Town of Queen Creek
2023 Wireless Service Provider Coverage Report

Multi-Carrier RF Benchmark Testing, and Results

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Executive Summary

Town of Queen Creek

Engineering Wireless Services (EWS) has been commissioned to collect and measure the wireless coverage for each carrier across the Town of Queen Creek. EWS completed the drive on October 18, 2023.

Drive testing occurred over a 7-day period covering accessible public roads across the Town of Queen Creek. EWS used wireless industry standard PCTEL scanner and Carrier handsets to collect and measure AT&T, T-Mobile and Verizon network information.

EWS is providing the top channels for each Wireless Service Provider showing general signal measurements along with live calling KPI measurements and plots.

- Outdoor coverage looks to slightly degraded between 2020 and 2023.
- Indoor residential coverage continues to lag behind across multiple master planned communities.

The following report outlines the measured coverage for each Wireless Service Provider.

Observations and Recommendations

Town of Queen Creek

Observations:

- AT&T, T-Mobile and Verizon primarily rely on low-band frequencies for a coverage layer. Lower frequencies, 700 MHz and 850 MHz, provide better propagation for extended coverage outdoors and better in-building reception.

- Mid Band layers are optimized by AT&T, T-Mobile and Verizon for a higher quality signal. While this typically results in a smaller coverage area, it will provide higher user capacity and faster data throughputs. The higher frequencies of mid-band, 1900 MHz and 2100 MHz do not propagate as well as low-band, and do not work as well penetrating buildings for indoor coverage.

Recommendations:

- Continued focus on carrier coordination to demonstrate coverage needs.
- Highlight weak areas for indoor and outdoor coverage
- Press to each carrier on the value of the Towns Wireless friendly locations to increase wireless service to the residential areas.
- Denser site spacing should allow for better overlap of mid-band signals to eliminate weak areas and provide a more seamless high-speed data user experience.

Signal (RSRP) Comparison 2020 / 2023

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This table shows the RSRP per channel of the top channels from the scanner data collected.

			2020	2023
Carrier	Band	Channel	RSRP >-100dBm	RSRP >-100dBm
ATT	B12	5110	96.5 / 3.5	89.7 / 10.3
ATT	B2	1050	51.2 / 48.8	51.2 / 48.8
TMO	B71	5035	91.4 / 8.6	83.5 / 16.5
TMO	B4	2300	44.1 / 55.9	48.6 / 51.4
TMO	B2	675	22.4 / 68.6	59.8 / 40.2
VZW	B13	5230	99.7 / .03	98.6 / 7.4
VZW	B2	775	78.6 / 21.4	77.6 / 22.5
VZW	B4	2125	45.2 / 54.8	31.3 / 68.7

Voice and Data Success Rate

Town of Queen Creek

This table shows the Voice Success, Data Success, DL and UL average speeds by percentage signal across the Town of Queen Creek doe 2023.

Carrier	RSRP > -100dBm	Call Success	# Success	Data Success	# Success	Downlink >20Mbps	Uplink > 5Mbps	Dominant channel 1	Dominant channel 2	Dominant channel 3
ATT	33%	98.80%	742	87.20%	1316	45%	36%	5110 B12 (lowband)	1050 B2 (midband)	66486 B66 (midband)
TMO	29%	87.97%	826	93.50%	1721	58%	56%	675 B2 (midband)	66786 B66 (midband)	68611 B71 (lowband)
VZW	25%	96.00%	766	91.06%	1436	40%	57%	5230 B13 (lowband)	66586 B66 (midband)	2600 B5 (lowband)

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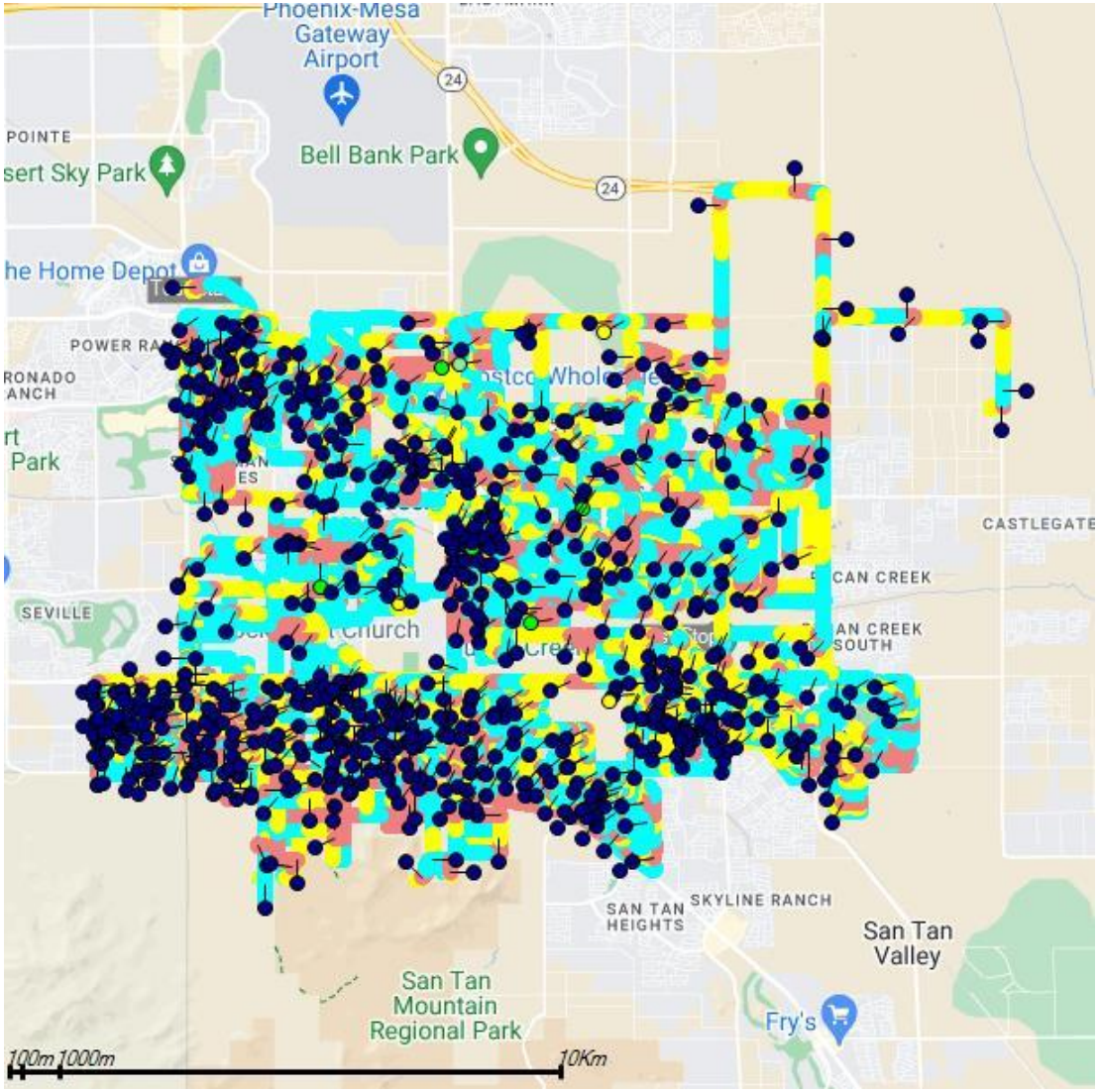
Queen Creek - Free Float - AT&T

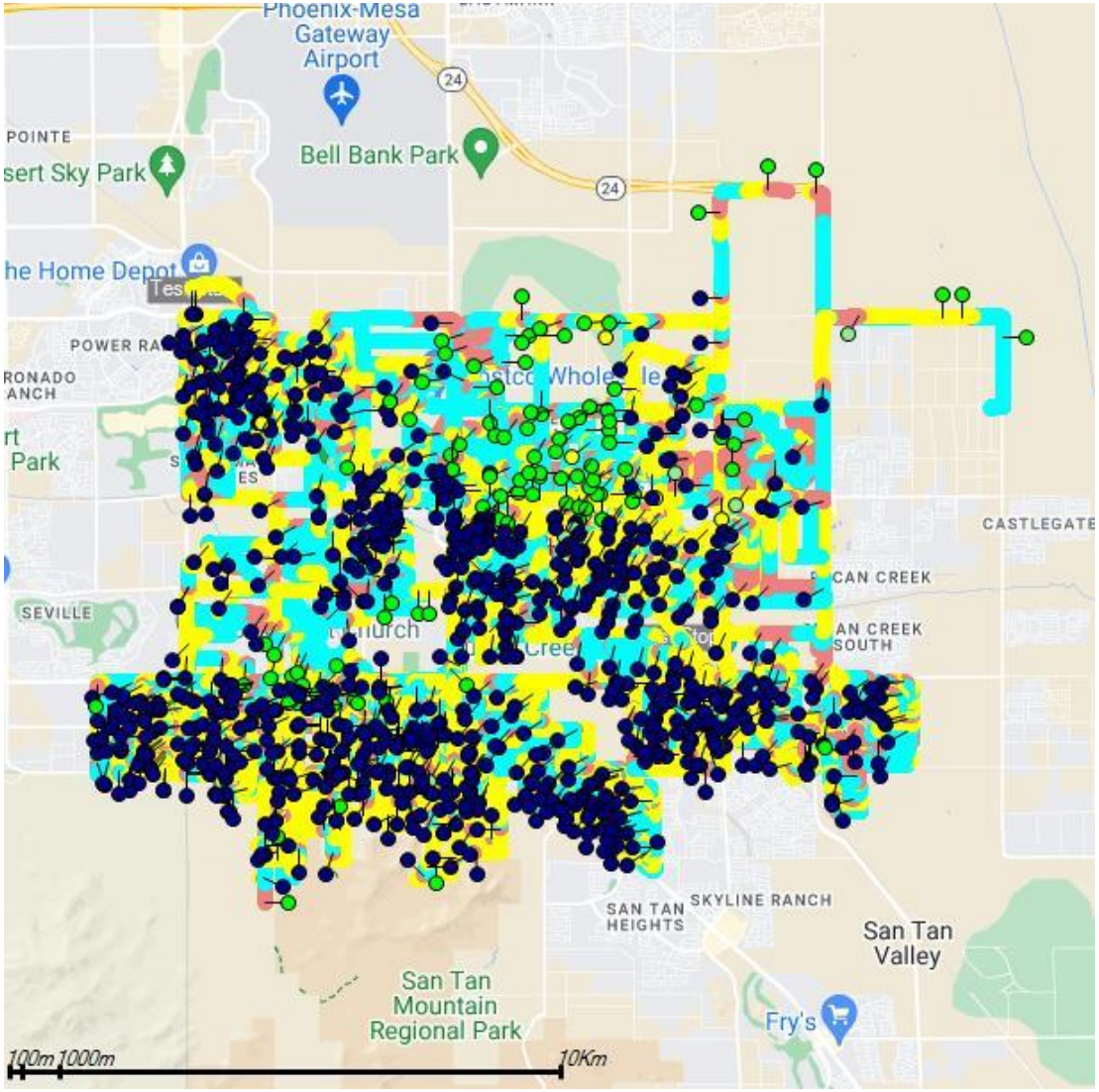
UE Voice Call Events Map



Call Event
- Success (98.80%,742)
- Timeout (0.00%,0)
- Drop (0.13%,1)
- Setup Fail (0.67%,5)
- T-Setup Fail (0.00%,0)
- End by user (0.40%,3)

Queen Creek - Free Float - T-Mobile

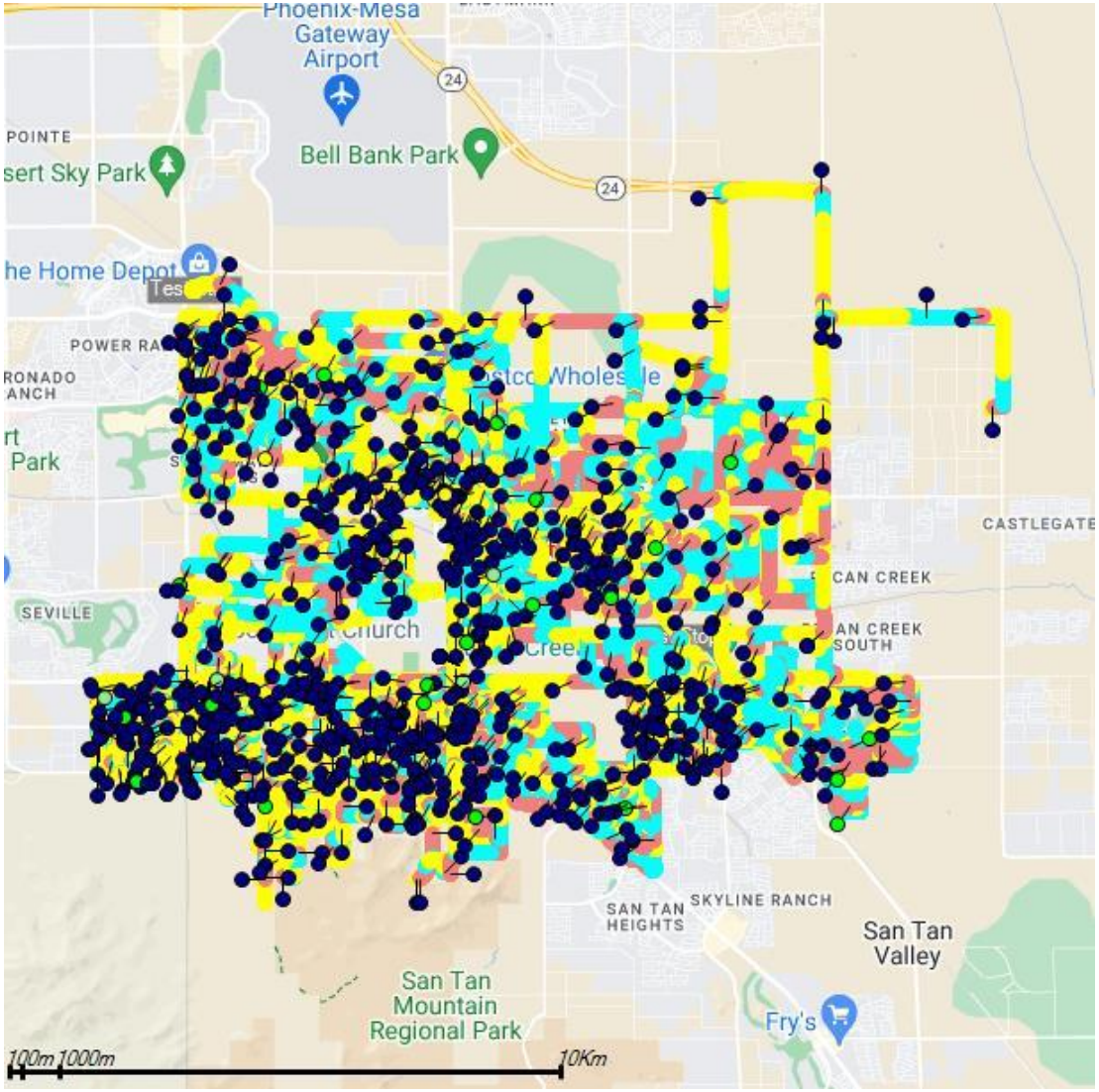
UE Voice Call Events Map



Call Event
- Success (87.97%,826)
- Timeout (0.00%,0)
- Drop (0.64%,6)
- Setup Fail (10.86%,102)
- T-Setup Fail (0.00%,0)
- End by user (0.53%,5)

Queen Creek - Free Float - Verizon

UE Voice Call Events Map



Call Event
- Success (95.99%,766)
- Timeout (0.00%,0)
- Drop (0.63%,5)
- Setup Fail (2.88%,23)
- T-Setup Fail (0.00%,0)
- End by user (0.50%,4)

Signal Strength Assessment

Town of Queen Creek

The following plots reflect the on-street signal strength by each Carrier. For our analysis we are using industry standard -100 dBm as a coverage threshold by carrier.

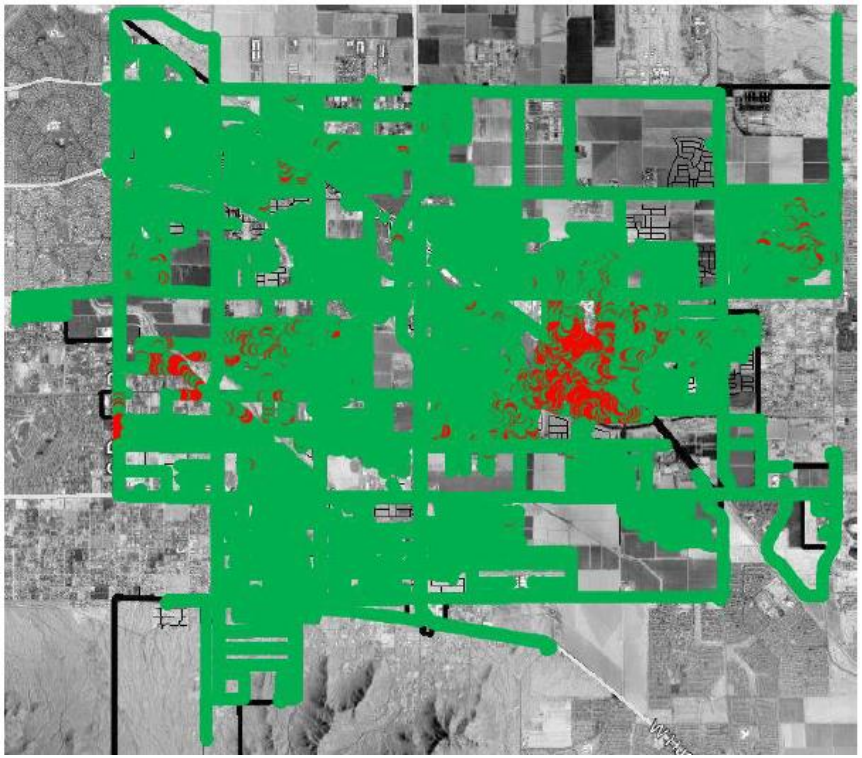
•Green = Stronger than -100 dBm you should see between 2 to 4 bars on your phone.
•Red = Weaker than -100 dBm you should see between 0 to 2 bars on your phone.
•In-Building signal can be between 5 dB to 12 dB weaker than on-street signal.

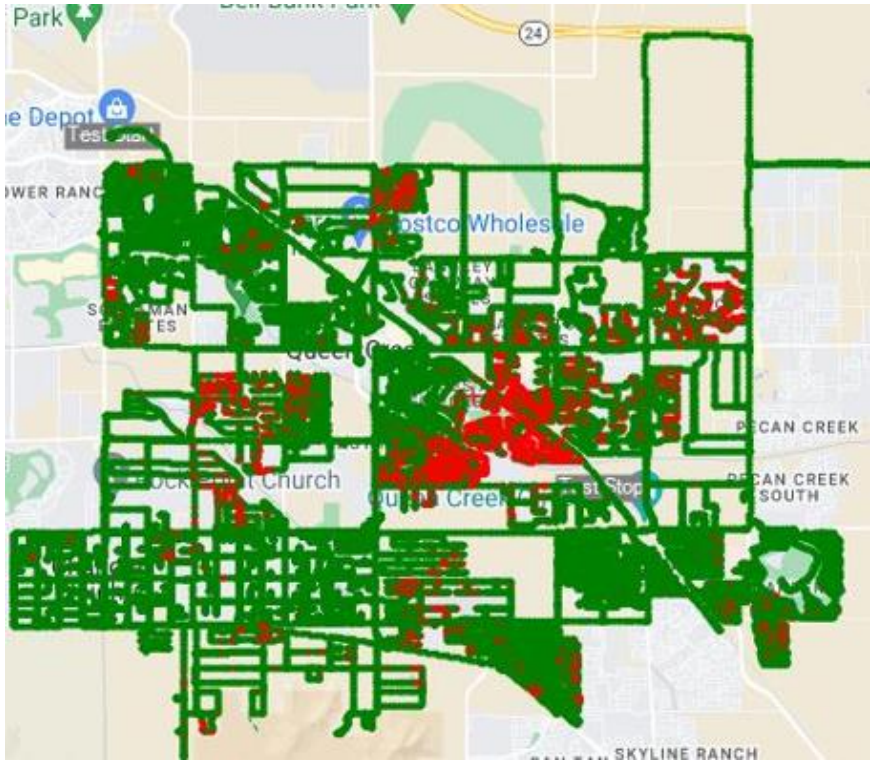
Difference in on-Street signal strength between Low Band and Mid Band Frequencies ~ Mid Band requires a higher site density than Low band.

Received Signal Level (dBm)	Phone Bar Representation	Signal Quality
-90	4	Excellent
-91 to -105	3	Good
-106 to 110	2	Fair
-111 to -119	1	Poor
-120	0	No usable coverage

AT&T 700MHz 2020 - 2023

Scanner CH5780 RSRP Map

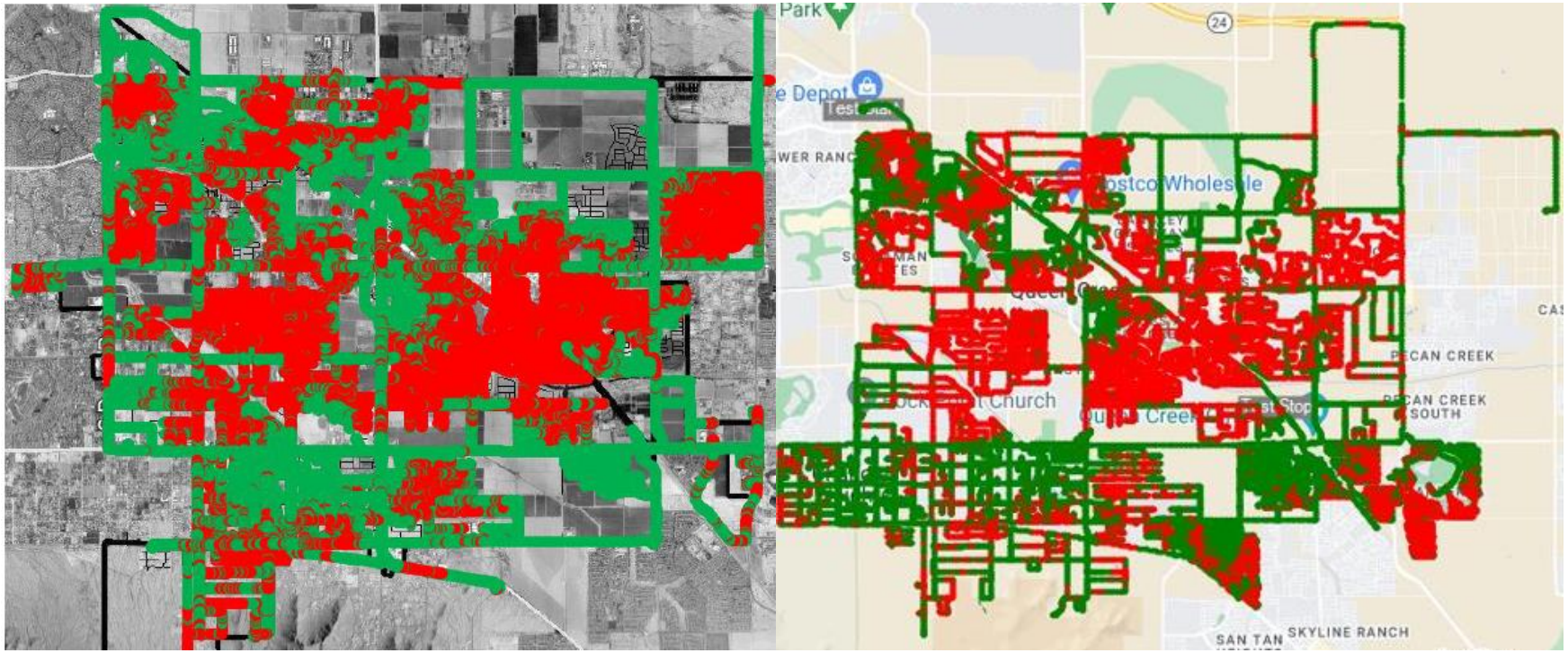




CH(5110) (1) (TopN) RSRP (dBm) 10MHz
-100 <= X < Above (89.09%,46878)
Below <= X < -100 (10.91%,5738)

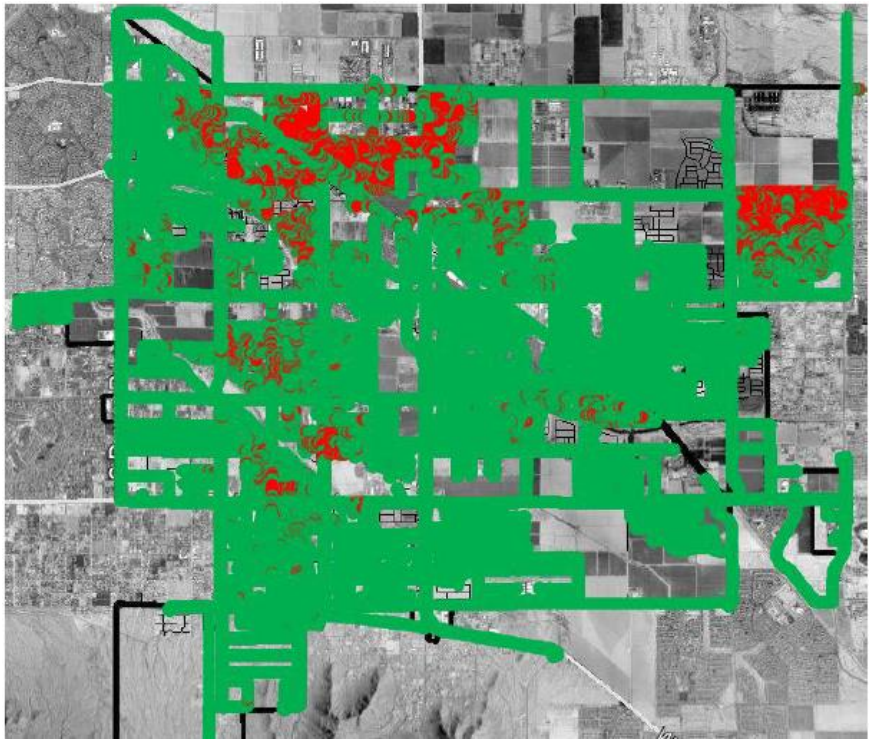
AT&T PCS 2020 – 2023

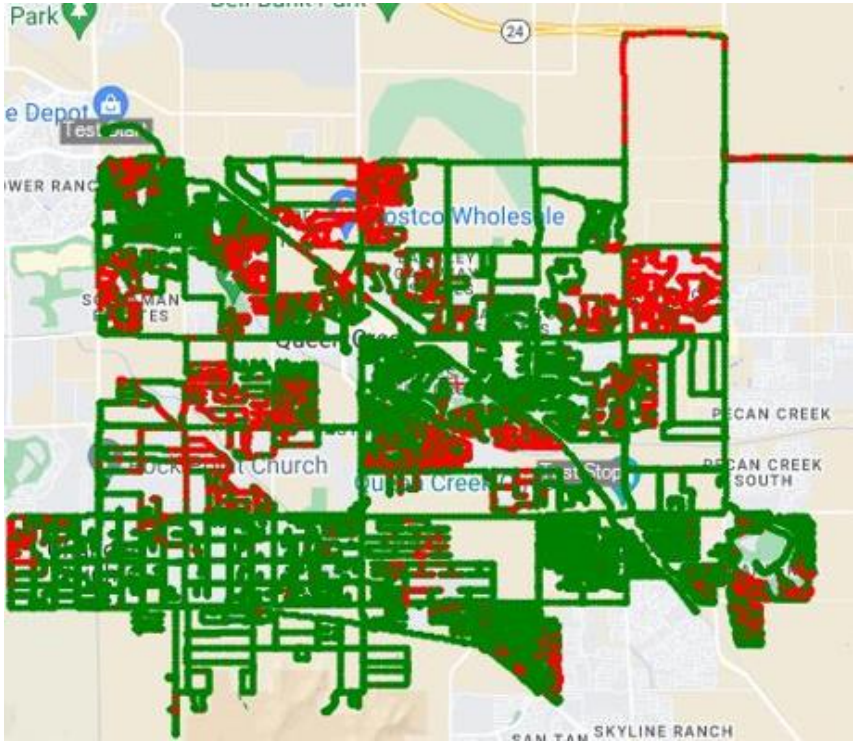
Scanner CH1050 RSRP Map



T-Mobile 700MHz 2020 - 2023

Scanner CH5035 RSRP Map

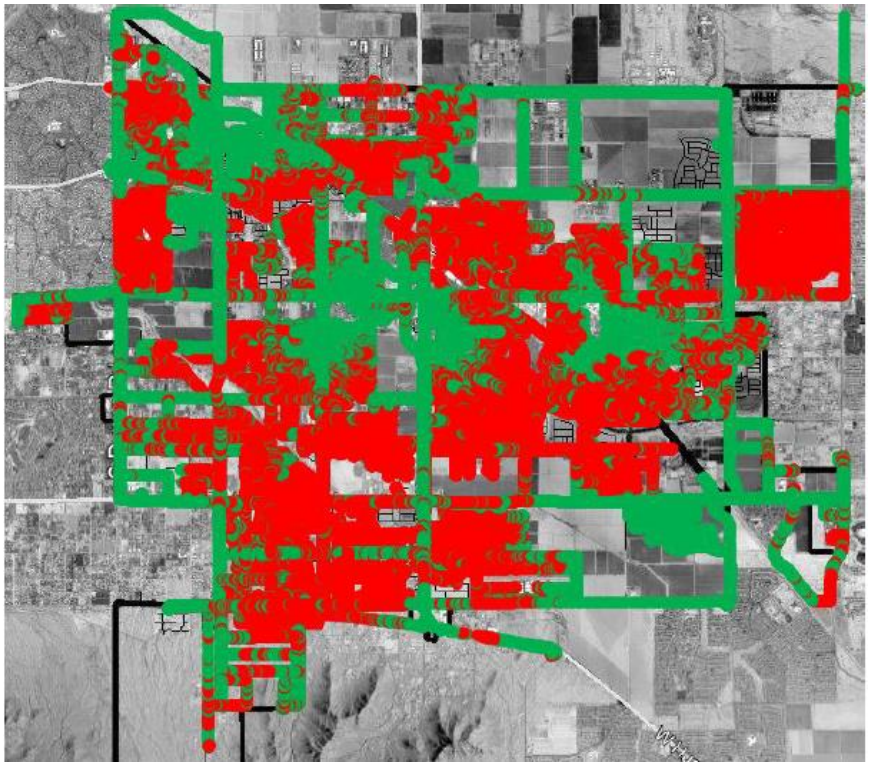


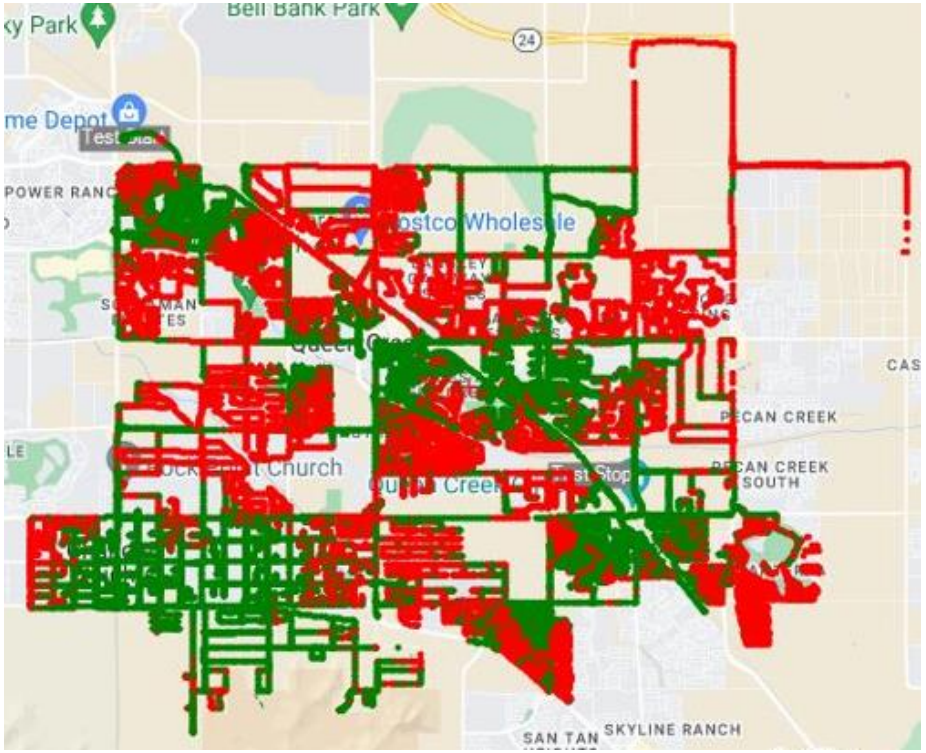


CH(5035) (1) (TopN) RSRP (dBm) 5MHz
-100 <= X < Above (82.50%,43377)
Below <= X < -100 (17.50%,9199)

T-Mobile AWS 2020 – 2023

Scanner CH2300 RSRP Map

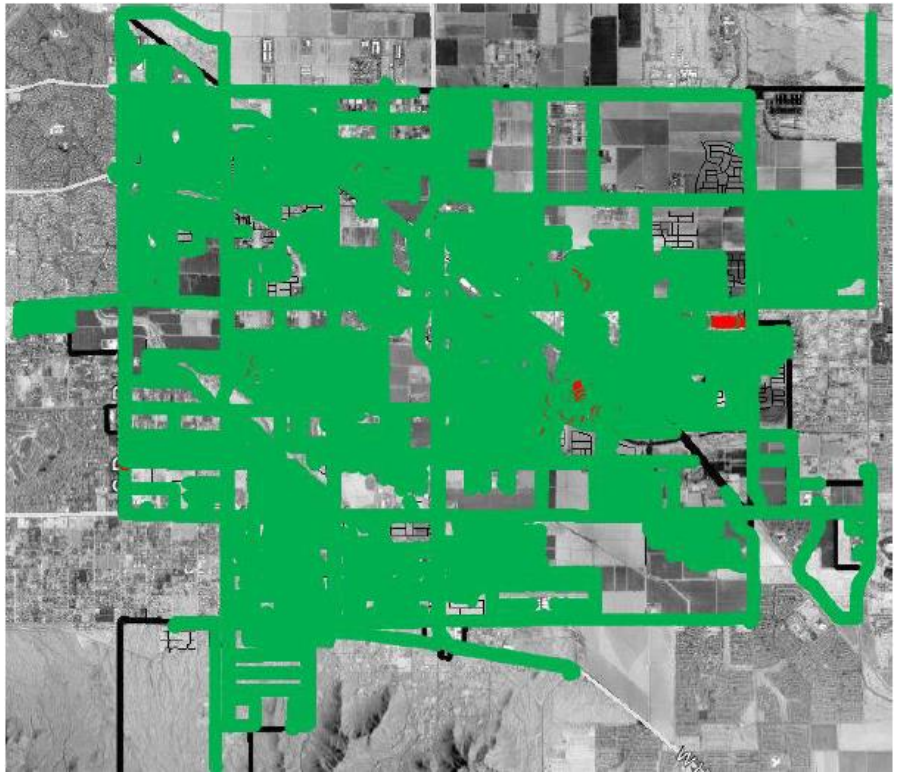


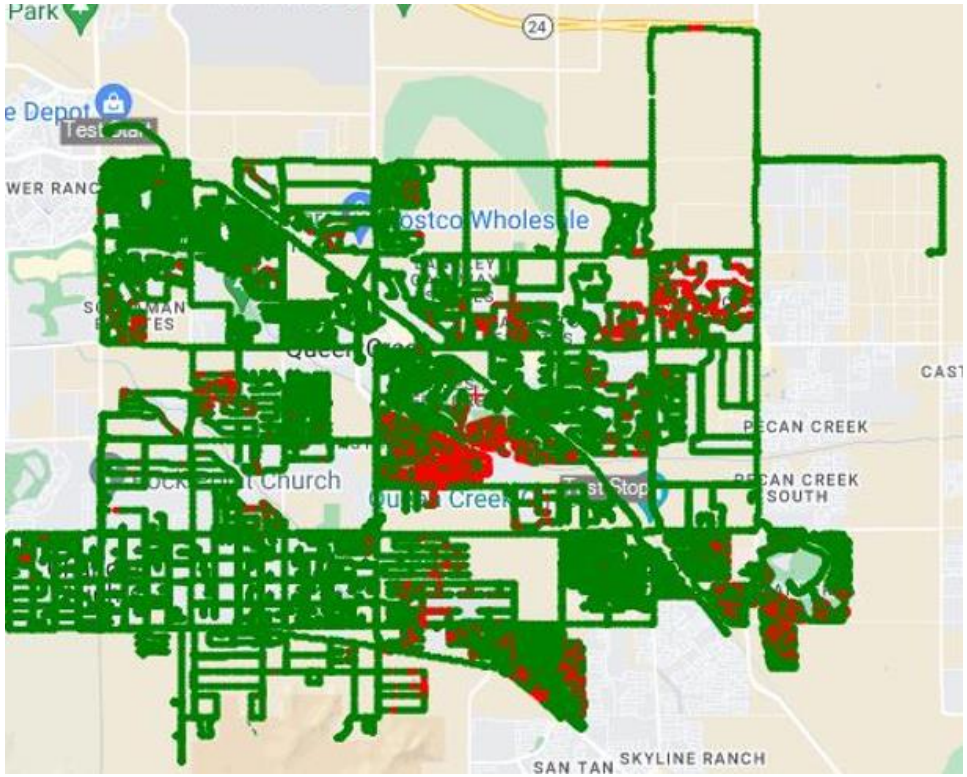


CH(2300) (1) (TopN) RSRP (dBm) 20MHz
-100 <= X < Above (47.66%,24284)
Below <= X < -100 (52.34%,26672)

Verizon 700MHz 2020 - 2023

Scanner CH5230 RSRP Map

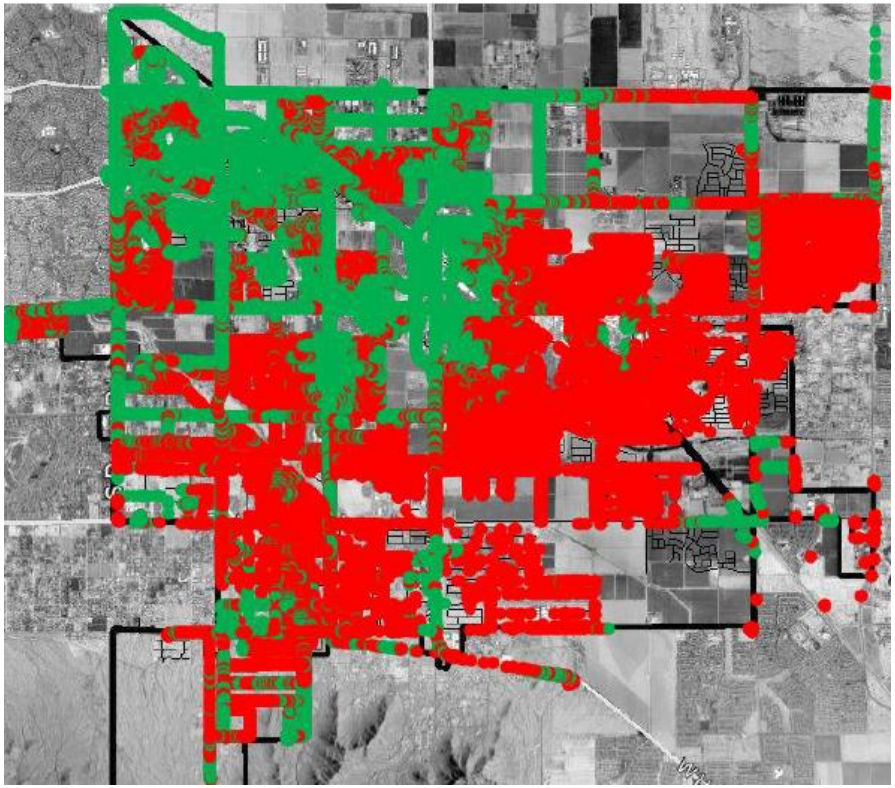


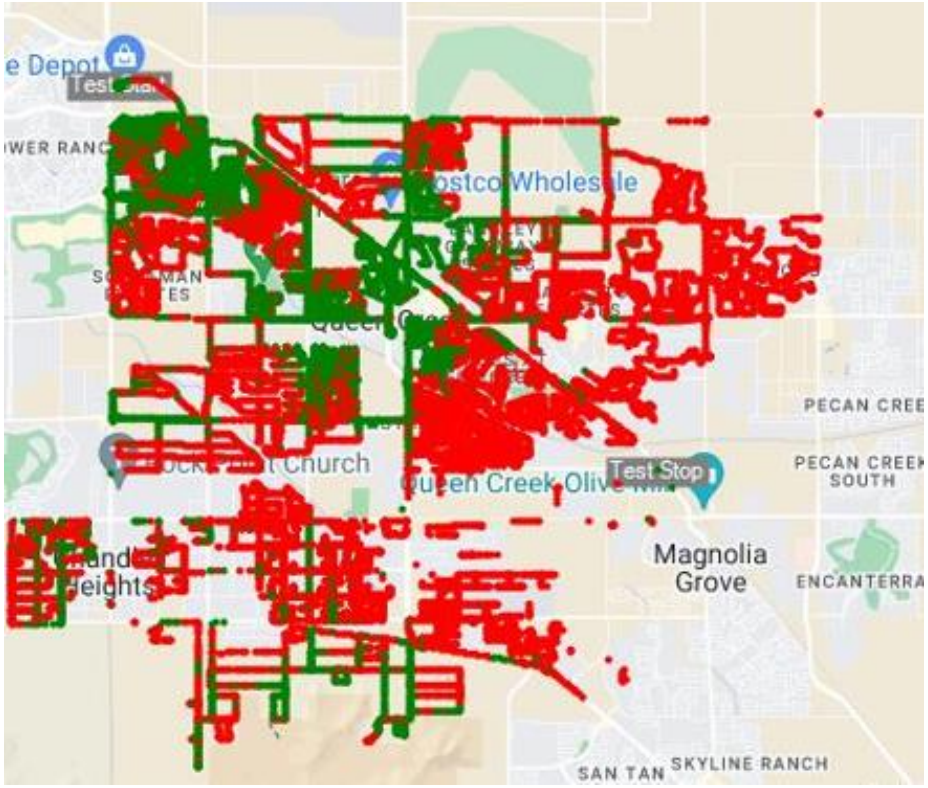


CH(5230) (1) (TopN) RSRP (dBm) 10MHz
-100 <= X < Above (92.67%,48805)
Below <= X < -100 (7.33%,3862)

Verizon AWS 2020 - 2023

Scanner CH2125 RSRP Map





CH(2125) (1) (TopN) RSRP (dBm) 15MHz
-100 <= X < Above (32.08%,10047)
Below <= X < -100 (67.92%,21272)

Contact Information

Main Office:

2175 West 14th Street, Tempe, Arizona 85281

Contact Information:

DEPARTMENT	EMAIL
EWS RF Management	rf.managers@engineeringwireless.com
EWS Sales Support	sales.support@engineeringwireless.com
EWS PMO Organization	PMO@engineeringwireless.com

Thank You

engineeringwireless.com