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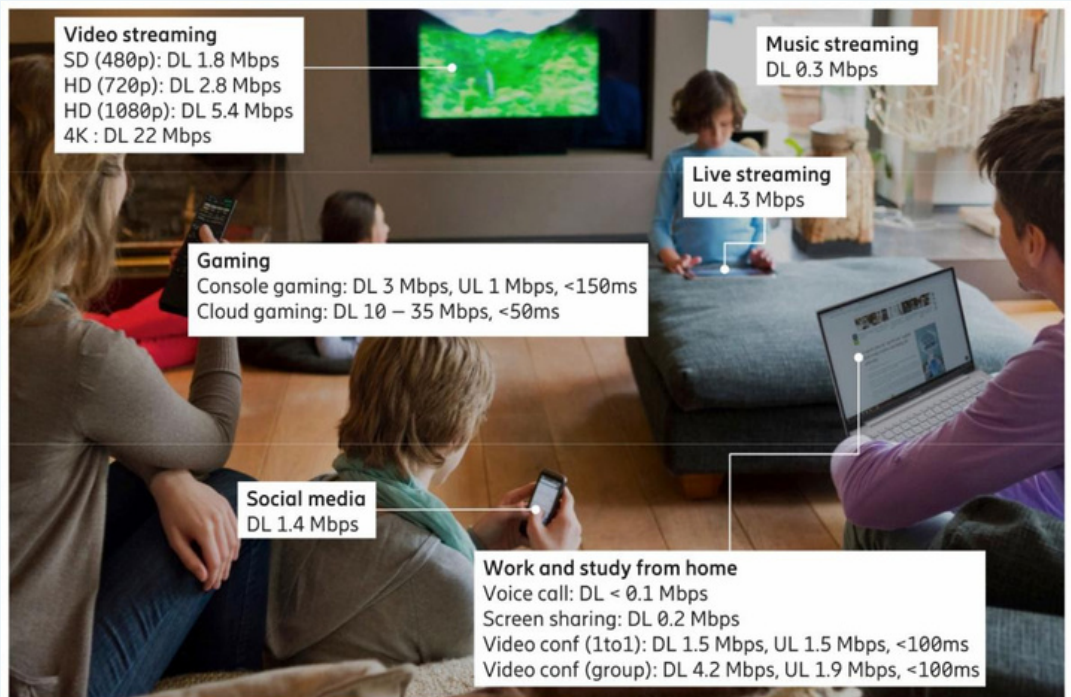
mmWave-based 5G FWA New Solution for WISP

Fixed Wireless Access 5G (NEW Solution for WISP)

Of course, Standalone Fixed Wireless Access (FWA) is NOT NEW. What is NEW is the mobile network operators will use their existing mobile network infrastructure to offer an FWA service giving them an advantage over standalone FWA providers.

This new service uses a 5G Mobile network and the mmWave spectrum to offer home users speeds up to 300 Mbps which is an increase of 10 - 15 times compared to traditional home internet services.

Average data rates for common broadband application at home users



The highest usage applications in every household are video related, which could include video conferencing as well as cloud gaming. Different video applications use a range of resolutions and frame rates, leading to different requirements on data rates. Overall household data consumption depends on the number of people per home. The illustration above shows some examples of required data rates for different applications in households.

New Essential Components at the Mobile Operator

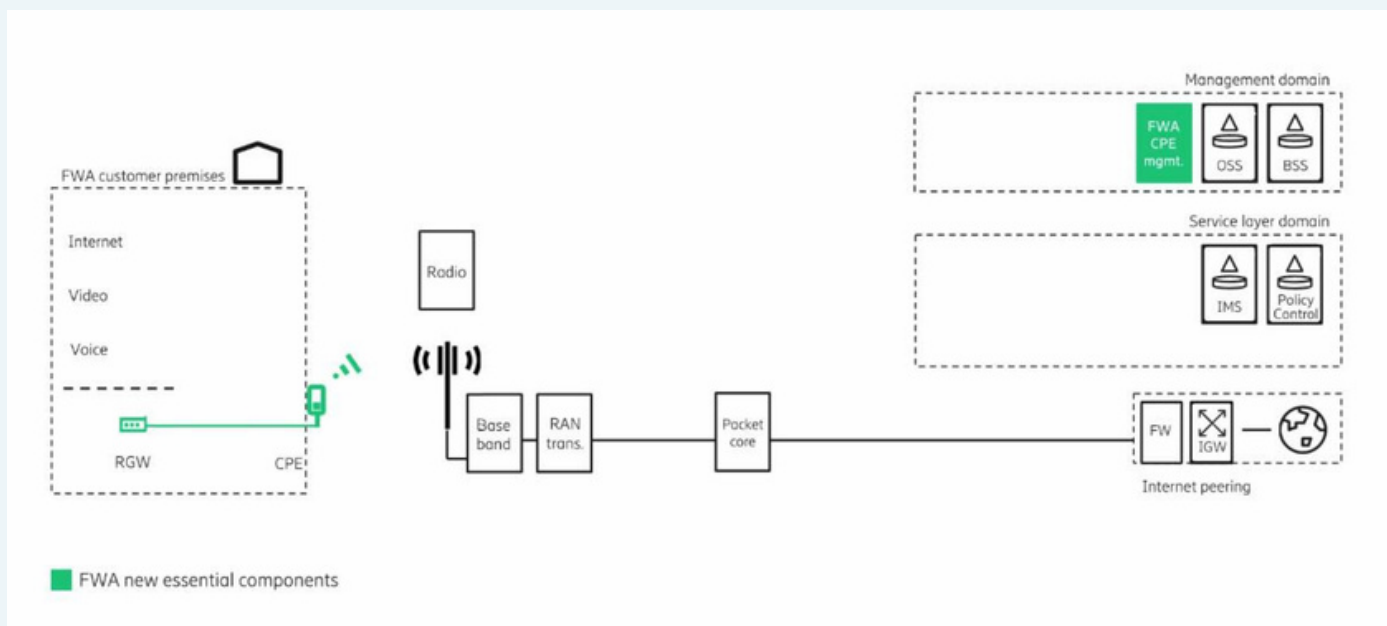
Existing Components

1. Radio Access Network (RAN) including RAN Transport
2. Core Network (CN)
3. Service Layer
4. Management Domain

For the new FWA 5G Service to take place, the mobile network operator needs new components

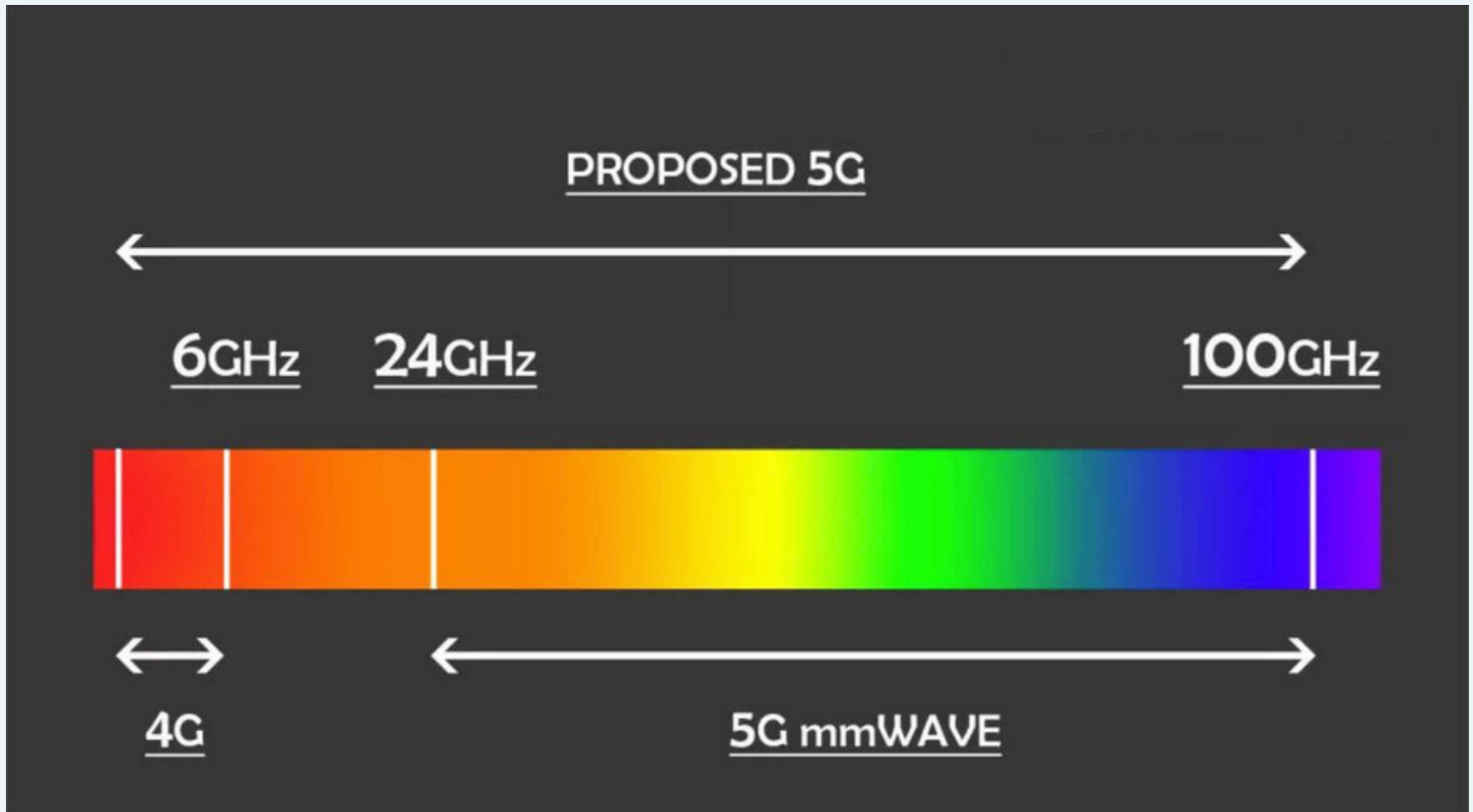
New Components

1. New FWA CPE is needed, from simple indoor nomadic devices to fixed outdoor-installed units.
2. A New CPE Management system is needed to manage the CPE in a fixed broadband sense - enabling the operator to log in to the devices, configure them and check status remotely.



Both CPE and CPE management systems are separate network entities with generally quite limited integration with cellular networks, meaning that the operator can acquire best-of-breed products and expect them to work using standard protocols.

5G mmWave Spectrum for FWA



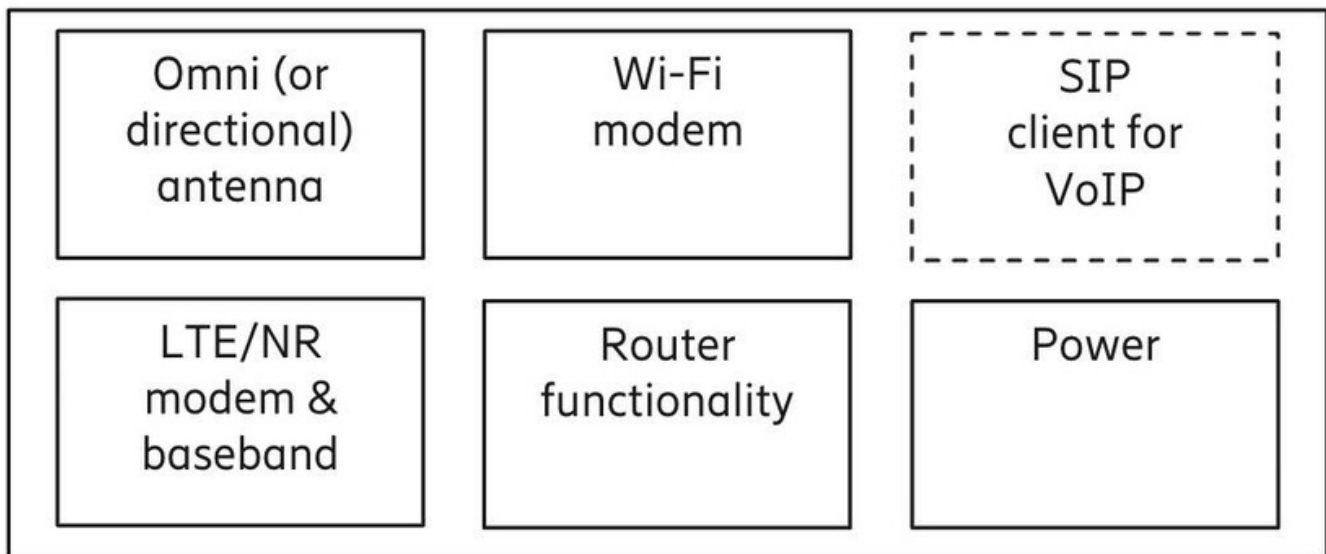
Technically, the term mmWave refers to frequencies located between 24GHz and 300GHz located between microwaves and infra-red. It is considered that the portion between 26GHz and 100MHz offers the greatest opportunity for mobile networks. The millimetre (mmWave) spectrum uses higher frequencies than the current 4G technology.

Types of 5G FWA mmWave CPEs

Indoor 5G FWA mmWave CPEs

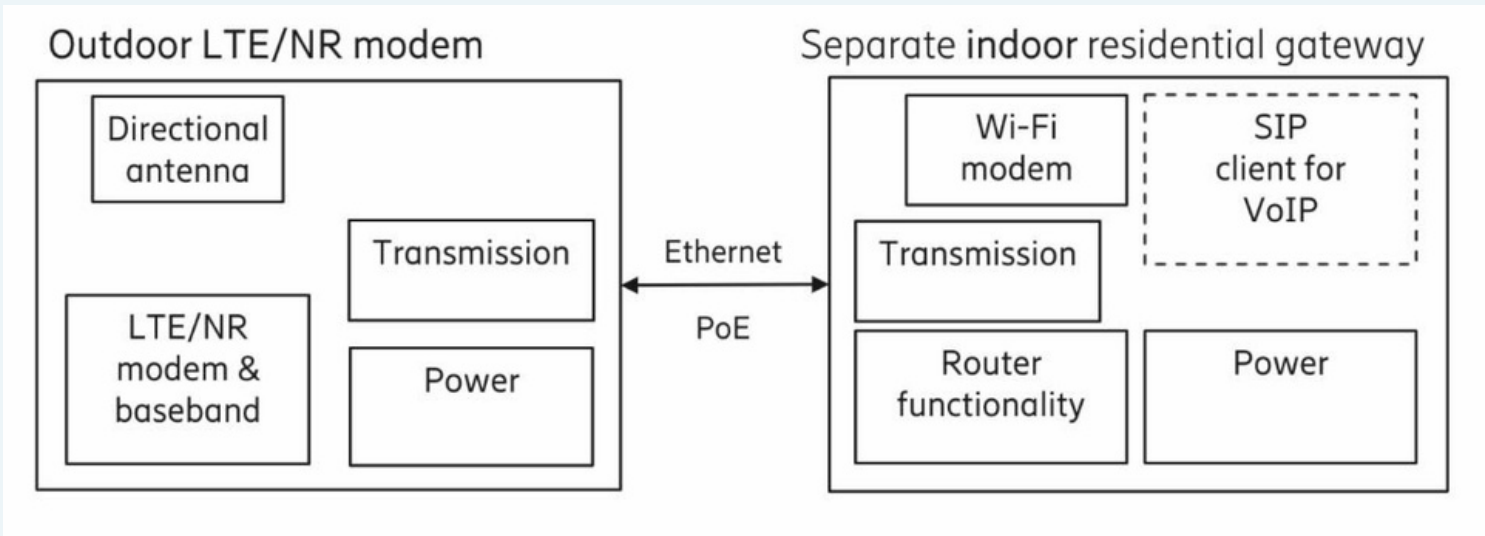


Combined LTE/NR modem including residential gateway

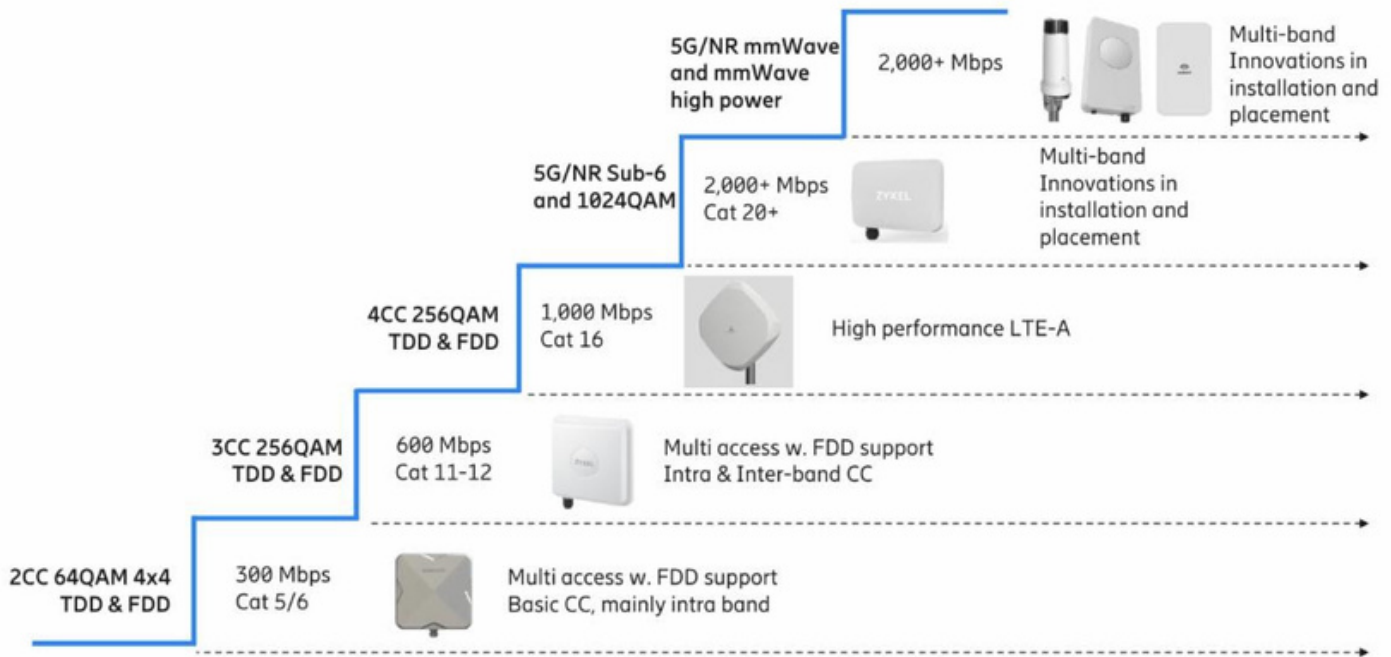


Types of 5G FWA mmWave CPEs

Outdoor High Power 5G FWA mmWave CPEs



3GPP FWA CPE Evolution



One of the main advantages of using 5G NR FWA over 'proprietary' FWA technologies is the large availability and continuous development of new 3GPP devices. As the same chipsets are used in FWA CPEs as in MBB smartphones, there is an ecosystem of multiple chipset suppliers producing hundreds of millions of chipsets a year

1. 300 Mbps QAM 64 4x4Cat 5/6
2. 600 Mbps QAM 256Cat 11/12
3. 1000 Mbps QAM 256.....Cat 16.....LTE-Advance
4. 2000+ Mbps QAM 1024.....Cat 205G/NR Sub-6 GHz
5. 2000+ Mbps QAM 1024.....Cat 225G/NR Multi-Band

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