructure

Three carriers, three different networks: an attested but aging T-Mobile DAS, an apparent independent Verizon path, and an AT&T footprint riding outdoor macro — measured across 129 gates, 494 tenants, and 80,783 tile-aggregates, under an open neutral-host DAS procurement.

Prepared by the Imagine Wireless Network Intelligence Platform

Data window: 2025-04-01 – 2026-03-31 · Issued: 2026-08-14 (Rev 2) · Freshness: 136 days (exceeds the 90-day default policy — see §16)

Primary sources: Ookla Cell Analytics (per-carrier tiles + venue aggregates) · MIA tenant graph (OSM + Google Places)

Reference sources: MDAD DAS Future Solicitation (draft Scope of Services) · das_master_feb2026 · Airport-KnowGraph deployment registry

CONFIDENTIAL — prepared for MDAD stakeholder review

Best indoor 5G	Cleanest signal quality	Gates critical (<-110 dBm)	Venue Wi-Fi offload
T-Mobile · median -93.1 dBm	Verizon · median SINR +11.8 dB	0 of 129 on any carrier	59% of observed MB

Contents

- 1. Executive Readout
- 2. Venue Snapshot and Asset Inventory
- 3. Carrier Findings (3.0 at a glance · 3.1 T-Mobile · 3.2 Verizon · 3.3 AT&T · 3.4 Sub-1 GHz reliance · 3.5 RSRQ, CQI & Optimization Priority · 3.6 Serving-cell volatility)
- 4. The View by Zone (4.1 Healthy share & medians · 4.2 Coverage class & PCI diversity · 4.3 Cross-carrier concordance · 4.4 Concourse D · 4.5 International concourses)
- 5. Tenant Level (5.1 Category RSRP & SINR · 5.2 Indoor vs outdoor · 5.3 Airline clusters · 5.4 Retail & F&B brands · 5.5 Lounges)
- 6. Load and Usage Intensity
- 7. Wi-Fi as an Augmentation Layer
- 8. Private Wireless
- 9. Spectrum and Service Availability
- 10. Carrier-Asymmetry Atlas
- 11. Federal and Operational-Critical Tenants
- 12. Passenger-Impact Translation
- 13. Prioritised Recommendations
- 14. Acceptance Criteria and Re-Measurement Plan
- 15. Next Layers to Add
- 16. Method, Thresholds, Confidence, and Caveats
- Appendix A — Worst 20 tenants per carrier (with n)
- Appendix B — Strongest-serving band tables per carrier

- Appendix C — Full lounge table

1. Executive Readout

Miami International Airport is served by a layered wireless environment: three cellular carriers with three visibly different network strategies, an airport-owned Wi-Fi network, and an attested private 5G deployment — all under an in-flight competitive procurement that will replace the dominant in-building cellular system with a neutral-host design. This report characterizes the venue at gate, tenant, concourse, band, and serving-cell resolution across 129 gates, 494 tenants, and 80,783 Ookla tile-aggregates.

T-Mobile US — strongest indoor signal, weakest signal quality.

Healthy 5G RSRP at 100 of 129 gates (venue median -93.1 dBm), consistent with its attested single-carrier DAS (contract expired 2024 — KG record, cited-not-held). But signal quality is the weakest of the three: median SINR +7.0 dB with only 2 healthy gates, plus the highest serving-cell volatility. Strong signal a device cannot cleanly use is a distinct pathology, and it is T-Mobile's at this venue.

Verizon Wireless — cleanest quality, LTE network of record, no recorded in-building path.

Median SINR +11.8 dB (82 healthy gates of 129), best-serving LTE at 128 of 129 gates with a healthy venue LTE median of -84.3 dBm — despite carrying no in-building DAS attestation in the airport graph. The pattern is consistent with a legacy standalone WSP system, exactly the asset class the open MDAD solicitation contemplates decommissioning on award.

AT&T — outdoor-strong, indoor macro-spillover only.

5G RSRP in the at-risk band at 122 of 129 gates (venue median -101.6 dBm). The indoor/outdoor tenant split is the donor-isolation tell: outdoor-category median -85.9 dBm vs indoor-category median -97.3 dBm — a +11.4 dB drop crossing the building skin (n = 89 outdoor / 268 indoor tenant aggregates). This corrects the rev-1 headline of "+15 to +17 dB": the reproducible category-median delta is +11.4 dB. The direction and diagnosis are unchanged; the magnitude is now the computed value.

Why this ordering holds

T-Mobile's DAS is attested and visible in the data; Verizon's clean quality plus LTE dominance implies an unrecorded independent path; AT&T shows no measurable in-building path. Deployment history explains the ranking — and the ranking is reproducible from the tile export alone.

Why it matters now

The MDAD neutral-host DAS solicitation (10-year term + 5-year option; names AT&T, T-Mobile, Verizon; includes CBRS; mandates decommissioning of legacy in-building systems on cutover) will reset all three carrier positions. This report is the pre-cutover baseline the new system should be accepted against — see §14.

2. Venue Snapshot and Asset Inventory

Element	Value	Notes
Airport / IATA / ICAO	Miami International / MIA / KMIA	Large-hub; 23.95M passengers per das_master (KG record, cited-not-held)
Operating authority	Miami-Dade Aviation Department (MDAD)	Property of Miami-Dade County; 3,230-acre site
FAA size class	LARGE	Top international gateway; #2 US international-passenger airport per RFP narrative

Concourses analyzed	6	D · E · F · G · H · J
Gates analyzed	129	Largest cluster: Concourse D (51 gates, AA hub)
Tenants analyzed	494	182 retail · 145 food · 113 transport_admin · 23 other · 9 lodging · 9 lounge · 8 services · 5 admin
Carriers measured	3	AT&T · T-Mobile US · Verizon Wireless (80,783 tile-aggregates)
Attested in-building cellular	T-Mobile DAS (contract expired 2024)	Single-carrier; managed by Black Box; subject to MDAD RFP replacement (KG record)
DAS manager / 24x7 NOC	Black Box	Telecom managed-services partner at MIA since 2004 (KG record)
Wi-Fi network	Airport-owned, managed by Boingo Wireless	Passpoint enabled (Passpoint offload corroborated 2026-05-12)
Private 5G	FutureTech / Black Box (joint, active contract)	Coverage area not specified in registry (KG record, cited-not-held)
Open procurement	MDAD Future Competitive Solicitation: DAS	Neutral-host converged DAS · 10-yr + 5-yr option · names AT&T, T-Mobile, Verizon · includes CBRS · mandates legacy decommissioning on cutover
Tenant airline footprint	21 airline hubs · 12 station carriers · 4 focus · 4 cargo/charter	AA primary hub (Concourse D); strong Latin-American footprint on Concourse J
How to read the measurement Every cellular number in this report is an aggregate of crowdsourced background scans from consumer Android devices (≈3% of handsets), binned to ~10×10 m map tiles by Ookla, then joined to gate and tenant points. Numbers describe where devices actually were over a 12-month window — they are not drive-test or walk-test measurements, and every table carries its n so thin cells are visible.		

3. Carrier Findings

3.0 At a Glance

Carrier	5G RSRP median (dBm)	5G SINR median (dB)	LTE RSRP median (dBm)	Healthy 5G gates	n (gates)
T-Mobile US	-93.1	+7.0	-94.8	100	129
Verizon Wireless	-97.3	+11.8	-84.3	38	129
AT&T	-101.6	+6.2	-98.5	7	129

MIA — Venue-Wide Carrier Medians (129 gates)

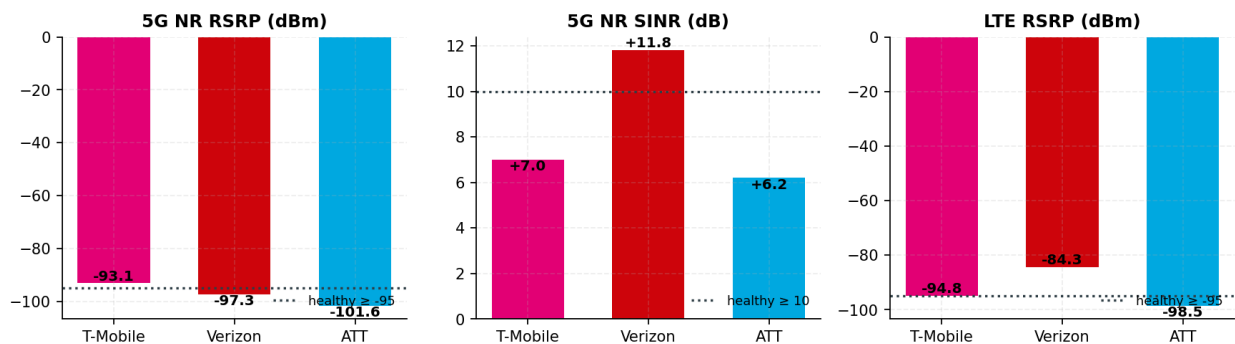


FIG. 1 — Venue medians across 129 gates against the locked threshold ladder (\$16). · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

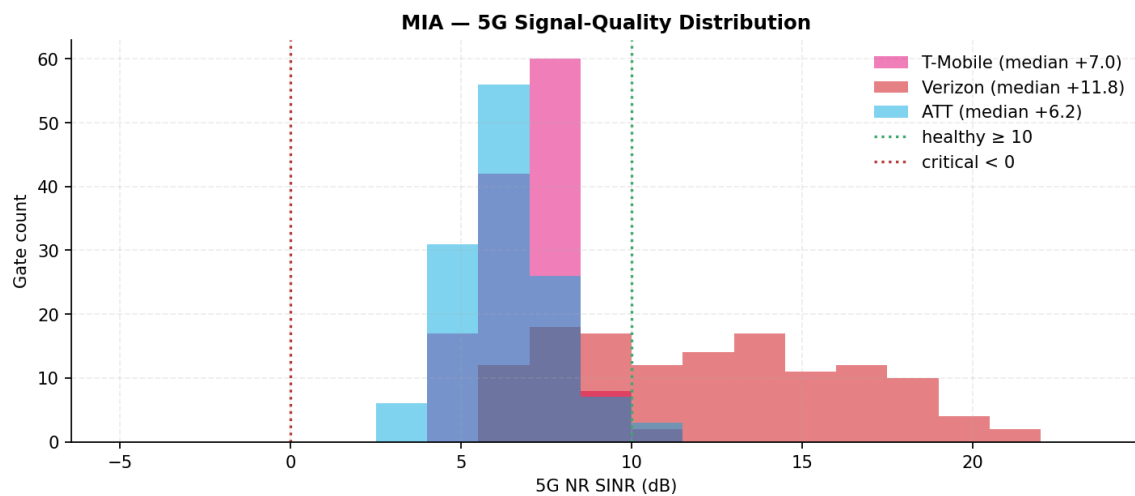


FIG. 2 — SINR distribution per carrier. Verizon's distribution sits several dB to the right of AT&T and T-Mobile. · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

3.1 T-Mobile US

T-Mobile delivers the strongest indoor 5G signal in the venue: 100 of 129 gates in the healthy RSRP band, venue median -93.1 dBm. This matches the attested T-Mobile single-carrier DAS. Signal quality, however, is the weakest of the three — median SINR +7.0 dB with 2 gates in the healthy band. RSRQ shows the same pattern.

Strong RSRP paired with weak SINR is a specific pathology class: it does not indicate a coverage hole, it indicates that the device sees plenty of energy but a substantial share of it is co-channel or adjacent-channel interference. The candidates are DAS-vs-macro dominance conflict at sector edges, PCI-plan staleness, and antenna placement no longer matching the post-buildout interior. The DAS contract expired in 2024 (KG record), consistent with a system that has not been re-tuned through a contract cycle. §3.6 adds serving-cell volatility as the quantitative proxy.

T-Mobile framed finding

Best signal, worst quality: median RSRP -93.1 dBm (rank 1 of 3) against median SINR +7.0 dB (rank 3 of 3). An aging DAS that reaches everywhere and interferes with itself.

3.2 Verizon Wireless

Verizon presents the most interesting profile in the dataset. NR signal strength is mid-tier (median -97.3 dBm, 38 healthy gates), but signal quality is the cleanest of the three (median SINR +11.8 dB, 82 healthy gates of 129) and LTE RSRP is healthy venue-wide at -84.3 dBm. Verizon is the best-serving LTE carrier at 128 of 129 gates.

The combination — strong LTE, clean SINR, mid-tier NR — without any DAS attestation is the strongest evidence in the dataset for an independent in-building Verizon path not recorded in the airport graph. The published RFP scope explicitly contemplates "existing legacy in-building systems, repeaters, BDAs, small cells, or standalone WSP systems" and mandates their decommissioning when the new DAS goes live. Locating, attesting, and documenting this path before award is a low-cost, high-value coordination task.

Verizon's one structural weakness is Concourse D: 0 of the 80 tenants measured there return a healthy Verizon NR reading. This is too clean to be random and is consistent with the apparent independent path not extending into the AA-hub concourse.

Verizon framed finding

LTE network of record (128 of 129 gates) with the cleanest 5G quality — and no recorded in-building system to explain it. Attest the path before the DAS award decommissions it unexamined.

3.3 AT&T

AT&T's 5G NR signal strength is in the at-risk band at 122 of 129 gates, venue median -101.6 dBm. SINR is similarly at-risk (median +6.2 dB, 3 healthy gates of 129). LTE provides near-universal service availability, with a median LTE RSRP of -98.5 dBm — also at-risk. Zero gates sit in the critical band (<-110 dBm): AT&T subscribers are not losing service outright; they operate one band above critical across nearly the entire indoor footprint.

The cleanest evidence that AT&T lacks an in-building path is the indoor/outdoor tenant split: outdoor-category median -85.9 dBm (n=89) against indoor-category median -97.3 dBm (n=268) — a +11.4 dB drop crossing the building skin, the classic macro-spillover signature. (Correction vs rev 1: the previously published "+15 to +17 dB" figure mixed category extremes; the reproducible category-median delta is +11.4 dB. See §16 and the audit findings log.)

AT&T is named in the MDAD DAS RFP as an expected hosted carrier. The current measurement establishes the baseline against which a future hosted AT&T path would be accepted (§14).

AT&T framed finding

No measurable in-building path: 122 of 129 gates at-risk, and a +11.4 dB indoor/outdoor drop. The neutral-host award is the fix; this baseline is how you prove it worked.

3.4 Sub-1 GHz Reliance

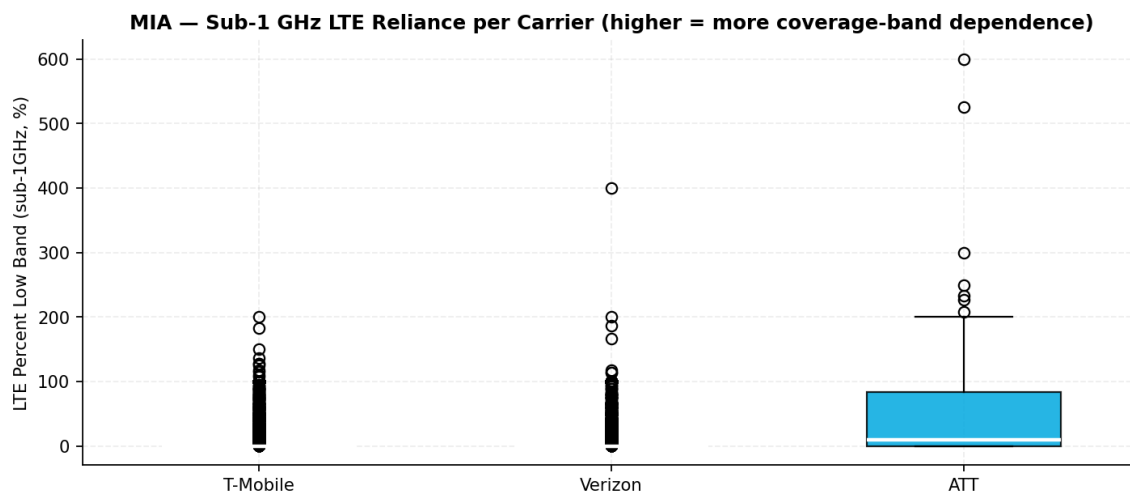


FIG. 3 — LTE percent-low-band distribution per carrier. Higher values = more reliance on sub-1 GHz coverage bands (700/850 MHz), which carry into buildings but offer lower capacity. · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

The percent-low-band statistic is an indirect indicator of in-building dependence: a carrier whose tiles disproportionately attach to sub-1 GHz spectrum is leaning on coverage-grade bands because higher-capacity mid-band is not reaching the tile reliably. The distribution is consistent with the per-carrier story above.

3.5 RSRQ, Channel Quality (CQI), and Optimization Priority

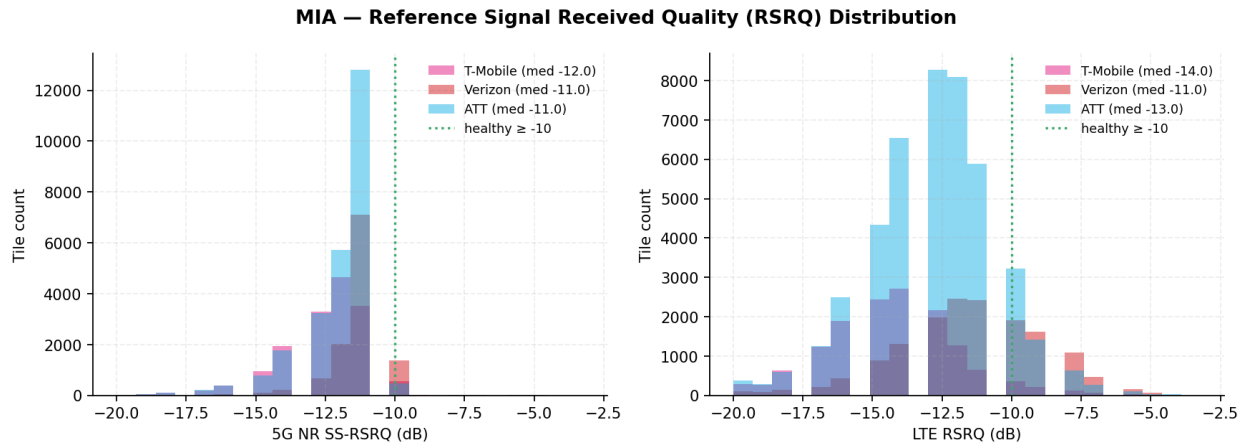


FIG. 4 — NR and LTE RSRQ distributions per carrier. RSRQ composites received signal and interference. · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

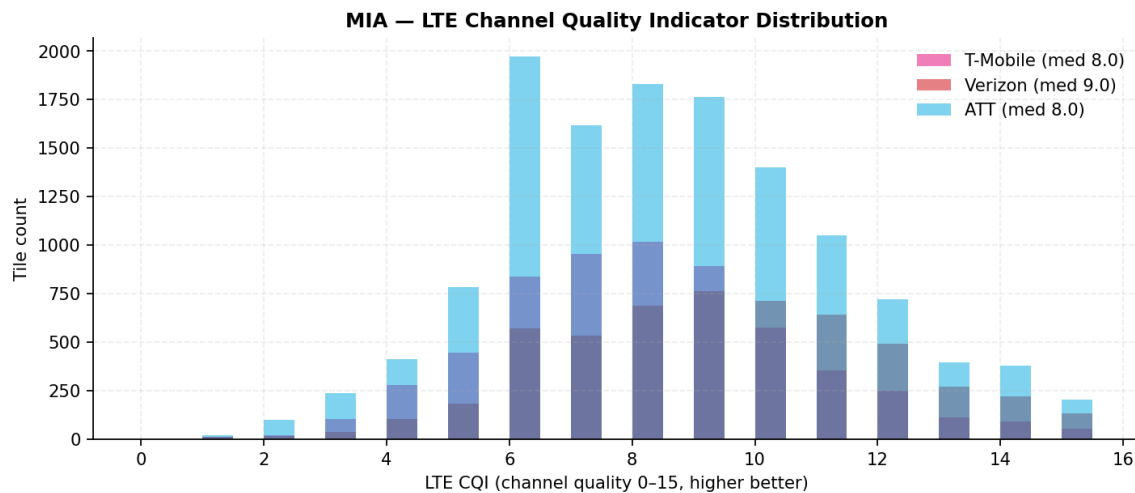


FIG. 5 — LTE CQI distribution. CQI maps to modulation/coding selection — the closest throughput proxy in an export without throughput. · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

RSRQ corroborates the SINR story: Verizon's distributions sit to the right of AT&T and T-Mobile at the median, indicating a cleaner spectral environment. CQI reinforces the same ordering — higher CQI translates to higher per-MCS throughput potential at the same RSRP.

Ookla's LTE Optimization Priority layer — the vendor's own index for exactly the strong-RSRP/poor-SNR pathology diagnosed by hand in §3.1 — is a portal layer not present in this export. It is queued in §15; when pulled, it replaces an argued diagnosis with the vendor's own definition.

3.6 Serving-Cell Volatility (Handover-Churn Proxy)

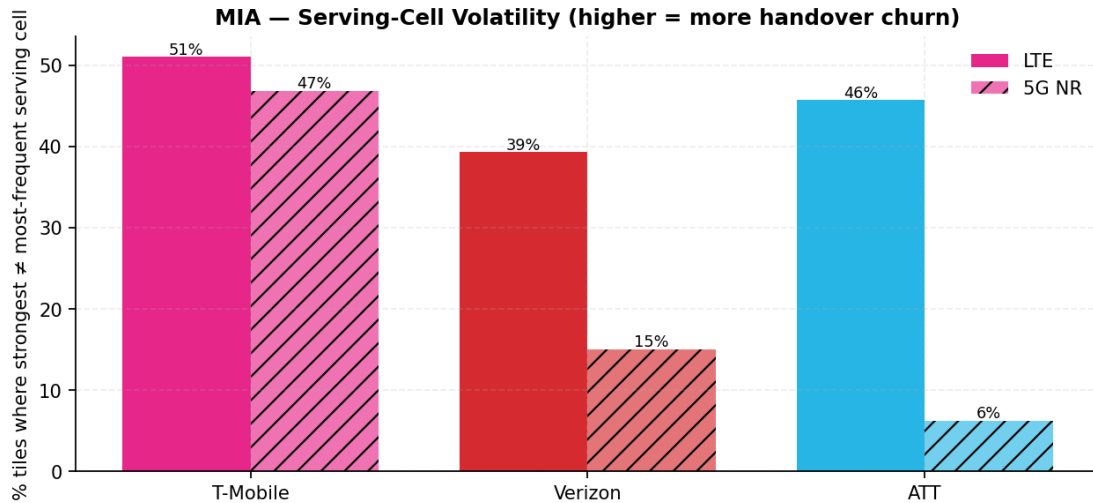


FIG. 6 — Share of tiles where the strongest observed cell differs from the most-frequent serving cell. A proxy for handover instability and dominance conflict. · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

Where the strongest cell at a tile is not the most-frequently-serving cell, the network is hand-keying between cells competing for the same coverage. T-Mobile shows the highest churn on both LTE and NR — consistent with a DAS overdue for re-tuning. Verizon shows the lowest, reinforcing the stable-path picture. This is a proxy, not a handover trace (§16).

4. The View by Zone

4.1 Healthy Share and Median RSRP by Concourse

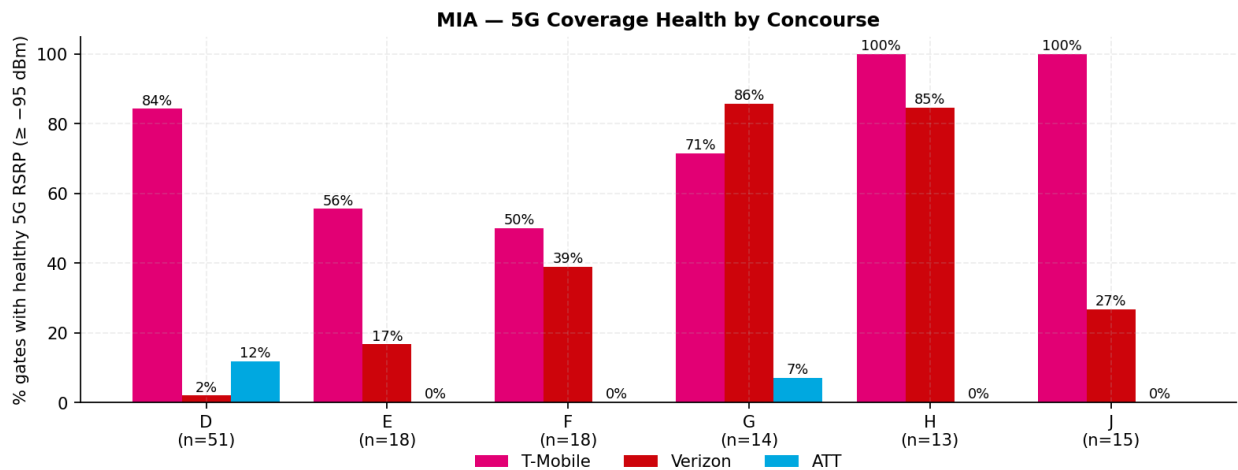


FIG. 7 — Share of gates with healthy 5G RSRP by concourse (n per concourse on axis). · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

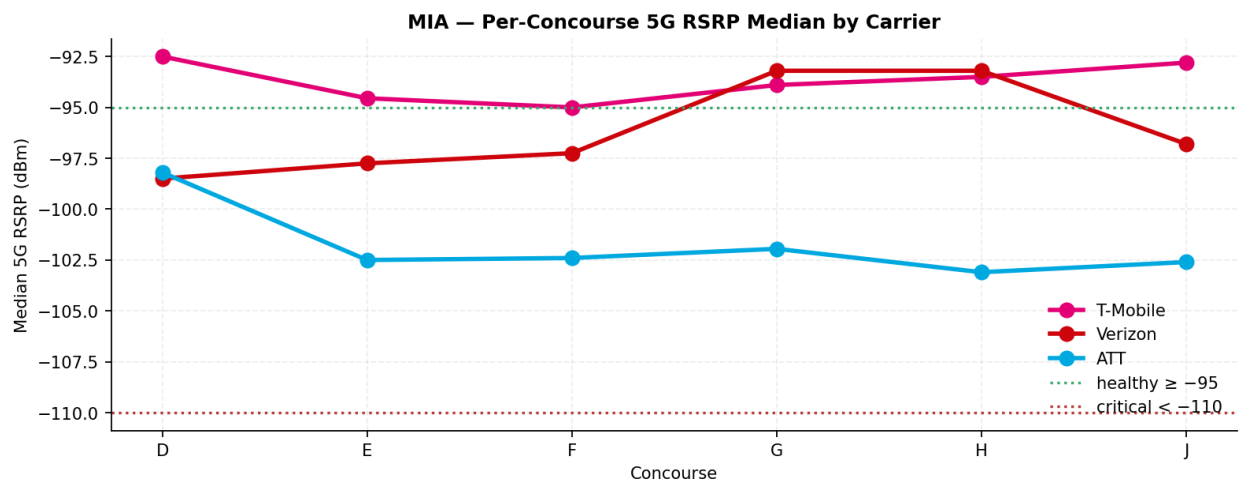


FIG. 8 — Per-concourse median 5G RSRP per carrier. · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

4.2 Coverage Class and PCI Diversity

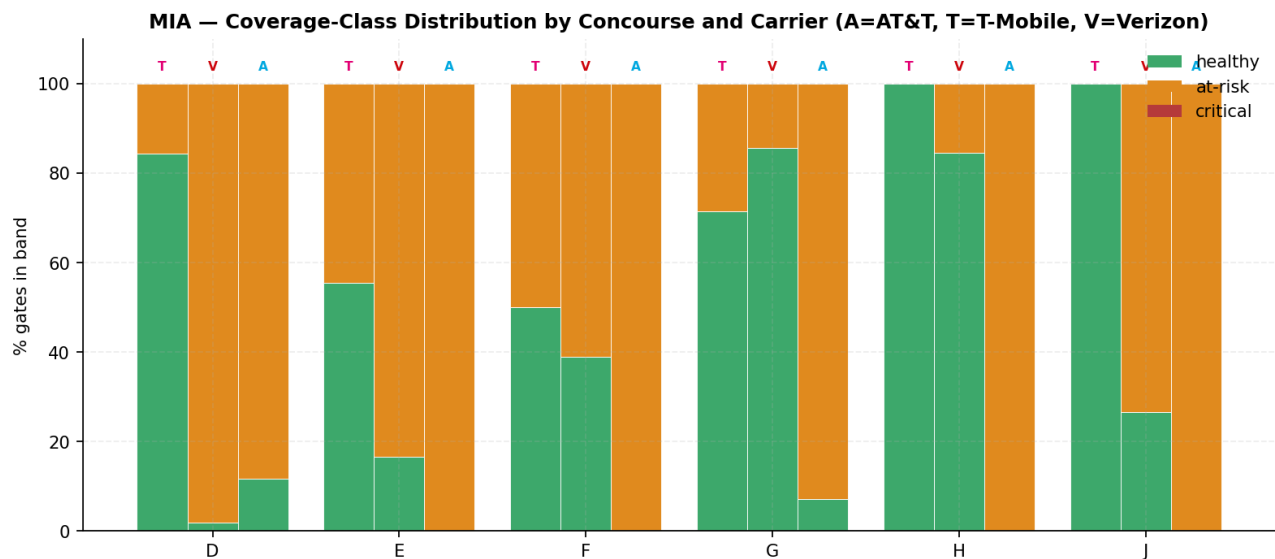


FIG. 9 — Coverage-class distribution by concourse and carrier (T=T-Mobile, V=Verizon, A=AT&T). · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

Even in the strongest concourses the bars remain dominated by the at-risk band for AT&T and Verizon; T-Mobile achieves majority-healthy distributions only in D, E, and J. No concourse has a gate in the critical band on any carrier — the single most reassuring fact in the report: there is no zone at MIA where 5G service is structurally lost.

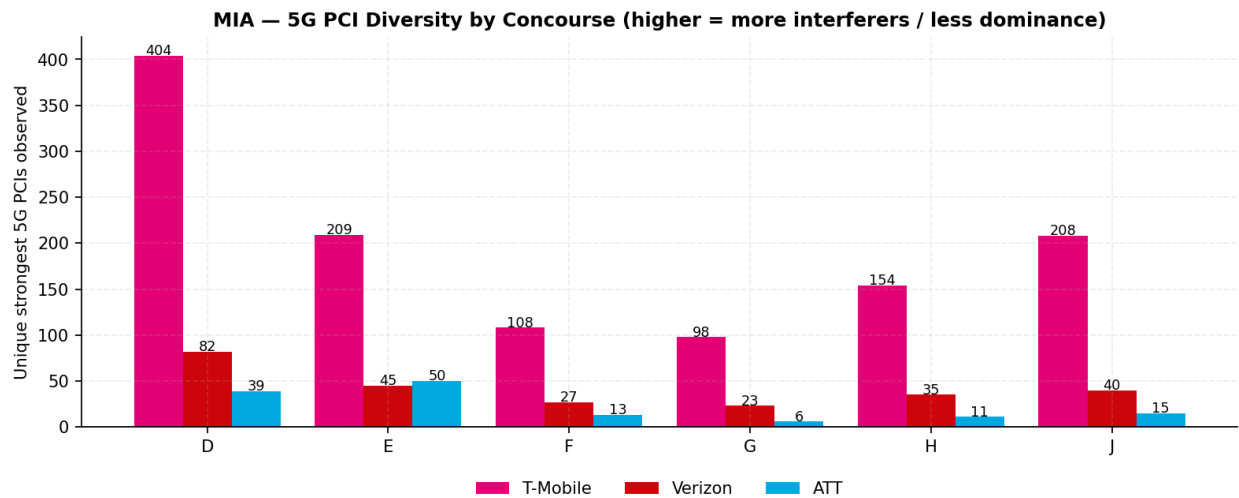


FIG. 10 — Unique strongest-serving PCIs per concourse per carrier. Reads in both directions — always paired with SINR (\$16). · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

For T-Mobile, higher PCI counts in D and E correlate with the SINR and volatility weakness seen earlier. For AT&T, low indoor PCI counts are consistent with donor isolation — few cells reach inside at all.

4.3 Cross-Carrier Concordance — Building Problem or Carrier Problem

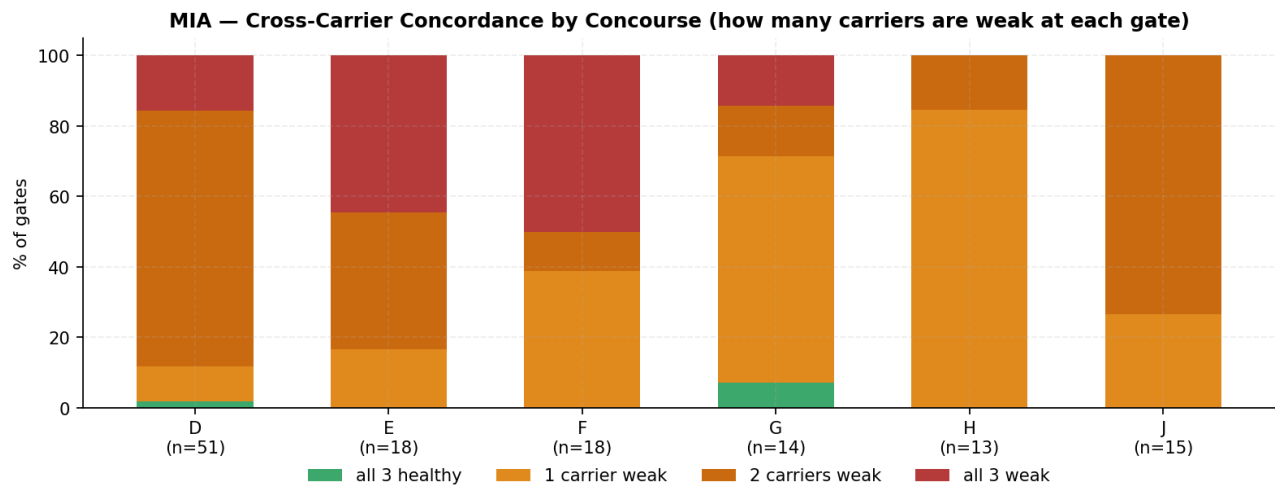


FIG. 11 — Per concourse: how many of the three carriers are below the healthy line at each gate. · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

This is the split that decides who pays. A gate weak for all three carriers is a building, geometry, or propagation problem — the neutral-host system's job. A gate weak for exactly one carrier is that carrier's path problem. The concordance view shows both patterns at MIA: Concourse F fails broadly across carriers (a propagation problem), while Concourse J's weakness is concentrated in AT&T (a carrier-path problem). Ookla's native Poor Multi-Network Coverage indoor layer ranks exactly this natively and is queued in \$15.

4.4 Concourse D — American Airlines Hub

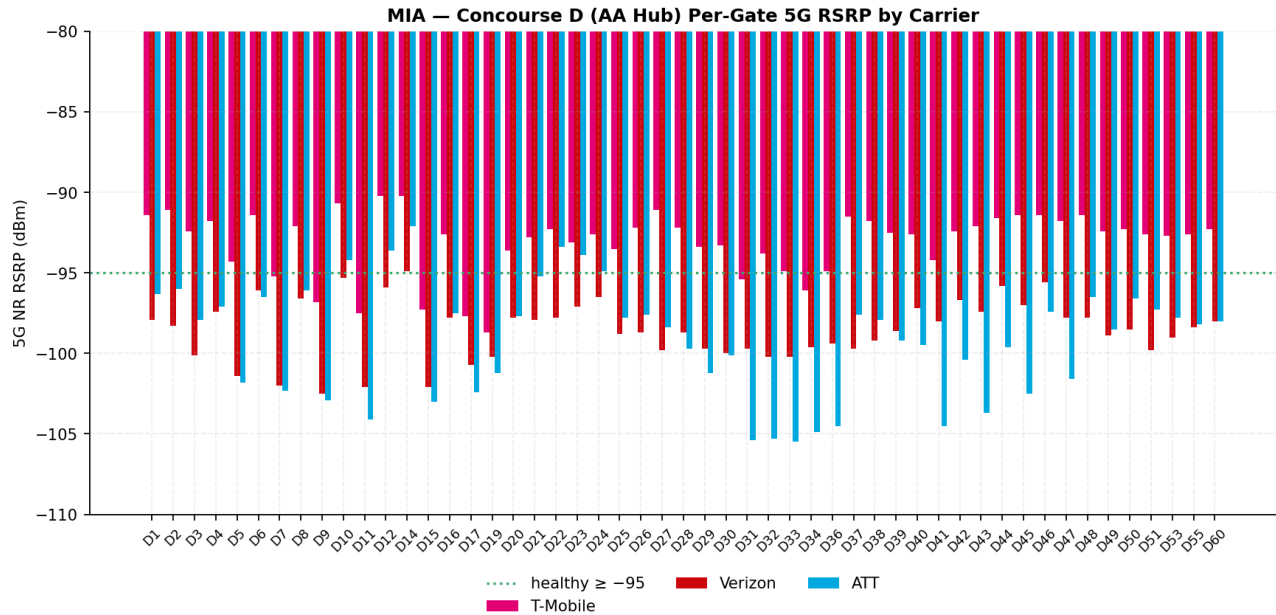


FIG. 12 — Per-gate 5G RSRP across all 51 Concourse D gates. · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

Concourse D contains 51 of the 129 gates measured — the dominant single-airline (AA) cluster in the venue. T-Mobile carries the concourse as best-serving 5G at every D gate. AT&T is at-risk at every D gate. Verizon is the carrier-specific anomaly: clean quality elsewhere, weakest NR coverage here. Any future neutral-host design needs to specifically validate Verizon NR in D as an acceptance criterion (§14).

4.5 International Concourses (E, F, H, J)

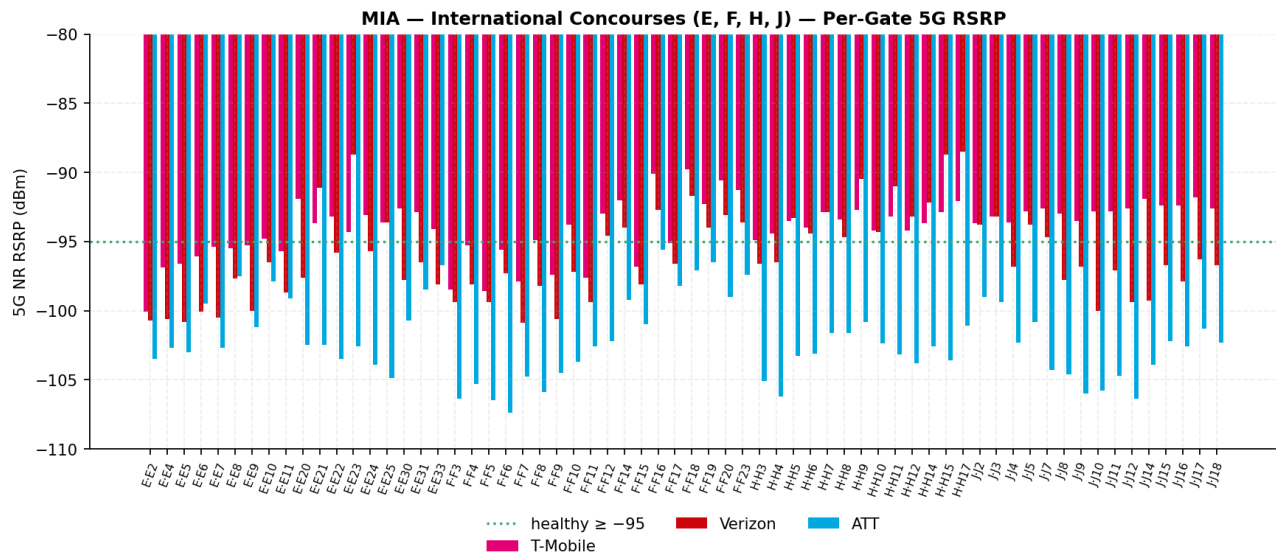


FIG. 13 — Per-gate 5G RSRP across the four international-traffic concourses. · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

Each international concourse has a different profile. Concourse E has the highest overall healthy share but the lowest Wi-Fi presence, making cellular the dominant lever there. Concourse F is the universally

weakest small concourse — 0% / 50% / 39% of its 18 gates healthy on AT&T / T-Mobile / Verizon — and its cross-carrier failure pattern (\$4.3) marks it as a propagation problem, not a carrier problem. Concourse H is the one zone where Verizon wins best-serving 5G. Concourse J shows zero healthy AT&T gates — the weakest single-carrier-by-concourse cell in the venue.

5. Tenant Level

5.1 Category Signal Strength and Quality

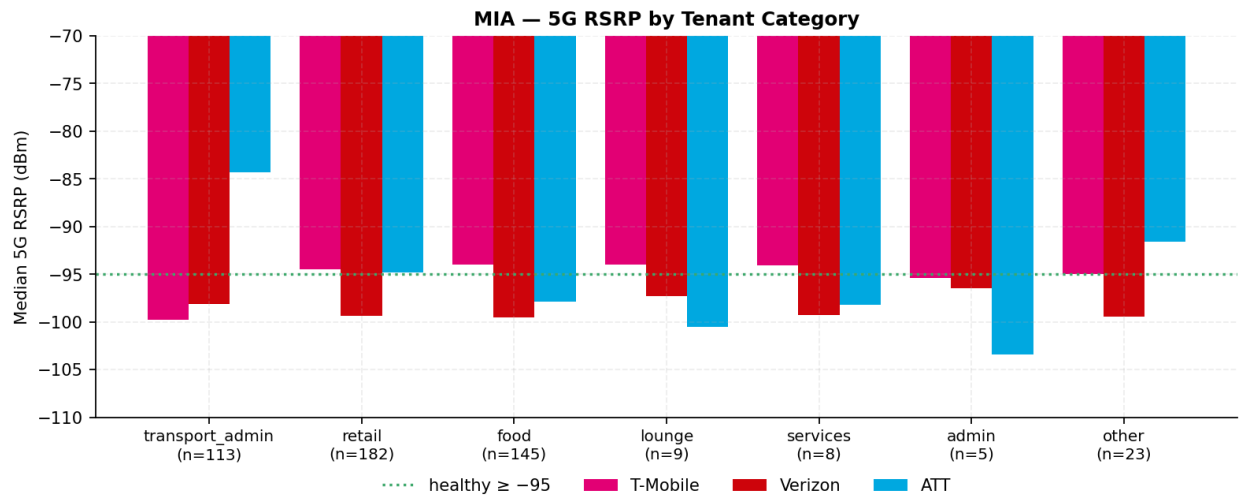


FIG. 14 — Median 5G RSRP by tenant category. · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

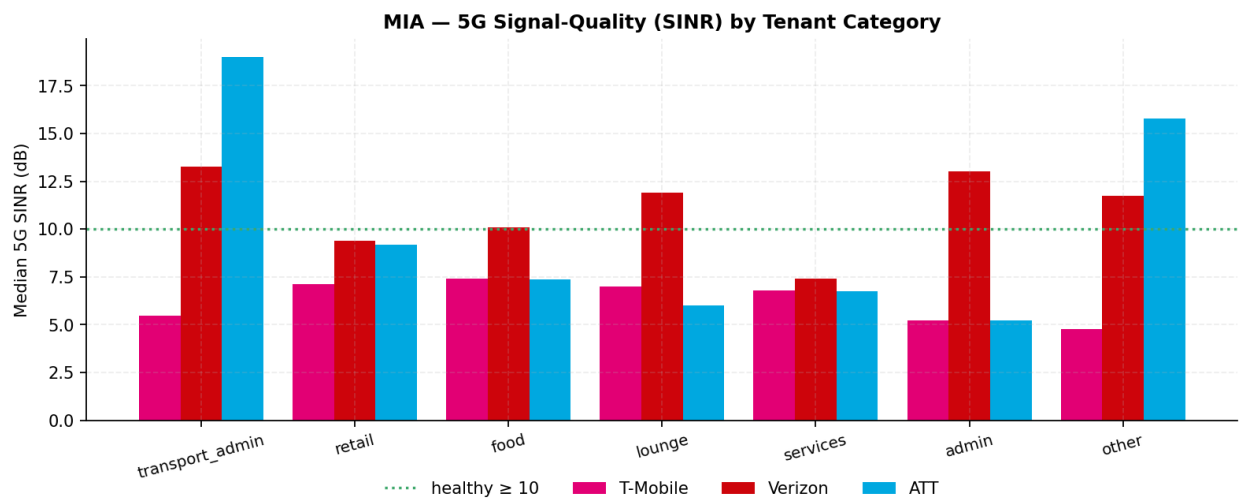


FIG. 15 — Median 5G SINR by tenant category. · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

Read together, the pattern across tenant categories: T-Mobile leads signal strength indoors, Verizon leads signal quality, AT&T leads only outdoors — three carriers, three network strategies. Read this as a pattern, not a per-category ranking: several individual category bins run below the $n \geq 30$ floor per carrier (admin $n=5$, services $n=8$, lodging $n=9$ tenants total), and per-row n is published in Appendix A and the summary tables.

5.2 Indoor vs Outdoor — the Donor-Isolation Diagnostic (proxy)

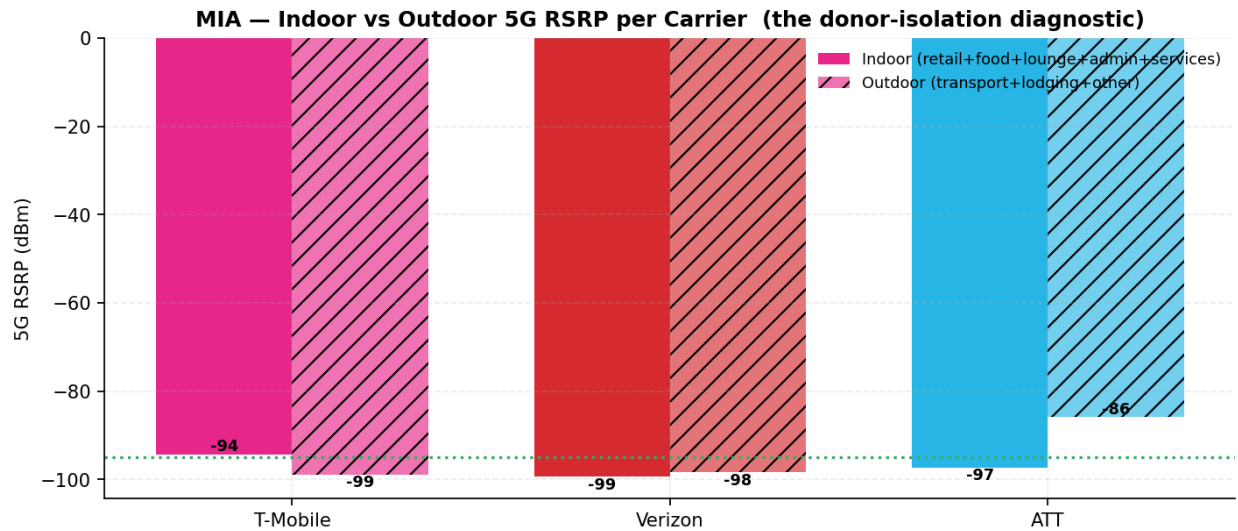


FIG. 16 — Per-carrier median RSRP, indoor tenant categories vs outdoor categories. PROXY: category-based masking, not Ookla's native building-polygon indoor mask (queued in §15). · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

AT&T's indoor/outdoor delta — the report's donor-isolation diagnostic — is +11.4 dB (outdoor -85.9 dBm, n=89 → indoor -97.3 dBm, n=268), the macro-spillover signature, published on adequate samples in both buckets.

Sample-floor disclosure: T-Mobile and Verizon have only n=16 outdoor tenant aggregates each — below this report's $n \geq 30$ floor — because AT&T dominates the outdoor/landside tenant sample (n=89). Their deltas are therefore shown as indicative only, not ranked: T-Mobile -4.5 dB (indoor STRONGER than outdoor — directionally consistent with its attested DAS), Verizon +1.0 dB (near flat). No cross-carrier 'largest delta' ranking is published on this basis; AT&T's absolute drop stands on its own n. The native indoor building-polygon mask (§15) resolves the asymmetry at the next refresh.

Method note: "indoor" and "outdoor" here are tenant-category proxies (retail/food/lounge/admin/services vs transport_admin/lodging/other). Ookla's native indoor/outdoor building-polygon mask (portal §2.2.5) is the measurement-grade replacement and is the top item in §15 — this is currently the strongest claim in the report resting on the weakest method, and it should be upgraded before the next issue.

5.3 Airline Gate Clusters

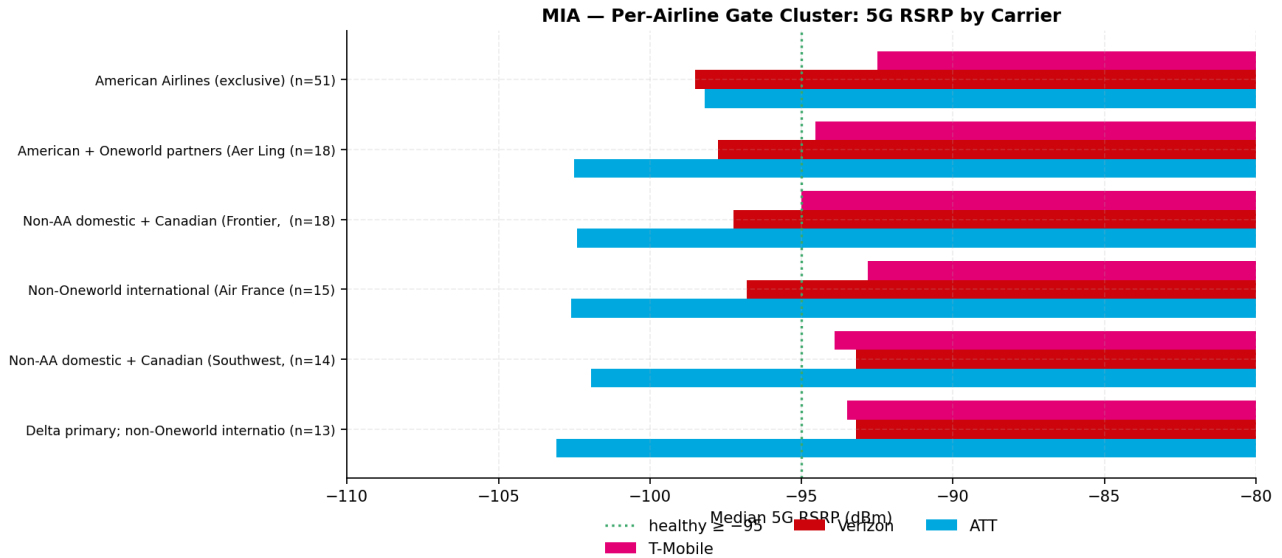


FIG. 17 — Top tenant operators by gate count, with per-carrier median RSRP at each operator's gates (n = gates per cluster shown on axis). · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

American Airlines (the dominant operator) sees the cleanest T-Mobile coverage. Delta-anchored gates in Concourse H show the clearest Verizon advantage. International-mixed gates in H and J inherit the worst AT&T values. For an airline, today's device performance at its gates is a function of concourse more than airline.

5.4 Retail and F&B Brand Coverage

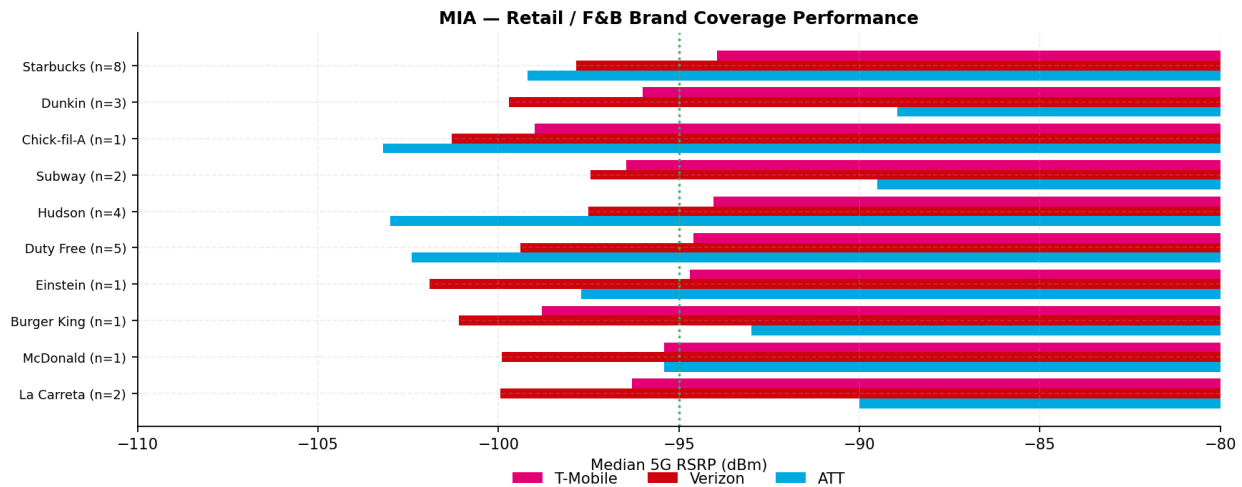


FIG. 18 — Per-brand median 5G RSRP across major multi-location brands. Small per-brand n — treat as consistency check, not ranking (\$16). · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

Multi-location brands serve as a natural cross-zone consistency check: coffee and quick-service brands cluster around carrier medians matching the venue-wide pattern. The takeaway is operational: this is the resolution at which a defensible per-store conversation with operations teams can start — not a league table.

5.5 Airline Lounges

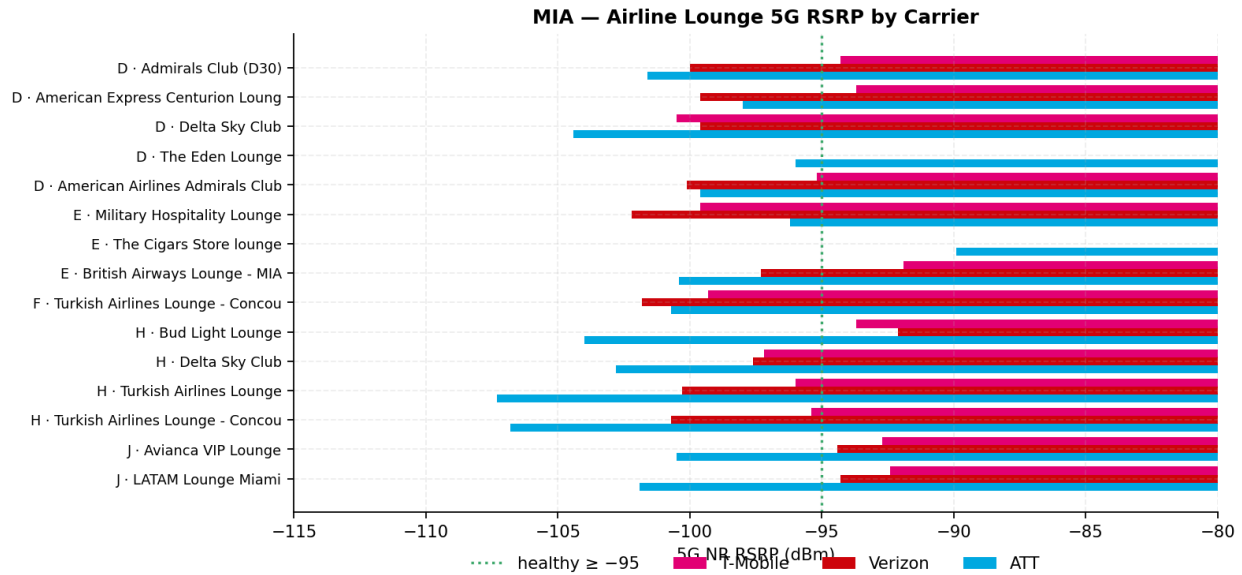


FIG. 19 — Per-lounge median 5G RSRP per carrier. · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

16 named airline and premium lounges have measurable data. Best-serving 5G: T-Mobile at 10, Verizon at 2, AT&T at 3 (n = 15 lounges with all-carrier data; single-point aggregates — see Appendix C for n per lounge). The Turkish Airlines lounges in Concourse H sit at the lowest AT&T values measured in the venue; the Latin-America hub lounges on Concourse J cluster at the weak end of AT&T's range.

6. Load and Usage Intensity

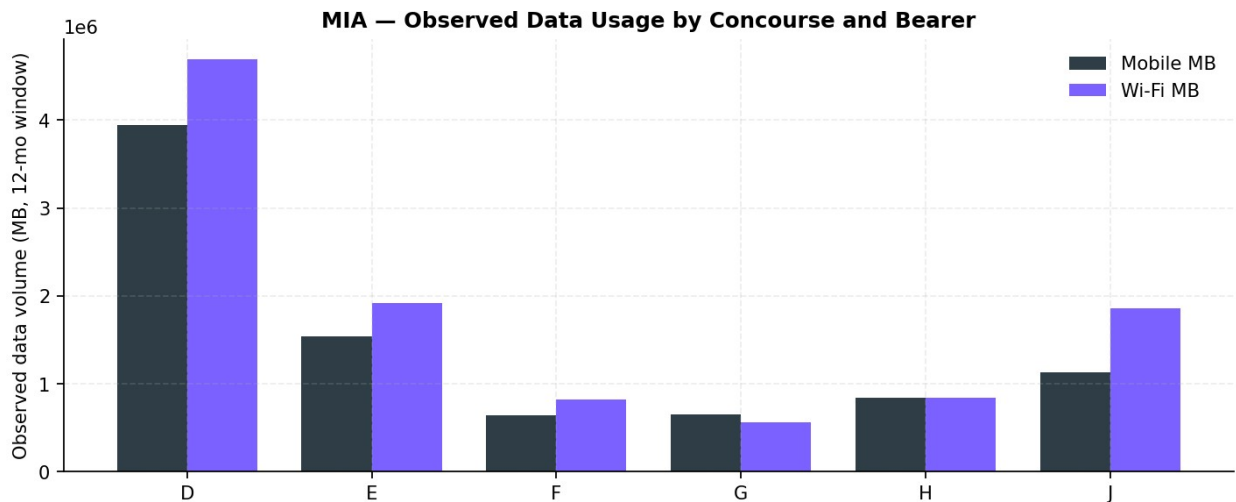


FIG. 20 — Observed data volume by concourse and bearer (MB over the 12-month window). · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

Usage volume is the demand signal this export carries: where bandwidth is actually consumed, by bearer, by zone. It ties the RF story to concession and dwell reality — the concourses with the largest observed volumes are where weak signal exposes the most passenger-hours.

What this export does NOT carry: Ookla's User Density layer — the count of unique Android devices per bin over the measurement interval (deduplicated; NOT concurrent users, NOT dwell time). That layer is the dataset's only true capacity signal, exists natively at bin and building level in the portal, and is absent from this pull. It is a \$15 next layer; until it is pulled, this report makes no device-count or density claim. The rev-1 platform roadmap listed peak-hour load as requiring DAS counters — the density layer delivers a first version from Ookla alone.

7. Wi-Fi as an Augmentation Layer

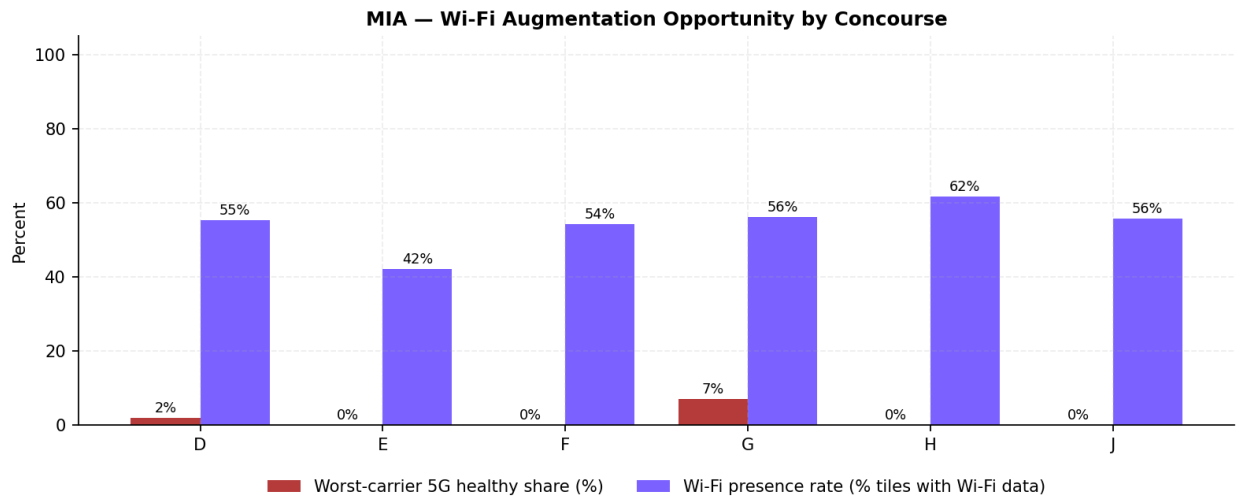


FIG. 21 — Worst-carrier 5G healthy share vs Wi-Fi presence rate by concourse. · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

Wi-Fi usage is observed at 56% of measured tiles — locked basis, one convention across all MIA artifacts: the export's 80,783 rows deduplicate to 54,654 unique tile centroids, of which 44,106 report the Wi-Fi field (81%); among those reporting tiles, 56% show Wi-Fi usage above zero from any carrier panel. Non-reporting tiles are excluded from the denominator (absence of a reading is absence of measurement, not evidence of no Wi-Fi). Historical note: rev 1 quoted ~53% on a venue-clipped row basis whose clip polygon is not retained (finding L1) — superseded by this reproducible basis. Concourse-level presence varies independently of cellular performance; the augmentation opportunity is largest where cellular is weakest on the worst-served carrier and Wi-Fi presence is high — Concourses F, H, and J.

7.1 Offload Share (venue and zone level only)

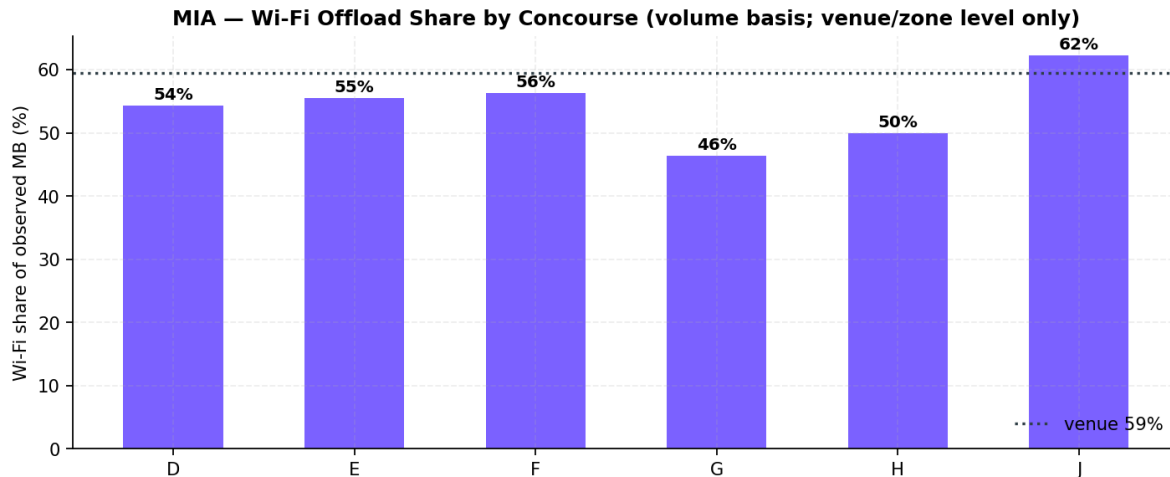


FIG. 22 — Wi-Fi share of observed data volume by concourse; venue reference line. · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

Venue-wide, 59% of observed data volume moves over Wi-Fi ($\sum \text{Wi-Fi MB} \div \sum \text{all MB}$, summed across the three carrier sampling panels — usage fields are panel-scoped, so this is a sample-weighted blend, stated as such). Locked rule (§16): offload is computed at venue and zone level ONLY. The export observes Wi-Fi and cellular volume per tile but does not attribute Wi-Fi usage to any cellular carrier's subscribers — per-carrier offload is not derivable from this dataset at any aggregation and is never implied in this report. The venue figure includes airport Wi-Fi and any other Wi-Fi observed in-venue; it cannot separate airport-run Wi-Fi from tenant or personal networks.

Scope decomposition (a reader summing the concourse rows will find this, so it is stated): the concourse rows cover tiles within 500 m of a concourse gate/tenant point and blend to 55.0% offload; the remaining export tiles — landside, periphery, and hotel-district areas inside the export footprint — run 75.8% Wi-Fi, which pulls the export-wide figure up to 59.5%. Landside Wi-Fi dominance is itself a finding: away from the gates, roughly three of every four observed megabytes move over Wi-Fi.

7.2 Tenant-Level Wi-Fi Footprint

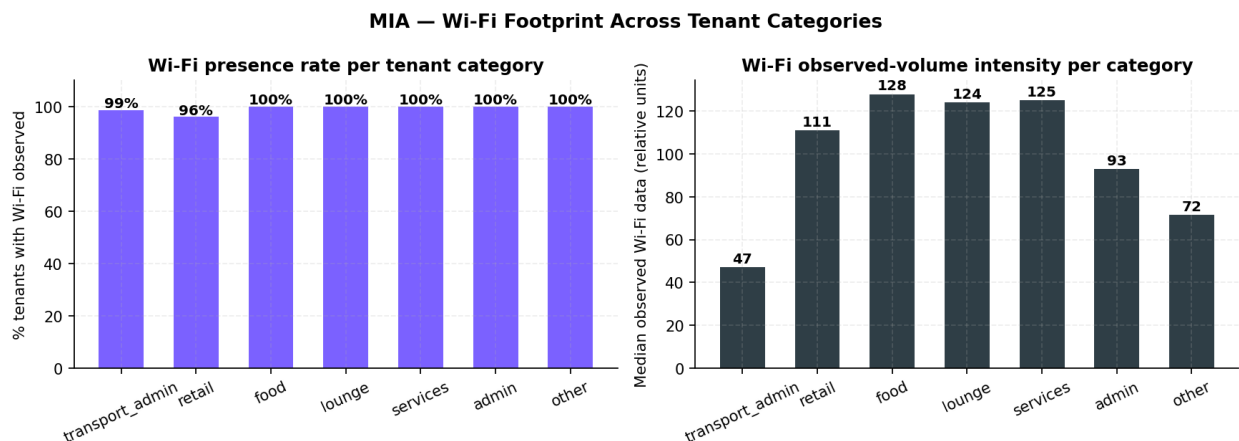


FIG. 23 — Wi-Fi observation rate and intensity across tenant categories. · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-

Wi-Fi data is observed at 96–100% of every tenant category measured, with observed volume highest at food and lounge locations — where passengers dwell and use bandwidth. The airport-owned, Boingo-managed, Passpoint-enabled network reaches the tenants that matter most for passenger experience.

7.3 Lounges — Cellular vs Wi-Fi

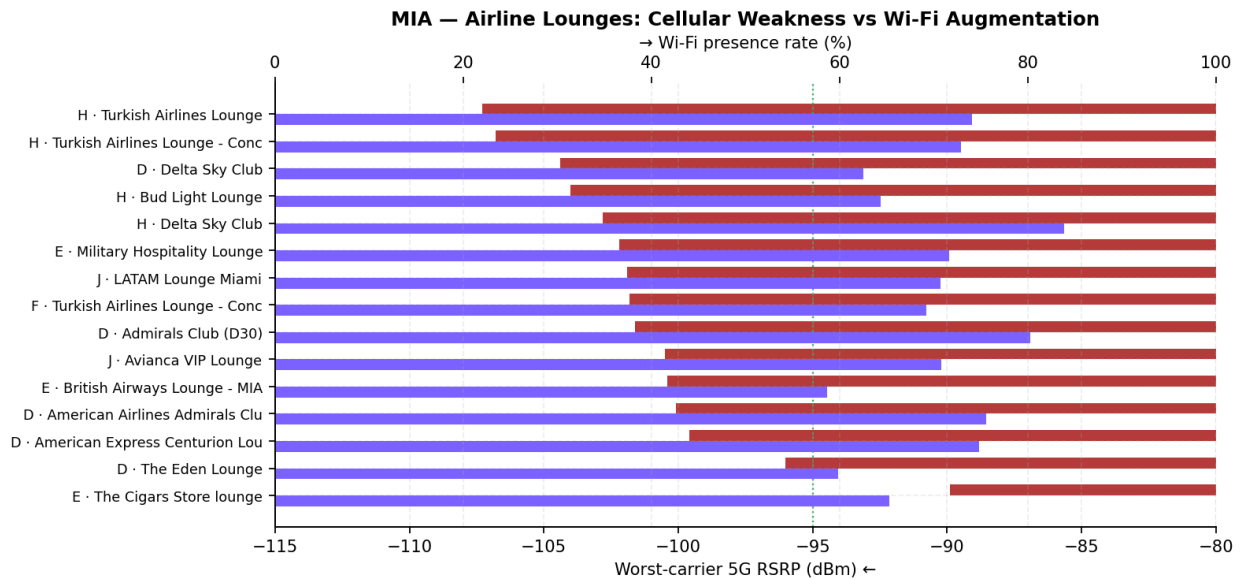


FIG. 24 — Per-lounge worst-carrier 5G RSRP against Wi-Fi presence rate. · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

Lounge	Worst-carrier 5G RSRP	Wi-Fi presence rate
H • Turkish Airlines Lounge	-107 dBm	74%
H • Turkish Airlines Lounge - Conc	-107 dBm	73%
D • Delta Sky Club	-104 dBm	62%
H • Bud Light Lounge	-104 dBm	64%
H • Delta Sky Club	-103 dBm	84%
E • Military Hospitality Lounge	-102 dBm	72%
J • LATAM Lounge Miami	-102 dBm	71%
F • Turkish Airlines Lounge - Conc	-102 dBm	69%
D • Admirals Club (D30)	-102 dBm	80%
J • Avianca VIP Lounge	-100 dBm	71%
E • British Airways Lounge - MIA	-100 dBm	59%
D • American Airlines Admirals Clu	-100 dBm	76%
D • American Express Centurion Lou	-100 dBm	75%
D • The Eden Lounge	-96 dBm	60%
E • The Cigars Store lounge	-90 dBm	65%

Every lounge measured shows Wi-Fi observed in a majority of nearby tiles. Where worst-carrier RSRP is lowest (the Turkish lounges in H), Wi-Fi presence above 70% is likely what keeps the room usable today for subscribers on the under-performing carrier. The practical point for executives: MIA's cellular profile is partially masked at the experience layer by an effective Wi-Fi network — an operational positive to sustain, not a reason to under-invest in cellular.

8. Private Wireless

The airport graph attests an active Private 5G deployment at MIA delivered jointly by FutureTech and Black Box (the same Black Box that manages the T-Mobile DAS) — KG record, cited-not-held. Coverage

area, technology generation, and use cases are not specified in the registry, and the public Ookla layer does not characterize private networks. What follows is coverage of the record, not a measurement.

The open MDAD DAS scope explicitly includes CBRS private-network technologies. The new neutral-host system and any expanded FutureTech / Black Box scope must be reconciled in design — subsume, expand, or deliberately separate with documented boundaries. The first analytical task is attestation: which spectrum, which zones, which use cases the existing footprint serves today.

Workload	Why a PWN fits	Coordination required
Baggage handling system (BHS) instrumentation	Deterministic latency, contained RF, isolation from passenger traffic	Facilities, BHS vendor
Ramp and ground-service vehicle telematics	Outdoor airside coverage with controlled SIM provisioning	Airside Operations
Push-to-talk and operational voice	QoS-guaranteed voice independent of public carriers	Public Safety, ground handlers
Fixed cameras and IoT in non-public areas	Bandwidth without consuming public-carrier capacity	Facilities Maintenance
Robotics / autonomous equipment in MRO & cargo	SLA-bound coverage with controlled spectrum	Cargo / MRO tenants
MIA Mover telemetry and CCTV	Stable connectivity along guideway	People-mover operator, Transit Maintenance
FIS and CBP secondary inspection devices	Isolated network for federal device workflows	CBP IT, MDAD

9. Spectrum and Service Availability

9.1 Band Distribution

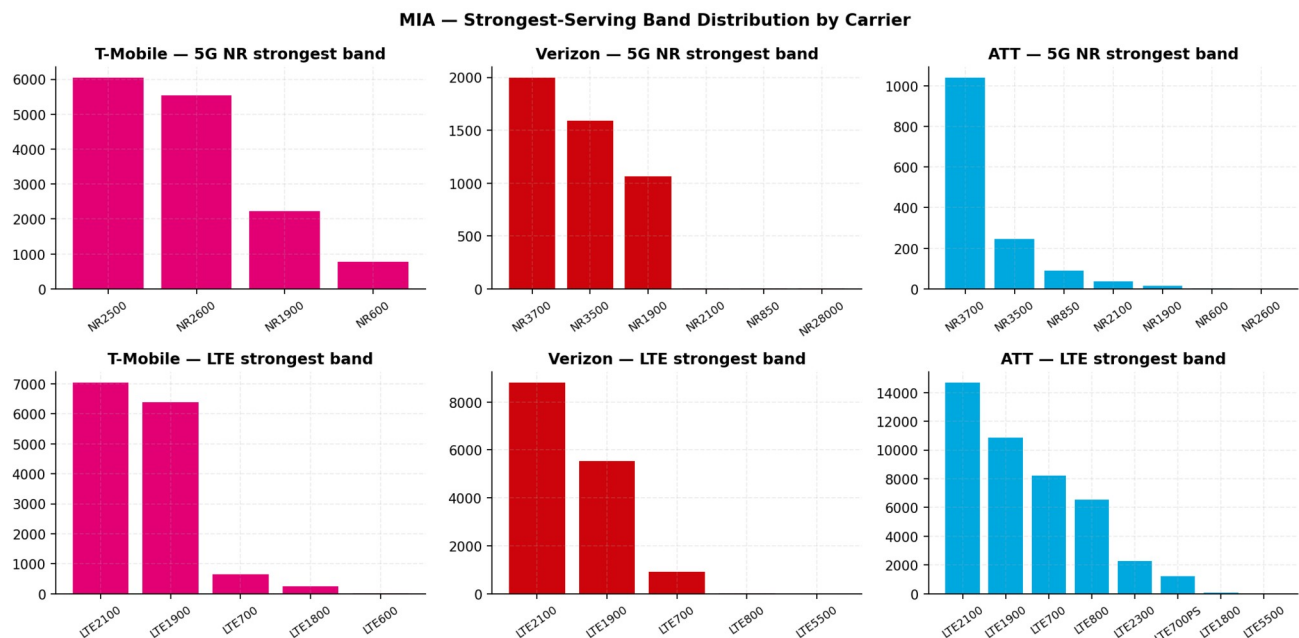


FIG. 25 — Strongest-serving band distribution per carrier, 5G NR and LTE (n = tile counts in tables). · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

The bands a tile attaches to most often reveal which spectrum each carrier actually puts to work inside the building. Reliance on sub-1 GHz (LTE700/850, n5, n71) implies coverage-grade attachment; reliance on mid-band implies a dedicated indoor source or unusually strong mid-band penetration.

T-Mobile US:

NR band	Tiles (n)	LTE band	Tiles (n)
NR2500	6048	LTE2100	7045
NR2600	5539	LTE1900	6386
NR1900	2219	LTE700	653
NR600	776	LTE1800	240

Verizon Wireless:

NR band	Tiles (n)	LTE band	Tiles (n)
NR3700	1998	LTE2100	8815
NR3500	1592	LTE1900	5532
NR1900	1063	LTE700	920
NR2100	3	LTE800	10
NR850	3	LTE5500	2

AT&T:

NR band	Tiles (n)	LTE band	Tiles (n)
NR3700	1040	LTE2100	14700
NR3500	247	LTE1900	10870
NR850	90	LTE700	8226
NR2100	37	LTE800	6541
NR1900	16	LTE2300	2284
NR600	3	LTE700PS	1199

9.2 Service Availability

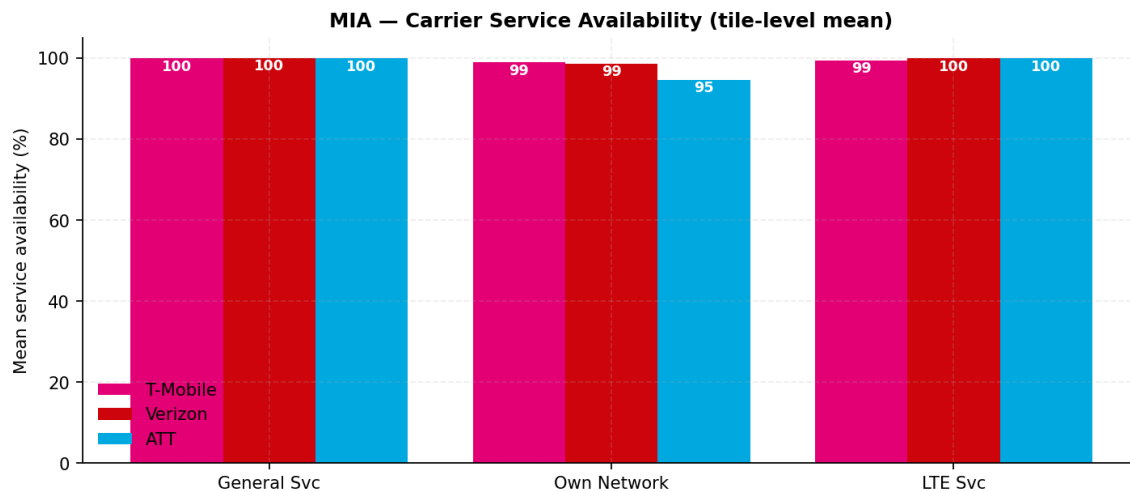


FIG. 26 — Service availability — General, Own Network, General LTE — mean across tiles REPORTING the field (basis note in text).
Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

On the tiles that report the field, all three carriers show effectively-universal LTE service availability: in the most graceful-degradation case a passenger always has LTE. Basis disclosure: availability fields are not populated on every tile (AT&T reports General-LTE service on roughly 73% of its tiles), and the mean is taken over reporting tiles only — an absent reading is absence of measurement, not evidence of no service, and the two must not be conflated in either direction. This sits here, not at the front, because near-universality on the measured basis makes it reassurance rather than diagnosis.

10. Carrier-Asymmetry Atlas

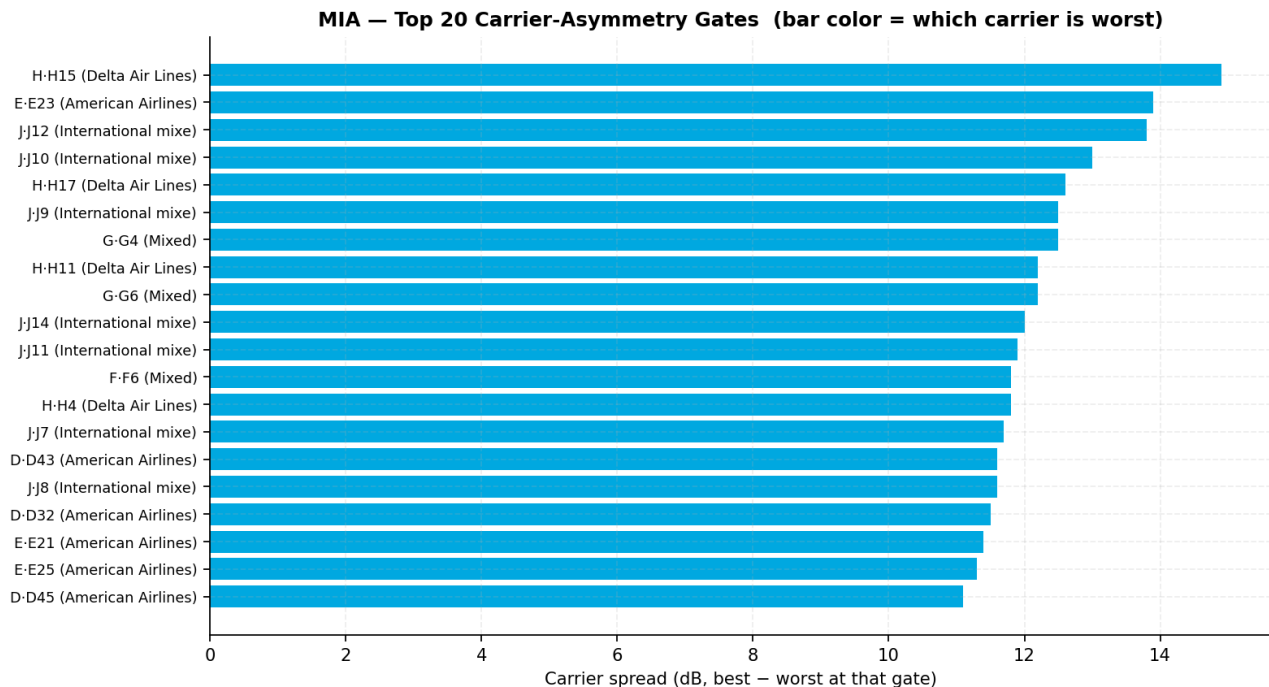


FIG. 27 — Top 20 gates by best-minus-worst carrier 5G RSRP spread; bar color = worst carrier at that gate. · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

These 20 gates are where a passenger's experience varies most by carrier (spreads of 11–15 dB). They serve two purposes: worst-case examples for the stakeholder narrative, and the proposed validation-point list for post-cutover acceptance testing (§14). A neutral-host design should compress this spread; that compression is the cleanest measurable success criterion available.

11. Federal and Operational-Critical Tenants

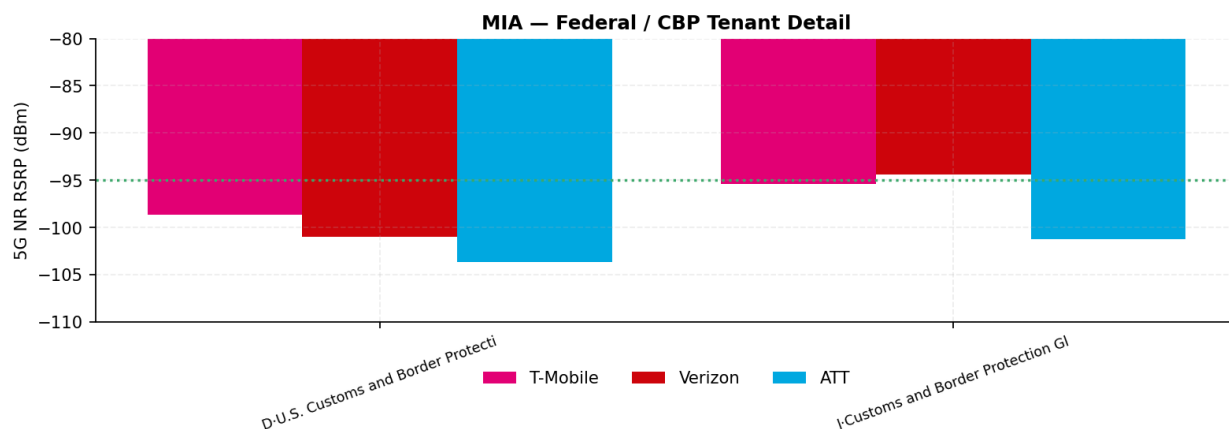


FIG. 28 — Per-carrier 5G RSRP at federal / CBP tenant locations (n = 4 named locations — small footprint, reported for scope, not ranked). · Source: Ookla Cell Analytics tile export, 2025-04-01 → 2026-03-31

MIA's federal-tenant footprint in the public dataset is small: the two CBP locations identifiable by tenant name plus two adjacent Virginia Gardens police entries. The main FIS hall in Concourse D reads T-Mobile US -98.7 dBm (at-risk); Verizon Wireless -101.0 dBm (at-risk); AT&T -103.7 dBm (at-risk) — at-

risk on all three carriers. The Global Entry Enrollment Center in Concourse J reads T-Mobile US -95.4 dBm (at-risk); Verizon Wireless -94.4 dBm (healthy); AT&T -101.3 dBm (at-risk) — at-risk on AT&T and T-Mobile, with Verizon at the healthy line. (This corrects rev 1, which stated both CBP zones were at-risk on all three carriers; audit finding F1.) The police entries are outdoor/landside and sit in AT&T's outdoor-strong profile. For engagement with federal stakeholders, the CBP zones are where the measurement-grounded conversation begins.

12. Passenger-Impact Translation

Carrier	Gates below healthy 5G	Share of gates	Illustrative annual passengers at those gates*
T-Mobile US	29 of 129	22%	≈ 5.4M
Verizon Wireless	91 of 129	71%	≈ 16.9M
AT&T	122 of 129	95%	≈ 22.7M

*Translation method, stated plainly: MIA handled 23.95M passengers (das_master_feb2026 — KG record, cited-not-held). Per-gate passenger volumes are NOT held, so the last column distributes annual passengers uniformly across measured gates as an explicit proxy. It is an order-of-magnitude translation from RF to people, not a measurement; a gate-level enplanement feed (\$15) would replace it. Even at proxy precision the point stands: on the weakest carrier, most passengers board at a gate where their 5G signal is below the healthy threshold — and the neutral-host award is the instrument that changes that sentence.

13. Prioritised Recommendations

Numbered, ordered by leverage, each with an owner. (Rev 1 buried these inside observation prose; the extraction is now the section.)

#	Recommendation	Owner
1	Proceed with the neutral-host DAS award naming AT&T, T-Mobile, and Verizon as hosted carriers; AT&T's absent in-building path is the largest single addressable gap (\$3.3), concentrated in Concourses H and J.	MDAD (procurement)
2	Before award: locate, attest, and document the apparent independent Verizon in-building path (\$3.2); specify in bidder requirements how its coverage is absorbed. Decommissioning it unexamined is the largest transition risk in the record.	MDAD + Verizon
3	Write §14's acceptance criteria into the RFP: asymmetry-spread compression at the named gates, Verizon NR validation in Concourse D, and the no-critical-gates floor.	MDAD (RFP author)
4	Commission a dedicated propagation review of Concourse F — it fails across all carriers (\$4.3), which prices as a building problem, not a carrier problem.	MDAD Facilities + DAS awardee
5	Obtain the T-Mobile DAS PCI/neighbor plan and re-tuning history; decide replace-vs-refresh with sector-load data rather than assumption (\$3.1, \$3.6).	T-Mobile + Black Box
6	Treat Wi-Fi as a coexisting capacity layer in the new design (venue offload is	MDAD + Boingo

	material, \$7.1); obtain Boingo controller telemetry to size it.	
7	Reconcile the FutureTech / Black Box private-5G footprint against the CBRS scope in the new RFP; first step is attestation of spectrum, zones, and workloads (\$8).	MDAD + FutureTech/Black Box
8	Pull the \$15 next layers before the next issue — indoor building-polygon mask, User Density, date-range comparison — each upgrades a named claim in this report from proxy to measurement.	Imagine Wireless

14. Acceptance Criteria and Re-Measurement Plan

The page an airport can paste into an RFP: threshold, zone, carrier, and re-test timing for the post-cutover system. Thresholds are the locked ladder (\$16); validation points are the measured worst cases from \$10.

Zone / point	Carrier	Criterion (threshold)	Re-test
All measured gates	Every hosted carrier	5G SS-RSRP median ≥ -95 dBm per gate	90 days post-cutover, then quarterly
All measured gates	Every hosted carrier	No gate below -110 dBm (hold the current floor)	90 days post-cutover
Concourse D (AA hub)	Verizon	Healthy NR at $\geq 90\%$ of D gates (today: carrier-specific weakness, \$4.4)	90 days post-cutover
Concourse F	All three	Cross-carrier concordance: zero gates weak-for-all-3 (today's propagation failure, \$4.3)	Post propagation-fix re-survey
Concourse J	AT&T	From zero healthy gates to parity with venue median	90 days post-cutover
Gate H-H15	worst today: AT&T	Best-minus-worst carrier spread ≤ 10 dB (today 15 dB)	90 days post-cutover
Gate E-E23	worst today: AT&T	Best-minus-worst carrier spread ≤ 10 dB (today 14 dB)	90 days post-cutover
Gate J-J12	worst today: AT&T	Best-minus-worst carrier spread ≤ 10 dB (today 14 dB)	90 days post-cutover
Gate J-J10	worst today: AT&T	Best-minus-worst carrier spread ≤ 10 dB (today 13 dB)	90 days post-cutover
Gate H-H17	worst today: AT&T	Best-minus-worst carrier spread ≤ 10 dB (today 13 dB)	90 days post-cutover

Re-measurement uses the same instrument as this baseline (Ookla Cell Analytics, identical window length and thresholds) so before/after is like-for-like. Ookla's native date-range comparison (portal \$2.2.4) renders the delta directly once a post-cutover window exists.

15. Next Layers to Add

Layer	What it would resolve	Source
Indoor building-polygon mask (portal \$2.2.5)	Replaces the tenant-category indoor/outdoor proxy behind the donor-isolation diagnostic — the report's strongest claim on its weakest method	Ookla portal pull
User Density (bins \$3.11 / buildings \$3.9)	The dataset's only capacity signal: unique devices per bin, deduplicated. Enables density-weighted weak-share ranking (\$6)	Ookla portal pull
Date-range comparison (\$2.2.4)	Native before/after for the DAS cutover; converts this snapshot into a trend	Ookla portal pull

Poor Multi-Network Coverage (§3.9)	Vendor-ranked building-vs-carrier problem split; corroborates §4.3	Ookla portal pull
LTE Optimization Priority (§3.8)	Vendor's own index for the strong-RSRP/poor-SNR pathology argued in §3.1	Ookla portal pull
Cell Sites layer (§3.10)	eNodeB/gNodeB locations feeding the terminal — turns macro spillover from inference into a map	Ookla portal pull
3D Z-axis view (§2.2.10)	15 m vertical bands; the export is flat but the portal is not	Ookla portal pull
Imported Points sample counts (§4.3)	True per-point sample n for every gate/tenant table (today's n = tile counts)	Ookla portal pull
Per-gate enplanements	Replaces §12's uniform-distribution proxy with measured passenger exposure	MDAD / airline schedules
DAS PCI / neighbor-list audit	Explains the T-Mobile RSRP/SINR/volatility gap	DAS operator + Black Box
Wi-Fi controller telemetry	Airtime, retries, BSS overlap, client density — converts presence into capacity	Boingo + MDAD
Private 5G attestation + telemetry	Characterize the FutureTech / Black Box footprint	FutureTech / Black Box / MDAD
Verizon in-building attestation	Confirm and locate the apparent independent path	Verizon
Public-safety (NFPA 1221) coverage	ERRCS / BDA posture	AHJ, public-safety integrator
Carrier-side PCI / neighbor lists	Makes §14 fully measurable	Each hosted carrier
Walk-test: jet bridges, people-mover, BHS corridors	Zones crowdsource cannot reach	Scanner survey

16. Method, Thresholds, Confidence, and Caveats

Measurement source: Ookla Cell Analytics tile-aggregated dataset for MIA, twelve-month window 2025-04-01 through 2026-03-31. Measurement freshness at issue date is 136 days, which EXCEEDS the platform's 90-day default freshness policy — this issue is a standards-conformance revision of the 2026-05-26 report on the same data window, not a data refresh; a refreshed window is the natural next issue. Bin geometry: Ookla tiles are approximately 10×10 m, produced by coordinate rounding and elongating away from the equator (Ookla help §2.1.2). Join: tiles to gate/tenant points within a 50 m proximity radius (80 m for the lounge Wi-Fi table); gate and tenant points from OpenStreetMap and Google Places (points only — no polygons, no Z-axis in the export; the portal's 3D view is a next layer, §15). Central tendency: median for every headline figure; means appear only where labeled (service availability). Carrier mapping: ATT → AT&T US, T-Mobile → T-Mobile US, Verizon → Verizon Wireless. Carrier ordering throughout: strongest indoor first.

Threshold ladder (locked, one ladder everywhere): 5G NR SS-RSRP and LTE RSRP — healthy ≥ -95 dBm, at-risk -95 to -110, critical < -110. 5G SS-SINR — healthy ≥ 10 dB, at-risk 0–10, critical < 0. RSRQ — healthy ≥ -10 dB. A venue-specified threshold would override and be named here; none was provided. Minimum-sample rule: no chart or comparative claim ships on fewer than 30 underlying tiles/points; smaller cells are reported as counts with n visible, never ranked (applied: §11 federal n=4; §5.4 brand bins).

Sample basis and inference limits: crowdsourced background scans from consumer Android handsets (~3% of devices), aggregated per tile over 12 months. Supported inferences: medians, shares, and distributions at venue, concourse, gate-cluster, and tenant-category level with n disclosed. Not supported: per-test speed metrics (throughput, latency, jitter are portal map layers, not in the Imported-Points-style export — restated precisely from rev 1's broader caveat), per-carrier Wi-Fi offload (not

derivable at any aggregation), device counts (User Density layer not pulled), sub-tile positioning, or floor separation from this flat export.

Confidence tagging: facts sourced from the knowledge graph rather than measurement are tagged "(KG record, cited-not-held)" inline — Tier C in the claims ledger; we do not hold the underlying instruments. Measured claims are Tier A and reproduce from the raw exports via the verification bundle; transcribed values are Tier B with capture dates in the provenance manifest.

Denominator discipline: gate-basis and tenant-basis healthy shares can disagree sharply in the same concourse (gate centroids and tenant locations sample different parts of a building; AT&T in E/F/H is the extreme case). Every zone claim in this report names its basis (gates or tenants) and its n, and no claim mixes the two in one sentence; reconciling the two bases requires the walk-test layer (§15).

Caveats: the dataset is gate-area and public-corridor weighted and does not cover jet-bridge interiors, below-grade people-mover, or BHS corridors. PCI diversity, serving-cell volatility, and band distributions are aggregate proxies, not active traces or carrier NMS data. Verizon's apparent independent path is inferred from measurement, consistent with RFP scope language, and unconfirmed by attestation. The FutureTech / Black Box private 5G is attested but uncharacterized in the public layer. Vendor and contract facts in §2 reconcile against das_master_feb2026 and the MDAD draft Scope of Services PDF.

Provenance discipline: every numerical value in this report is computed from the cited source files at build time or carries an inline cited-not-held tag. No value is estimated or invented. Engineering inferences about cause are labeled as inferences where they appear.

Appendix A — Worst 20 Tenants per Carrier (5G NR RSRP, with n)

T-Mobile US

RSRP (dBm)	Conc	Category	Tenant	n (tiles)
-102.6	J	transport_admin	Park 8 Employee Parking	110
-101.7	D	transport_admin	Airport Parking Associates	160
-101.5	J	transport_admin	Park 8	130
-101.0	E	food	Food Truck Pan Con Timba	75
-101.0	D	transport_admin	MIA & Lower Level Ramp	177
-100.8	D	transport_admin	Short Term Parking	180
-100.6	D	transport_admin	Dolphin Parking	175
-100.6	D	admin	Miami International Airport Lost and Found	172
-100.5	D	food	Delta Sky Club	167
-100.5	H	transport_admin	Flamingo Parking Garage	181
-99.6	E	food	Military Hospitality Lounge	179
-99.4	D	food	Subway	179
-99.3	F	food	Turkish Airlines Lounge - Concourse E	177
-99.0	D	food	Chef Creole Seasoned Restaurant	182
-99.0	E	food	Chick-fil-A	172
-99.0	D	transport_admin	Miami Airport	176

			Motorcycle and Bicycle Parking	
-98.9	D	retail	Communitel	180
-98.8	F	food	Burger King	179
-98.7	D	lounge	Miami International Airport Hotel	182
-98.7	D	transport_admin	SP+ Parking	176

Verizon Wireless

RSRP (dBm)	Conc	Category	Tenant	n (tiles)
-102.4	D	transport_admin	Airport Parking Associates	101
-102.2	E	food	Military Hospitality Lounge	162
-102.1	D	retail	Starbucks	158
-101.9	D	retail	Einstein Bros. Bagels	164
-101.8	F	food	Turkish Airlines Lounge - Concourse E	150
-101.6	F	food	Dunkin'	161
-101.4	D	food	Air Margaritaville Miami	170
-101.3	E	food	Chick-fil-A	159
-101.2	D	retail	Newslink	162
-101.1	F	food	Burger King	168
-101.1	D	retail	Miami Inter CF	161
-101.1	D	food	Subway	159
-101.0	D	food	Estefan Kitchen Express	161
-101.0	D	food	KFC	165
-101.0	D	food	Pizza Hut	158
-101.0	D	food	Shula's Bar and Grill	158
-101.0	D	admin	U.S. Customs and Border Protection - Miami Interna	162
-100.9	D	food	305 Pizza	161
-100.9	D	retail	Duty Free Store	172
-100.9	D	food	Nathan's Famous Hot Dogs	164

AT&T

RSRP (dBm)	Conc	Category	Tenant	n (tiles)
-115.0	E	retail	NATURES FLOWERS SATELITE	28
-111.0	E	transport_admin	24th St Parking	11
-109.0	E	food	Double Trading, Inc	37
-107.4	H	retail	Duty Free Americas	176
-107.3	H	lounge	Turkish Airlines Lounge	175
-106.8	H	lounge	Turkish Airlines Lounge - Concourse H	169
-106.7	H	retail	Gilbert's Food Bar	171
-106.3	H	retail	Michael Kors - Miami International Airport	175
-106.3	J	lounge	United Airlines	151
-106.2	H	retail	Victoria's Secret - Miami International Airport	178
-105.8	J	food	McDonald's	167
-105.3	H	retail	Hudson	178
-105.1	D	transport_admin	Airport Parking Associates	143

-105.1	E	retail	Cathay Freight Office	48
-104.5	J	food	Starbucks Coffee Company	171
-104.4	D	food	Delta Sky Club	134
-104.4	D	food	The Counter	167
-104.1	E	food	Starbucks	106
-104.0	H	food	Bud Light Lounge	139
-104.0	J	admin	Copa Airlines - Miami International Airport	170

Appendix B — Strongest-Serving Band Tables per Carrier

T-Mobile US — 5G NR strongest band

Band	Tile count (n)
NR2500	6048
NR2600	5539
NR1900	2219
NR600	776

T-Mobile US — LTE strongest band

Band	Tile count (n)
LTE2100	7045
LTE1900	6386
LTE700	653
LTE1800	240
LTE600	12

Verizon Wireless — 5G NR strongest band

Band	Tile count (n)
NR3700	1998
NR3500	1592
NR1900	1063
NR2100	3
NR850	3
NR28000	3

Verizon Wireless — LTE strongest band

Band	Tile count (n)
LTE2100	8815
LTE1900	5532
LTE700	920
LTE800	10
LTE5500	2

AT&T — 5G NR strongest band

Band	Tile count (n)
NR3700	1040
NR3500	247
NR850	90
NR2100	37
NR1900	16
NR600	3

AT&T — LTE strongest band

Band	Tile count (n)
LTE2100	14700

LTE1900	10870
LTE700	8226
LTE800	6541
LTE2300	2284
LTE700PS	1199

Appendix C — Full Airline Lounge Table

Conc	Lounge	TMO RSRP/SINR	VZ RSRP/SINR	ATT RSRP/SINR	Wi-Fi%	n
D	Admirals Club (D30)	-94/+8	-100/+8	-102/+5	80%	534
D	American Airlines Admirals Club	-95/+5	-100/+8	-100/+5	76%	513
D	American Express Centurion Lounge	-94/+5	-100/+7	-98/+6	75%	526
D	Delta Sky Club	-100/+3	-100/+11	-104/+6	62%	410
D	The Eden Lounge	—	—	-96/+13	60%	124
E	British Airways Lounge - MIA	-92/+9	-97/+11	-100/+6	59%	400
E	Military Hospitality Lounge	-100/+9	-102/+10	-96/+7	72%	500
E	The Cigars Store lounge	—	—	-90/+16	65%	107
F	Turkish Airlines Lounge - Concourse E	-99/+7	-102/+10	-101/+6	69%	484
H	Bud Light Lounge	-94/+5	-92/+17	-104/+5	64%	418
H	Delta Sky Club	-97/+7	-98/+13	-103/+5	84%	513
H	Turkish Airlines Lounge	-96/+5	-100/+11	-107/+4	74%	502
H	Turkish Airlines Lounge - Concourse H	-95/+5	-101/+11	-107/+3	73%	489
J	Avianca VIP Lounge	-93/+8	-94/+14	-100/+8	71%	467
J	LATAM Lounge Miami	-92/+7	-94/+14	-102/+8	71%	507