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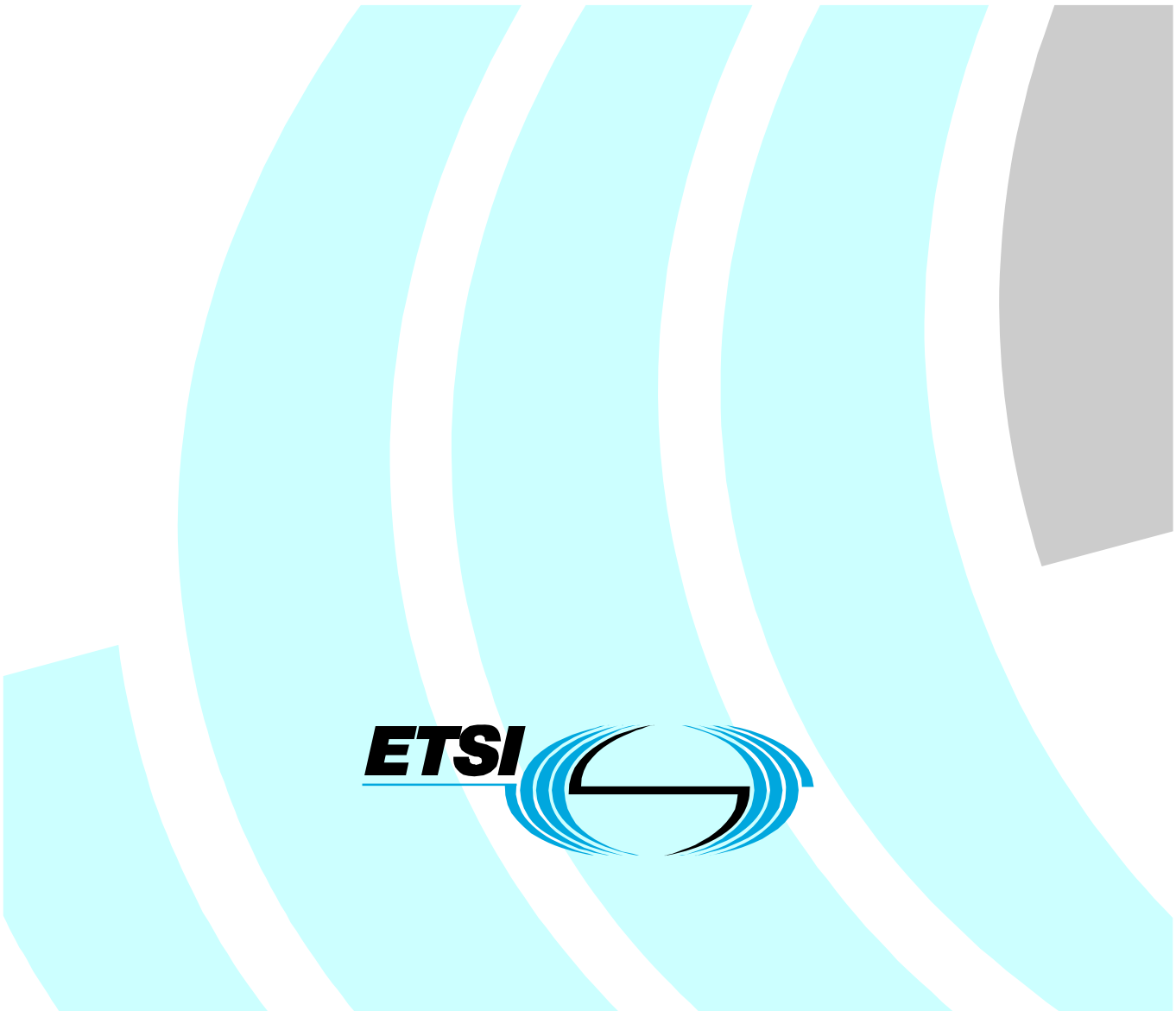
Technical Report

Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Fixed Mobile Convergence; Requirements analysis



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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN).

1 Scope

The present document identifies and analyses fixed-mobile convergence scenarios in order to derive requirements and capabilities to support FMC capabilities (e.g. network attachment, roaming, etc.) and the impact to services, e.g. multimedia communication services (e.g. telephony, sms, mms, etc.). It determines the responsible standards body for each requirement/capability and the release in which it is (expected to be) covered.

The goals are:

- to identify specific access types, and which organization is defining each of them;
- to determine requirements and capabilities (taking account of terminal requirements) and to analyse these to determine which are:
  - within the scope of ETSI TISPAN;
  - being progressed in other standards bodies;
  - a priority for TISPAN NGN Release 2;
  - included in the next release of 3GPP.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.
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NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

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3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 180 000 [3] and the following apply:

access network: collection of network entities and interfaces that provides the underlying IP transport connectivity between the device and the NGN entities

NOTE: An example of an "Access Network" is ADSL.

access point: wireless LAN base station. An Access Point (AP) acts as the communication hub for wireless device users to be able to connect to services such as the Internet, PSTN and PBX, backhauled typically via a wired fixed access network

broadband access network: broadband network backhaul from wireless Access Point, e.g. ADSL, cable

cellular/cellular network: use of 2G, 2.5G and 3G networks for voice and data services

coverage: zone of coverage created by one or multiple wireless Access Points

device: UE which could take several form factors, e.g. a mobile handset, PC or a PDA3GPP, 3GPP2 as its radio interface, not necessarily simultaneously

NOTE: A user equipment able to use both Circuit Switched and Packet Switched networks, not necessarily simultaneously.

fixed mobile convergence (FMC): in a given network configuration, the capabilities that provide service and application to the end-user irrespective of the fixed or mobile access technologies and independent of user's location

NOTE: In the NGN environment, it means to provide NGN services to end-users regardless of the access technology.

free access: access for which the busy condition as defined by NDUB [2] does not exist.

hand-over: special case of session continuity where the incurred interruption or loss of data is below certain limits such that real-time services can be continued despite of the change of access point

messaging services: interactive service which offers user-to-user communication between individual users via storage units with store-and-forward, mailbox and/or message handling, (e.g. information editing, processing and conversion) functions

mobility: ability for the user or other mobile entities to communicate and access services irrespective of changes of the location or technical environment

NOTE 1: The degree of service availability may depend on several factors including the Access Network capabilities, service level agreements between the user's home network and the visited network (if applicable), etc. Mobility includes the ability of telecommunication with or without service continuity.

NOTE 2: In ITU-T Recommendation Y.2001 [4] this is called Generalized Mobility.

nomadism: ability of the user to change his network access point on moving; when changing the network access point, the user's service session is completely stopped and then started again

NOTE: I.e. there is no session continuity or hand-over possible. It is assumed that normal usage pattern is that users shutdown their service session before moving to another access point.

public hotspot: zone of continuous public access to IP networks owned by one or multiple operators via wireless access points.

roaming: ability of the users to access services according their user profile while moving outside of their subscribed home network

NOTE: I.e. by using an access point of a visited network. This requires the ability of the user to get access in the visited network, the existence of an interface between home network and visited network, as well as a roaming agreement between the respective network operators.

seamless mobility: ability to provide services irrespective of changes that may occur by user/terminal's activities

NOTE: The user is able to change his network access point, as he moves, without interrupting his current service session, i.e. handovers are possible. In some situations, the hand-over may lead to a briefly suspended service session or it may require a change in the level of service provided as a consequence of the capabilities of the new access point to which the user has become connected through the hand-over process.

service continuity: ability for a user to maintain an ongoing service during mobility

session continuity: ability of a user or terminal to change the network access point while maintaining the ongoing session

NOTE: This may include a session break and resume, or a certain degree of service interruption or loss of data while changing to the new access point.

session transfer: transfer of a multimedia session (e.g. VoIP) from one IP transport connectivity to another IP transport connectivity or within one IP transport connectivity (e.g. change of Terminal) while maintaining active session

user equipment (UE): one or more devices allowing user access to network services delivered by TISPAN NGN networks

NOTE 1: This includes devices under user control commonly referred to as CPE, IAD, ATA, RGW, TE, etc., but not network controlled entities such as access gateways.

NOTE 2: This definition differs from that provided in TR 121 905 [5] version 7.0.0 Release 7.

NOTE 3: User Equipment is sometimes referred to as Customer Equipment (customer ownership of the UE).

user profile: set of information necessary to provide a user with a consistent personalized service environment, irrespective of the user's location or the terminal used (within the limitations of the terminal and the serving network).

voice call continuity (VCC): 3GPP system is able to provide continuity between CS voice services (Teleservice) and IMS voice services with no negative impact upon the user's experience of the voice service

NOTE: Voice call continuity should be executed when continuation of a voice service is required based on operator policy across a change in the connection of the UE to the 3GPP system as the user moves from using the CS domain to using IMS and vice versa. Voice Call Continuity is a home IMS application that provides capabilities to transfer voice calls between the CS domain and the IMS. VCC provides functions for voice call originations, voice call terminations and for Domain Transfers between the CS domain and the IMS.

Wireless Fidelity (Wi-Fi®): wireless-LAN technology based on IEEE 802.11 [7] specifications

NOTE: Wi-Fi is a registered trademark of the Wi-Fi Alliance.

WiMAX: World Interoperability for Microwave Access is a broadband wireless access technology based on IEEE 802.16 [8] standard

4 Introduction

Fixed networks and mobile networks have traditionally evolved separately, each offering services to their own set of subscribers. Today these networks have little in common and consist of different types of "core networks" (i.e. call processing subsystems or switching subsystems, services platforms, subscriber databases, etc). The services offered to the subscribers in the two networks are often similar but slightly different, due to the differences in the type of resources used in the two networks. Even for a similar service, the user experience can be different. Today a consumer generally subscribes to the two services separately, receives two separate invoices and there is no integration between the two set of services.

Fixed Mobile Convergence (FMC) is a general term used in the industry with a wide ranging concept of various meanings as it applies to consumers, network operators, services and the network technologies. The definition of FMC as found in clause 3.1 is "In a given network configuration, the capabilities that provide service and application to the end-user irrespective of the fixed or mobile access technologies and independent of user's location. In the NGN environment, it means to provide NGN services to end-users regardless of the access technology". Without intending to change the definition of FMC, it can be elaborated into different levels of FMC:

- FMC on billing level (One Bill FMC) provides the subscriber with one common invoice for mobile and fixed (broadband) services. This level of convergence has no impact on the actual "core network"
- FMC on network level (One Core Network FMC) envisages the use of common core network interfacing with the fixed broadband access network and mobile access network. This level of convergence needs to provide the necessary capabilities to support subscribers over the fixed and mobile access networks.
- FMC on terminal level (One Terminal FMC) envisages the use of a so-called Multi-Mode Terminal, which can interface with one (or more) mobile access network(s) and WiFi (or similar, e.g. WiMax) LAN connected to a fixed broadband access network. With the same terminal, a subscriber can access services over a mobile access network or over the WiFi LAN connected to a broadband access network.
- FMC on numbering level (One Number FMC) envisages the subscriber to be reachable using only one public user ID, regardless of whether the subscriber is connected to a fixed access network, a mobile access network, or both.

Combinations of these levels of convergence are of course possible but not mandatory in the context of FMC.

FMC concerns different service provider roles, which can be performed by one single provider or by different providers. The following roles can be distinguished:

- **CS Mobile access provider:** in this role a service provider caters for the access to the core network over the current well known cellular access network (e.g. GSM CS System: Air Interface, Base station/Base Station Controller/MSC).
- **PS Mobile access provider:** in this role a service provider caters for the access to the core network over the packet switched part of the cellular network (e.g. GSM PS System: Air Interface, Base Station, Base Station Controller, SGSN/GGSN).
- **IMS service provider:** in this role a service provider caters for the IMS based services.
- **Managed WiFi Provider:** in this role a service provider caters for the access to the core network using WiFi technology combined with fixed broadband interface (e.g. xDSL, Cable, Ethernet). The service provider provides managed fixed broadband interface from the WiFi access points to the core network. The WiFi access points may or may not be owned by the Service Provider. Following examples are possible.

    i) Home WiFi: The WiFi network is owned by an individual and is connected to the Core Network via the managed fixed broadband interface (e.g. xDSL) of the Service Provider.

    ii) Enterprise WiFi: The WiFi network is owned by the enterprise and is connected to the core network via the managed fixed broadband interface (e.g. fast ethernet) of the Service Provider.

    iii) Public WiFi hotspots owned by the Service Provider: The WiFi hotspots are connected to the core network via the managed fixed broadband interface (e.g. fast Ethernet) of the Service Provider. This could be in airports, hotels, etc.

iv) Visited WiFi: The WiFi network is owned by a third party (e.g. café, neighbour, another SP) and is connected to the Core Network via managed fixed broadband (e.g. cable) of the Service Provider. The access to the WiFi network may be free or at charge, independent of the SP.

- **Unmanaged WiFi Provider:** the WiFi network is not owned by the Fixed Broadband provider. The WiFi network is connected to the Core Network via the public internet (unmanaged). The WiFi network could be owned by an individual, enterprise or other SPs.
- **Wimax access provider:** in this role a service provider caters for the access to the core network using Wimax technology.

These roles can be combined in many different ways. For example a, a PS Mobile Service Provider and an IMS Service Provider will provide end-to-end mobile IMS services. Combined this with Managed WiFi Provider, IMS services can be offered in convergence.

5 Fixed Mobile Convergence uses cases

5.1 Use Case 1

5.1.1 Use Case 1a

Krister and his family are customers of a FMC service provider which offers them a FMC service over a fixed broadband access and a mobile access. They receive one common telephone number for their fixed phone connected to their fixed broadband access, as well as a personal (mobile) number for each family member for their mobile handsets.

Krister has received from his service provider 3 numbers. His family number (corresponding to his old PSTN number) and a personal number for him and his wife, Anna. Both personal numbers correspond to their old GSM numbers.

Incoming calls to the family number can be received on the fixed (family) phone or on one of the dual mode mobile phones, if they are in WiFi range. The call is sent over the fixed broadband connection. When the mobile handsets are NOT within WiFi range, the call can not be received on these handsets.

Incoming calls to one of the personal numbers can be received on the dual mode mobile phone. These calls are sent over the fixed broadband connection, when the dual mode handset is within WiFi range, or over the mobile access, when the dual mode handset is not within WiFi range.

5.1.2 Use Case 1b

Krister and his family are customers of a FMC service provider which offers them a FMC service over a fixed broadband access and a mobile access. They receive one common telephone number, as well as a personal (mobile) number for each family member.

Krister has received from his service provider 3 numbers. His family number (corresponding to his old PSTN number) and a personal number for him and his wife, Anna. Both personal numbers correspond to their old GSM numbers.

Incoming calls to the family number can be received on the fixed (family) phone or on one of the dual mode mobile phones. The call is sent over the fixed broadband connection to the fixed phone and to one of the dual mode mobile phones, if one is in WiFi range. When the mobile handsets are NOT within WiFi range, the call can be received on these handsets over the cellular network.

Incoming calls to one of the personal numbers can be received on the dual mode mobile phone, or any other terminal in the home. These calls are sent over the fixed broadband connection, when the dual mode handset is within WiFi range, or over the mobile access, when the dual mode handset is not within WiFi range.

5.2 Use Case 2

Krister and his family are customers of a FMC service provider which offers them a FMC service over a fixed broadband access and a mobile access. They receive one common telephone number for their fixed phone connected to their fixed broadband access, as well as a personal (mobile) number for each family member for their mobile handsets.

Krister has received from his service provider 3 numbers. His family number (corresponding to his old PSTN number) and a personal number for him and his wife, Anna. Both personal numbers correspond to their old GSM numbers. Since the dual mode mobile handsets can be used to received calls to the (fixed) family number, as well as calls to the personal number, both user profiles are programmed in the handset. The mobile user profile is set as default.

An outgoing call from Krister's dual mode handset can appear as being made from the family number or from his personal number. Since his personal number is set as default, Krister needs to select the family number profile before starting his call, if he wants to appear as family. Krister has also the possibility to choose whether the call will be set-up over the fixed broadband connection, or over the cellular network.

5.3 Use Case 3

Krister and his family are customers of a FMC service provider which offers them a FMC service over a fixed broadband access and a mobile access. They receive one common telephone number for their fixed phone connected to their fixed broadband access, as well as a personal (mobile) number for each family member for their mobile handsets.

Krister has received from his service provider 3 numbers. His family number (corresponding to his old PSTN number) and a personal number for him and his wife, Anna. Both personal numbers correspond to their old GSM numbers.

Krister uses his dual mode handset to initiate a voice call while he is under WLAN coverage. The call is set-up over the fixed broadband access. During this call Krister leaves his home and the WLAN coverage. The call continues over the mobile access without dropping. When Krister returns to his home, and is under WLAN coverage again, while still engaged in the call, the call is continued without dropping over the fixed broadband access and the WLAN.

5.4 Use Case 4

5.4.1 Use Case 4a

Bob works for a company that has customers all over the world. Bob can do most of his work at home, but sometimes he prefers to be at the company office to consult with a colleague or to meet a customer. This afternoon he and a colleague have an appointment with a customer to discuss a new project. He decided to walk to the company building as he lives only 2 km away.

As he is about to leave home his dual mode multimedia IP phone rings, the phone is connected to his wireless home network that is connected to the fixed access network. On the display Bob sees that his colleague is trying to reach him via a video call. Bob decides to answer the call in video mode. His colleague tells him that he will probably be a bit late to the meeting.

While they discuss some details for the meeting, Bob leaves home. Shortly after, his phone gets out of the reach of the wireless home network and the phone is connected to a WIMAX (or UMTS) base station. Since bandwidth is more expensive on this network, Bob receives a message on his screen asking whether he wants to continue with the video path. Since video is not really important while walking, Bob decides to save money and tells his colleague that he will end the video path (the applicability of this feature depends on the tariff arrangements). The audio path stays active, so they will be able to continue their conversation. According to Bob's preferences, the video path will be re-established as soon the costs of bandwidth are low enough again.

Arriving at the company's site, the phone connects automatically with the company's wireless network and the video connection becomes active again. At his office he transfers the running video call from the mobile terminal (WLAN, WIMAX, UMTS) to his Notebook connected to a fixed access network.

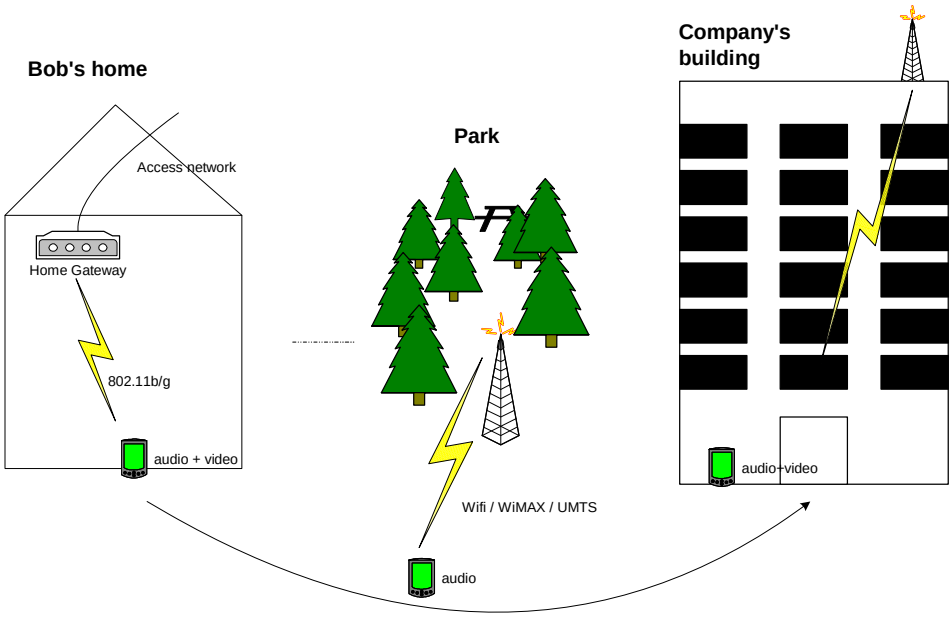

Figure 1: Bob's walk to the company's office; without extension

5.4.2 Use Case 4b

This use case is a possible extension to the use case in clause 5.4.1 for a more advanced longer term scenario. It introduces private WLAN to private WLAN hopping.

Bob works for a company that has customers all over the world. Bob can do most of his work at home, but sometimes he prefers to be at the company office to consult with a colleague or to meet a customer. This afternoon he and a colleague have an appointment with a customer to discuss a new project. He decided to walk to the company building as he lives only 2 km away.

As he is about to leave home his multimedia IP phone rings, the phone is connected to his wireless home network that is connected to the fixed access network. On the display Bob sees that his colleague is trying to reach him via a video call. Bob decides to answer the call in video mode. His colleague tells him that he will probably be a bit late to the meeting.

While they discuss some details for the meeting, Bob leaves home. Shortly after, his phone gets out of the reach of the wireless home network and starts searching for other wireless LANs in order to continue the video call session. Like Bob, all neighbours in the street have one or more wireless access points in the house. They may allow their network service provider to offer network access to strangers over their access point and access network using the bandwidth that they (temporarily) do not use themselves; of course under the condition that they are not faced with service degradation or security threads. Operators give discounts to people who let the operator do so. For an operator it is an excellent way to extent the coverage of his network in a cheap way and to be able to offer nomadic services. Bob's phone soon finds a private wireless access point. He has a subscription with his service provider that allows him to connect to the internet and to continue the video call. While walking on the street, his phone roams from one access point to another and he is able to maintain his connection and call, possibly with some short breaks when roaming between the WLAN access points. Having reached the end of the street, Bob has to cross a small park to reach the company buildings. Now, the coverage of private WLAN gets poor and the phone searches for other wireless networks. and the phone is connected to a WIMAX (or UMTS) base station. Since bandwidth is more expensive on this network, Bob receives a message on his screen asking whether he wants to continue with the video path. Since video is not really important while walking, Bob decides to save money and tells his colleague that he will end the video path (the applicability of this feature depends on the tariff arrangements). The audio path stays active, so they will be able to continue their conversation. According to Bob's preferences, the video path will be re-established as soon the costs of bandwidth are low enough again.

Arriving at the company's site, the phone connects automatically with the company's wireless network and the video connection becomes active again. At his office he transfers the running video call from the mobile terminal (WLAN, WIMAX, UMTS) to his Notebook connected to a fixed access network.

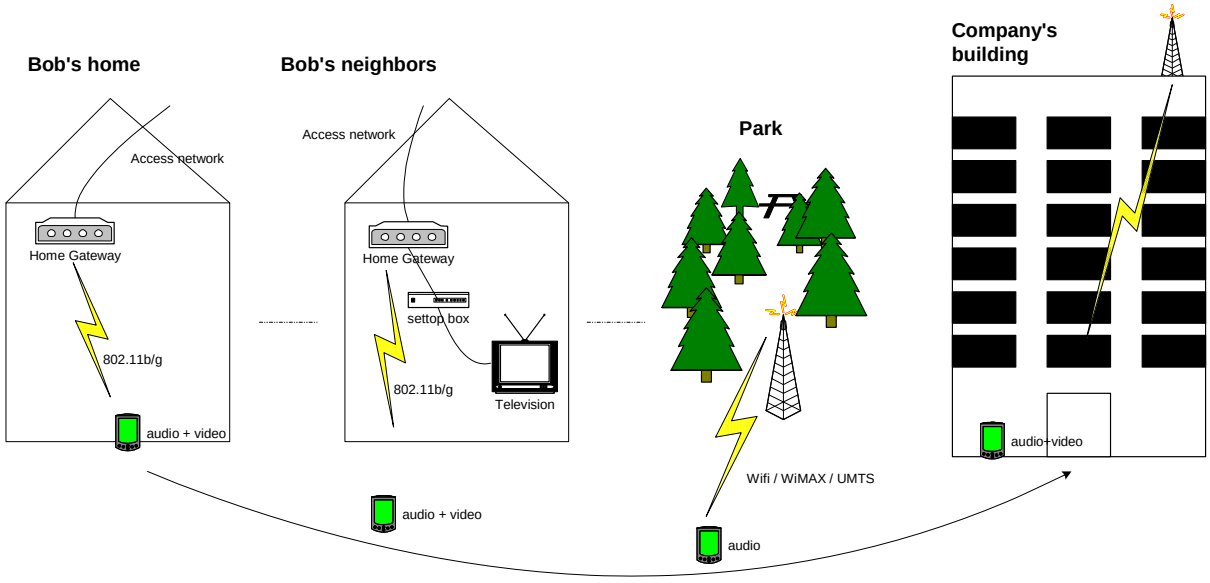

Figure 2: Bob's walk to the company's office; with extension for a longer term scenario

5.5 Use Case 5

Peter is a subscriber of Mobile Operator CEL and also has a fixed broadband service from FIX. He also has a WiFi equipment at his premises that is connected to the internet through the BB service offered by FIX. Operator CEL offers Peter a FMC service that allows him to use the WiFi home (it can be extrapolated to an enterprise environment) network to access the services provides by CEL in exchange of a very good service packages in addition to the basic service over the mobile access network. In line of the service offering, when Peter in under his WiFi coverage, Peter's voice calls are transported via the broadband connection instead of the public mobile access network. When Peter moves out of reach of its WiFi the calls are now transported over the CEL access network. In such a case, operator FIX is unaware of the relationship Peter-CEL.

5.6 Use Case 6

Peter is a subscriber of Mobile Operator CEL and also has a fixed broadband service from FIX. He also has a WiFi equipment at his premises that is connected to the internet through the BB service offered by FIX. Operator FIX offers Peter a FMC service that allows him to use a mobile network to access the services provided by FIX, when his away of his WiFi coverage, in exchange of a very good service packages in addition to the basic service over the broadband fixed network. In line of the service offering, when Peter in under his WiFi coverage, Peter's voice calls are transported via the broadband connection. When Peter moves out of reach of its WiFi the calls are now transported over the mobile access network of CEL. In such a case, the mobile operator is unaware of the relationship Peter-FIX.

5.7 Use Case 7

Pre-condition: Krister and his wife Anna or their SP has defined personal profiles for all the terminals associated with the personal numbers and the family number.

Krister is calling his friend, Anette from home. He uses a terminal (e.g. the family PC) where the family profile is the default setting. In order to access his personal phone book and let Anette see that Krister is calling he first activates his personal profile.

5.8 Use Case 8

John has a FMC service subscription with a service provider CONV which has a mobile and a fixed broadband wireless data (e.g. WiFi) accesses networks. The service subscription allows that the voice sessions established between John's hybrid terminal and any other terminal can be originated or received via any access network belonging to the service provider and included in the subscription plan. John can also use a fixed or mobile access network from a third party service provider which had celebrated technical and commercial agreement with CONV to authenticate and carry the voice sessions to the CONV's network.

John is travelling abroad and is waiting the departure time of his flight in the airport. The airport is supported with WiFi service coverage from a service provider which John has no information, this service provider has agreement with CONV. John turn-on his hybrid terminal and realize that it is able to authenticate and get connection with his FMC service through the airport WiFi access. After the terminal complete the authentication and service registration john calls his wife to tell her that the flight will delay and he will arrive late at home.

5.9 Use Case 9

Mary has a FMC service subscription with a service provider who has a mobile access network and a fixed broadband wireless data (e.g. WiFi) access network. The service subscription allows that the voice and data sessions established between Mary's hybrid terminal and any other terminal can be originated or received via any access network belonging to the service provider and included in the subscription plan.

Mary is a heavy user of multimedia messaging services and she has one of the most advanced hybrid terminal with multimedia capabilities, including a high definition digital camera. One of the Mary's hobbies is to take pictures from the places she visit and send them to his friend's mobile terminal. As most of the friends of Mary have only standard mobile terminals she uses the MMS service to send her pictures to their terminals.

Mary has just taken some pictures from a nice place outside and goes into a café with WiFi service available. While she is waiting for the coffee she decides send some pictures to a friend and, using the WiFi connection, send them using the MMS service capability of her terminal. After a few minutes she receives back a text message from her friend, during all the time the Mary's terminal is under WiFi coverage only.

5.10 Use Case 10

A user initially is viewing an IPTV session via a Set Top Box (STB) at the home. The user transitions the IPTV session from the STB to the best available wireless network within the range of the home.

The user's IPTV service is provisioned to be delivered to a Mobile Video Device in addition to a Set Top Box (STB).

A user is viewing an IPTV session, initially viewing the IPTV session on a home (fixed) television via STB box connected to a cable or DSL network.

A Mobile Video Device is available in dual mode, Cellular (UMTS) and WiMAX.

Fixed, Cellular (UMTS) and WiMAX represent some of the access network alternatives to provide wireless IPTV.

A user can initiate an IPTV session transfer from the wired STB to the wireless Mobile Video Device.

The user has the options of fixed and wireless (mobile) IP connectivity, i.e. home wired (e.g. Cable/xDSL) and wireless (e.g. UMTS, WiMAX) IP connections. The user initiates IPTV video session at home via fixed TV connected to a STB/wired connection. The user picks up a dual mode (UMTS and WiMAX) Mobile Video Device, and manually initiates a transfer of the IPTV session (human action) from the STB to the Mobile Video Device. The request to move the IPTV session to the Mobile Video Device is received by the network. Session continuity is expected for the transfer of the IPTV session. As part of the session handoff process, the decision to send the session to the user via UMTS or WiMAX is based on the media type that is being delivered, available link bandwidth, policy, user preference, etc. This decision is made by a network controlling entity. The user may also manually initiate a request to move the IPTV session from the Mobile Video Device back to the IPTV session on the STB.

5.11 Use Case 11

An operator CONV has both fixed and mobile networks, and provides a FMC service with hybrid short-number-dialling feature. A company CORP is a customer of this hybrid short-number-dialling service. Krister and John both work for CORP. Krister has one fixed phone in the office and one mobile phone for work, while John has only one fixed phone in the office. Each fixed phone is connected to CONV's fixed network and has a PSTN number, while the mobile phone is connected to CONV's mobile network and has a mobile phone number(e.g. GSM number). Being a customer of hybrid short-number-dialling service, besides the PSTN numbers and the mobile phone number, each terminal is allocated one short-number by operator CONV, such as 4 digits xxxx, which could to be used for short-number-dialling within the CORP. The 4 digits short-numbers can be allocated regardless of terminal type, e.g. 58xx for both fixed phones and mobile phones. John can call Krister by short-numbers 58xx, without knowing whether he is calling Krister's fixed phone or mobile phone. The short-number can also be allocated according to the terminal types, e.g. 55xx for fixed phone, 56xx for mobile phone. In this case, Krister has 2 different short-numbers: 55xx and 56xx . John can make a call to Krister's fixed phone by calling 55xx, or to Krister's mobile phone by 56xx when he is not sure whether Krister is in his office or not.

6 Access network Types

All access networks that provide IP connectivity on control and user plane from UE to core NGN as specified in TS 181 005 [2], are supported.

6.1 Mobile Wireless

This type of access networks are deployed in licensed frequency spectrum. A single cell site can cover several miles/kilometres. They generally utilize multiple cell sites with frequency re-use and support handoffs between them at the access network level, thereby providing seamless service over large geographic areas. Examples of these networks include 2G, 2.5G, 3G and 4G voice and/or data networks. Examples of technologies used in those networks include:

- GSM
- GPRS
- UMTS/WCDMA
- WiMAX (802.16e)
- CDMA
- EVDO

6.2 Fixed Wireless

This type of access networks are deployed in unlicensed frequency spectrum. A single access point can cover several feet/meters. Unlike Mobile Wireless networks, the Fixed Wireless networks generally do not support handoffs between access points at the access network level. It is left to the applications to provide continuity when the user moves from one access point to another.

Generally one of the Fixed Broadband access types (e.g. xDSL or Cable) provides connectivity from a Fixed Wireless access point towards the core network. In a Managed Fixed Wireless access network the connectivity between an access point and core network is managed, making it possible to provide QoS. In an Unmanaged Fixed Wireless access network the connectivity from an access point towards the core network traverses the public internet, making it not possible to provide QoS.

Fixed wireless access networks can be private or public. Private Fixed Wireless access networks can be owned by individuals in homes or owned by enterprises in offices/work places. Private Fixed Wireless access networks are intended for the use of (a set of) individual(s). Public Fixed Wireless access networks, sometimes also referred to as "hotspots", can be owned by businesses (e.g. café) or Service Providers or municipalities, etc. Public Fixed Wireless access networks are intended for use by anyone, who are generally required to agree to the terms and conditions, and may also be required to pay certain fees.

Examples of the technologies used in the Fixed Wireless access networks include:

- WiFi
- WiMAX

6.3 Fixed Broadband

This type of access networks provide wired broadband connectivity to customer premises. Fixed Broadband access networks include:

- xDSL: This includes ADSL, SDSL and VDSL.
- Optical: This includes single star and xPON transport systems such as BPON, EPON and GEPON.
- Cable: This includes Docsis and Packet Cable 2.0.

Other wireline access networks: This includes Gigabit Ethernet.

7 Services in an FMC context

7.1 Introduction

Ideally the introduction of FMC should not interfere with existing services. For example call forwarding unconditional remains the same service regardless whether the forwarding subscriber uses a fixed service or a mobile service or a converged service. However, some services may appear slightly different in an FMC context, some may even become obsolete. The following clauses explore what the addition of FMC capabilities means for existing services.

7.2 Voice/video telephony services

7.2.1 Basic telephony services

7.2.1.1 Simultaneous Incoming communication presentation (e.g. simultaneous ringing)

Simultaneous incoming communication presentation results in an incoming call or session being presented to multiple terminals, which can be connected to either the mobile or the fixed access, or both.

Depending on the functional level of convergence this service requires different capabilities. In case of a One Number FMC environment (e.g. different terminals registering with the same public user ID) the service requires the so-called parallel forking. In case of a One Bill FMC environment (e.g. each terminals registers with a different public user ID) a specific network feature (e.g. application server) is needed to offer the communication to the different terminals.

Regardless of the functional level of convergence, no new capabilities have been identified compared to the capabilities needed in an non-FMC environment.

7.2.1.2 Cyclic hunting

Selection of a free access always starts at the next access after the one used last, and follows a fixed order. When the last access in the group is reached, the search continues from the beginning of the group until all accesses in the group have been searched, or a free access is found.

7.2.1.3 Sequential hunting

Selection of a free access always starts with the same access and then follows a fixed order until all accesses in the hunt group have been searched or a free access is found.

7.2.1.4 Intelligent routing of outgoing calls

In case of availability of different access network at the same time the possibility to the network to choose the access network on destination basis, service basis, cost basis, etc.

7.2.2 Supplementary services

7.2.2.1 Call Waiting

Network determined user busy (NDUB) [2] should be supported to trigger Call Waiting service.

7.2.2.2 OIP/OIR

In case of one number FMC environment, OIP service requires to provide the terminating party with the same public identity, regardless of the type of terminals that the originating FMC user uses (e.g. FMC user may use fixed or mobile terminals).

A has subscribed to one bill FMC service. **A** is in home and calls **B**. **B** has subscribed to the OIP service. Unless **A** has activated OIR, the identity information presented to **B** should:

- the personal public identity (by default); or
- the collective public identity.

It should depend on:

- the user profile (collective profile or personal profile) loaded in the terminal used by **A** to make the call:
  - the fixed terminals in home may have the collective profile set as default and can be switched to a personal profile of the household member; or
  - the dual mode mobile terminals may have the personal profile set as default and can be switched to the collective profile.
- and the choice of **A** or of the service provider.

7.2.2.3 TIP/TIR

In case of one number FMC environment, TIP service requires to provide the originating party with the same public identity, regardless of the type of terminals that the terminating FMC user uses (e.g. FMC user may use fixed or mobile terminals).

B has subscribed to one bill FMC service. **B** is in home network. **A** calls **B**. **A** has subscribed to the TIP service. Unless **B** has activated TIR, the identity information presented to **A** should:

- the personal public identity (by default); or
- the collective public identity.

It should depend on:

- the user profile (collective profile or personal profile) loaded in the terminal used by **B** to make the call:
  - the fixed terminals in home may have the collective profile set as default and can be switched to a personal profile of the household member; or
  - the dual mode mobile terminals may have the personal profile set as default and can be switched to the collective profile.
- and the choice of **B** or of the service provider.

7.2.2.4 Call Forwarding

In TS 181 005 [2] the network determined user busy condition is defined as:

- the maximum number of total communications permitted has been reached; or
- the maximum number of simultaneous media streams supported at the given subscriber's interface(s) has been reached; or
- the maximum bandwidth supported at the given subscriber's interface(s) has been reached.

In an FMC context the maximum number of total communications permitted can be a subscription parameter and hence this NDUB condition is applicable, regardless whether all communications use the same access network and/or terminal.

Even so the maximum number of simultaneous media streams can be a subscription parameter regardless the given subscriber's interface.

Lastly, also the maximum bandwidth supported can be a subscription parameter regardless the given subscriber's interface.

Consequently, network determined user busy(NDUB) [2] should be supported to trigger Call Forwarding on Busy service

7.3 Advanced Services

7.3.1 Combinational Services

The combination of 2 ore more media flow, e.g. a voice call and image sharing both on the same terminal or not.

8 Mobility and Service Continuity

8.1 Mobility in Fixed Networks and Mobile Networks

Mobility generally refers to the movement of the subscriber in conjunction with the availability of service. Without intending to change the existing definitions for the different terms used in this clause, it analyses the concept of Mobility as it exists today in the Fixed networks and Mobile networks.

The simplest form of Mobility involves the movement of the subscriber while he/she is not engaged in any service or is in the idle mode. As the subscriber moves to a new location the user equipment does **Location Update** (term used in Mobile networks) or **Network Attachment** (more general term used in Fixed and Mobile networks). This essentially registers the new user location in the network. It only prepares the subscriber to get service in the new location and however, the user may or may not access service while in this location. The registration makes it possible for the network to deliver (push) service to the subscriber or for the subscriber to initiate (pull) service in the new location. For example, a call or a message can be delivered to the subscriber terminal in the new location. This type of mobility exists in both Fixed and Mobile networks. However, the user experience in the two may be little different. For example, in the Fixed network the user in the new location may have to manually connect his device to fixed network, while in the Mobile networks it can be all automatically done between the device and the network without any user intervention. Furthermore, mobile networks typically provide large geographic areas made up of contiguous "location areas" and the location updates take place as the user moves between location areas, without any user intervention or knowledge. While the Fixed networks can be viewed as islands or non-contiguous service areas as the user moves between them and that typically requires user intervention.

If the network the user attaches to in the new location is owned by a different service provider than the home network service provider, usually associated with the subscriber movement over large geographic distances or crossing of national boundaries, it is referred to as **Roaming**. This typically requires business agreement between the home service provider and the visited service provider.

Discrete Motility involves the movement of the subscriber while engaged in a service that can be suspended during the movement and resumed in the new location. These types of services are relatively less interactive and can tolerate suspension for a time period. For example, a person could be logged on to the email, then he moves to a different location, attaches to the network and logs on to his email again. This type of Mobility is generally referred to as **Nomadism**. This type of mobility builds upon the first type of Mobility discussed above and exists in both Mobile networks and Fixed networks.

Continuous Mobility refers to the movement of the subscriber while he/she is engaged in a real time service and the continuous availability of the service during his/her movement. For example, a person is on a voice/video call on a mobile terminal and he/she starts driving to another place. As he/she is driving, the call stays on. This type of Mobility is generally referred to as **Handoffs**, as this is achieved by "handing-off" the subscriber from one radio (cell site) to another. This type of mobility exists in Mobile Wireless networks.

8.2 Service Continuity

Service Continuity is a general and emerging concept, and generally refers to the continuity of a service in conjunction of the movement of a subscriber. Traditionally voice has been the dominant service provided by Telecom networks. With the advent of IP and the migration towards IP at all levels of the network, such as radio, transport, core, etc., new and innovative services are emerging. Voice is no longer "the" only prominent service. New business models are emerging based on specific service. For example, there may be a Service Provider that only offers IPTV service. As such, there is a new need to address mobility aspects related to a specific service and the term Service Continuity refers to it.

Voice Call Continuity is a specific example of Service Continuity as it applies to Voice service.

8.3 Voice Call Continuity

In 3GPP the requirements for voice call continuity are specified in TS 122 101 [6] clause 21. These requirements should be considered also for TISPAN NGN R2 with the following changes:

- Replace "3GPP system" by "network".
- Replace "ME" by "UE".

9 Terminals

Terminals are an important part of Fixed Mobile Convergence. Some of the considerations for the terminals in the context of FMC are as follows.

In order to deliver service to a terminal regardless of the fixed or mobile access networks, the terminal would need to support both mobile wireless access technology (e.g. GSM) and a fixed wireless access technology (e.g. WiFi). This type of terminals has been referred to as multi-mode terminals or hybrid terminals in the present document. Fixed terminals can also be part of FMC.

Requirements on terminals may be driven by the need to deliver new converged services, which would have been traditionally delivered in the other access network.

Requirements on terminals may also be driven by the need for interaction with other terminals. For example, if a SMS is delivered to both fixed terminals and mobile terminal, and if it is read on one terminal, would need to appear as read on all the terminals.

Terminals would need to support different user profiles and the ability for the user to switch between profiles, before originating calls. For example, a call made from a fixed terminal at home with the default family number profile can be made to appear as made from the personal mobile terminal, by selecting the appropriate profile prior to making the call.

Another factor to consider is the need for consistency in the user interface between the fixed terminals and the mobile terminals. A general requirement would also be the ease of use terminals with the complexity of convergence.

It should also be possible for a single identity to be shared between several terminals (fixed or mobile).

10 Identifiers

Identities in the FMC context are used for FMC services. The identity is used for authorization for FMC services independent of underlying networks and services. Every user has a personal identity. A user can be a person, a terminal or an application. The same identity can be used on different terminals and on different access networks. Multiple identities can be associated with the same terminal. A user can access FMC services authorized by the identity across multiple networks.

11 Requirements and capabilities

11.1 General

[Req11.1.1] A user should be able to access (a subset of) his services from any available network connection in accordance to the policy agreed with the access provider and the capabilities of the access technology.

[Req11.1.2] A prerequisite for session continuity, allowing an user to continue his sessions/services in an other access network, is to obtain secure connectivity in the corresponding access network.

[Req11.1.3] The network should provide capabilities to support session continuity.

[Req11.1.4] FMC solutions to support session continuity for services should be flexible enough to allow configurations in which access transport network and core transport network are provided by different operators/providers as the service provider.

[Req11.1.5] The user shall be able to change terminals (e.g. from a fixed to a mobile terminal), if the contract allows it.

11.2 Network attachment

11.2.1 Authentication

[Req11.2.1.1] The solution shall allow the usage of security mechanisms that prevent unauthorized session transfer from one access network to any other. This is related to the case, when one already established - authenticated and authorized - session shall continue in case of session continuity triggered by end systems (e.g. terminals). These security mechanisms shall exclude the usage of illegal networks between the UE and the access network or any illegal usage of access network resources by any unauthorized user.

[Req11.2.1.2] The user and terminal shall be authenticated and authorized for the session transfer by the involved operator or service provider. This authentication and authorization may be implicit by means of the existing procedures for each access technology as waiting for explicit session transfer authentication could delay the handover.

11.3 Resource and admission control

[Req11.3.1] It should be possible for services to know whether the available bandwidth has been changed or the used codec is no more supported (e.g. change of terminal) in order to re-negotiate the codec or, if supported by the network, to perform media adaption (transcoding).

11.4 Handover

[Req11.4.1] The mobility solution should allow session continuity triggered by end systems (e.g. terminals) involved in the session.

[Req11.4.2] *The mobility solution should allow session continuity triggered by the network* (e.g. by application servers of the provider of this service, e.g. ASP), depending on operator policies.

[Req11.4.3] *The* session transfer should be as seamless as possible. Session transfers for session continuity should cause minimal disruption of the media flow, meaning there should be no noticeable service interruption .

11.5 Access network selection for originating sessions

[Req11.5.1] It shall be possible for a user/terminal to define the preferable access network to access its services.

[Req11.5.2] Network provider preference shall take precedence over user preference.

11.6 Access network selection for terminating sessions

[Req11.6.1] It shall be possible for an operator to define the preferred access network for service delivery in case the user has dual coverage.

[Req11.6.2] *It* shall be a network policy to decide when the handover is executed; for example, an ongoing call over the mobile access network may be switched to the fixed access network when the terminal enters the fixed coverage.

[Req11.6.3] *It* shall be a network policy to limit the number of handovers within a call.

11.7 Emergency and location determination

Need to be supported independent of the access network used by the user. It should be a network police the preferable access network for an Emergency Call.

[Req11.7.1] The location of the user must be known by authorized entities in the network (e.g. operator), even when session continuity or continuous mobility is the case. (e.g. for use with emergency calls)

[Req11.7.2] The signalling for session transfer should (depending on operator policies) not disclose additional internal network information due to the session transfer. The mobility solution should (depending on operator policies) not disclose additional knowledge about the internal network structure across administrative domains due to the session transfer. (network topology hiding)

11.8 Security

[Req11.8.1] a.) If a mobile or nomadic user is allowed to connect to the user's (residential) network of somebody else to get connectivity to an access network via an operator owned Residential Gateway, sufficient measures should have been taken to protect security of that said network (including the protection against malicious attacks on devices that are connected to the other user's network).
b.) If a mobile or nomadic user is allowed to connect to the user's (residential) network of somebody else to get connectivity to an access network sufficient measures should have been taken to protect the privacy of the user in the other user's network.
c.) If a mobile or nomadic user is allowed to connect to the user's (residential) network of somebody else to get connectivity to an access network sufficient measures should have been taken to protect the access line towards the access provider.

11.9 Charging

[Req11.9.1] The implications for Charging shall be considered.

[Req11.9.2] Charging/billing record may be adjusted depending on the type of access and the bandwidth used to reflect the session continuity (e.g. change of access networks) in the charging record to finally provide a single record for a dedicated session.

11.10 Numbering

[Req11.10.1] The network should support the ability for the FMC user to be reachable using a public user ID, regardless of whether the subscriber is connected to a Mobile Wireless network, Fixed Wireless network or Fixed Broadband network.

The network should support different possibilities for the FMC user's public user ID, including a mobile number, a fixed number or both.

11.11 Lawful intercept

[Req11.11.1] Any lawful intercept in progress before session transfer shall continue after session transfer, if authorization from legal authority is given.

11.12 Mobility

[Req11.12.1] Inter-access mobility is required.

- The network shall support a user to access his services via the fixed access network (e.g. in the WIFI area coverage) in accordance with the user's contract with the FMC service provider.
- The network shall support a user to access his services via mobile access network (e.g. GSM access network) in accordance with the user's contract with the FMC service provider.
- The network shall support seamless mobility for services between different access networks technologies. The level of service transparency depends on the service:
  - Voice Communication: the network maintains the communication when leaving or entering the WIFI covered area in order to avoid degradation of the service user experience.
  - SMS/MMS: it is considered acceptable that the transmission of a SMS/MMS is aborted and restarted in the new access network, as this doesn't deteriorate the user service experience.

[Req11.12.2] Services are offered in accordance with the network capabilities. It means that a Video Communication can be downgraded to Voice Communication when the user/terminals migrate to the mobile only coverage.

11.13 Service continuity

[Req11.13.1] Voice Call Continuity: The requirements for voice call continuity in TS 122 101 [6], clause 21 apply for TISPAN NGN network with the following changes:

- Replace "3GPP system" by "network".
- Replace "ME" by "UE".

12 Responsible organizations

Since FMC is about bringing together of traditionally separate fixed networks and mobile networks, it spans a number of standards development organizations and consortia in the areas of fixed networks, mobile networks, fixed wireless networks and FMC itself. Following key organizations have been identified as relevant in each of these areas.

FMC	Fixed Networks	Mobile Wireless Networks	Fixed Wireless Networks
TISPAN ITU-T FMCA UMA (now 3GPP)	TISPAN CableLabs HGI	3GPP3GPP 3GPP2 WiMAX Forum (802.16e) GSMA OMA	WFA IEEE (802.11, 802.16)

Annex A: FMC work in the industry Fora

Table A.1

SDO / Fora / Consortia	Network attachment	Resource and admission control	Roaming	Handover	Access network selection for originating sessions	Access network selection for terminating sessions	Emergency and location determination	Security	Charging	Numbering
ETSI TISPAN WG1										
	TR 181 011	TR 181 011	TR 181 011	TR 181 011	TR 181 011	TR 181 011	TR 181 011	TR 181 011	TR 181 011	TR 181 011
	TS 181 005 [2]	TS 181 005 [2]	TS 181 005 [2]	TS 181 005 [2]	TS 181 005 [2]	TS 181 005 [2]	TS 181 005 [2]	TS 181 005 [2]	TS 181 005 [2]	TS 181 005 [2]
3GPP										
VCC			TS 122 101 [6]	TS 122 101 [6]	TS 122 101 [6]	TS 122 101 [6]	TS 122 101 [6]	TS 122 101 [6]	TS 122 101 [6]	TS 122 101 [6]
VCC					TS 123 206 [10]	TS 123 206 [10]	TS 123 206 [10]	TS 123 206 [10]	TS 123 206 [10]	
VCC				TR 23.806 [34]	TR 23.806 [34]	TR 23.806 [34]	TR 23.806 [34]	TR 23.806 [34]	TR 23.806 [34]	
QoS					TS 122 105 [11]	TS 122 105 [11]				
QoS					TR 23.836 [36]	TR 23.836 [36]				
Presence								TS 122 141 [12]	TS 122 141 [12]	
IMC EC							TS 22.167 [28]			
SAE	TS 122 258 [13]	TS 122 258 [13]			TS 122 258 [13]	TS 122 258 [13]		TS 122 258 [13]		
SAE	TS 22.278 [29]	TS 22.278 [29]	TS 22.278 [29]	TS 22.278 [29]	TS 22.278 [29]	TS 22.278 [29]	TS 22.278 [29]	TS 22.278 [29]	TS 22.278 [29]	TS 22.278 [29]
SAE: PCC AAA	TS 23.401 [39]	TS 23.401 [39]	TS 23.401 [39]	TS 23.401 [39]	TS 23.401 [39]	TS 23.401 [39]	TS 23.401 [39]	TS 23.401 [39]	TS 23.401 [39]	TS 23.401 [39]
IP-CAN					TS 124 229 [14]	TS 124 229 [14]				
UMA GAN			TS 123 234 [15]		TS 123 234 [15]	TS 123 234 [15]		TS 123 234 [15]	TS 123 234 [15]	TS 123 234 [15]
					TS 133 234 [16]	TS 133 234 [16]		TS 133 234 [16]		
I-WLAN			New WI/SI	New WI/SI	New WI/SI	New WI/SI				
GSM GPRS/3G WLAN			New WI/SI	New WI/SI	New WI/SI	New WI/SI				
Non 3GPP access			New WI/SI	New WI/SI	New WI/SI	New WI/SI				
			TS 122 011 [17]							
							TS 122 071 [18]			
			TS 122 115 [19]						TS 122 115 [19]	
					TS 122 127 [20]	TS 122 127 [20]			TS 122 127 [20]	
				TS 122 129 [21]						
					TS 122 228 [22]	TS 122 228 [22]				
									TS 122 279 [23]	

SDO / Fora / Consortia	Network attachment	Resource and admission control	Roaming	Handover	Access network selection for originating sessions	Access network selection for terminating sessions	Emergency and location determination	Security	Charging	Numbering
			TR 22.800 [30]		TR 22.800 [30]	TR 22.800 [30]		TR 22.800 [30]	TR 22.800 [30]	
					TR 22.811	TR 22.811				
			TR 22.935 [32]				TR 22.935 [32]			
			TR 122 936 [24]					TR 122 936 [24]	TR 122 936 [24]	
			TR 122 967 [25]				TR 122 967 [25]			
								TR 22.980 [33]		
				TS 123 236 [26]						
								TR 123 808 [35]	TR 123 808 [35]	TR 123 808 [35]
			TR 23.837 [37]				TR 23.837 [37]			
	TR 23.882 [38]		TR 23.882 [38]		TR 23.882 [38]	TR 23.882 [38]				
			TR 123 981 [27]		TR 123 981 [27]	TR 123 981 [27]				
3GPP2										
			S.R0087-A [40]		S.R0087-A [40]	S.R0087-A [40]		S.R0087-A [40]	S.R0087-A [40]	
					X.PS0028 [41]	X.PS0028 [41]		X.PS0028 [41]	X.PS0028 [41]	
ITU-T										
					FMC-Req [56]	FMC-Req [56]		FMC-Req [56]	FMC-Req [56]	
	FMC-IMS [58]	FMC-IMS [58]	FMC-IMS [58]	FMC-IMS [58]	FMC-IMS [58]	FMC-IMS [58]		FMC-IMS [58]	FMC-IMS [58]	
				FMC-PAU [57]	FMC-PAU [57]	FMC-PAU [57]		FMC-PAU [57]	FMC-PAU [57]	
			MMR [59]	MMR [59]	MMR [59]	MMR [59]		MMR [59]	MMR [59]	
			MMF [60]	MMF [60]	MMF [60]	MMF [60]		MMF [60]	MMF [60]	
			LMF [61]		LMF [61	LMF [61				
				HMF [62]	HMF [62]	HMF [62]		HMF [62]	HMF [62]	
IEEE										
			802.11u [43]	802.11u [43]	802.11u [43]	802.11u [43]				
			802.11r [45]							
								802.11i [46]		
			802.11k [47]							
			802.21 [42]	802.21 [42]	802.21 [42]	802.21 [42]		802.21 [42]	802.21 [42]	
					802.16d	802.16d				
			802.16e [49]	802.16e [49]	802.16e [49]	802.16e [49]				
WFA										
			WCC	WCC	WCC	WCC	WCC	WCC	WCC	
FMCA										
			Bluetooth CTP [63]	Bluetooth CTP [63]	Bluetooth CTP [63]	Bluetooth CTP [63]	Bluetooth CTP [63]	Bluetooth CTP [63]	Bluetooth CTP [63]	
			Wi-Fi GAN (UMA) [64]	Wi-Fi GAN (UMA) [64]	Wi-Fi GAN (UMA) [64]	Wi-Fi GAN (UMA) [64]	Wi-Fi GAN (UMA) [64]	Wi-Fi GAN (UMA) [64]	Wi-Fi GAN (UMA) [64]	
			SIP over Wi-Fi [65]	SIP over Wi-Fi [65]	SIP over Wi-Fi [65]	SIP over Wi-Fi [65]	SIP over Wi-Fi [65]	SIP over Wi-Fi [65]	SIP over Wi-Fi [65]	

SDO / Fora / Consortia	Network attachment	Resource and admission control	Roaming	Handover	Access network selection for originating sessions	Access network selection for terminating sessions	Emergency and location determination	Security	Charging	Numbering
Ecma										
			TC32 [50] and [51]	TC32 [50] and [51]	TC32 [50] and [51]	TC32 [50] and [51]	TC32 [50] and [51]	TC32 [50] and [51]	TC32 [50] and [51]	TC32 [50] and [51]
HGI			FMC use cases in R2	FMC use cases in R2	FMC use cases in R2	FMC use cases in R2	FMC use cases in R2	FMC use cases in R2	FMC use cases in R2	FMC use cases in R2
GSMA										
		IR.65 [66]	IR.65 [66]	IR.65 [66]	IR.65 [66]	IR.65 [66]	IR.65 [66]	IR.65 [66]	IR.65 [66]	
	Other PRDs	Other PRDs	Other PRDs	Other PRDs	Other PRDs	Other PRDs	Other PRDs	Other PRDs	Other PRDs	Other PRDs
OMA										
			BCAST [52]					BCAST [52]	BCAST [52]	
			IM [53]	IM [53]	IM [53]	IM [53]	IM [53]	IM [53]	IM [53]	
PacketCable										
			2.0 (FMC)	2.0 (FMC)	2.0 (FMC)	2.0 (FMC)	2.0 (FMC)	2.0 (FMC)	2.0 (FMC)	2.0 (FMC)
IETF										
			fmc-arch [54]	fmc-arch [54]	fmc-arch [54]	fmc-arch [54]	fmc-arch [54]	fmc-arch [54]	fmc-arch [54]	
				hoakey				hoakey [67]	hoakey [67]	
			Netlmm [55]	netlmm [55]	netlmm [55]	netlmm [55]	netlmm [55]	netlmm [55]	netlmm [55]	
IPsphere Forum										
	FMC UC IMS-SSS	FMC UC IMS-SSS	FMC UC IMS-SSS	FMC UC IMS-SSS	FMC UC IMS-SSS	FMC UC IMS-SSS	FMC UC IMS-SSS	FMC UC IMS-SSS	FMC UC IMS-SSS	FMC UC IMS-SSS

3GPP

WID for network selection for I-WLAN: Integrate requirements for the selection of I-WLAN access into the existing PLMN network selection mechanisms and define these in one specification.

Seamless handover between mobile and WLAN: Seamless roaming and handover between a GSM/GPRS/3G mobile network and a WLAN. Determine the requirements for seamless roaming and handover between a GSM/GPRS/3G mobile network and a WLAN.

Non 3GPP access networks selection principles: Study how a UE which can support both cellular and non 3GPP access performs the network selection procedures. Update TS 122 011 to include selection of these access types.

GSMA

GSM Association Official Document IR.65 [66] plus other relevant PRDs.

History

Document history		
V2.0.0	January 2008	Publication