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LIVE

The Rising Demand of VoLTE in IoT

A Market Perspective and Roadmap from floLIVE

Background

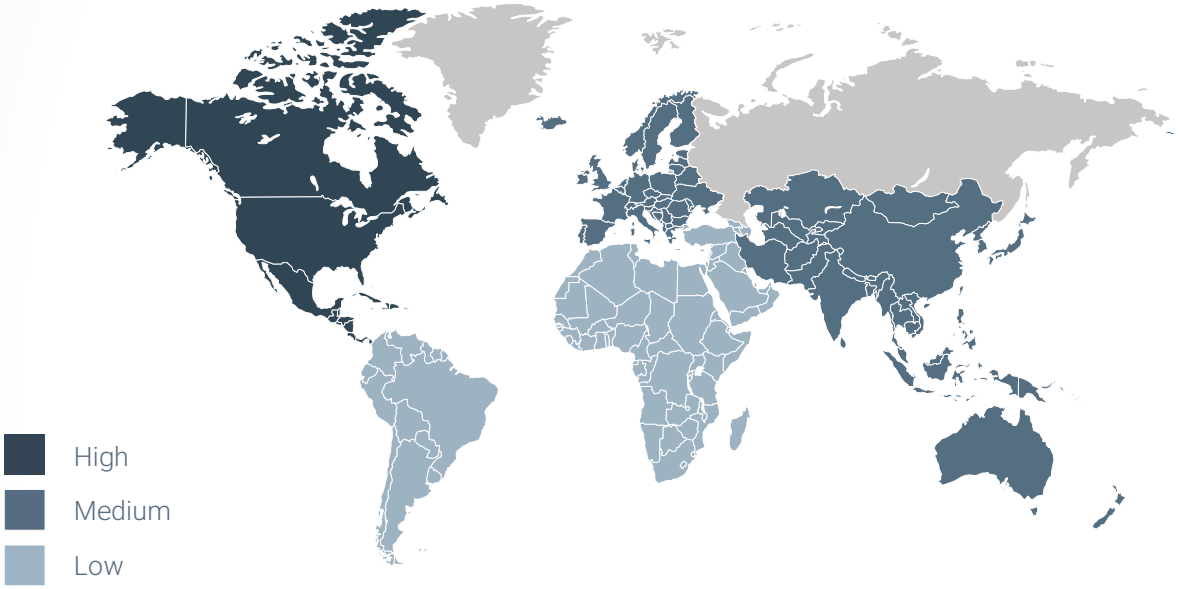
A new generation of IoT technology is rapidly developing to meet the demands of voice calls and high-speed data, which will impact key IoT applications, such as smart cities, healthcare, fleet management, industrial IoT, and much more. Voice over LTE (VoLTE) is a state-of-the-art technology that facilitates voice calls over 4G LTE networks. Unlike traditional circuit-switched networks used in earlier mobile generations, VoLTE uses digital packet switching, leveraging LTE's data-centric approach to enhance call quality and reliability. This technology allows simultaneous voice and data usage, leading to better customer experiences. VoLTE is particularly attractive for IoT environments due to its low energy consumption and efficient resource footprint.

VoLTE also offers capabilities beyond voice, including video calls, file transfers, real-time language translation, and video voicemail. The expansion of 5G networks worldwide is set to further boost VoLTE adoption, introducing "Vo5G" services that enhance voice capabilities across various sectors.

Market Status

The VoLTE market is rapidly evolving and converging with IoT and Artificial Intelligence (AI) technologies, leading to the creation of new use cases across multiple industries. In 2024, the global VoLTE market is estimated to be worth $43.69 billion and is expected to grow at a CAGR of 54 percent, reaching $378.38 billion by 2029. By 2025, around 400 operators are projected to deliver commercial VoLTE services, indicating the growing adoption and reliance on this technology.

GLOBAL VOICE OVER LTE(VoLTE) Market - Growth Rate by Region (2022-2027)



Source: Mordor Intelligence

For IoT devices, the convergence of VoLTE provides additional benefits such as Network Provided Location Information (NPLI) and event-based triggers, making it a suitable choice for applications like emergency response, healthcare, law enforcement, and connected infrastructure. Operators and technology providers are extending the applications of VoLTE to facilitate the ongoing adoption of IoT.

floLIVE's Plan for VoLTE

floLIVE aims to offer a comprehensive VoLTE solution tailored for IoT devices, enhancing its overall cellular ecosystem. Our VoLTE solution will be built in multiple phases to cater to customer demands and regulatory requirements. In the first phase, we plan to enable key features such as:

- Outbound and inbound call support for use cases like law-related communications, safety alerts, and remote health monitoring.
- Emergency call support for IoT devices to support automotive industry needs
- Deployment of IMS (IP Multimedia Subsystem) on our core network to support both voice initiation and termination services (through integration with a termination vendor and allocating MSISDNs).

VoLTE capabilities will be part of our Connectivity Management Platform (CMP), enabling users to manage call preferences, billing, and reporting easily.

floLIVE VoLTE Roadmap

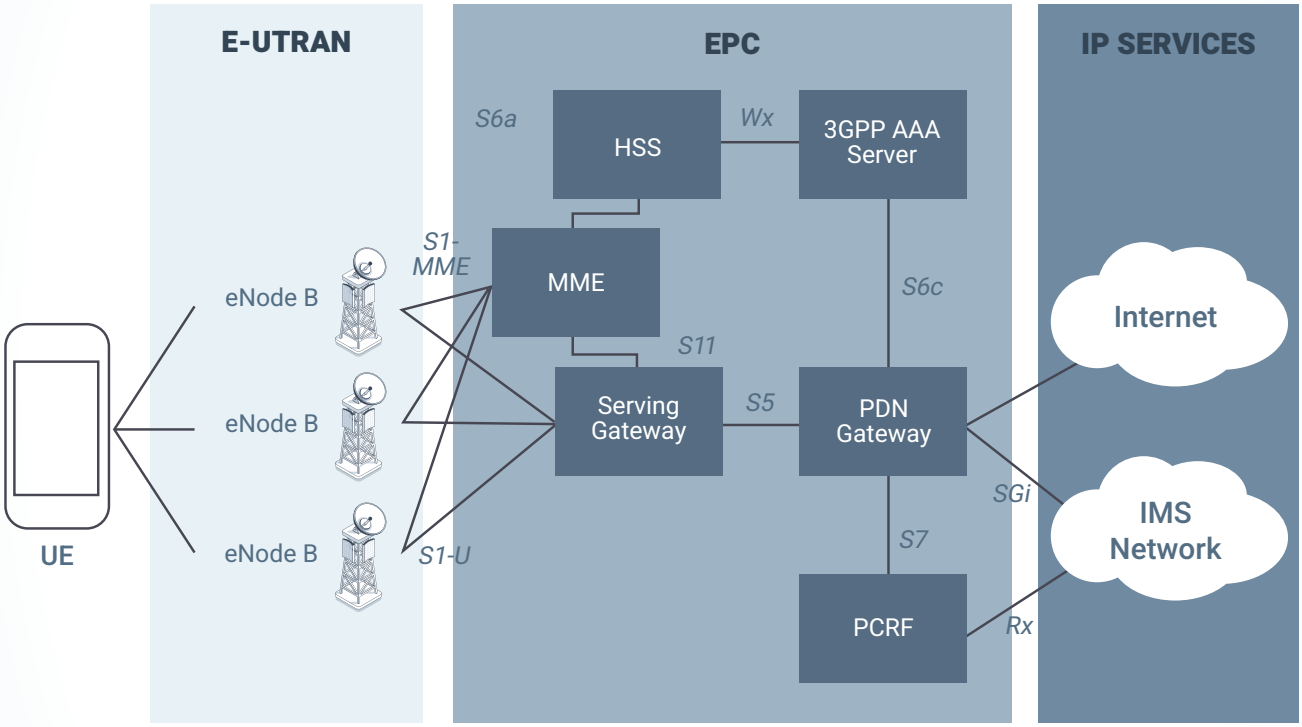
The floLIVE VoLTE roadmap will roll out as follows:

- **Phase 1 (2024-2025):** Deploy IMS on our core integrated to TIS network to support VoLTE. Implement emergency call capabilities and basic voice functionalities for IoT devices.
- **Phase 2 (2025):** Introduce advanced features, like event-based triggers for enhanced service reliability. Focus on regulatory compliance for emergency calls.
- **Phase 3 (2025):** Expand VoLTE capabilities to cover additional key geographies where floLIVE operates. Enhance scalability to cater to an increasing number of IMSIs and integrate value-added services such as video calling and real-time translations.

floLIVE Technology Approach to VoLTE

To support VoLTE, floLIVE will deploy IMS (IP Multimedia Subsystem) on our core network. This standalone system connects to the PDN Gateway over the SGi interface, facilitating seamless communication. Our IMS will be configured by floLIVE personnel, supporting both Mobile Originating (MO) and Mobile Terminating (MT) voice services.

VoLTE capabilities will be part of our Connectivity Management Platform (CMP), enabling users to manage call preferences, billing, and reporting easily.



floLIVE's technology approach includes:

- **Regulatory Compliance:** We will comply with regulations for emergency calls (e.g., eCall), ensuring correct data transfer (e.g., vehicle information, location) in emergencies.
- **CMP Integration:** Our VoLTE capabilities will be managed through the existing CMP portal, allowing for easy management, billing, and configuration.

floLIVE VoLTE Positioning

floLIVE's VoLTE solution is designed to provide an unmatched service in the IoT industry. Our focus on full control, seamless integration, and high scalability makes our solution ideal for enterprises seeking reliable voice services for mission-critical IoT deployments.

Full Control of the Cellular Ecosystem - floLIVE has developed and owns the entire cellular ecosystem, including our core network and Connectivity Management Platform (CMP). Unlike competitors who rely on third-party components, our integrated approach allows us complete flexibility and customization capabilities, ensuring that we meet specific customer requirements with precision.

Integrated Multi-IMSI Technology - A key differentiator for floLIVE is our multi-IMSI technology, which provides seamless network switching capabilities, even across borders. This ensures that IoT devices using our VoLTE solution experience uninterrupted voice connectivity, which is especially crucial for mission-critical use cases such as healthcare, connected vehicles, and public safety.

Scalable and Flexible Deployment - floLIVE's geo-redundant IMS (IP Multimedia Subsystem) deployment guarantees high availability and resilience. Our system is built to support seamless scalability, allowing us to cater to the growing number of devices and IMSIs without compromising on service quality. Whether it is managing millions of devices or expanding across new geographies, floLIVE's infrastructure is designed to adapt and grow with customer needs.

Comprehensive Management through CMP - The integration of our VoLTE capabilities with floLIVE's CMP provides a unified platform for customers to manage all aspects of their IoT connectivity. From voice, data, billing, to alerts, customers have complete transparency and control through a single portal. This seamless integration not only simplifies management but also helps reduce operational complexity for enterprises, making it easier to deploy and maintain IoT solutions.

Regulatory and Compliance Excellence - floLIVE's VoLTE solution is designed with a strong emphasis on regulatory compliance, particularly for emergency services such as eCall. We ensure that essential data—such as vehicle location and other emergency details—is accurately transmitted, adhering to the highest industry standards. This commitment to compliance is a critical component of our offering, providing peace of mind to customers who need to meet stringent regulatory requirements.

End-to-End Security and Quality Assurance - floLIVE provides an end-to-end secure VoLTE experience by deploying IMS on our own core network. This approach ensures that voice communications are secure from initiation to termination. Additionally, our robust quality of service (QoS) mechanisms ensure that customers receive high-quality, consistent voice service, regardless of the volume of network traffic or the number of connected devices.

Positioning for Customers - For enterprises in sectors such as healthcare, public safety, connected vehicles, and smart infrastructure, floLIVE's VoLTE solution offers enhanced real-time communication capabilities, ensuring reliable emergency response and seamless connectivity. Our comprehensive management capabilities through CMP, combined with our scalable and secure infrastructure, make floLIVE the ideal partner for businesses looking to leverage advanced voice technologies in their IoT deployments.

floLIVE's Superior VoLTE Solution

floLIVE's VoLTE solution stands superior to the competition in several key areas:

- **Full Control of the Cellular Ecosystem:** Unlike competitors who rely on third-party components, floLIVE has developed and owns the entire cellular ecosystem, including our own core network, IMS and CMP. This provides us with unparalleled flexibility, control, and the ability to customize services to meet specific customer needs.

- **Integrated Multi-IMSI Technology:** Our VoLTE solution is enhanced by floLIVE's multi-IMSI capabilities, allowing seamless network switching and ensuring the best possible connectivity for IoT devices, even across borders. This capability is critical for maintaining uninterrupted voice services for mission-critical IoT use cases.

- **Scalable and Flexible Deployment:** floLIVE's geo-redundant IMS deployment ensures high availability and resilience, reducing the risk of service disruption. Our solution is built to scale with customer growth, supporting a growing number of IMSIs and use cases without compromising on quality.

- **Comprehensive Management through CMP:** Our VoLTE offering is fully integrated with floLIVE's Connectivity Management Platform, providing customers with a unified portal to manage all aspects of their IoT connectivity, including voice, data, billing, and alerts. This seamless integration simplifies operations for customers and offers superior transparency and control.

- **Regulatory and Compliance Excellence:** floLIVE's approach to VoLTE places a strong emphasis on regulatory compliance, especially for emergency services like eCall. Our solution ensures that data such as vehicle location and other emergency information is transmitted accurately and reliably, adhering to the highest industry standards.

- **End-to-End Security and Quality Assurance:** floLIVE provides a secure and reliable VoLTE experience by deploying IMS on our own core network, ensuring end-to-end security for voice communications. Our commitment to maintaining high standards for quality of service ensures that customers receive a consistent, high-quality voice experience.

floLIVE's VoLTE roadmap and technology approach is designed to provide a compelling solution for enterprises seeking to leverage advanced voice capabilities in their IoT deployments, meeting both the demands of today and the future.

eCall implementation

floLIVE eCall implementation will be according to the local regulation, for reference

1. Europe (EU) implementation - Regulated market
2. United States (US) implementation - None regulated market

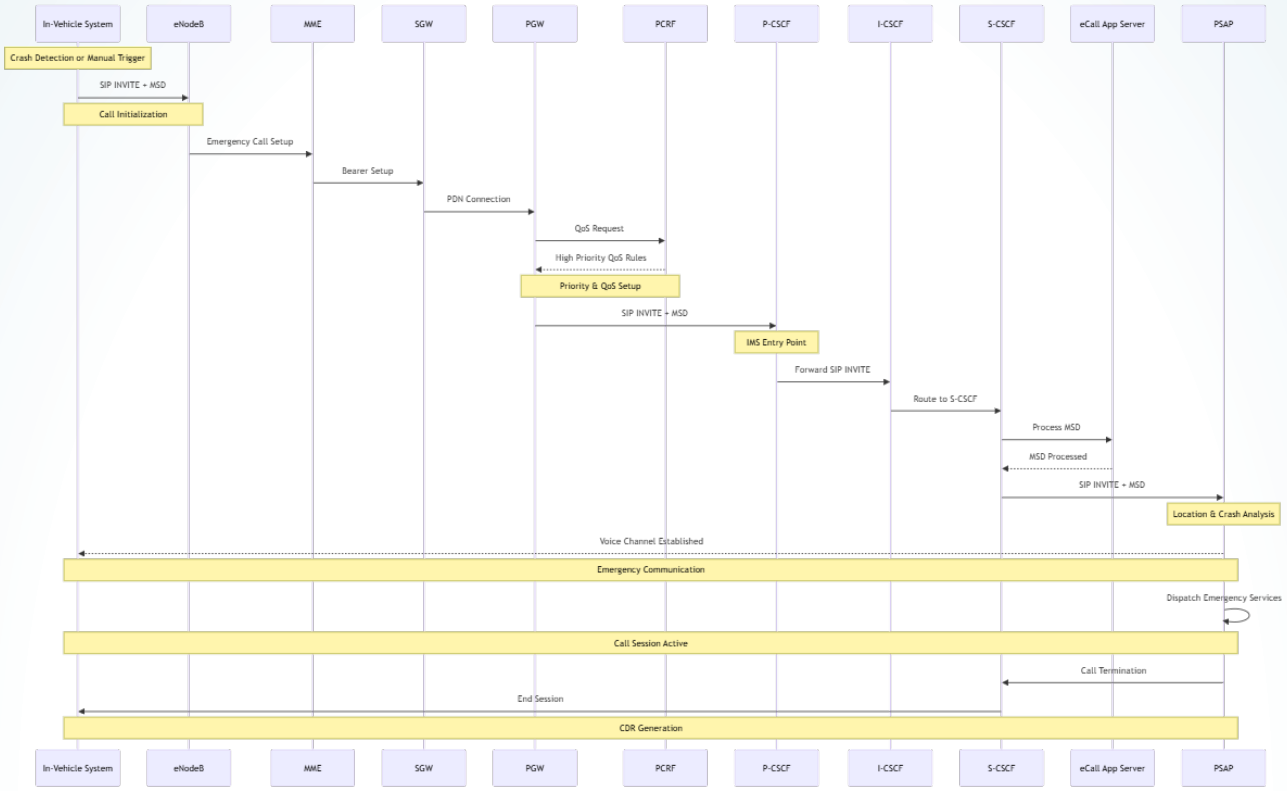
Europe (EU) Implementation

- **Mandatory Compliance with NG112 Standards:** The eCall system is mandatory in Europe for all new vehicles since 2018. In-Vehicle System (IVS) and/or eCall devices installed in vehicles must meet the Next Generation 112 (NG112) standards for it to work.
- **IMS Deployment:** floLIVE IP Multimedia Subsystem (IMS) supports SIP signaling and ensures the appropriate management of eCall flows.
- **Regulatory and Technical Considerations:** The IMS is fully interoperated with floLIVE core networks to ensure correct data transmission, including Minimum Set of Data (MSD), such as vehicle location and crash details, during emergency calls.
- **Location-Based Routing:** eCalls must be routed to the appropriate Public Safety Answering Point (PSAP) based on the caller's location. This involves leveraging the Network Provided Location Information (NPLI) feature of LTE and ensuring Quality of Service (QoS) is maintained for priority handling.
- **PSAP Integration:** floLIVE will need to ensure that the call is delivered to the PSAP and that the MSD is sent in compliance with European Telecommunications Standards Institute (ETSI) guidelines, ensuring consistency and accuracy of emergency information across borders.

United States (US) Implementation

- **Support for Proprietary Services:** Unlike Europe, there is no mandatory eCall system in the US. Vehicle manufacturers, like GM with OnStar, have their proprietary systems for automatic crash notification.
- **NG911 Compliance:** The emergency calls will be routed to PSAPs using the existing 9-1-1 framework under the Next Generation 911 (NG911) system. floLIVE's IMS will comply with NENA (National Emergency Number Association) standards to ensure compatibility.
- **Proprietary MSD Handling:** In the US, the MSD is not standardized as in Europe. Instead, Automatic Location Identification (ALI) or Device-Based Hybrid (DBH) GPS solutions are used to determine caller location. floLIVE's IMS is adaptable to send location information in a format compatible with the NG911 system.
- **Routing Considerations:** Since the US has a fragmented emergency service infrastructure, floLIVE will work with local PSAPs to route calls, either via IMS or through legacy TDM (Time Division Multiplexing) systems, ensuring emergency call information reaches the correct authorities.

eCall Call Flow



1. **Incident Detection:**
    a. The In-Vehicle System (IVS) detects a crash through sensors (e.g., airbags, accelerometers) or the driver manually presses an emergency button.
2. **Call Initialization:**
    a. The IVS automatically generates a SIP INVITE message to initiate an emergency voice call over the LTE network.
    b. Along with the SIP INVITE, the Minimum Set of Data (MSD), containing vehicle location, timestamp, and crash details, is packaged for transmission.
3. **LTE Network Access:**
    a. The emergency call is transmitted via the eNodeB (base station), which provides the necessary radio access and forwards the call to the core network components, namely the Mobility Management Entity (MME), Serving Gateway (SGW), and Packet Data Network Gateway (PGW).
4. **IMS Core Network:**
    a. The Packet Data Network Gateway (PGW) directs the call to the IP Multimedia Subsystem (IMS).
    b. The Proxy Call Session Control Function (P-CSCF) in the IMS network acts as the first point of contact, authenticating and forwarding the SIP INVITE to the Interrogating CSCF (I-CSCF).
    c. The I-CSCF forwards the SIP request to the appropriate Serving CSCF (S-CSCF), which manages session control, and the eCall Application Server is used to handle the MSD.

5. **Routing to Public Safety Answering Point (PSAP):**
    a. The S-CSCF identifies the appropriate Public Safety Answering Point (PSAP) based on location information.
    b. The SIP INVITE with voice and the MSD are routed to the designated PSAP.
6. **PSAP Response:**
    a. The PSAP receives the SIP INVITE and MSD. It establishes a voice channel with the IVS and processes the MSD to determine the vehicle's location, the nature of the crash, and other vital details.
    b. The operator at the PSAP can communicate directly with the occupants of the vehicle and dispatch emergency services accordingly.
7. **Call Priority and Quality of Service:**
    a. Throughout the call, the Policy and Charging Rules Function (PCRF) ensures that the call is given high priority, ensuring low latency and quality of service (QoS).
8. **End of eCall Session:**
    a. Once emergency services are dispatched, and the conversation concludes, the call session is terminated.
    b. Relevant Call Detail Records (CDRs) are generated and exported for auditing, billing, and analysis purposes.

Let’s Connect You to the World

About floLIVE

floLIVE designed and developed an elastic, robust core cellular infrastructure that is the largest connectivity backbone in the world. Through this powerful infrastructure, the company offers numerous services to mobile operators, IoT MVNOs and Global Enterprises seeking seamless, compliant, high performance and regulatory compliant connectivity, anywhere in the world.

With a global carrier library that is based on interconnected local core mobile networks, floLIVE ensures low latency, high performance, and full compliance with privacy acts, data regulations, and roaming restrictions. As of today, more than 20 mobile operators are on board the platform, giving companies multi-tier connectivity access.

Through direct access to our network, customers can monitor their devices, access real-time network events and usage, switch operators remotely, and troubleshoot failures ahead of time, providing a seamless experience that keeps devices connected at all times. Through one integration, one SKU and one platform, customers have a world of connectivity and endless possibilities.

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Let’s connect

Get in touch to discuss how we can meet your IoT requirements. We’re sure to surprise you.

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