

**KENTUCKY-AMERICAN WATER COMPANY**  
**CASE NO. 2023-00191**  
**COMMISSION STAFF'S SECOND REQUEST FOR INFORMATION**

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**Witness: Melissa Schwarzell and David Hill**

12. Refer to the Application, Exhibit A, Advanced Metering Infrastructure Development Plan, page 14. Explain in specific detail how Kentucky-American evaluated each of the proposed alternatives, a copy of all documents Kentucky-American relied upon in its evaluation of the proposed alternatives, and a copy of all written material explaining the reason that Kentucky-American selected the proposed AMI system.

**Response:**

Please see the direct testimony of Melissa Schwarzell, pages 3 through 9, for a detailed description of the methodology followed in developing the cost benefit analysis.

Additionally, please see three attachments which are confidential and provided pursuant to a Petition for Confidential Protection:

1. Confidential Attachment 1 - CBA: This is the Excel file which supports the calculations and charts found in the Cost Benefit Analysis section of Exhibit A. (Please note that the file includes a minor update with an immaterial impact of small differences of ~\$0.2mm in the 20-year NPV charts (or ~\$20k/year), relative to those filed.)
2. Confidential Attachment 2 – Propagation Study: This is the propagation study which supported the hybrid solution cost benefit analysis.
3. Confidential Attachment 3 – Ops Matrix: This is a matrix of considerations that were evaluated when determining the best metering equipment vendor from an operational perspective.

**KAW\_R\_PSCDR2\_NUM012\_081823\_ATTACHMENT 1\_CONFIDENTIAL  
FILED UNDER SEAL PURSUANT TO THE PETITION FOR  
CONFIDENTIAL TREATMENT FILED ON AUGUST 18, 2023**

# R900 Propagation Analysis KY American – Lexington, KY September 2nd, 2021

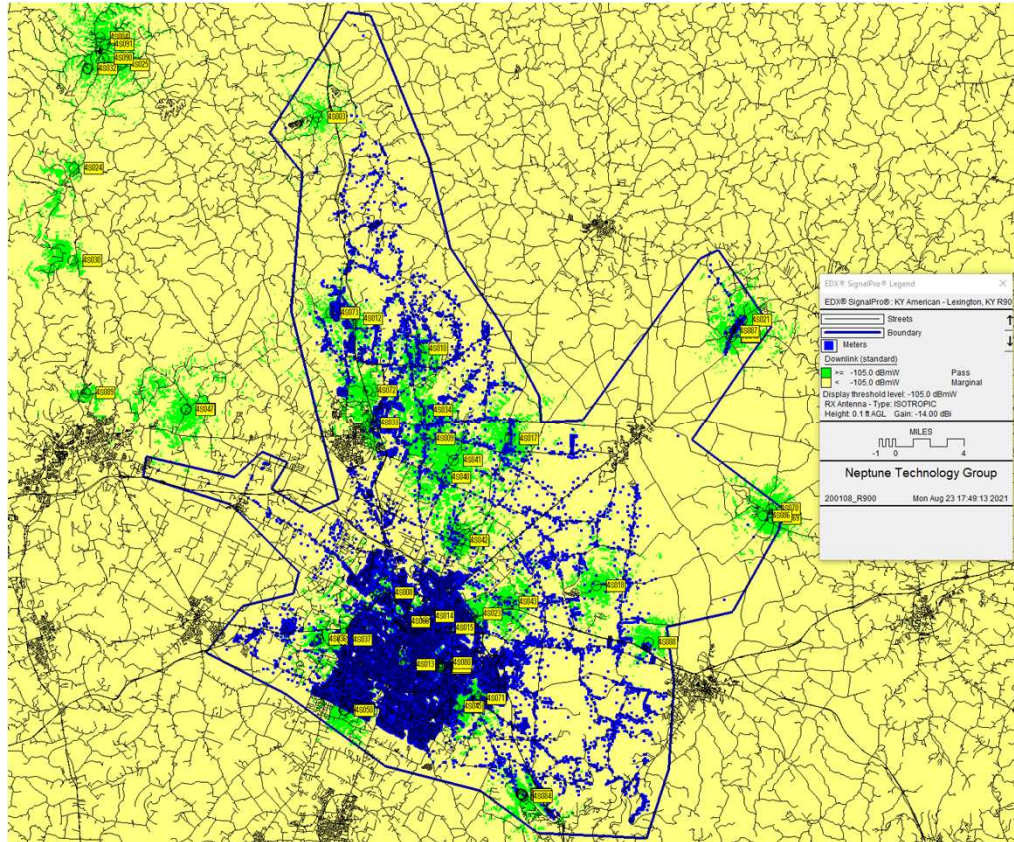


# Predicted Coverage Results:

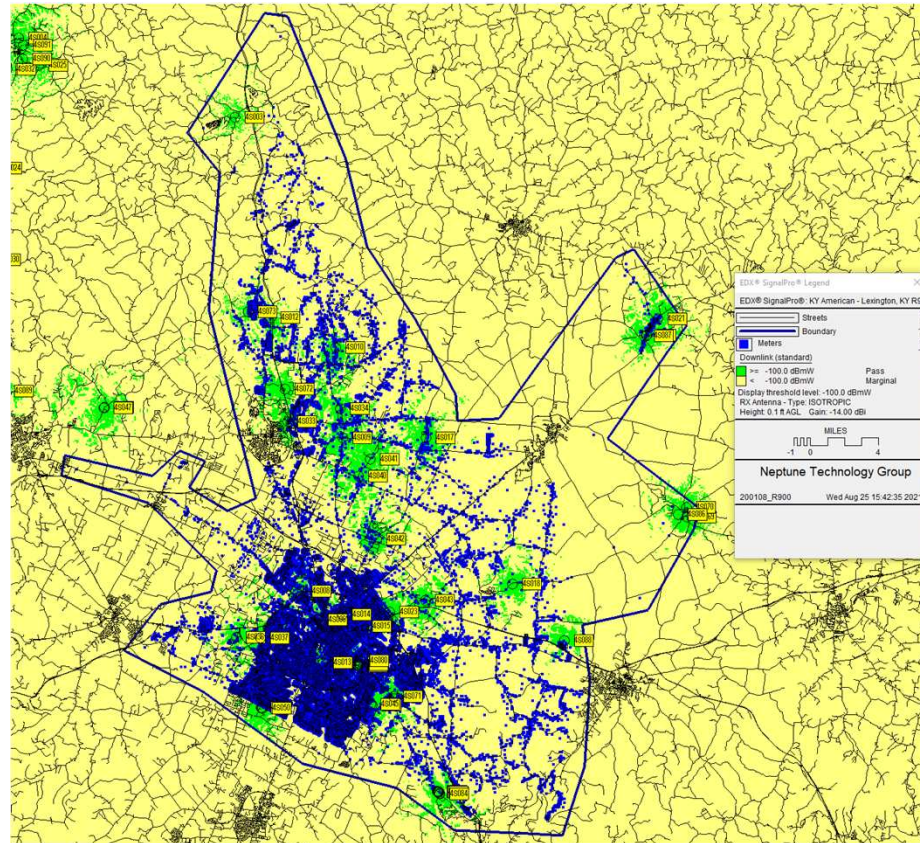


Map	Description	Provided Services		133,805	Geocoded Services	132,400	Area (sq Miles)	833.80
		#Coll	MIU Type	Read Type	Pass	%Pass	Pass	%Pass
1a	Provided	91	R900v4 Pit	Billing	41,644	31.45%	134.24	16.09%
1b	Provided	91	R900v4 Pit	Daily	31,825	24.03%	102.16	12.25%
2a	Best Provided	50	R900v4 Pit	Billing	40,679	30.72%	120.86	56.70%
2b	Best Provided	50	R900v4 Pit	Daily	31,205	23.56%	91.85	11.01%
3	~99%	278	R900v4 Pit	Billing	130,715	98.72%	472.78	56.70%
4	~99%	309	R900v4 Pit	Daily	130,551	98.60%	426.52	51.15%

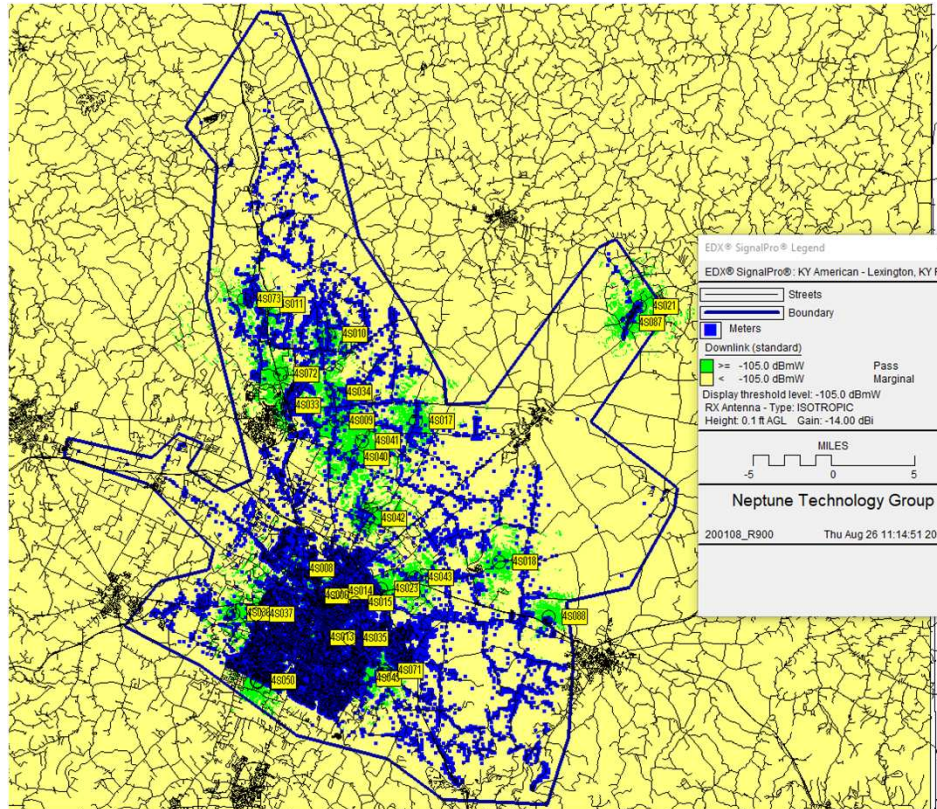
# Map 1a: Provided Assets - Billing



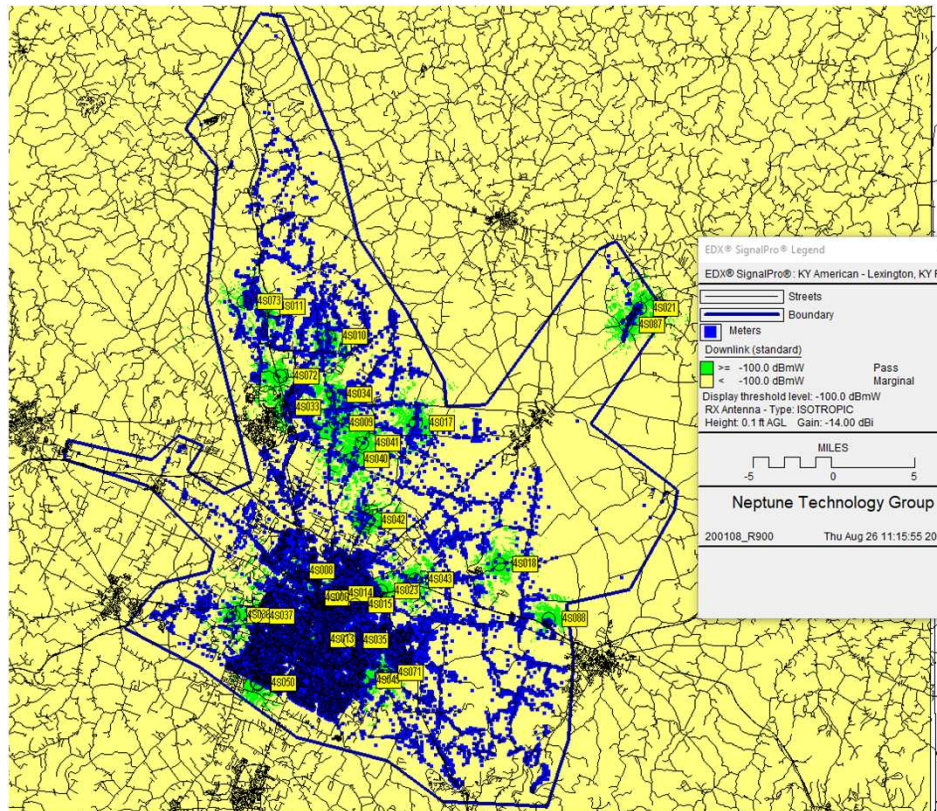
# Map 1b: Provided Assets - Daily



# Map 2a: Best Provided Assets - Billing

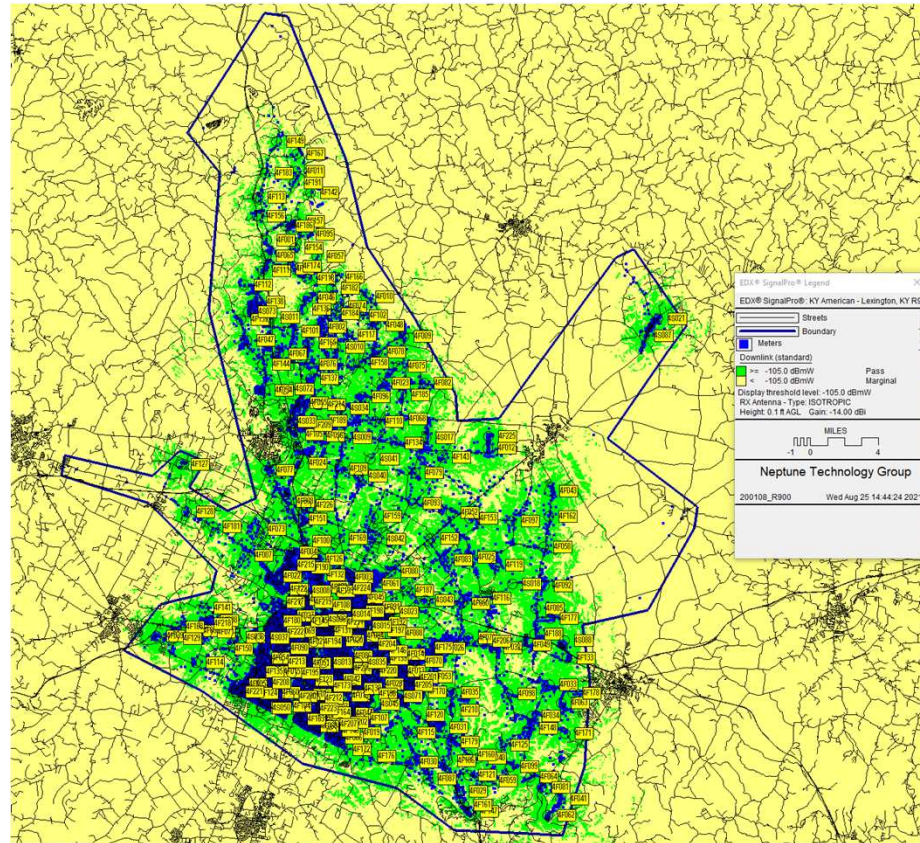


# Map 2b: Best Provided Assets - Daily

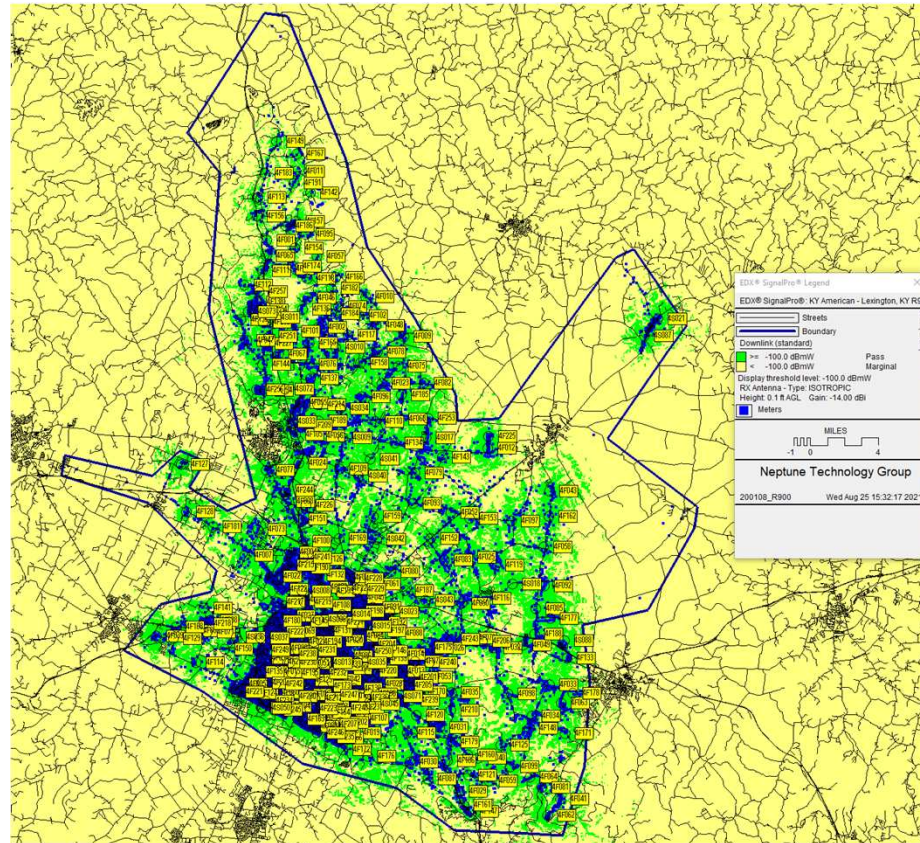




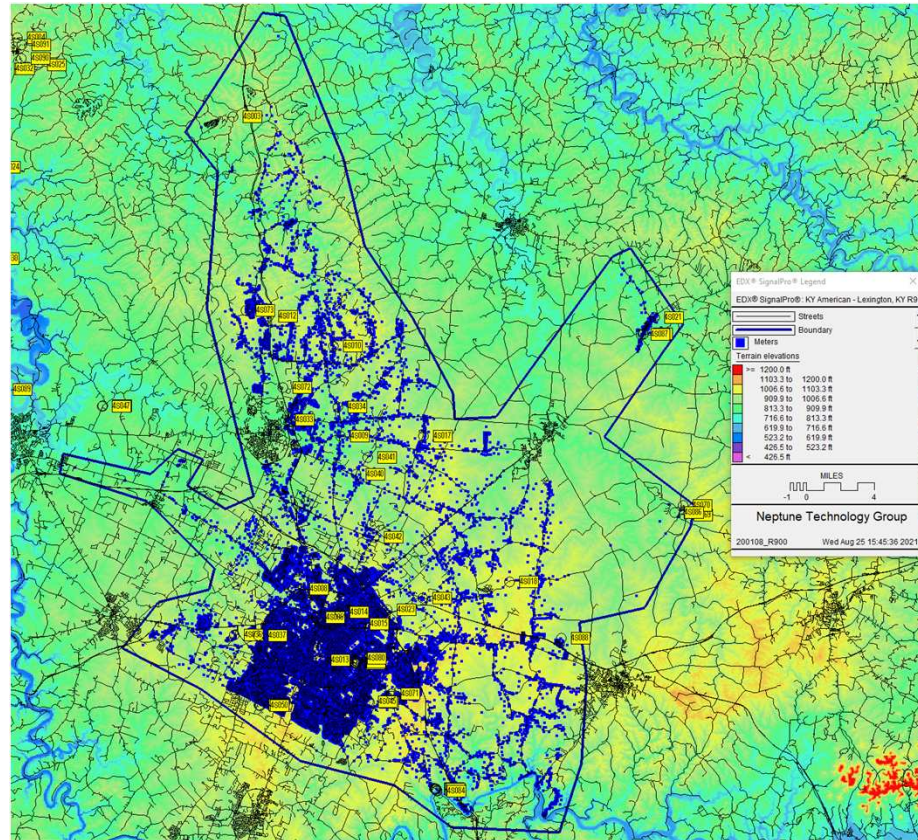
# Map 3: ~99% predicted - Billing



# Map 4: ~99% predicted - Daily



# Elevation Map (National Elevation Dataset available, courtesy of the U.S. Geological Survey)



# Gateway Locations:



Map	Location	Latitude	Longitude	Collector	Elev(m)	AntHgt(m)	Elev(ft)	AntHgt(ft)	Coax(dB)	AntGain	Antenna
[Redacted Content]											

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## Assumptions:



- Spare gateway recommended for system maintenance.
- Revised propagation analysis required for Gateway location or height changes.
- FAA/ASR may be required for structures near airports or heights >200ft.
- AM Tower detuning evaluations for structures within 3km, check with LBA Group or Sitesafe.
- 10ft minimum vertical separation from other 900MHz system antennas on structure. Antenna requires 3ft-4ft standoff for side mounting on towers.
- Complies with FCC/IC Rules: May not cause harmful interference, and must accept any interference received, including interference that may cause undesired operation.
- MIUs mounted inside structures are not recommended for Fixed Network solutions. RF signal is affected differently by building materials used within structures and it is difficult to account for all types of construction. If the Scope states inside MIU used for study, an average loss value is applied to the model. In situations, where inside MIUs do not perform as necessary, an external wall MIU or additional Gateways may be required
- Propagation based on defined MIU (External Wall or Pit w/External Antenna) with specified gateway/collector. Older equipment should be replaced. Propagation is subject to change based on equipment specifications and performance. Performance cannot be confirmed until final system evaluation and analysis complete. Daily - 1 read in 24 hours (1 Day) expected; Billing - 1 read in 72 hours (3 Days) expected; Hourly - 1 read each hour expected. Propagation model is based on performance for >90% read success; backfill read redundancy included, and typical RF environment <-120dBm. Use of this propagation analysis done with this understanding and there is no guarantee of product or performance. Additional gateways could be required. Antenna heights are set to 75 feet as default unless heights provided. This affects Find (search ring) and asset locations.
- R900 IoT gateway (Tmega) with 2 antenna receiver diversity requires minimum of 6 feet horizontal and ideally 12-20 feet horizontal antenna separation.



			<b>Badger</b>	<b>Neptune</b>	Additional Notes
<b>Pros and Cons</b>	<b>Notes</b>				
Supply Chain - Lead times and availability	Can meet delivery deadlines?		Lead times are not a concern.	Lead times are not a concern.	Lead times are considerably shorter than anticipated.
Supply Chain - return/cancellation policy	Which is flexible with commission not approving AMI?		Any unshipped orders can be canceled.	No confirmation yet but meter team believes they will be as flexible as Badger.	We have contracts that allow us to stop orders for items that have not been shipped.
Supply Chain - Ability to exchange with other states	Are states willing to take on delivered and unused endpoints?		States such as MO and PA have compatibility.	States such as NJ have compatibility.	There is a method to transfer endpoints to others states.
Costs - meter pit alterations	Costs		Plastic Lid is preferred for this specific manufacturer. Testing to confirm endpoints work with metal lids with the gasket/washer ring in 2023. Any cellular endpoint is preferred to have composite lids from AW's meter team's perspective.	Neptune endpoints are compatible with metal lids but needs new antenna. Testing confirming new antenna. Any cellular endpoint is preferred to have composite lids from AW's meter team's perspective.	Lid ring has nothing to do with performance of the endpoint and only deals with compaitibility of lid. Work with exisiting manufacturer to potentially create a composite lid with correct hole size. Composite lids are preferred for any AMI endpoint. Trumble, Nicro, and VWF brand.
Costs - meters and endpoints	Costs		Pricing is more favorable.	Pricing is less favorable.	
MDMS maturity	Which manufaturer is further along with our MDMS?		Badger's comatibility with AW's MDMS is more mature and established.	Neptune's is scheduled to be compatible between 2023.	
Customer service- Internal Facing	Which system can provide customer data today?		Portal that can be deployed today and used by employees. Superior and more mature than Neptune.	Portal that can be accessed by employees and not as much information. No single sign on. Not as user friendly.	This detail is critical for the commision. What additional information is will be available for customers who have high usage? How quickly will we inform customers and how will we inform customers? Will need to know what other states are doing?
Customer service - External Facing	Which system can provide customer data today?		Portal that can be deployed today and used by customers. Scheduled to be compatible in 2023/2024 with AW's MyWater.	Portal cannot be accessed by customers. Customer data must be managed internally. Scheduled to be compatible in 2023/2024 with AW's MyWater.	Important but not critical. Better to wait for information to be compatible with MyWater for residential customers.
Readability - Cellular Coverage	Percentage of cellular coverage		Badger uses the AT&T network and Verizon today.	Neptune uses the Firstnet network. Will be transitioning to Verizon Q2 2023.	Neptune - Firstnet capable vs ready. They use the same bandwidth as neptune on the AT&T network which uses the 2,4, and 12 bands vs band 14. Currently Firstnet is still not letting LTE-M devices join on band 14(Firstnet)
Meter and Endpoint Performance	Does technology operate as intended?		Yes	Yes	