TECHNICAL AND OPERATIONAL GUIDELINES FOR DEPLOYMENT AND ROLL OUT OF COMMERCIAL INTERNET TELEPHONY SERVICES 2026

1. INTRODUCTION

Innovations in the telecommunications subsector have seen telephony services evolve from Plain Old Telephone Service (POTS) implemented as the Public Switched Telephone Network (PSTN) using copper wire infrastructure, to Mobile Telephony, implemented as Public Land Mobile Networks (PLMN) cellular networks that use radio waves to transmit voice and data, to the now Internet Telephony which uses Voice over Internet Protocol (VoIP) protocols to convert voice into digital signals transmitted over the internet.

Whereas the Authority runs a Unified Licensing Framework (ULF) that is technology and service-neutral, which covers all technological advancements used in regulated services provision, the technologies present gaps and inconsistencies that need to be addressed in various supplementary regulatory documents.

These guidelines, therefore, supplement existing legal and regulatory documents with regard to the technical and operational aspects of commercial Internet Telephony Services.

2. OBJECTIVES

The specific objectives to be realized are:

2.1. Provide an understanding of internet telephony services and the distinction for internet telephony services that are amenable to regulation and the associated regulatory constraints.

2.2. Provide for a fair and level playing field between internet telephony service providers and other telephony service providers.

2.3. Provide for obligations of internet telephony service providers to ensure compliance with the existing legal and regulatory documents on telephony services.

2.4. Provide for best practice regarding deployment and rollout of internet telephony services.

3. **SCOPE**

These Technical and Operational guidelines for Deployment and Roll Out of Commercial Internet Telephony Services are limited to:

3.1. Overview of Internet telephony services covering types of Internet telephony services, architectures, and protocols powering Internet Telephony Services.

3.2. Licensing requirements for Internet telephony services.

3.3. Deployment and Rollout Requirements for Internet Telephony Services.

3.4. Local and International Commercial Internet Telephony Calls

3.5. Obligations for Internet telephony services not covered in the general Unified Licensing Framework conditions.

3.6. Obligations for Public Switched Telephone Network (PSTN) and Public Land Mobile Networks (PLMN) in relation to Internet telephony service providers.

3.7. General obligations for Commercial Internet Telephony Service Providers.

3.8. Repeal of the Guidelines for the Implementation and Provision of Voice over Internet Protocol (VoIP) Services.

4. **INTERNET TELEPHONY SERVICES**

Internet telephony services involve conversion of analog voice signals to digital formats and translation of the signals into Internet protocol (IP) packets for transmission over the Internet or Internet Protocol network, and reversing the process at the receiving end.

Internet telephony services have evolved, resulting in various implementations by different telephony service providers. The models include trunk replacement, where the call originating and receiving parties use PSTN/PLMN networks, with the call having transited via IP networks/internet. Figure 1 depicts this setup.
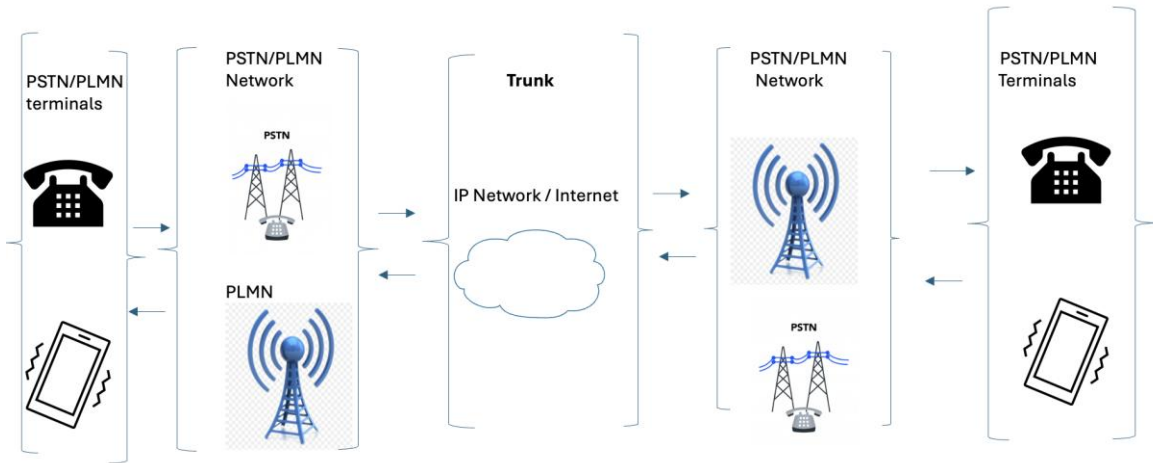
Figure 1: Trunk Replacement Model

The second model, hybrid architecture, involves the call originating from the PSTN/PLMN network and the receiving party being on the IP network or vice versa. Figure 2 shows this hybrid setup.
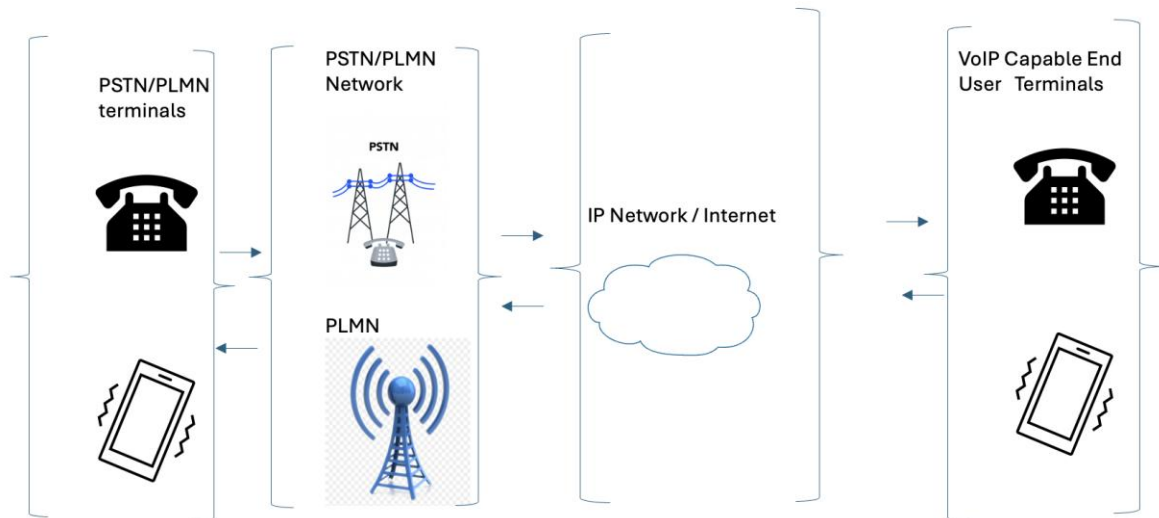

Figure 2: Hybrid Model

Modern implementations of hybrid architecture has seen emergence of technologies like VoLTE (Voice over LTE), where Cellular LTE (4G) network, which is IP based, used to terminate calls on LTE-enabled smartphones and SIM cards, and VoWiFi (Voice over WiFi) where WiFi network is used to terminate calls to compatible phones, and Voice over New Radio(VoNR), which enables transportation and termination of voice calls over 5G networks and the associated compatible devices.

The third model is the end to end IP telephony, where both the call originating and receiving parties are on the IP networks/internet. This is self-provisioned internet telephony service and is currently not regulated. Figure 3 depicts this model.
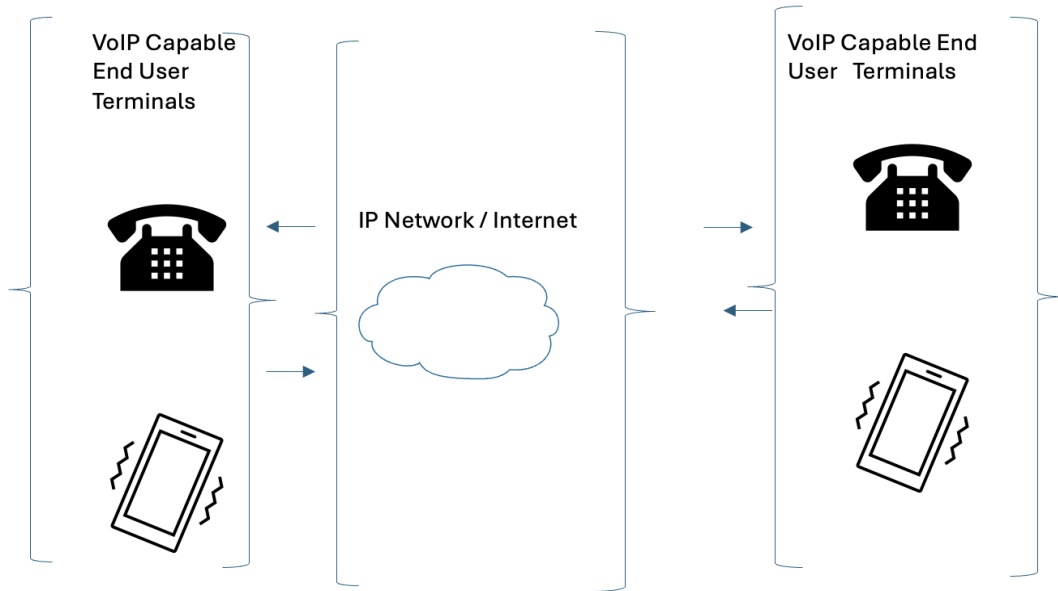

Figure 3 : End-to-End Model

These guidelines are meant for the Hybrid model of commercial Internet Protocol telephony deployment. A zoomed-in architecture of the hybrid model with key components is depicted in Figure 4.
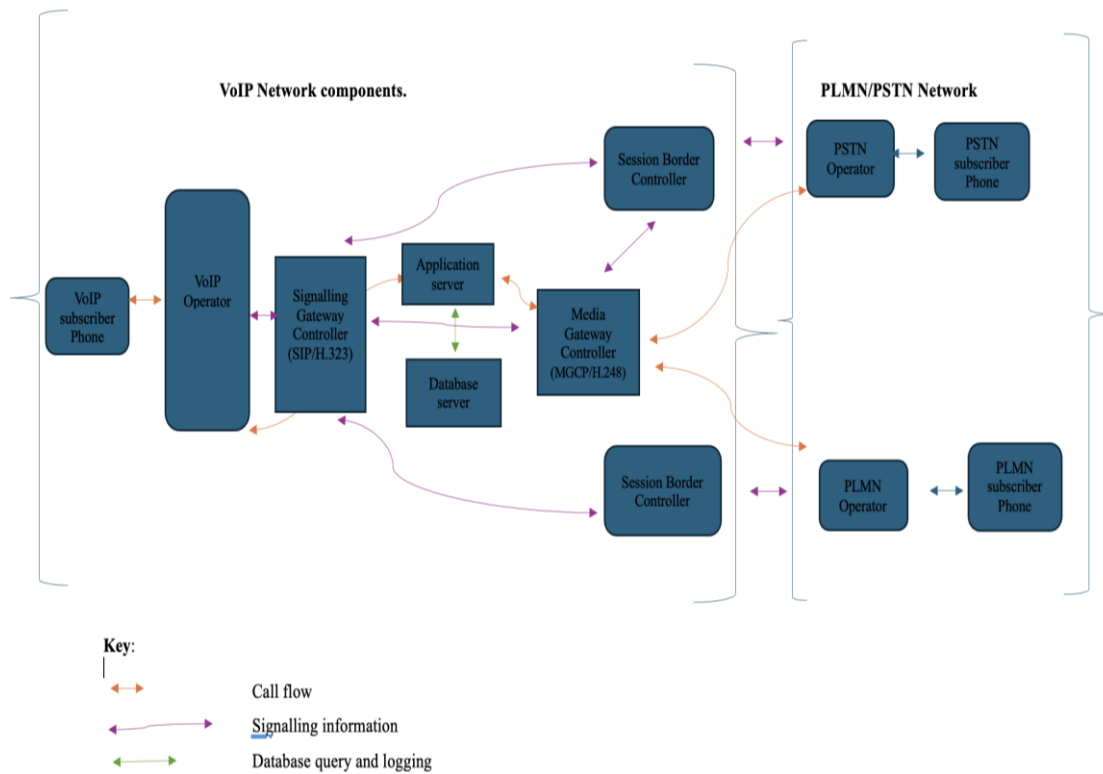
Figure 4: Key Components of Internet Telephony

The functionalities of the various components are detailed in Table 1.

Table 1: Functions of Internet telephony Architecture components

No.	Component	Function
1.	Signaling Gateway Controller (SGC)	⇒ Manages call setup, routing, and teardown. ⇒ signaling protocols SIP and H.323.
2.	Session Border Controller (SBC)	⇒ Protecting and regulation of VoIP traffic across distinct networks. ⇒ Other duties include NAT traversal, security, and bandwidth management.
3.	Media Gateway	⇒ Converts voice between IP and traditional PSTN/PLMN formats enabling communication between digital and analog systems. ⇒ Uses codecs like: G.711, G.729, Opus, SILK

No.	Component	Function
		⇒ Protocols used include Media Gateway Control Protocol (MCGP) and H.248
		⇒ Uses **SDP** (Session Description Protocol) to describe media streams and **RTP** (Real-time Transport Protocol) to transmit audio data.
4.	Application Server	⇒ Handles call forwarding, voicemail, conferencing and other telephony features
5.	Database Services	⇒ Stores user registration, call records, and endpoint locations.

5. LICENSING REQUIREMENTS

5.1. For commercial internet telephony services within the country, the applicable license is an Application Service Provider (ASP).

5.2. For termination, transit, or origination of internet telephony calls out of the country, the applicable license is International Gateway Systems and Services (IGSS).

6. DEPLOYMENT AND ROLLOUT REQUIREMENTS FOR INTERNET TELEPHONY SERVICES

6.1. Deployment and roll-out of Internet Telephony services shall utilise Internet Protocol (IP) version 6 and any emergent latest technologies riding on IPv6, both at the network and end user levels.

6.2. To sustain the required Quality of Service, internet telephony deployment shall utilise Key QoS protocols and techniques like:

6.2.1. Differentiated Services Code Point (DSCP)

A field in the IP header used to mark voice packets as high-priority traffic so routers and switches can identify them.

6.2.2. Priority Queuing

A method that sorts traffic into different queues, ensuring that voice packets are processed and sent before other, lower-priority types of traffic.

6.2.3. Traffic Shaping

A technique that limits the bandwidth available to non-voice traffic to guarantee sufficient bandwidth for voice calls.

6.2.4. Jitter Buffers

A temporary storage for incoming voice packets that smooths out variations in packet arrival times, which helps prevent audio glitches.

6.2.5. Class-Based Queuing

A more advanced form of queuing that assigns traffic to different classes based on priority levels, ensuring higher-priority traffic is handled first.

6.3. The applicable Quality of Service parameters for commercial internet telephony shall be:

6.3.1. Packet loss of less than 1%.
6.3.2. One-way delay of less than 150 milliseconds for real-time voice traffic in line with ITU G.114 specification.
6.3.3. Latency of less than 100milliseconds.
6.3.4. Jitter of less than 20milliseconds.

6.4. From the deployment, it should be possible to:

6.4.1. Trace the IP address of the originating call, noting that different Regional Internet Registries (RIRs) have different IP address blocks.
6.4.2. View the airtime top-up pattern of a given internet telephony number.
6.4.3. View the International Mobile Equipment Identifier (IMEI) number as registered by the network for each number in use.
6.4.4. View the settlement patterns between different interconnected service providers.

6.5. All calls made via VoIP platforms must display valid Caller Line Identifiers (CLI) information for purposes of distinction between international and local commercial internet calls.

6.6. Assigned numbering resources are for use in Kenya and can not be reassigned or transferred for use in a different country.

6.7. It shall be possible to demonstrate that the numbers used for termination of local commercial internet telephony traffic within the country are configured on systems of Kenyan licensed commercial internet telephony providers.

7. LOCAL AND INTERNATIONAL COMMERCIAL INTERNET TELEPHONY CALLS

7.1. A subscriber of a Kenyan internet telephony provider calling a subscriber of another telephony service provider in Kenya, irrespective of their physical location, shall be considered to be making a local call.

7.2. Local internet telephony calls shall be subjected to local interconnect rates.

7.3. A subscriber of a non Kenyan telephony provider calling a subscriber of a Kenyan telephony service provider in Kenya, irrespective of their physical location, shall be considered to be making an international internet call.

7.4. International internet telephony calls shall be subjected to commercial interconnect rates.

8. OBLIGATIONS FOR COMMERCIAL INTERNET TELEPHONY SERVICE PROVIDERS

In addition to obligations stated in the respective licences held, the commercial internet telephony service provider shall ensure to:

8.1. Transit or deliver only internet calls with valid Calling Line Identifiers.

8.2. Deploy their networks in conformance with the requirements of these guidelines.

8.3. Ensure registration of Subscribers in line with the set framework governing subscriber registrations, the Kenya Information and Communications (Registration of Telecommunications Service Subscribers) Regulations.

9. **OBLIGATIONS FOR PUBLIC SWITCHED TELEPHONE NETWORK (PSTN) AND PUBLIC LAND MOBILE NETWORKS (PLMN)**

In addition to obligations stated in the respective licences held, the PSTN and PLMN shall:

9.1. Ensure only internet calls with valid Calling Line Identifiers are terminated or switched through their networks.
9.2. Block any internet calls without Calling Line Identifiers.
9.3. Flag and report internet calls with Calling Line Identifiers suspected to be invalid or manipulated.

10. REPEAL OF 2005 VoIP GUIDELINES

10.1. These Technical and Operational Guidelines for Deployment and Roll Out of Commercial Internet Telephony Services 2025, REPEAL, the Guidelines for the Implementation and Provision of Voice over Internet Protocol (VoIP) Services published on August 12th, 2005, vide Gazette Notice No. 6394.

Signed:

D/SRM: _____ **Date** _____

Director General: _____ **Date** _____