INTERNATIONAL TELECOMMUNICATION UNION

TELECOMMUNICATION STANDARDIZATION SECTOR

STUDY PERIOD 2022-2024

SG11-TD417/GEN

STUDY GROUP 11

Original: English

Question(s): 1/11 Geneva, 10-19 May 2023

TD

Source: Editors

Title: Output – initial draft baseline text of draft Recommendation ITU-T Q.FMSC-SA "Signalling architecture of fixed, mobile and satellite convergence for IMT-2020 networks and beyond" (Geneva, 10-19 May 2023)

Contact: Jianyin Zhang
China Mobile
China
Tel: +86 13910022506
E-mail: zhangjianyin@chinamobile.com

Contact: Pengcheng Shang
China Mobile
China
Tel: +86 13810246486
E-mail: shangpengcheng@chinamobile.com

Contact: Huan Deng
China Telecom
China
Tel: +86-10-50902867
E-mail: denghuan@chinatelecom.com

Contact: Lingfei Ni
China Mobile
China
Tel: +86 13810268653
E-mail: nilingfei@chinamobile.com

Abstract: This document is the output draft Recommendation Q.FMSC-SA, "Signalling architecture of fixed, mobile and satellite convergence for IMT-2020 networks and beyond". This document includes the results of discussion on the Q1/11 meeting (Geneva, 10-19 May 2023).

The following table shows discussion results for input document.

Document Number	Source	Title	Meeting results
C120	China Mobile	Q.FMSC-SA: Signalling architecture of fixed, mobile and satellite convergence for IMT-2020 networks and beyond	Accepted with modifications

Draft new Recommendation of ITU-T Q.FMSC-SA

Signalling architecture of fixed, mobile and satellite convergence for IMT-2020 networks and beyond

Table of Contents

1. Scope 3

2. References 3

3. Definitions 3
   3.1 Terms defined elsewhere 3
   3.2 Terms defined in this Recommendation 3

4. Abbreviations and acronyms 3

5. Conventions 4

6. Overview of signalling architecture for fixed, mobile and satellite convergence for IMT-2020 networks and beyond 4

7. General requirements 5

8. Signalling requirements 6

9. Requirements of interworking function between satellite-based and land-based networks 6

10. Signalling architecture and interfaces for fixed, mobile and satellite convergence for IMT-2020 networks and beyond 6
    10.1 Signalling architecture of FMSC 7
    10.2 Interfaces of FMSC 7

11. Security Consideration 7

Annex 1 A.1 justification for proposed draft new ITU-T Q.FMSC-SA " Signalling architecture of fixed, mobile and satellite convergence for IMT-2020 networks and beyond " ..... **Error! Bookm**

Draft new Recommendation of ITU-T Q.FMSC-SA

Signalling architecture of fixed, mobile and satellite convergence for IMT-2020 networks and beyond

1. Scope

This draft Recommendation presents the signalling requirements of fixed, mobile and satellite convergence for IMT-2020 networks and beyond, specifies the signalling architecture of fixed, mobile and satellite convergence for IMT-2020 networks and beyond, and provides the interfaces among network functions, satellite-based and land-based networks, and includes the security consideration

2. References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T Y.3201] Recommendation ITU-T Y.3201, *Fixed, mobile and satellite convergence – Framework for IMT-2020 networks and beyond*

[ITU-T Y.3200] Recommendation ITU-T Y.3200, *Fixed, mobile and satellite convergence – Requirements for IMT-2020 networks and beyond*

[ITU-T Y.3102] Recommendation ITU-T Y.3102, *Framework of the IMT-2020 network*

[ITU-T Y.3104] Recommendation ITU-T Y.3104, *Architecture of the IMT-2020 network.*

3. Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

4. Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

ASF Authentication Server Function

FMSC Fixed, Mobile and Satellite Convergence

MUE Multi-connection User Equipment

NACF Network Access Control Function

PCF Policy Control Function

SMF Session Management Function

UPF User Plane Function

5. Conventions

In this Recommendation:

The keywords "is required to" indicate a requirement which must be strictly followed and from which no deviation is permitted, if conformance to this Recommendation is to be claimed.

The keywords "is recommended" indicate a requirement which is recommended but which is not absolutely required. Thus, this requirement need not be present to claim conformance.

The keywords "can optionally" indicate an optional requirement which is permissible, without implying any sense of being recommended. This term is not intended to imply that the vendor's implementation must provide the option, and the feature can be optionally enabled by the network operator/service provider. Rather, it means the vendor may optionally provide the feature and still claim conformance with this Recommendation.

6. Overview of signalling architecture for fixed, mobile and satellite convergence for IMT-2020 networks and beyond

With the development of high-throughput satellite communication technology and low-earth-orbit satellite constellation, the communication capability of satellite network has been significantly improved, in terms of speed, delay and reliability. It makes effective complementation and collaboration between the satellite network and terrestrial network, in the aspects of seamless service, connection reliability, service continuity, network efficiency, load balancing, disaster recovery, etc. Fixed, mobile and satellite convergence network provides services and applications to end users with wide coverage.

Recommendation [ITU-T Y.3201] depicts the high-level framework of fixed, mobile and satellite convergence in the IMT-2020 network and beyond. Figure 6-1 quotes the overall framework of fixed, mobile and satellite convergence in Y.3201. The MUE has all the fixed access, mobile access and satellite access. The converged core network has connections to all the access networks, including fixed access networks, mobile access networks, and satellites access networks; it also connects to the service platform and data network. The converged core network includes satellite-based core network and land-based core network; they are interworking with each other by interworking function.

The signalling architecture studied in this new draft Recommendation is focused on satellite-based network, including architecture research, network functions enhancements, interfaces definition, and security consideration.

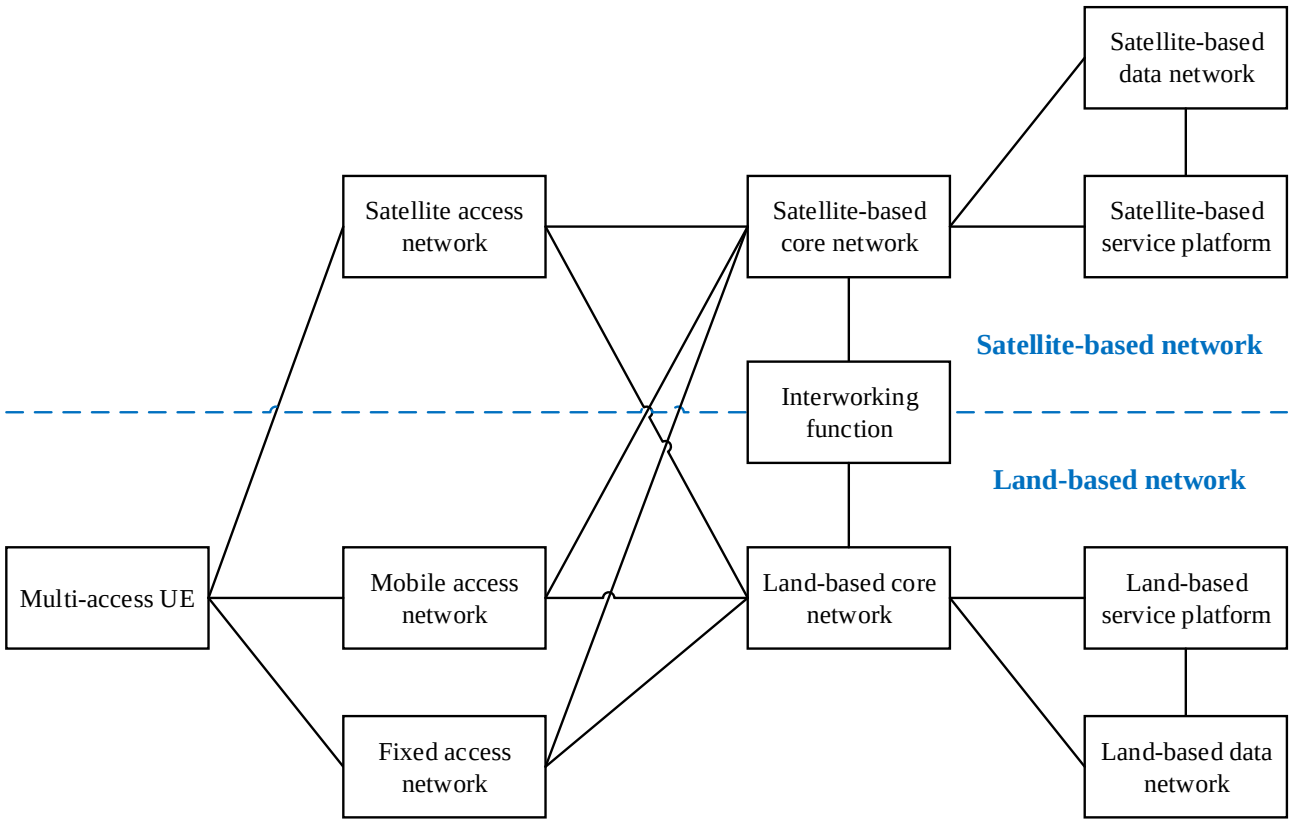

Figure 6-1 - Overall framework of fixed, mobile and satellite convergence [ITU-T Y.3201]

Satellite-based network consists of satellite access network, satellite-based core network, satellite-based service platform, and satellite-based data network. Land-based network consists of mobile access network, fixed access network, land-based core network, land-based service platform, and land-based data network. Land-based network interacts and cooperates with the satellite-based network to achieve FMSC for IMT-2020 and beyond.

7. General requirements

The general requirements of fixed, mobile and satellite convergence for IMT-2020 networks and beyond are as follows. Some requirements are referring to SG13 [Y.3201].

- MUE is required to support multi access network connection, and detect signalling information automatically, such as signal intensity for selecting the access network.
- MUE is required to support handover between different access networks and execute the handover policy sent by converged core network.
- Satellite-based core network and land-based core network are required to support the handover policy, switching policy, service continuity policy, service scheduling policy among fixed, mobile, and satellite access network.
- Satellite-based core network and land-based core network are required to support unified user identity during service execution and signalling interaction.
- Satellite-based core network and land-based core network are required to interworking with each other, including signalling interaction, services interaction, etc.
- Satellite-based core network and land-based core network are required to support disaster recovery backup with each other.
- Satellite-based network is required to support network functions deployment, according to different strategy.

- Satellite-based network is required to support signalling interaction between different satellites.
- Satellite-based network is required to support intelligent management and orchestration for network functions deployment.
- Satellite-based network is required to support receiving the breakdown information of land-based network from interworking function, such as land-based network paralysis induced by disaster, signalling storm, network equipment fault, etc.
- Satellite-based network is required to support core network capabilities, including control plane functions (NACF, SMF, PCF, ASF, etc) and user plane function (UPF).

8. Signalling requirements

The signalling requirements of fixed, mobile and satellite convergence for IMT-2020 networks and beyond are as follows.

- Signaling between satellite access network and satellite-based core network / land-based core network is required to bear the legal session request / data request from MUE to core network (including IMT-2020 networks and beyond, IMS) .

Note: legality of requests is judged by satellite gateway function, e.g. whether it comes from the trusted network, whether there are malicious attacks, whether it meets the requirements of the protocol (UDP, TCP, etc).

TBD

9. Requirements of interworking function between satellite-based and land-based networks

TBD

10. Signalling architecture and interfaces for fixed, mobile and satellite convergence for IMT-2020 networks and beyond

[Editor's Note] This clause specifies the signalling architecture of FMSC network, in the context of IMT-2020 and beyond.

10.1 Signalling architecture of FMSC

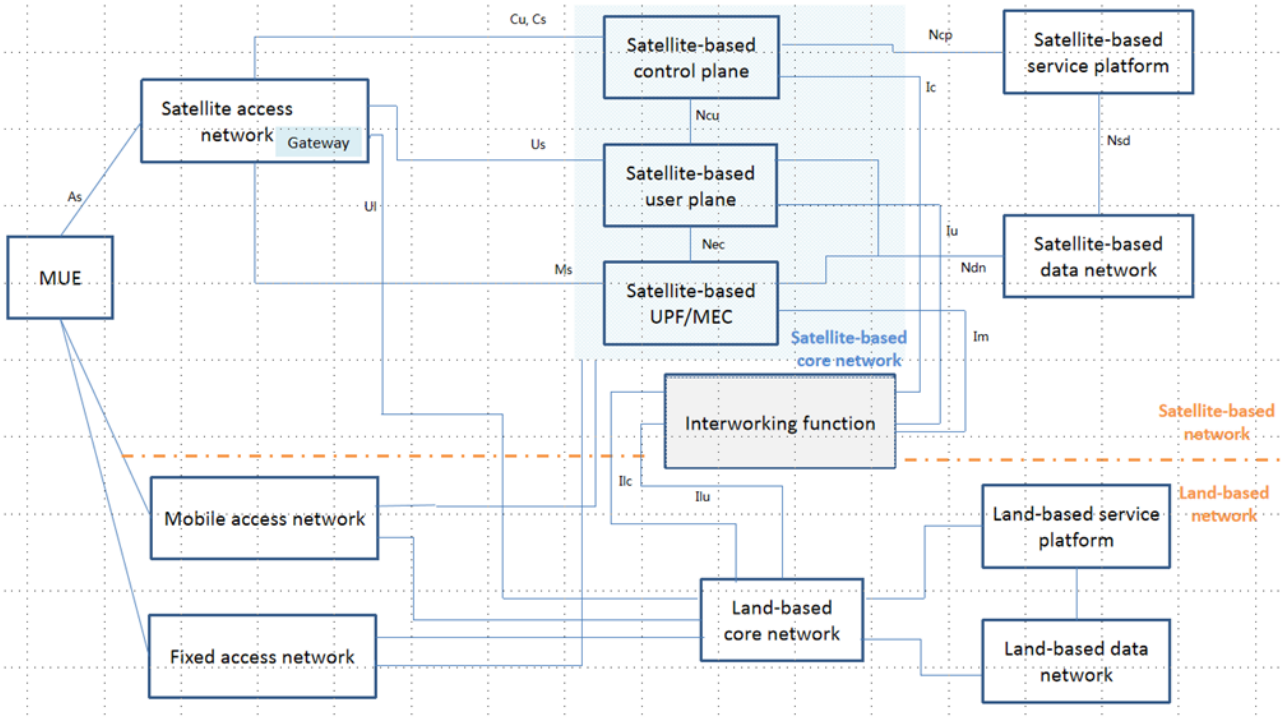

Figure 10-1 –Signalling architecture for fixed, mobile and satellite convergence for IMT-2020 networks and beyond

10.2 Interfaces of FMSC

TBD

11. Security Consideration

[Editor's Note] This clause will present the general security considerations on signalling architecture for fixed, mobile and satellite convergence IMT-2020 networks and beyond, including network security issues and privacy issues.

_____