Learn the very basics of 5G voice

5G has arrived, and the first networks and 5G smartphones have been launched in this first half of 2019. One aspect which could be seen as a hygiene factor for all 5G smartphone buyers is that a phone is still a phone! Users should be able to make regular service provider voice calls whether connecting on 5G, 4G, 3G, or even Wi-Fi.

It is, however, quite advanced to make this "basic" voice service work in mobile networks, and when adding yet another radio access, 5G, the network will need to be further evolved to support this. It will take several years before 5G is fully rolled out everywhere in the world, and there are several steps in the network evolution which must be taken into consideration when enabling voice services on 5G smartphones and other 5G voice-capable devices.

Users must be able to make regular voice calls, emergency calls, and send SMS messages on 5G smartphones. A 5G smartphone will not connect to a 5G network unless it can detect a voice-capable network.

Today’s mobile voice service network infrastructure in 4G using VoLTE will continue to be used in 5G networks

User benefits
- Smartphones with high 5G data speeds
- HD voice + call quality (EVS – Enhanced Voice Quality) provides improved voice and music quality within calls (e.g., announcements, playing music from a concert during a voice call, etc.)
- Though optional, EVS can also be used in 4G networks
- Enables for future 5G voice-related use case innovations (real-time voice translation, real-time interaction, etc.)

Service provider values
- Long-term reduced total-cost-of-ownership with fewer generations of networks to maintain
- If 2/5G/5G networks are closed down to re-form spectrum for 4G and 5G, voice services will be supported via 4G and 5G instead

IMS continues as service engine for voice services in 5G

Different generations of 5G smartphones use different mobile network functionalities to enable voice calls

Estimated industry timeline

<table>
<thead>
<tr>
<th>Q1 2019</th>
<th>Q4 2019</th>
<th>H1 2020</th>
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<tbody>
<tr>
<td>5G dual-connectivity smartphone</td>
<td>5G smartphone changes access to 4G during voice call</td>
<td>5G smartphone using voice over 5G</td>
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<tr>
<td>Voice over 4G while using 5G as a data boost</td>
<td>5G for data traffic but falling back to voice and data over 4G during voice call (EPS fallback)</td>
<td>Using 5G (NR) standalone) for voice and data</td>
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<tr>
<td>Benefits</td>
<td>Benefits</td>
<td>Benefits</td>
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<tr>
<td>Enables early market launch of smartphones with high 5G data speeds</td>
<td>Enables early market launch of smartphones with high 5G speeds</td>
<td>Always higher 5G data speeds also while making phone calls</td>
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<tr>
<td>Enables unique business opportunities and reduced cost of network operation</td>
<td>Improved voice uplink coverage vs. dual-connectivity phones</td>
<td>Improved voice quality between 5G smartphones with HD voice+</td>
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<tr>
<td>Drawbacks</td>
<td>Drawbacks</td>
<td>Drawbacks</td>
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<tr>
<td>Poorer voice uplink coverage</td>
<td>No 5G data speeds while making voice calls</td>
<td>If spotty and limited 5G coverage, there could be many voice handovers, deteriorating call reliability</td>
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<td>Shorter battery time on 5G smartphones</td>
<td>Somewhat longer call setup time due to fallback from 5G to 4G</td>
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<td>More complex and costly smartphones</td>
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</tbody>
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Mobile network and device impact

Mobile Network
- SW upgrade of 4G and 5G Rado Access Network
- SW upgrade of EPS

5G devices
- 5G smartphone with dual connectivity (5G/4G)
- VoLTE-enabled

Mobile Network
- SW upgrade of IMS
- Upgrade to 5G core network (5GC) built on service-based architecture (SBA) with tight interworking with EPS
- SW upgrade of 4G and 5G Rado Access Network

5G devices
- 5G smartphone with support for EPS Falloff (5G/4G)
- VoLTE-enabled

Mobile Network
- SW upgrade of IMS
- SW upgrade of 5G Core
- SW upgrade of 5G Radio Access Network

5G devices
- 5G smartphone with support for voice over NR (5G)
- Backwards compatible with earlier functionalities

Want to know more? Dive deep into 5G voice network evolution aspects.

Note: All information in this document reflects high-level generic industry impact on mobile networks and devices and is not intended to be used as commercial Ericsson roadmap commitments. The information provided includes some examples of benefits, drawbacks, and network and device impacts but is not intended to be an exhaustive list.

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