Prospects and challenges of next generation radio systems

Shining the torch of realism on some of the most hyped tech around
(with the exception of AI and LLMs!)

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about.me();

- Deputy Chair – UK Telecoms Data Taskforce
- Deputy Chair – UKTIN Security Expert Working Group
- Worked with Governments, energy network operators, telecoms companies, and others on telecoms, security and resilience
- Big believer in the importance of growing robust technical understanding of what we build, rather than guessing/outsourcing

Let’s Future-Gaze

Look backwards to see forwards

4G – “VoLTE, IMS, digital voice, VoWiFi, CA”

- A pile of operator-specific configs added – VoWiFi very often using hardcoded strings in the modem firmware of the handset to work!
- Any “hardcoding” makes life hard for private networks
- But… even today, most MVNOs (with a few exceptions) are still yet to deploy a VoLTE offering (even as 3G networks are phased out)
- Much of the standard is optional – you won’t generally find MCPTT on regular handsets (or on lower price network infra either)
- It’s never as simple as it seems – even things like CA are all defined by band combinations and pairings, and you need a large enough ecosystem to move the needle in standards. Then a lot of large buyers to get handsets to support it!

Takehome: Ecosystem compatibility is a big deal!

5G – “band pairing, SA, and whitelists”

- Nearly everything in 5G on handsets is being whitelisted by PLMN/market – a bit like 4G, but more extreme!
- 5G, as used by most people in this room, is 5G NSA (4G core)
- 5G with 5G core (SA) – starting to become ”5G Advanced”
- 5G SA needed for many of the ‘heralded’ features of 5G (e.g. slicing)
- Even getting a commercial handset to join an SA network with an arbitrary PLMN to do some lab testing can be “interesting”
- (This is still the case at end of 2023, getting towards 4 years into 5G)

Takehome: 6G is likely to be whatever the UK has deployed in the RAN by 2027

(Huawei strip-out deadline, lack of aspiration for a full RAN rip-and-replace, higher cost of capital going forwards, and a lack of real "killer use-case" – your cat GIFs are already fast enough!

5G – 5G SBA, slicing, etc

- While you will be told “5G is here”, you’ll likely find many of the features you’re interested in are actually “roadmap items”.
- 5G SBA (SA) is starting to very slowly roll out, but the handset-network support is a bit patchy due to fairly reserved roll-out pace.
- There are technical options in public 5G networks (but with the same resilience challenges as in 4G – power autonomy, etc.) – running a private slice over public RAN etc.
- A lot of the features of “5G” are around QoS (which 4G could technically do)

Even headline features take time to gain support

Understand what you need, and check if it's ACTUALLY available (preferably in a lab type trial, before you go too far!)

I have a large graveyard of phones that claim to "do" 5G SA, but don't work on a test network PLMN (or indeed even on a cloned overseas SA-capable network PLMN)!

Takehome: Headline features will arrive late (nG+1)

(and if it's a hyped academic buzzword like self-organising networks, those have been coming in 3G, and 4G, and 5G, and 5G Advanced, and 6G, honest guv!)

The headline features help "sell" the G, but sometimes to the detriment of wider more holistic requirements – getting rid of "carrier fudges" would be great, but "carrier is king"! This makes private network operations more complex.

The risks/distractions


A.I.

“Can you give my AI access to your RAN management plan pls?”

“Y U NO????!”

Moar download speeds pls

People download…

Things upload…

Fixed assets give a different network design from MNO networks

Uplink performance and capacity (TDD slot biasing to UL)

MNOs often don’t get the UL right – ”4 bars” of 5G in a city centre with constant data stalling, anyone?

Security – the bar is raising

Telecoms Security Act + Codes of Practice

NCSC Vendor Security Assessment Framework

NIS1 and the “telecoms gap”

The TSA legislation won’t apply to private networks – separate consultation has been taking place on this by DSIT.

Does mean you need to take quite an active role in security, and really challenge your vendors (even the big names!)

Spectrum
Standards
Security
Skills

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