

The Anterix logo is located in the top left corner. It consists of the word "Anterix" in a white, sans-serif font, with the letter "x" in orange. The background of the slide is a night-time aerial view of a city skyline, with the Freedom Tower being the most prominent building. A network diagram is overlaid on the city, featuring several circular nodes with an "X" inside, connected by thin white lines. In the bottom right corner, there is a large, stylized arrow pointing to the right, with a blue-to-orange gradient.

NR Support for FDD Bandwidths less than 5 MHz

June 2021

Utilities in Dedicated NR Spectrum
3GPP RAN Rel 18 Workshop

Tdoc: RWS-210035

Anterix Overview

Anterix

- [Anterix](#) is a publicly traded company with leadership that has roots deep in wireless, with industry veterans from Nextel and Sprint.
- In May 2020, the Federal Communications Commission (FCC) unanimously approved Anterix's petition to repurpose a 2x3 MHz (6 MHz FDD) of the 900 MHz band for broadband services (Band 8).
 - The FCC has also included Anterix's 900 MHz spectrum in its 5G FAST Plan, indicating the US government backs the company's spectrum as ideal for 5G.
- For the past few months, we have been working with industry partners and other 3GPP network operators from UIC and Southern Linc on this proposal to support our migration to 5G NR.



INTERNATIONAL UNION
OF RAILWAYS



Southern Linc

NOKIA

Qualcomm



MOTOROLA SOLUTIONS

Dedicated Anterix Spectrum Holdings



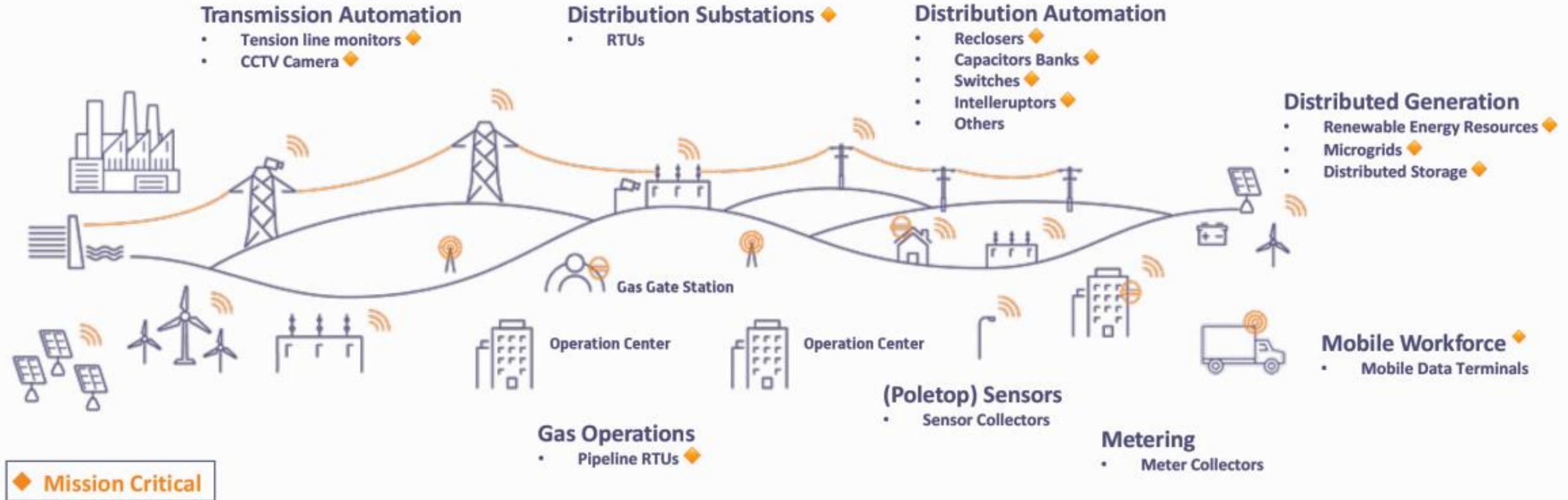
Utility Grade - Private Networks



- 900 MHz FDD spectrum allocation resides within 3GPP Band 8/n8.
- Available on a per county license basis across the entire USA.
- Several operational 4G LTE networks are deployed in this spectrum
- Growing device ecosystem deployed in multiple markets.
- The **only** dedicated and licensed spectrum allocation for private network critical infrastructure use in the USA.

*NOTE: Railways in Europe using 900 MHz will have similar demand.

Primary Use Case for Utility Grid Private Networks



Grid automation places more stringent requirements on network performance and reliability

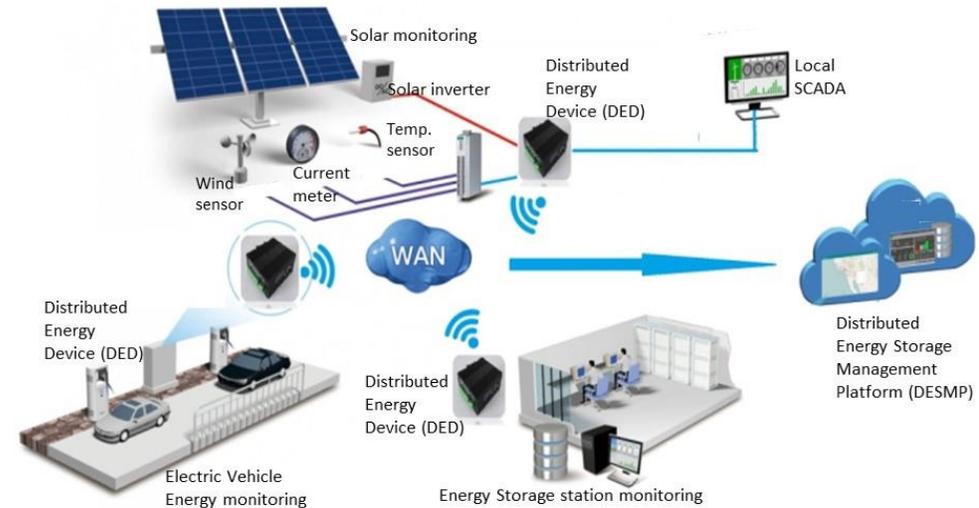
- Currently deploying Private LTE to meet the use case requirements.
- 3GPP TR22.867 outlines 5G NR Use cases for electric utilities.
- Railways also have use cases defined for FRMCS in 3GPP TS 22.289 in the migration from GSM-R to 5G NR

Supporting 3GPP 5G Utility Use Cases

FS_5GSEI SA1 TR 22.867: Study on 5G Smart Energy and Infrastructure 3GPP Utility Use Cases

How do we transition from 4G LTE to 5G NR in order to support advanced use cases?

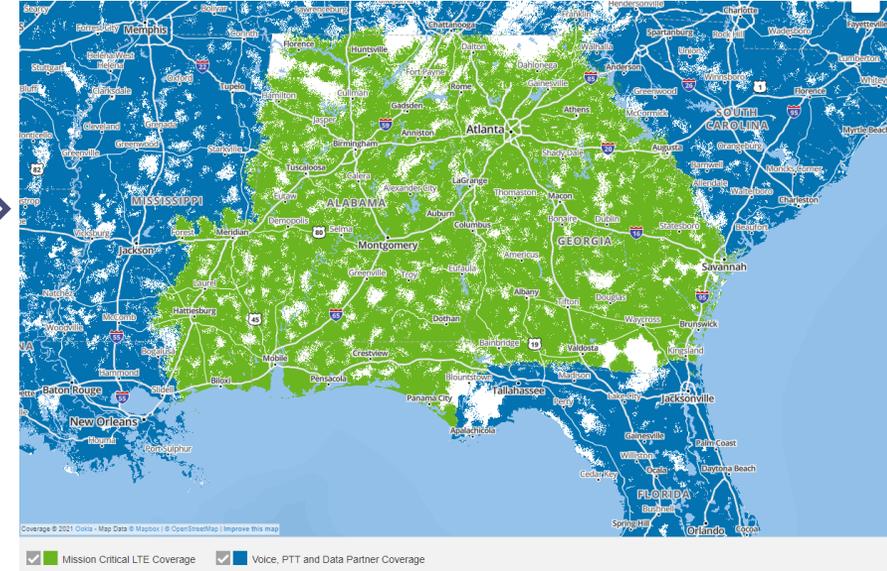
- 3GPP SA1 has already defined multiple electric grid utility use cases requiring 5G. Most of these require **low latency communications (URLLC)** to support solar integration and EV charging, along with **high density device deployments (mMTC)**.
 - Distributed Energy Resources (DER)
 - Microgrids
 - DESS – Distributed Energy Storage Systems
 - Advanced Metering (AMI)
 - Distributed Feeder Automation
 - Line Differential Protection of the Grid
 - Smart Distribution Transformer Terminal
 - Energy Isolation Demand
 - Wide area synchrophasors
 - Fault Location, Isolation & Service Restoration (FLISR)



Source: TR 22.867

Existing LTE Network Migration

- Southern Linc (3GPP member) **commercially operates** an 800 MHz multi-state LTE network (includes nationwide roaming).
 - Over 1000 sites across 4 states
 - **LTE Band 26 in 2x3 MHz allocation**
- There is a necessity to migrate to NR in the future for this **existing commercial 800 MHz LTE network** and their future 900 MHz network.
 - FCC is unlikely to allocate more spectrum in these bands



- Southern Linc and multiple other utilities are deploying trial and operational 900 MHz private LTE networks.
- Migration to 5G NR is a roadmap issue for Anterix and Southern Linc.

Private LTE: Successfully demonstrated 14 utility operations use cases.

A Semptra Energy utility

Private LTE: Multiple use cases in support of electric and gas utility operations.

Private LTE: Multiple use cases from metering and monitoring to workforce mobility and emergency management.

Private LTE: Multiple use cases in support of electric distribution and transmission operations.

DoE lab proving ground for Private LTE DER and AMDS reliability testing.

Private LTE: Wide range of use cases for Electric and Gas.

Proposal for Rel-18 RAN WS



- Anterix, UIC, Southern Linc and our industry supporting partners* would like to work with 3GPP RAN members to introduce a new **Study Item for Release 18** specifically looking at **NR Support for FDD Bandwidths less than 5 MHz**.
 - **Anterix and UIC** are looking for a solution to allow us to migrate to 5G NR in our 900 MHz allocations and support critical communications.
 - This SI is intended to support the **electric utility and railroad verticals**.
 - Identify the range of channel bandwidths less than 5 MHz to meet regulatory spectrum block allocations.
 - Limit the focus on FR1 FDD associated spectrum blocks.
 - Study necessary changes and identify limitation to NR physical layer to support channel bandwidths less than 5 MHz and **specifically minimize changes** on numerology, channel and synchronization design impacts. e.g For example this means minimal to no PSS/SSS redesign and no new SCS, use 15 kHz for FR1 FDD.

*NOTE: Anterix [Vendor partner ecosystem](#) has over 40 vendors supplying 4G LTE devices and infrastructure

3GPP TSG RAN Meeting #nn
Location, Country, Date

RP-21xxxx
(revision of xx-yyxxxx)

Source: Anterix, UIC
Title: New SID on NR support for channel bandwidth less than 5 MHz
Document for: Approval
Agenda Item: xxx

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
See also the [3GPP Working Procedures](#), article 39 and the TSG Working Methods in [3GPP TR 21.900](#)

Title: NR Support for FDD Bandwidths less than 5 MHz

Acronym: FS_NR_LT5_CBW

Unique identifier: *(A number to be provided by MCC at the plenary)*

Potential target Release: Rel-18

Note that this field above indicates the proposed Release at the time of submission of the WID to TSG approval. It can later be changed without a need to revise the WID. The updated target Release is indicated in the Work Plan.

1 Impacts

Affects:	UICC apps	ME	AN	CN	Others (specify)
Yes		x	x		
No				x	
Don't know	x				

2 Classification of the Work Item and linked work items

2.1 Primary classification

This work item is a ...

	Feature
	Building Block
	Work Task
x	Study Item

2.2 Parent Work Item

Parent Work / Study Items			
Acronym	Working Group	Unique ID	Title (as in 3GPP Work Plan)

2.3 Other related Work Items and dependencies

Thanks

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