**3GPP TSG SA WG4#132 Tdoc S4-251155**

**Fukuoka, Japan, 19-23 May 2025**

**Source: China Mobile**

**Title: Timeplan for FS\_ULBC Study Item**

**Version: 0.2**

**Agenda Item: 7.9**

**Document for: Discussion and Agreement**

# Introduction

This document outlines a timeplan for the proposed new Feasibility Study on Ultra Low Bitrate Speech Codec. The proposed Feasibility Study has the following objectives:

1. Document the application scenarios for ultra-low bit rate communication services taking into account the use cases and potential requirements documented in TR 22.887 related to IMS Voice Call Using GEO Access.

2. Study GEO channel characteristics and derive service-related dependencies, e.g. bitrates, mouth-to-ear delay or loss/delay/jitter profiles.

NOTE: Any impact of ultra-low bitrate voice codec in NB-IoT services is outside of the scope of the study and is expected to be addressed by other working groups.

3. Identify the relevant design constraints for such a codec, in coordination with other WGs, including

- Bit rates

- Sample rate and audio bandwidth

- Frame length

- Complexity and memory demands

- Algorithmic delay

- Packet loss concealment (PLC)

- Potential use of noise suppression as part of the codec

- Discontinuous transmission including voice activity detection and comfort noise

- Speech quality

- Robustness to non-speech input

4. Provide some evidence that the design criteria can be met, for example existing reference codecs.

5. Define performance requirements and identify appropriate test methodologies, regarding speech quality, intelligibility, conversational quality, in particular taking into account

a) Clean speech and noisy speech

b) Tandeming with existing IMS voice codecs

c) Clean channel and GEO channel conditions

6. Identify or develop objective measures to verify the design constraints as necessary (e.g., to measure complexity and memory demands)

7. Identify relevant reference codecs for comparison and evaluation purposes.

8. Coordinate work with other 3GPP groups e.g. SA2, RAN, CT1, and others as needed.

9. Define potential normative work item objectives and timeline.

# Timeplan

The timeplan for the execution of the FS\_ULBC study item objectives is in the following table:

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| **Meeting** | **Objectives** |
| TSG SA#107Incheon, KR(12th – 14th March 2025) | * Approval of study item FS\_ULBC by TSG SA (SA#107)
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| SA4#131-bis-e(11th – 17th April 2025) | * **Start** documenting the application scenarios for ultra-low bit rate communication services taking into account the use cases and potential requirements documented in TR 22.887 related to IMS Voice Call Using GEO Access.
* **Start** studying GEO channel characteristics and derive service-related dependencies, e.g. bitrates, mouth-to-ear delay or loss/delay/jitter profiles.
* **Start** identifying relevant reference codecs for comparison and evaluation purposes
* **Start** coordinating work with other 3GPP groups e.g. SA2, RAN, CT1, and others as needed.
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| Audio SWG telco, May 5th, 15:00 – 16:00 CEST, submission deadline May 2nd, 15:00 CEST, host: Ericsson | * Application Scenarios
* Technical Contributions
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| SA2#169Fukuoka, JPCT1#155Bratislava, SKRAN1#121RAN2#130RAN3#128RAN4#115RAN5#107Malta, MT(19th – 23rd May 2025) | For information:* Opportunity for feedback to SA4(Same time as SA4#132)
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| SA4#132Fukuoka, JP(19th – 23rd May 2025) | * **Finalize** documentation of the application scenarios for ultra-low bit rate communication services addressing the use cases and potential requirements documented in TR 22.887 related to IMS Voice Call Using GEO Access.
* Progress study of GEO channel characteristics and derivation of service-related dependencies, e.g. bitrates, mouth-to-ear delay or loss/delay/jitter profiles.
* Progress identifying relevant reference codecs for comparison and evaluation purposes
* Progress coordinating work with other 3GPP groups e.g. SA2, RAN, CT1, and others as needed.
* **Start** identifying or developing objective measures to verify the design constraints as necessary (e.g., to measure complexity and memory demands)
* **Start** Identifying the relevant design constraints for such a codec, in coordination with other WGs, including
	+ Bit rates
	+ Sample rate and audio bandwidth
	+ Frame length
	+ Complexity and memory demands
	+ Algorithmic delay
	+ Packet loss concealment (PLC)
	+ Potential use of noise suppression as part of the codec
	+ Discontinuous transmission including voice activity detection and comfort noise
	+ Speech quality
	+ Robustness to non-speech input
* **Start** providing some evidence that the design criteria can be met, for example existing reference codecs.
* **Start** defining performance requirements and identifying appropriate test methodologies, regarding speech quality, in particular taking into account
	+ Clean speech and noisy speech
	+ Tandeming with existing IMS voice codecs
	+ Clean channel and GEO channel conditions
* If time permits: **Start** documentation of the application scenarios for ultra-low bit rate communication services addressing potentially additional use cases.
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| Audio SWG telco, June 4th, 15:00 – 16:00 CEST, submission deadline May 30, 15:00 CEST, host: Qualcomm | * Progress study of GEO channel characteristics and derivation of service-related dependencies, e.g. bitrates, mouth-to-ear delay or loss/delay/jitter profiles.
* Perform RAN related simulation within SA4
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| Audio SWG telco, June 18th, 15:00 – 16:00 CEST, submission deadline June 13, 15:00 CEST, host: Qualcomm | * Progress study of GEO channel characteristics and derivation of service-related dependencies, e.g. bitrates, mouth-to-ear delay or loss/delay/jitter profiles.
* Alignment with RAN1 simulation efforts
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| Audio SWG telco, July 11st, 15:00 – 16:00 CEST, submission deadline July 8nd, 15:00 CEST, host: Qualcomm | * Progress study of GEO channel characteristics and derivation of service-related dependencies, e.g. bitrates, mouth-to-ear delay or loss/delay/jitter profiles.
* Perform End-to-End simulation within SA4
 |
| SA4#133-e(21st – 25th July 2025) | * Progress study of GEO channel characteristics and derivation of service-related dependencies, e.g. bitrates, mouth-to-ear delay or loss/delay/jitter profiles.
* Progress coordination work with other 3GPP groups e.g. SA2, RAN, CT1, and others as needed.
* Progress identification of relevant reference codecs for comparison and evaluation purposes
* Progress Identifying or developing objective measures to verify the design constraints as necessary (e.g., to measure complexity and memory demands)
* Progress identifying the relevant design constraints for such a codec, in coordination with other WGs, including
	+ Bit rates
	+ Sample rate and audio bandwidth
	+ Frame length
	+ Complexity and memory demands
	+ Algorithmic delay
	+ Packet loss concealment (PLC)
	+ Potential use of noise suppression as part of the codec
	+ Discontinuous transmission including voice activity detection and comfort noise
	+ Speech quality
	+ Robustness to non-speech input
* Progress providing some evidence that the design criteria can be met, for example existing reference codecs.
* Progress defining performance requirements and identifying appropriate test methodologies, regarding speech quality, in particular taking into account
	+ Clean speech and noisy speech
	+ Tandeming with existing IMS voice codecs
	+ Clean channel and GEO channel conditions
* If time permits: Progress documentation of the application scenarios for ultra-low bit rate communication services addressing potentially additional use cases.
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| SA2#170CT1#156Goteborg, SERAN1#122RAN2#131RAN3#129RAN4#116RAN5#108Bengaluru, IN(25th – 29th August 2025) | For information:* Opportunity for feedback to SA4
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| TSG SA#109China, CN(16th – 19th September 2025) | * n/a
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| F22 Ad-hoc MeetingErlangen, GermanySeptember 23rd – 25th (Tuesday – Thursday) | Fraunhofer IIS offers to host an ad hoc meeting in its facilities in ErlangenElectronic participation could be provided on a best effort approach. |
| SA4#134Dallas, US(17th – 21st November 2025) | * **Finalize** study of GEO channel characteristics and derivation of service-related dependencies, e.g. bitrates, mouth-to-ear delay or loss/delay/jitter profiles.
* Finalize coordination work with other 3GPP groups e.g. SA2, RAN, CT1, and others as needed.
* **Finalize** identification of relevant reference codecs for comparison and evaluation purposes
* **Finalize** identification the relevant design constraints for such a codec, in coordination with other WGs, including
	+ Bit rates
	+ Sample rate and audio bandwidth
	+ Frame length
	+ Packet loss concealment (PLC)
	+ Potential use of noise suppression as part of the codec
	+ Discontinuous transmission including voice activity detection and comfort noise
* If time permits: **Finalize** documentation of the application scenarios for ultra-low bit rate communication services addressing potentially additional use cases.
* Progress evidence that the design criteria can be met, for example existing reference codecs
* Progress identifying or developing objective measures to verify the design constraints as necessary (e.g., to measure complexity and memory demands)
* Progress identifying the relevant design constraints for such a codec, in coordination with other WGs, including
	+ Complexity and memory demands
	+ Algorithmic delay
	+ Speech quality
	+ Robustness to non-speech input
* Progress defining performance requirements and identifying appropriate test methodologies, regarding speech quality, in particular taking into account
	+ Clean speech and noisy speech
	+ Tandeming with existing IMS voice codecs
	+ Clean channel and GEO channel conditions
* Start defining potential normative work item objectives and timeline
 |
| TSG SA#110Baltimore, US(9th – 12th December 2025) | * n/a
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| SA4#135India, IN(9th – 13th February 2026) | * **Finalize** identification or development objective measures to verify the design constraints as necessary (e.g., to measure complexity and memory demands)
* Progress identification of the relevant design constraints for such a codec, in coordination with other WGs, including
	+ Complexity and memory demands
	+ Algorithmic delay
	+ Speech quality
	+ Robustness to non-speech input
* Progress evidence that the design criteria can be met, for example existing reference codecs.
* Progress defining performance requirements and identifying appropriate test methodologies, regarding speech quality, in particular taking into account
	+ Clean speech and noisy speech
	+ Tandeming with existing IMS voice codecs
	+ Clean channel and GEO channel conditions
 |
| TSG SA#111Japan, JP(10th – 13th March 2026) | * TR for information
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| SA4#136location tbd(13th – 17th April 2026) | * **Finalize** identification of the relevant design constraints for such a codec, in coordination with other WGs, including
	+ Complexity and memory demands
	+ Algorithmic delay
	+ Robustness to non-speech input
* **Finalize** evidence that the design criteria can be met, for example existing reference codecs.
* Progress identification of the relevant design constraints for such a codec, in coordination with other WGs, including
	+ Speech quality
* Progress defining performance requirements, regarding speech quality, in particular taking into account
	+ Clean speech and noisy speech
	+ Tandeming with existing IMS voice codecs
	+ Clean channel and GEO channel conditions
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| SA4#137location tbd(11th – 15th May 2026) | * **Finalize** identification of the relevant design constraints for such a codec, in coordination with other WGs, including
	+ Speech quality
* **Finalize** definition of performance requirements and identifying appropriate test methodologies, regarding speech quality, in particular taking into account
	+ Clean speech and noisy speech
	+ Tandeming with existing IMS voice codecs
	+ Clean channel and GEO channel conditions
* Finalize Define potential normative work item objectives and timeline
 |
| TSG SA#112Singapore, SA(9th – 12th June 2026) | * TR for approval
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# References

[1] SP-250378 - Study on Ultra Low Bitrate Speech Codec