

3GPP TSG RAN Rel-18 workshop
Electronic Meeting, June 28 - July 2, 2021

RWS-210017

Qualcomm

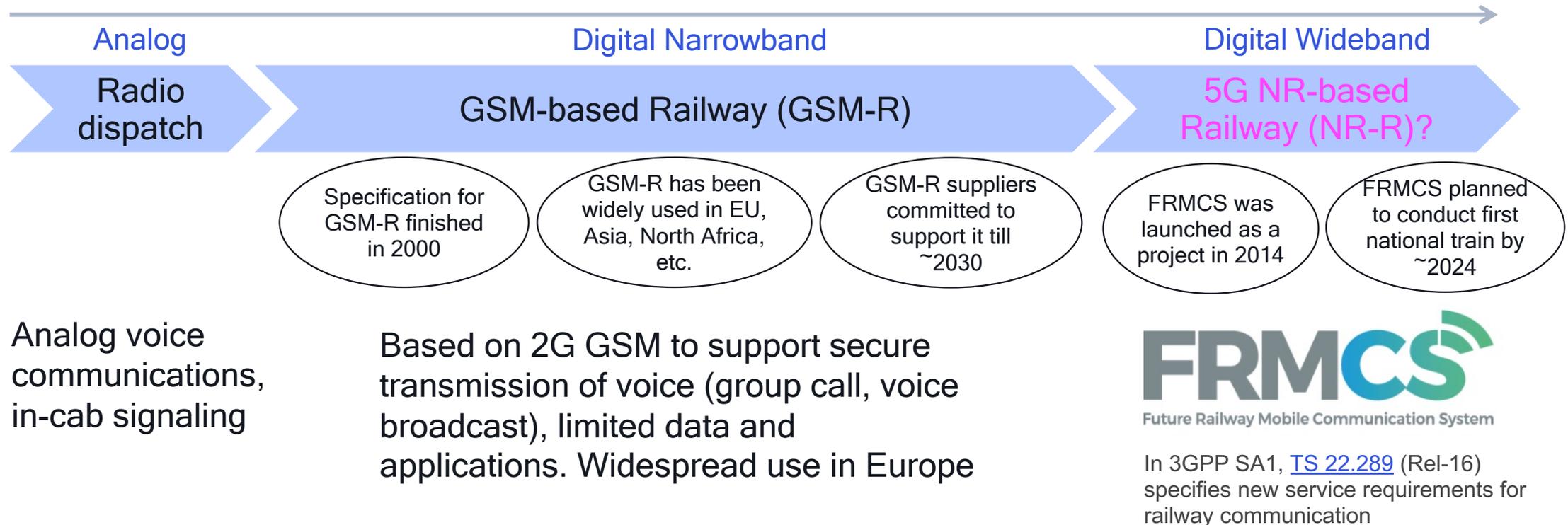
Agenda Item: 4.2

On Narrowband NR in Dedicated Spectrum enabling new 5G verticals

Qualcomm

Background: Railway Mobile Radio (RMR)

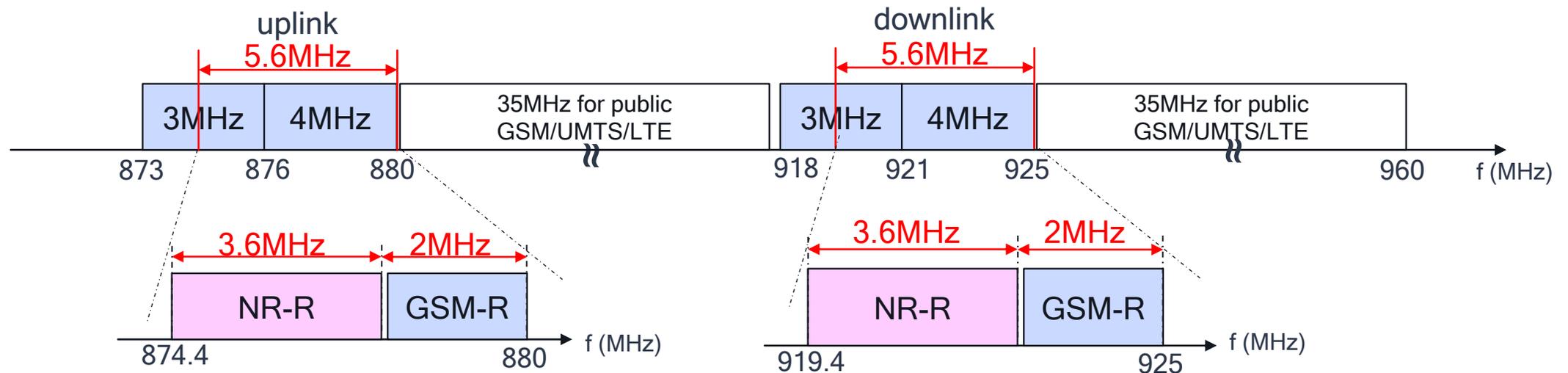
- Railway Mobile Communication is to provide secure, reliable, and efficient connectivity for railways, improving the experience of passengers.



Narrowband NR for Railway dedicated bands?

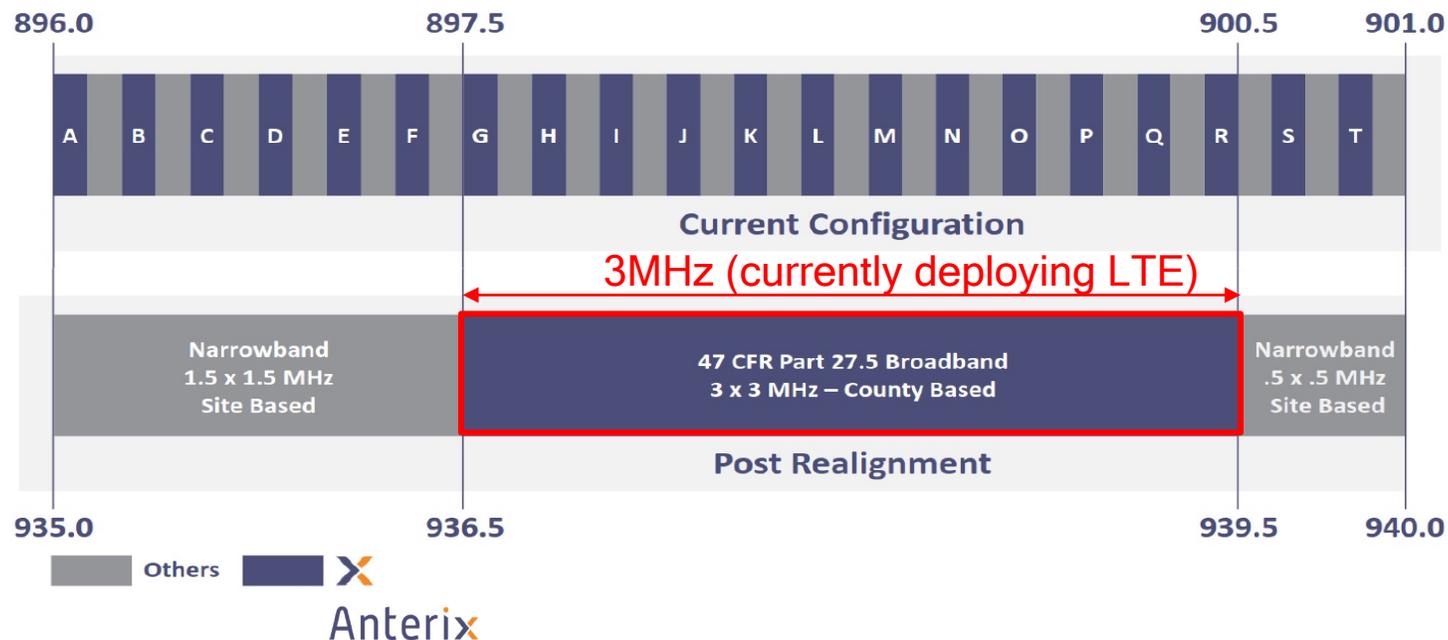
How to enable the railway industry to adopt 5G

- (E)R-GSM 900MHz FDD bands are dedicated for Railway
- These bands would have to support NR and simultaneously legacy GSM-R (to enable transition).
 - In Europe, R-GSM bands have 4MHz x 2 and (E)R-GSM bands have 3MHz x 2.
 - (E)R-GSM bands are re-farmed for FRMCS to share 5.6MHz x 2 by NR-R and GSM-R.
- This would require the definition of a "Narrowband NR with BW < 5MHz for dedicated bands" (e.g., 3.6MHz)



Other possible applications for Narrowband NR (1/2)

- A newly defined "Narrowband NR for dedicated bands" could also address some other use cases
- **Example 1:** there are smart grid private network operators in the US with **a dedicate nationwide allocation of 900MHz FDD band with 3MHz x 2**, and they are interested in adopting 5G
 - E.g., for Anterix, the FCC unanimously approved Anterix's petition to repurpose 3 MHz x 2 FDD band at 900 MHz in May 2020.

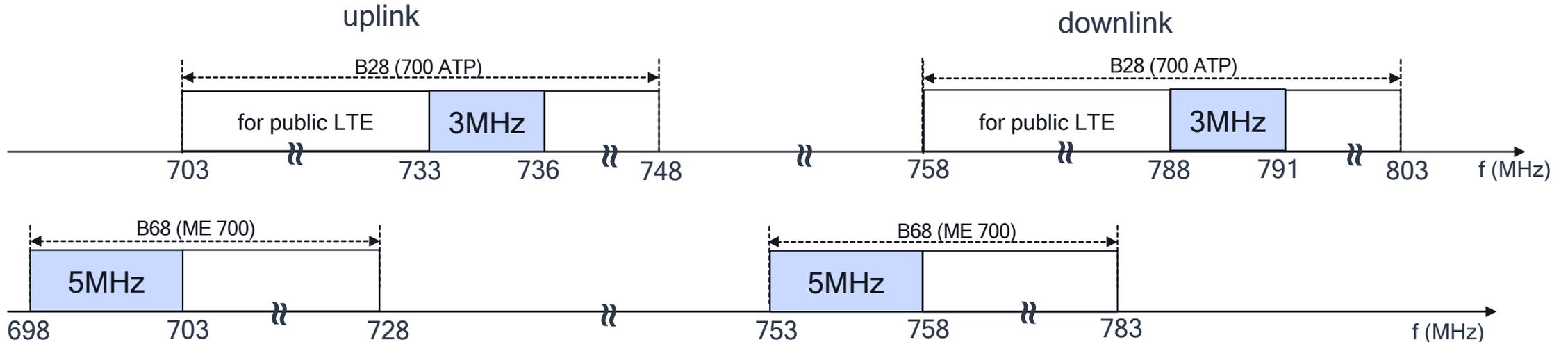


Anterix is building the foundation for smart infrastructure, smart cities and smart communities

We are focused on delivering transformative broadband that enables the modernization of critical infrastructure for energy, transportation, logistics and others. At Anterix, we are uniquely positioned to enable the solutions that support secure, resilient and customer-controlled operations.

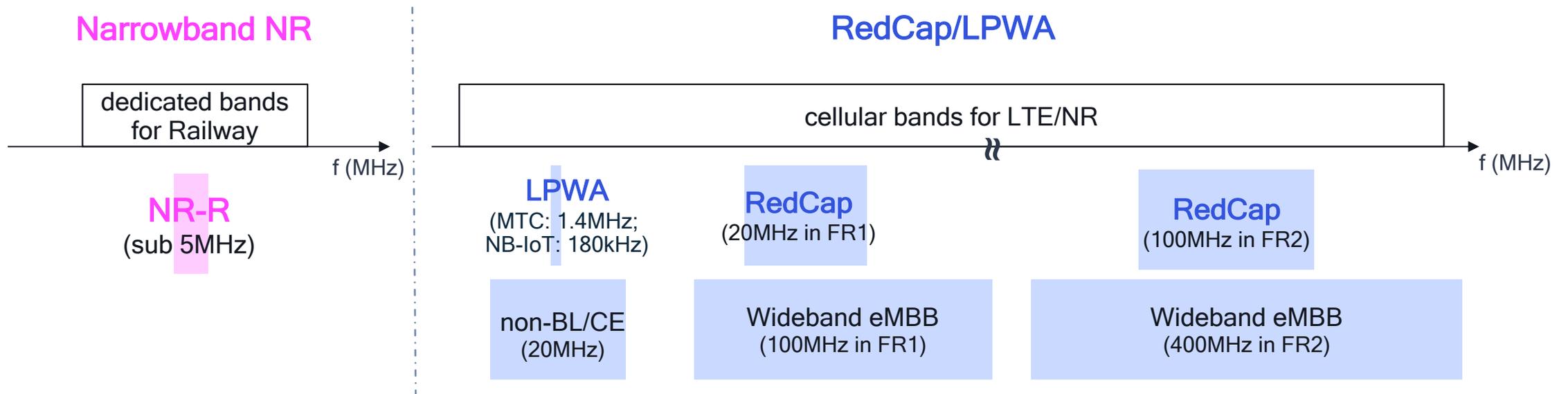
Other possible applications for Narrowband NR (2/2)

- A newly defined "Narrowband NR for dedicated bands" could also address some other use cases
- **Example 2:** there are Public Protection and Disaster Relief (PPDR) applications in Europe with **a dedicate nationwide allocation of 700MHz FDD band**, potentially based on 5G.
 - Revised [Resolution 646](#) adopted by ITU WRC -2015 recognized 694-894 MHz (700-800) as the globally harmonized frequency range for broadband PPDR
 - **2 x 3MHz band** in B28 (700 ATP) requires narrowband NR to be specified in n28.
 - **2 x 5MHz band** in B68 (ME 700) can reuse NR channelization to be specified in n68.



Narrowband NR vs. RedCap/LPWA

- **Narrowband NR** is different than both **RedCap** and **LPWA** at least in the following aspects:
 - No “legacy coexistence”: the identified use cases are in dedicated spectrum where there would be no Rel-15 eMBB, for example
 - No requirement of low cost or low complexity, nor any specific concern on device power consumption



Conclusion & Proposals

- Start a Rel-18 study item to expand NR to support **new verticals** (railways, smart grid, PPDR) in their own **dedicated spectrum**.
- Enable Narrowband NR with **BW < 5MHz** by reusing existing NR techniques with **minimum changes**
- Clearly identify the specific characteristics of these deployment scenarios (e.g., dedicated spectrum, no legacy Rel-15, etc.) & ensure these guide the design activity
- **Aspects to consider (example):**
 - At least no PSS/SSS redesign, no new SCS choice, 15kHz only.
 - Minimum changes to SSB, CORESET0, CSI-RS/TRS, etc.
 - Channelization specification for dedicated bands.
 - Potential changes to sync raster for dedicated bands.
 - Emission / coexistence issues.
 - GSM-R and NR-R interworking or in-device coexistence are not requirements.



Thank you!

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