



Fixed-Mobile
Convergence Alliance

Convergence Services over Wi-Fi GAN (UMA)

Release 2.0
8th May 2006

FMCA Product Requirement Definitions

Release 2.0 – 8th May 2006

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2 Acknowledgements

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UMA Technology:

To highlight key FMCA product requirements, this document quotes some of the requirements and definitions from the UMA Stage 1 User Perspective and Stage 2 Architecture specifications. The use of UMA specifications is identified and referenced within Wi-Fi GAN PRD Release 1.0. It is acknowledged that this material may be copyright of the participating partners of UMA Technology.

IEEE:

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Open Mobile Alliance (OMA):

OMA technical specifications, definitions, terms and abbreviations have been referenced in this document.

3 Introduction

The Fixed-Mobile Convergence Alliance (FMCA) is a global alliance of telecom operators whose objective is to accelerate the development of Convergence products and services.

The FMCA is committed to providing a superior experience to customers by creating seamless services using a combination of fixed broadband and local access wireless technologies to meet their needs in homes, offices, other buildings and on the move.

In order to accomplish its goals, the Alliance is focused on the close collaboration with Standards Development, Specification and Certification Organisations (SDO/Fora) and wider vendor community in key technical areas which require telecom operator input.

The FMCA Technical Working Group (TWG), with its various Workstreams and Working Groups, is responsible for the timely release of the FMCA Product Requirement Definitions (PRD), which are high level technical papers providing the common operator requirements for Convergence Services in areas such as Service Capabilities, Handset, Access Point & Gateway, and Network Architecture.

The FMCA PRDs are working documents, with each new release reflecting collaborative input from FMCA members and joint reviews with industry. For example, Release 2.0 of the FMCA Wi-Fi SIP and Wi-Fi GAN (UMA) PRDs benefit from input from the Wi-Fi Alliance, with whom the FMCA has a strategic relationship.

The FMCA is not a Standards Development, Specification or Certification Organisation. Its focus is on the rapid productisation of the Convergence technologies by identifying and setting product and service requirements for industry to meet when developing Convergence technologies. The FMCA PRDs will reference, where possible, existing and emerging standards and certifications.

Standards Development, Specification and Certification Organisations (SDO/Fora) and wider vendor community are invited to review the FMCA Product Requirement Definitions (PRD) and advise how these operator-led requirements can be integrated into existing and/or upcoming standards and certification programmes as well as product roadmaps.

The FMCA benefits from a clear PRD development framework, with PRDs Release 3.0 planned for late 2006.

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4 Scope

Release 2.0 of the FMCA's Convergence Services Over Wi-Fi GAN (UMA) PRD highlights a series of updates and hence should be read in conjunction with Release 1.0.

Within this PRD the word 'shall' denotes a mandatory requirement and the word 'should' denotes a desirable requirement.

SDOs/Fora and vendors wishing to review the FMCA Product Requirement Definitions (PRD) should contact, in the first instance, the FMCA Programme Office, expressing their interest:

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Enquiries will be reviewed by the FMCA Programme Office and passed to the relevant Workstreams and respective Working Groups within the overall FMCA Technical Working Group.

More information is available from the FMCA website: <http://www.thefmca.com>

5 Updates

Requirement Reference	PRD Release 1.0 Requirement	Updated PRD Release 2.0 Requirement
5.2.1.1	Wi-Fi GAN (UMA) MS shall support the following transport options: <ul style="list-style-type: none"> • IEEE 802.11b; • IEEE 802.11g. 	The MS shall support IEEE 802.11b and be certified by the Wi-Fi Alliance through the existing IEEE 802.11b certification or the emerging Wi-Fi Alliance Device Class certification.
5.2.1.2	The MS shall have Wi-Fi Alliance certifications for layer 2 operation in IEEE 802.11b and IEEE 802.11g modes.	The MS should support IEEE 802.11g and where implemented it shall be certified by the Wi-Fi Alliance through existing IEEE 802.11g certification or the emerging Wi-Fi Alliance Device Class certification.
5.2.1.3	The MS should support IEEE 802.11a, IEEE 802.11h and IEEE 802.11n as appropriate.	In addition operators may require that the MS should support IEEE 802.11a and/or IEEE 802.11h. Where implemented these shall be certified by the Wi-Fi Alliance.
5.2.1.4	The MS should have Wi-Fi Alliance certifications for layer 2 operation in IEEE 802.11a and IEEE 802.11h.	
5.2.1.5	For IEEE 802.11b the minimum specification for Transmit power at the antenna input for the MS shall be +17dBm (+3/-2 dBm). The FMCA recognises that certain aspects of this requirement may be met through emerging Wi-Fi Alliance Wireless Cellular Convergence (WCC) certifications. More details will follow in subsequent PRD releases.	MS Total Radiated Power (TRP) shall be measured according to the emerging Wi-Fi Alliance Wi-Fi Mobile Convergence (WMC) RF Performance Certification (at the rates and on the channels specified by the RF Performance Certification). Future PRD Releases or white papers will recommend target values which the resulting TRP measurement shall meet or exceed.
5.2.1.6	For IEEE 802.11b the minimum specification for Receive sensitivity for the MS shall be at least -87dBm (at 1Mbit/s). The FMCA recognises that certain aspects of this requirement may be met through emerging Wi-Fi Alliance Wireless Cellular Convergence (WCC) certifications. More details will follow in subsequent PRD releases.	MS Total Isotropic Sensitivity (TIS) shall be measured according to the emerging Wi-Fi Alliance Wi-Fi Mobile Convergence (WMC) RF Performance Certification (at the rates and on the channels specified by the RF Performance Certification). Future PRD Releases or white papers will recommend target values which the resulting TIS measurement shall meet or exceed.
5.2.1.7	For IEEE 802.11b the minimum specification for MS antenna gain shall be at least -10dBi.	Replaced by updates to 5.2.1.5 and 5.2.1.6.

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Requirement Reference	PRD Release 1.0 Requirement	Updated PRD Release 2.0 Requirement
5.2.1.8	When the MS is in GSM/cellular mode, the MS should periodically scan for IEEE 802.11 coverage. The interval for scan is implementation-specific, depending on power conservation strategies.	When the MS is in GSM/cellular mode, the MS should periodically search for IEEE 802.11 coverage. The interval for probing or scanning is implementation-specific, depending on power conservation strategies. The interval probe/scan period shall be operator configurable and should be configurable over the air (Wi-Fi and cellular), e.g. through use of OMA Device Management.
5.2.1.15	The MS should be compliant with emerging Wi-Fi Alliance WMM-Power Saving Certifications.	The MS shall be compliant with Wi-Fi Alliance WMM Power Save.
5.2.1.16 - New		The MS should support the simultaneous connection of both Wi-Fi and cellular radio interfaces. MS receiver sensitivity should be tested, to establish that the operation of the cellular interface does not significantly degrade Wi-Fi receiver sensitivity, e.g. as per emerging Wi-Fi Alliance WMC RF Performance certification.
5.2.2.1	The MS shall support WEP (RC4) and WPA (TKIP) at the minimum.	The MS shall support WEP (RC4) and WPA Personal (TKIP) at the minimum.
5.2.2.2	The MS should support IEEE 802.11i / WPA 2.	The MS shall be compliant with Wi-Fi Alliance WPA 2 certifications. It shall be operator configurable to support WPA 2 Personal or WPA 2 Enterprise Profiles.
5.2.2.4	The MS should support one or more operator specified upper layer authentication protocols, e.g. HTTP, HTTPS, SSL/RADIUS, EAP TLS, PEAP, EAP-FAST, XML minibrowser in particular for public hotspot scenarios.	The MS should support operator specified upper layer authentication protocols, e.g. HTTP, HTTPS, SSL/RADIUS, EAP TLS, PEAP, EAP-FAST, EAP-AKA, EAP-SIM, XML minibrowser in particular for public hotspot scenarios.
5.2.2.6	The MS shall be compliant with Wi-Fi Alliance WPA and WPA2 certifications.	Now covered by update to 5.2.2.2
5.2.2.10	The MS shall provide a user-friendly mechanism for entry of Wi-Fi pre-shared keys onto the MS, e.g. the key should be user-entered on the MS in groups of four or five characters. The FMCA recognises that certain aspects of this requirement may be met through emerging Wi-Fi Alliance Simple Configuration certifications. More details will follow in subsequent PRD releases.	The first association between an MS and an AP shall be initiated by the MS user, e.g. via menu selections or a user friendly mechanism. A user friendly mechanism shall be supported for first-time residential association. This shall provide a secure way to configure WPA/WPA 2 without the need for the user to enter a pass phrase into the MS. It shall not be possible for a third party to crack the WPA / WPA 2 security by eavesdropping the set-up process.

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Requirement Reference	PRD Release 1.0 Requirement	Updated PRD Release 2.0 Requirement
5.2.4.1	The Wi-Fi air interface shall be optimised for voice, i.e. voice delay shall be minimised and the MS should internally prioritise voice packets ahead of any other data packets that are to be transmitted. The FMCA recognises that certain aspects of this requirement may be met through existing Wi-Fi Alliance Wi-Fi Multimedia (WMM) certifications and emerging Wi-Fi Alliance Public and Managed Access certifications. More details will follow in subsequent PRD releases.	<p>The Wi-Fi air interface shall be optimised for voice and associated signalling traffic, i.e. voice delay shall be minimised and the MS should internally prioritise voice packets ahead of any other data packets that are to be transmitted.</p> <p>The MS shall also support the prioritisation of emergency voice calls. The FMCA recognises that certain aspects of this requirement may be met through existing and emerging Wi-Fi Alliance Wi-Fi Multimedia (WMM) certifications.</p>
<p>5.2.4.3</p> <p>5.2.4.4</p> <p>5.2.4.5</p> <p>5.2.4.6</p>	<p>The MS shall support IEEE 802.11e EDCA to allow prioritised access for voice packets to the medium.</p> <p>The MS shall set the IEEE 802.11e EDCA access categories — voice, video, best effort, background — based on the traffic type, e.g. voice, data, signalling.</p> <p>The MS shall be certified by the Wi-Fi Alliance for compliance to Wi-Fi Multimedia (WMM).</p> <p>MS functionality should progress from Wi-Fi Alliance WMM to full IEEE 802.11e capability and at this stage should be certified by the Wi-Fi Alliance for compliance to their emerging Wi-Fi Multimedia Scheduled Access (WMM-SA) and Wi-Fi Multimedia – Power Saving certifications.</p>	<p>The MS shall be certified by the Wi-Fi Alliance for compliance to Wi-Fi Multimedia (WMM). WMM shall be used by the MS to allow prioritised access for voice packets and associated signalling traffic to the medium. This shall include setting the IEEE 802.11e EDCA access categories for voice, video, best effort, background based on traffic type, e.g. voice, data, signalling and emergency call.</p> <p>The MS shall be certified by the Wi-Fi Alliance for compliance with Wi-Fi Multimedia – Power Save and in the future should be certified for compliance with Wi-Fi Multimedia Scheduled Access (WMM-SA).</p>

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Requirement Reference	PRD Release 1.0 Requirement	Updated PRD Release 2.0 Requirement
5.2.5.4	The MS shall be capable of storing a minimum of 32 wireless profiles and differentiate between them based on Wi-Fi parameters such as SSID and MAC address. Operators shall have the ability to restrict the maximum number of WLAN associations.	The MS shall be capable of storing a minimum of 32 wireless profiles and differentiating between them based on Wi-Fi parameters such as SSID and MAC address. Operators shall have the ability to restrict the maximum number of wireless profiles. The user shall have the ability to label the wireless profile; the default shall be the SSID. The MS shall prompt the user when the maximum number of wireless profiles is exceeded. The MS shall support user configurable options for new profiles when the MS maximum number of wireless associations limit is reached. For example, whether to automatically delete the least used profile, or to alert the user that an existing profile will need to be deleted before the new profile can be added. The MS should support the use of device management (e.g. OMA-DM) to manage the wireless profiles.
5.2.5.9	The MS shall only accept an association attempt from an AP or initiate an association attempt to an AP if the Wi-Fi signal strength and/or error rate is above a defined threshold.	The MS shall only initiate an association attempt to an AP if the Wi-Fi signal quality is above a defined threshold. Signal quality threshold shall be operator configurable, e.g. through use of OMA-DM.
5.2.6.1	Wi-Fi association with an AP, which the MS has a security association with, shall not require any user action, unless the MS is configured to be in cellular-only mode.	Wi-Fi association with an AP, for which the MS has a stored profile, shall not require any user action, unless the MS is configured to be in cellular-only mode or in cellular-preferred mode
5.2.6.2	The first association between an MS and an AP shall be initiated by the MS user, e.g. via menu selections. The MS may provide a visual or audible prompt configurable by the operator and user. The operator preference shall prevail.	The first association between an MS and an AP shall be initiated manually by the MS user if the MS and AP do not have pre-configured settings. In the case of manual user configuration this shall be achieved through the use of menu selections on the MS and/or AP. The MS should provide a visual or audible prompt to alert when the MS switches to/from a GAN Wi-Fi network. These prompts shall be configurable by the operator and user.
5.2.6.3	The MS should support the option not to display a prompt to the user to initiate or accept an association to an AP it has already associated with, i.e. the first association to an AP shall be initiated by the user; subsequent associations to this AP shall not require user intervention.	If the MS is in wireless-only mode or wireless-preferred mode, the MS shall not display a prompt to the user to initiate or accept an association to an AP it has already associated with, i.e. any first association to an AP shall be initiated by the user; subsequent associations to this AP shall not require user intervention. Options shall be operator configurable through remote management, e.g. OMA-DM.

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Requirement Reference	PRD Release 1.0 Requirement	Updated PRD Release 2.0 Requirement
5.2.6.5	If the MS detects a Wi-Fi AP that it has a security association with, and there is no other higher priority WLAN available, the MS shall automatically associate to that AP - subject to the MS being in wireless-preferred or wireless-only mode.	If the MS detects a Wi-Fi AP for which it has a stored profile, and there is no other higher priority WLAN available, the MS shall automatically associate to that AP - subject to the MS being in wireless-preferred or wireless-only mode and having a wireless profile for that AP. If the MS does not have a wireless profile for that AP, then a profile would need to be manually added.
5.2.7.1	MS should be capable of seamlessly performing in-call/in-session AP to APs handovers on the same network. The FMCA recognises that certain aspects of this requirement may be met through emerging Wi-Fi Alliance Wireless Cellular Convergence (WCC) and Voice over Wi-Fi certifications. More details will follow in subsequent PRD releases.	MS should be capable of seamlessly performing in-call/in-session AP-to-AP handovers for both APs on the same IP subnet and different sub-nets.
5.2.8.2	The MS shall meet the requirements of RFC3715 (IPsec-Network Address Translation (NAT) Compatibility Requirements).	The MS shall meet the requirements of RFC3948 (UDP Encapsulation of IPsec ESP packets).
5.2.8.3	MS should support native data capability outside UMA. Where this is implemented it shall be done without compromising UMA security.	MS should support native data capability. Where a native data capability is implemented it shall be done without compromising GAN/UMA security or QoS. Capability should be operator configurable – enable/disable.
5.3.7	The AP shall at the minimum support conformance to IEEE 802.11b, IEEE 802.11g.	APs shall at the minimum support conformance to IEEE 802.11b and IEEE 802.11g through Wi-Fi Alliance certification.
5.3.8	The AP should support conformance to IEEE 802.11a and IEEE 802.11h as per regional operator requirements.	APs should support conformance to IEEE 802.11a and IEEE 802.11h as per operator requirements. Conformance shall be through Wi-Fi Alliance certification.
5.3.9	The AP shall have Wi-Fi Alliance certifications for layer 2 operation in IEEE 802.11b and IEEE 802.11g modes and be compliant with other IEEE 802.11b/g systems.	
5.3.10	The AP should have Wi-Fi Alliance certifications for layer 2 operation in IEEE 802.11h and IEEE 802.11a modes and be compliant with other IEE 802.11a and IEEE 802.11h systems.	

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Requirement Reference	PRD Release 1.0 Requirement	Updated PRD Release 2.0 Requirement
5.3.12	For IEEE 802.11b the minimum specification for transmit power at the antenna input for the AP shall be +17 dBm (+3/-2 dBm). The FMCA recognises that certain aspects of this requirement may be met through emerging Wi-Fi Alliance Wireless Cellular Convergence (WCC) certifications. More details will follow in subsequent PRD releases.	AP Total Radiated Power (TRP) shall be measured according to the emerging Wi-Fi Alliance Wi-Fi Mobile Convergence (WMC) RF Performance Certification (at the rates and on the channels specified by the RF Performance Certification). Future PRD Releases or white papers will recommend target values which the resulting TRP measurement shall meet or exceed.
5.3.13	For IEEE 802.11b the minimum specification for receive sensitivity for the AP shall be at least -87 dBm (at 1Mbit/s). The FMCA recognises that certain aspects of this requirement may be met through emerging Wi-Fi Alliance Wireless Cellular Convergence (WCC) certifications. More details will follow in subsequent PRD releases.	AP Total Isotropic Sensitivity (TIS) shall be measured according to the emerging Wi-Fi Alliance Wi-Fi Mobile Convergence (WMC) RF Performance Certification (at the rates and on the channels specified by the RF Performance Certification). Future PRD Releases or white papers will recommend target values which the resulting TIS measurement shall meet or exceed.
5.3.11	The minimum specification for Access Point antenna gain should be at least -0 dBi. The FMCA recognises that certain aspects of this requirement may be met through emerging Wi-Fi Alliance Wireless Cellular Convergence (WCC) certifications. More details will follow in subsequent PRD releases.	Requirement covered by updates to 5.3.12 and 5.3.13.
5.3.21.18	The AP shall support the IEEE 802.11e EDCA to allow prioritised access for voice packets to the medium.	The AP shall be certified by the Wi-Fi Alliance for compliance to Wi-Fi Multimedia (WMM). WMM shall be used by the AP to allow prioritised access for voice packets and associated signalling traffic to the medium. This shall include setting the IEEE 802.11e EDCA access categories for voice, video, best effort, background based on traffic type, e.g. voice, data, signalling, emergency calls, etc. The AP shall be certified by the Wi-Fi Alliance for compliance to Wi-Fi Multimedia Power Save (WMM-Power Save) and in the future should be certified for compliance to Wi-Fi Multimedia Scheduled Access (WMM-SA).
5.3.21.19	The AP shall set the IEEE 802.11e EDCA access categories – voice, video, best effort, background – based on the traffic type, e.g. voice, data, signalling.	
5.3.21.20	The AP shall be certified by the Wi-Fi Alliance for compliance to Wi-Fi WMM.	
5.3.21.21	AP functionality should progress from WMM to full IEEE 802.11e capability and at this stage should be certified by the Wi-Fi Alliance for compliance to their emerging Wi-Fi Multimedia Scheduled Access (WMM-SA) certifications.	
		The AP shall support prioritisation of traffic types based on DSCP settings. The QoS policy on the AP shall be agreed with the operator.

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Requirement Reference	PRD Release 1.0 Requirement	Updated PRD Release 2.0 Requirement
5.3.21.1	The AP should be compliant with emerging Wi-Fi Alliance WMM-Power Saving Certifications.	The AP shall be compliant with Wi-Fi Alliance WMM Power Save certifications.
5.3.21.11	The AP shall support WEP (RC4) and WPA (TKIP) at the minimum.	The AP shall support WEP (RC4) and WPA Personal (TKIP) at the minimum.
5.3.21.12	The AP should support IEEE 802.11i / WPA 2.	The AP shall be compliant with Wi-Fi Alliance WPA 2 certifications. It shall be operator configurable to support Personal or Enterprise Profiles.
5.3.21.14	The AP should support one or more operator specified upper layer authentication protocols, e.g. HTTP, HTTPS, SSL/RADIUS, EAP TLS, PEAP, EAP-FAST, XML minibrowser in particular for public hotspot scenarios.	The AP should support operator specified upper layer authentication protocols, e.g. HTTP, HTTPS, SSL/RADIUS, EAP TLS, PEAP, EAP-FAST, EAP-AKA, EAP-SIM, XML minibrowser in particular for public hotspot scenarios.
5.3.21.16	The AP shall be compliant with Wi-Fi Alliance WPA and WPA 2 certifications.	Covered by updates to 5.3.21.12.
6.1.2	The MS should be capable of configuring at least 8 emergency call codes in the device (not in the SIM card).	The MS should be capable of configuring at least 8 emergency call codes in either the device or SIM card. The assignment of emergency call codes are subject to regional/in-country regulations.
6.1.4	Emergency calls shall take precedence over the mode (cellular only, cellular preferred, wireless-only, wireless-preferred) of the MS.	Operator network configuration for handling emergency calls shall take precedence over the mode (cellular only, cellular-preferred, wireless-only, wireless-preferred) of the MS.

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Requirement Reference	PRD Release 1.0 Requirement	Updated PRD Release 2.0 Requirement
6.1.12 - New		<p>The MS shall support the ability to route emergency calls as follows:</p> <ul style="list-style-type: none"> • if Home PLMN GERAN coverage is available then the call shall be routed over the Home PLMN GERAN network — the MS shall be registered with the Home PLMN (including perform a Location Update if this has not already been performed to the GERAN network) when it initiates the emergency call; • if Home PLMN GERAN coverage is not available then the emergency call shall be routed over the GAN Wi-Fi network if in GAN Wi-Fi coverage. <p>This shall apply regardless of the wireless-only, wireless-preferred, mobile-preferred, mobile-only setting on the MS. The MS shall be configurable such that this can override the ECMP setting.</p> <p>The MS shall contain a configurable list of country codes for which the above behaviour applies. If a country code is not in the configurable list then the MS shall attempt an emergency call over any GERAN network if the Home PLMN GERAN network is not available.</p>
6.1.13 - New		<p>For both Wi-Fi and cellular modes location information as required by emergency services should be supported (regional/in-country regulatory dependent).</p>
5.3.21.32 - New		<p>The AP should support a mechanism to identify MS classes and differentiate between MS types. Whether this mechanism is used or not shall be determined by the operator. It may be necessary to differentiate between MS classes if for example, the MS classes support different QoS policies.</p>
7.1.12	<p>MS should support different configurable alerts (ring tone, ring volume, etc) for cellular and Wi-Fi GAN (UMA) modes. This capability should be able to be set on or off by the end user.</p>	<p>MS should support different configurable alerts (ring tone, ring volume, etc) for cellular and Wi-Fi GAN (UMA) modes. This capability should be able to be set on or off by the end user and configurable via device management, e.g. OMA-DM.</p>

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Requirement Reference	PRD Release 1.0 Requirement	Updated PRD Release 2.0 Requirement
7.1.13	MS should support the capability to provide an audible and/or visual indication to the MS user when a handover occurs (i.e. for an in-call switch between wireless and mobile modes). This capability should be able to be set on or off by the end user. The actual indication shall be different depending on the direction of the mode change. Note that there is no requirement for an audible indication in idle mode (roving).	MS should support the capability to provide an audible and/or visual indication to the MS user when a handover occurs (i.e. for an in-call switch between wireless and mobile modes). This capability shall be able to be set on or off by the end user. The actual indication shall be different depending on the direction of the mode change. Note that there is no requirement for an audible indication in idle mode (roving). Capability for remote management, e.g. OMA-DM.
7.1.15	MS should provide visual indication showing its mode of communication, e.g. Wi-Fi GAN (UMA) or cellular. The indication shall change automatically when the mode changes. In addition, it may be useful for the MS to indicate which access network is being used for any incoming or outgoing call (if this is not implicit from the mode indication). These capabilities should be able to be set on or off by the end user.	MS should provide visual indication showing its mode of communication, e.g. Wi-Fi GAN (UMA) or cellular. The indication shall change automatically when the mode changes. In addition, it may useful for the MS to indicate which access network is being used for any incoming or outgoing call (if this is not implicit from the mode indication). These capabilities should be able to be set on or off by the end user.
7.1.16	The MS should support the facility to provide an audible warning that wireless signal strength is deteriorating prior to handover. This is to give users an early indication of a potential network change.	The MS should support the facility to provide an audible warning that wireless signal strength is deteriorating prior to handover. This is to give users an early indication of a potential network change. Where implemented, this shall be operator and/or user configurable – enable/disable.
5.9.7 - New		The MS shall provide support to users with disabilities, including but not restricted to those with hearing and speech disabilities, and in accordance with local and regional regulatory requirements.
7.1.26 - New		The MS shall be tested in accordance with a conformance test specification UMA Mobile Conformance R1.0.4 ⁷¹ and UMA Mobile Conformance PICS R1.0.4 ⁷² .
5.2.6.11 - New		After the MS has successfully attached the first time, for all types of AP, the MS-to-AP authentication on connection shall be seamless and shall not require any keystroke entry on the MS to attach to the service.

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Requirement Reference	PRD Release 1.0 Requirement	Updated PRD Release 2.0 Requirement
5.5.1.12 - New		UNC should support connections to multiple MSCs. Network requirement TS 23.236.
5.3.21.33 - New		The following types of APs should be considered (but not limited to): (i) private/home APs and gateways, (ii) public Wi-Fi hotspots and enterprise/corporate APs, and (iii) temporary portable APs, e.g. USB dongle for laptops.
5.3.21.34 - New		All settings and configurations shall be stored in the AP. In the event of complete loss of power to the AP, all settings and configurations shall be resumed.
5.3.21.35 - New		The AP shall have the capability, depending on user or operator requirements to disable the broadcasting of SSIDs.
5.3.21.27	The Wi-Fi AP point shall support NAT, DHCP client and DHCP server functionality.	The Wi-Fi AP shall support the following DHCP and DNS functionality in addition to NAT. DHCP <ul style="list-style-type: none"> • Server (RFC2131, RFC2132); • Relay Agent (RFC1452); • Client (RFC2132). DNS <ul style="list-style-type: none"> • DNS Server (RFC1611); • DNS Relay.
5.3.21.36 - New		APs shall support IEEE 802.1q for multiple VLANs.
5.3.21.37 - New		APs shall support IEEE 802.1p.
5.3.21.38 - New		APs should be able to support multiple SSIDs and associate network profiles and policy groups to these SSIDs.
5.3.21.39 - New		The AP should support mapping of BSSIDs to specific VLANs.
5.3.21.40 - New		The AP should support mapping of BSSIDs to specific traffic priorities via IEEE 802.1p.
5.3.21.41 - New		The AP shall support DSCP tagging and marking; rules to be defined by the operator.

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Requirement Reference	PRD Release 1.0 Requirement	Updated PRD Release 2.0 Requirement
5.3.21.42 - New		The AP should be configured to recognise IEEE 802.1p, IEEE 802.1q and DSCP to maintain voice prioritisation and minimise latency and jitter.
5.3.21.43 - New		The AP shall provide user management log-in and password authentication.
5.3.21.44 - New		The AP shall support MAC address authentication, and the MAC address of an MS shall be stored on the AP during the first-time association process.
5.3.21.14	The AP should support one or more operator specified upper layer authentication protocols, e.g. HTTP, HTTPS, SSL/RADIUS, EAP TLS, PEAP, EAP-FAST, XML mini-browser.	The AP should support one or more operator specified upper layer authentication protocols, e.g. HTTP, HTTPS, SSL/RADIUS, EAP TLS, PEAP, EAP-FAST, EAP-AKA, EAP-SIM, XML mini-browser in particular for public hotspot scenarios.
5.3.21.45 - New		The AP shall support MAC address filtering (with the ability to black-list MAC addresses).
5.4.1.1	<p>Public Wi-Fi hotspots should support Wi-Fi UMA authentication and association through one or more of the following methods:</p> <ul style="list-style-type: none"> • existing SSL/RADIUS authentication using just a 'single shot' HTTPS get command; • a simplified version of existing SSL/RADIUS authentication using just a 'single shot' HTTPS get command or scripts; • creating trusted 'walled gardens' for Wi-Fi GAN (UMA) traffic, bypassing it straight through to the GANC/UNC — the GANC/UNC would then be responsible for authenticating the end user and all billing and audit functions; • public Wi-Fi hotspot support for IEEE 802.1x and EAP (e.g. EAP-SIM authentication) — the FMCA recognises that certain aspects of this requirement may be met through emerging Wi-Fi Alliance Public Managed and Access certifications; more details will follow in subsequent PRD releases. 	<p>Public Wi-Fi hotspots should support Wi-Fi UMA association / authentication through one or more of the following methods:</p> <ul style="list-style-type: none"> • the usage of well defined XML data within in the initial UAM redirect to facilitate the MS to directly post log-in credentials — the MS will also need to be appropriately specified to ensure it looks for and parses the XML; • creating trusted 'walled gardens' for Wi-Fi GAN (UMA) traffic, bypassing it straight through to the GANC/UNC — the GANC/UNC would then be responsible for authenticating the end user and all billing and audit functions; • public Wi-Fi hotspot support for IEEE 802.1x and EAP (e.g. EAP-SIM authentication).

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