



WiMAX Forum Correspondence
Service Provider Working Group

20 December 2010

To: Roger Marks, Chair, IEEE 802.16 Working Group <r.b.marks@ieee.org>

Subject: Draft WiMAX Forum Machine to Machine Communications Requirements Spec

The Service Provider Working Group (SPWG) in the WiMAX Forum (WMF) has recently completed the Draft Specification on *Requirements for WiMAX Machine to Machine Communications*. It is attached for your information. We hope that this document will be informative to the IEEE 802.16 Working Group and will be taken in to consideration in the development of the IEEE P802.16n and P802.16p draft standards (on *Higher Reliability Networks* and *Enhancements to Support Machine-to-Machine Applications*, respectively).

Although the draft is not yet formally approved, it is our view that the technical content is quite stable. However, we welcome any comments or feedback that you may have, and we can consider such feedback during a future revision. We further request you to share the scope and the schedule of the work in your relevant development activities. We would be pleased to receive your information in January 2011, if possible.

Best regards

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Requirements for WiMAX Machine to Machine (M2M) Communication

2010-12-20

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1	TABLE OF CONTENTS	
2	1 INTRODUCTION (INFORMATIVE)	7
3	2 OBJECTIVE AND SCOPE	8
4	3 ABBREVIATIONS, DEFINITIONS, AND CONVENTIONS	
5	(INFORMATIVE)	8
6	3.1 Conventions (Informative)	8
7	3.2 Abbreviations and Acronyms (Informative)	8
8	3.3 Definitions (Informative)	8
9	3.3.1 M2M ASN	8
10	3.3.2 M2M CSN	8
11	3.3.3 M2M Device.....	8
12	3.3.4 M2M Features.....	9
13	3.3.5 M2M Group.....	9
14	3.3.6 M2M Server.....	9
15	3.3.7 M2M Service	9
16	3.3.8 M2M Subscriber	9
17	3.3.9 WiMAX M2M System	9
18	4 REFERENCES	9
19	5 USE CASES (INFORMATIVE)	10
20	5.1 Use Case 1 - Fleet Management	10
21	5.1.1 Short Description	10
22	5.1.2 Actors.....	10
23	5.1.3 Pre-conditions	10
24	5.1.4 Post-conditions	10
25	5.1.5 Normal Flow	10
26	5.1.6 Alternative Flow	11
27	5.2 Use Case 2 - Vending machine	11
28	5.2.1 Short Description	11
29	5.2.2 Actors.....	11
30	5.2.3 Pre-conditions	11
31	5.2.4 Post-conditions	11
32	5.2.5 Normal Flow	11
33	5.2.6 Sub Flow	12

1	5.3	Use Case 3 - Smart Metering	12
2		5.3.1 Short Description	12
3		5.3.2 Actors.....	12
4		5.3.3 Pre-conditions	12
5		5.3.4 Post-conditions	12
6		5.3.5 Normal Flow	12
7		5.3.6 Sub Flow	13
8		5.3.7 Alternative Flow	13
9	5.4	Use Case 4 - Surveillance Video	13
10		5.4.1 Short Description	13
11		5.4.2 Actors.....	13
12		5.4.3 Pre-conditions	13
13		5.4.4 Post-conditions	14
14		5.4.5 Normal Flow	14
15		5.4.6 Sub Flow	14
16		5.4.7 Alternative Flow	14
17	5.5	Use Case 5 – Remote Diagnostics (Informative)	15
18		5.5.1 Short Description	15
19		5.5.2 Actors.....	15
20		5.5.3 Pre-conditions	15
21		5.5.4 Post-conditions	15
22		5.5.5 Normal Flow	15
23		5.5.6 Sub Flow	15
24	5.6	Use Case 6 – Traffic Information	16
25		5.6.1 Short Description	16
26		5.6.2 Actors.....	16
27		5.6.3 Pre-conditions	16
28		5.6.4 Post-conditions	16
29		5.6.5 Normal Flow	16
30	5.7	Use Case 7 – Mobile Payment	16
31		5.7.1 Short Description	16
32		5.7.2 Actors.....	16
33		5.7.3 Pre-conditions	17
34		5.7.4 Post-conditions	17
35		5.7.5 Normal Flow	17
36	6	MACHINE TO MACHINE COMMUNICATION ASPECTS	
37		(INFORMATIVE)	17
38	6.1	M2M Applications	17
39	6.2	M2M Features	18
40		6.2.1 Low Mobility Feature	18
41		6.2.2 Time Controlled Feature	18

1	6.2.3	Monitoring Feature	18
2	6.2.4	Small Data Transmission Feature	19
3	6.2.5	Low Power Consumption Feature	19
4	6.3	M2M Communication with M2M Server Scenarios	19
5	6.3.1	M2M server(s) operated by the WiMAX Operator	19
6	6.3.2	M2M Server not operated by the WiMAX Operator.....	19
7	7	REQUIREMENTS (CONDITIONAL NORMATIVE)	20
8	7.1	Service Requirements.....	20
9	7.1.1	General Requirements	20
10	7.1.2	Naming, identification and Addressing Requirements.....	21
11	7.2	Functional Requirements.....	21
12	7.2.1	System Requirements	21
13	7.2.2	Low Mobility Requirements	22
14	7.2.3	Time Controlled Requirements.....	22
15	7.2.4	Monitoring Requirements	22
16	7.2.5	Small Data Transmission Requirements.....	23
17	7.2.6	Low Power Consumption Requirements	23
18	7.3	Roaming Requirements.....	23
19	7.4	Accounting and Management Requirements.....	23
20	7.4.1	Accounting Requirements	23
21	7.4.2	Operation and Management Requirements	23
22	7.5	Security Requirements.....	23
23	7.6	Regulatory Requirements.....	24
24	8	GUIDANCE AND RECOMMENDATION TO OTHER WIMAX WGS	24
25	ANNEX A	DOCUMENT HISTORY (INFORMATIVE)	24
26	ANNEX B	PHASING OF M2M SERVICE (INFORMATIVE)	ERROR!
27		BOOKMARK NOT DEFINED.	
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1 ***I*** **Introduction (Informative)**

2 This document is the first of a three-stage, end-to-end network system architecture specification for
3 broadband wireless networks based on WiMAX Forum Certified™ products. This document specifies
4 recommendations and requirements for such networks from the perspective of network operators intending
5 to deploy WiMAX networks. It describes business and usage scenarios, deployment models, and functional
6 requirements. Architectural details shall be specified in stage-2 and stage-3 specifications based on the
7 requirements outlined in this document.

8

9 Machine to Machine (M2M) service is a data communication between devices through a WiMAX access
10 network, or between a device and a server in the core network through a WiMAX access network that may
11 be carried out without any human interaction. Common characteristic of M2M applications may include:

12

- 13 • Large number of devices;
- 14 • Bursts of data transmission;
- 15 • Stationary or low mobility application;
- 16 • Automatic resource connection and release from the devices.

17

18 For M2M communication, two different modes of communication can be identified:

19

- 20 1. An M2M Device communicates with one or more servers,
- 21 2. An M2M Device communicates with another M2M Device.

22 Note: This second communication mode is outside the scope of this document.

23

1 **2 Objective and Scope**

2 The objective of this document is to define requirements to support Machine to Machine Service over
3 WiMAX System. The WiMAX Machine to Machine Service supports WiMAX network and device [].

4
5 The scope of the work item is as follows:

- 6
7 • To define use cases for M2M communications over the WiMAX network
8 • To define the requirements for M2M communications over WiMAX network

9 **3 Abbreviations, Definitions, and Conventions (*Informative*)**

10 **3.1 Conventions (*Informative*)**

11 The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”,
12 “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be
13 interpreted as described in Ref [3] RFC 2119.

14 **3.2 Abbreviations and Acronyms (*Informative*)**

- 15 API Application Programming Interface
16 ASN Access Service Network
17 CSN Connectivity Service Network
18 GPS Global Positioning System
19 M2M Machine to Machine
20 NAP Network Access Provider
21 NSP Network Service Provider
22 PLC Power Line Communication
23 QoS Quality of Service

24 **3.3 Definitions (*Informative*)**

25 3.3.1 M2M ASN

26 The M2M ASN is an access service network that supports M2M service capability.

27 3.3.2 M2M CSN

28 The M2M CSN is a core service network that supports M2M service capability.

29 3.3.3 M2M Device

30 A WiMAX device that is capable to provide M2M service(s) and can communicate with M2M
31 server.

1 3.3.4 M2M Features

2 The M2M Feature is a network capability to support a specific characteristic associated with
3 M2M applications. One or more M2M features may be invoked in support of a M2M
4 application.

5 3.3.5 M2M Group

6 The M2M Group is a group of M2M devices that has one or more M2M features that belong to
7 the same M2M Subscriber.

8 3.3.6 M2M Server

9 A server that runs M2M applications.

10 3.3.7 M2M Service

11 The M2M Service provides functionalities that enable the M2M device to communicate with the
12 M2M server, e.g. network access and rejection, waking up device, and device provisioning. The
13 M2M network entity supports an interface that can be accessed by the M2M Device.

14 3.3.8 M2M Subscriber

15 A M2M Subscriber is a legal entity having a contractual relationship with the service provider to
16 provide service to one or more M2M Devices.

17 3.3.9 WiMAX M2M System

18 The WiMAX M2M System is a WiMAX System that supports M2M features.

19 **4 References**

20 [1] 3GPP TS 22.368: "Service Requirements for Machine-Type Communications", stage 1, Rel
21 10.

22 [2] 3GPP TR 23.888: "System Improvements for Machine-Type Communications", stage 2, Rel
23 10.

24 [3] RFC 2119 "Key words for use in RFCs to Indicate Requirement Levels".
25

1 **5 Use Cases (Informative)**

2 **5.1 Use Case 1 - Fleet Management**

3 5.1.1 Short Description

4 Fleet Management application is defined as the remote monitoring of a vehicle fleet. It can be
5 efficiently deployed using the WiMAX wireless technology.

6 5.1.2 Actors

7 John – a member of car sharing service.

8 WiCAR – a company which provides car sharing service to registered members.

9 WiMAX service provider.

10 Car alpha – one of the cars are owned by WiCAR.

11 Blackbox – securely located in car alpha.

12 Auto Management Server.

13 5.1.3 Pre-conditions

14 Car alpha has a built-in Blackbox. The Blackbox of car Alpha is equipped with WiMAX
15 module which is certified in the network of WiMAX Service Provider and interworking with
16 various car sensors that can identify an occurring event.

17 5.1.4 Post-conditions

18 The Blackbox sends information to the Auto Management Server. The information (e.g. GPS
19 coordinate, tire pressure, odometer reading, etc) is used to track the car and car condition.

20 5.1.5 Normal Flow

21 1. John reserves the Car alpha either online or by telephone.

22 2. John goes to the location of the car and starts Car alpha.

23 3. The Blackbox performs device authentication over the WiMAX network for WiMAX
24 access service.

25 4. As John drives the Car alpha, the Blackbox collects information (e.g. location, speed, car
26 maintenance data, etc) and sends them periodically to the Auto Management Server in
27 headquarter of WiCAR via the WiMAX network.

28 Note: The Management server may send any information to the Blackbox.

29 5. John arrives at the destination and locks the Car alpha's. The trip information (e.g.
30 driving time, miles, gas usage, etc) will then be transmitted to the Auto Management
31 Server and the member's account is automatically charged.

1 5.1.6 Alternative Flow

- 2 1. A car moves out of the WiMAX coverage.
- 3 2. The WiMAX Module in the Blackbox fails to communicate to the Auto Management
- 4 Server over the predefined intervals.
- 5 3. The WiMAX Module in the Blackbox waits until it is able to scan the WiMAX signal.
- 6 4. The car moves into the WiMAX coverage.
- 7 5. Once the WiMAX Module in the Blackbox senses that the WiMAX network is available,
- 8 it sends the stored information to the Auto Management Server.

9 5.2 **Use Case 2 - Vending machine**

10 5.2.1 Short Description

11 Vending machine allows a customer to buy products such as soft drink, cigarette, and flower
12 from the machine in a self service manner.

13 5.2.2 Actors

- 14 John – customer who wants to buy a drink.
- 15 Tommy – machine items supplier who wants to get paid for any goods dispensed.
- 16 WiMAX Service Provider.
- 17 Vending Machine.
- 18 Order Management Server.

19 5.2.3 Pre-conditions

20 Tommy runs several soft drink vending machines. The Vending machine shall only dispense a
21 selected soft drink when the coin is inserted. The Vending machine is equipped with a WiMAX
22 module which is certified in the network of WiMAX Service Provider and with various sensors
23 that can identify an occurring event. The WiMAX module is activated and authorized
24 successfully over the WiMAX Service Provider network. The availability of a particular item is
25 based on the sensor of whether one item is still in place inside the vending machine.

26 5.2.4 Post-conditions

27 If a correct purchase has taken place, the Vending machine dispensed purchased merchandise.

28 5.2.5 Normal Flow

- 29 1. Once the machine detects that an item is out of stock, the Vending Machine reports “out
30 of stock” to the Order Management Server.
- 31 2. The Order Management Server processed the info and sent an out of stock notification to
32 Tommy. The Order Management Server may acknowledge the receiving of the
33 notification.
- 34 3. Tommy restocks the Vending Machine.

1 5.2.6 Sub Flow

- 2 1. The Vending Machine stores daily sales data in its internal database.
- 3 2. At a pre-configured evening time, the Vending Machine sends a message (e.g. SMS,
- 4 email or MMS) containing daily sale report to Tommy.
- 5 3. Tommy knows which products have been sold and the total daily revenue.

6 5.3 **Use Case 3 - Smart Metering**

7 5.3.1 Short Description

8 Smart Metering is used to monitor and control utilities (e.g. electricity, gas, and water)
9 consumption. The Smart Meter collects utilities consumption in the house and provides usage
10 information to a utility company.

11 5.3.2 Actors

- 12 John - a consumer who has an electricity subscription.
- 13 Smart Meter - an intelligent electricity metering device with WiMAX capability.
- 14 Utility Company.
- 15 Metering Server – a server is located in a utility company premise.

16 5.3.3 Pre-conditions

17 The Smart Meter is installed and configured to provide metering information periodically to the
18 Smart Server located in the Utility Company. The Smart Meter is equipped with WiMAX
19 module which is certified in the network of WiMAX Service Provider. The Smart Meter can
20 communicate with the home appliances using various technologies (e.g. Bluetooth, Zigbee,
21 Power Line Communication (PLC), WiMAX, WiFi, etc).

22 5.3.4 Post-conditions

23 The Smart Meter provides metering information to Metering Server and John can see the
24 retrieved information from Metering Server.

25 5.3.5 Normal Flow

- 26 1. John bought a refrigerator and a washing machine which support green energy. The home
- 27 appliances are PLC enabled ones.
- 28 2. John subscribed to a smart meter with the Utility Company.
- 29 3. The agent of Utility Company visited and installed a Smart Meter in John's house.
- 30 4. The Smart Meter starts communicating with the application of home appliances (e.g. the
- 31 refrigerator and the washing machine) in his house via Power Line Communication.
- 32 5. The Smart Meter collects the information from the home appliances and sends the small
- 33 bursts of information to Metering Server at preconfigured time over secure WiMAX
- 34 network.

1 6. The smart meter can transmit emergency messages at any time and with a higher priority
2 than preconfigured messages.

3 5.3.6 Sub Flow

- 4 1. John wants to monitor the electricity consumption in his house.
- 5 2. John logs in to the web portal of Utility Company via his PC or his mobile device.
- 6 3. John can see the consumption and cost data transmitted by Metering Server.

7 5.3.7 Alternative Flow

- 8 1. John bought a refrigerator and a wash machine which support green energy. Those
9 appliances are certified by the Utility Industry.
- 10 2. John decided to apply for a smart meter subscription for power efficiency in his house.
- 11 3. The Utility Company agent visits and installs Smart Meter in John's house.
- 12 4. Smart meter starts communicating with the application of home appliances (e.g. the
13 refrigerator and the wash machine) in the house via Power Line Communication.
- 14 5. The Smart Meter collects the information from the home appliances and sends the
15 information to the Metering Server at preconfigured time.
- 16 6. The Smart Meter fails to send the information to Metering Server (e.g. can't get network
17 access due to congestion or information lost).
- 18 7. The Smart meter re-sends the information when the air link is recovered.

19 5.4 **Use Case 4 - Surveillance Video**

20 5.4.1 Short Description

21 Surveillance Cameras are extensively used in the market, such as in home security, healthcare
22 monitoring, outdoor security, to transmit wireless video to a server or a device. It allows for
23 remote observation of objects. The wireless broadband connection can promise wider
24 bandwidth to transmit multimedia contents in high quality.

25 5.4.2 Actors

26 John – a home owner.
27 Surveillance Camera.
28 WiMAX Service Provider.
29 WiMAX enabled Device.
30 SiCom server – located in home or Home Security Company.

31 5.4.3 Pre-conditions

32 Surveillance Camera was installed in home environment. The Surveillance Camera is equipped
33 with WiMAX module which is certified in the network of WiMAX Service Provider. It is also
34 equipped with a motion sensor that can sense an object's movement. The Camera will be ON,
35 either continuously or when it detects an object within the environment. The relevant

1 surveillance application is running on a WiMAX enabled Device to control the surveillance
2 camera.

3 5.4.4 Post-conditions

4 Surveillance Camera transmits wirelessly and securely video stream. The video is stored in the
5 SiCom server for monitoring by the Home Security Company.

6 5.4.5 Normal Flow

- 7 1. John has installed Surveillance Cameras in his home and set it as “always-on” mode.
8 John configured the destination of video streaming with the address of SiCom server.
- 9 2. The WiMAX module is activated and authorized over WiMAX Service Provider
10 network.
- 11 3. The video recorded by Surveillance Camera is transmitted to the SiCom server in real
12 time.
- 13 4. John wants to observe the home environment while he is away. John invokes security
14 application on his device (e.g. mobile terminal, Laptop, etc) and the device is connected
15 to the SiCom server.
- 16 5. The SiCom server forwards the video to John’s device and adopts the encoding rate based
17 on device capability.
- 18 6. John is watching the optimized video of his home environment.

19 5.4.6 Sub Flow

- 20 1. John has changed the mode as “away event” when leaving for work.
- 21 2. The Camera is automatically turned off and activates movement sensor.
- 22 3. The sensor detects a movement in a room.
- 23 4. The Camera is turned ON then sends an alarm notification to the SiCom server or pre-
24 configured address.

26 5.4.7 Alternative Flow

- 27 1. John has installed Surveillance Cameras in his home and set it as “always-on” mode.
28 John manually configured the destination of video streaming with the address of SiCom
29 server.
- 30 2. The WiMAX module is activated and authorized over WiMAX Service Provider
31 network.
- 32 3. The video recorded by Surveillance Camera is transmitted to the SiCom server in real
33 time.
- 34 4. John wants to observe home environment while he is away. John invokes the security
35 application on his device (e.g. mobile terminal, Laptop, etc) and the device is connected
36 to SiCom server.
- 37 5. The video quality becomes poor due to congestion in the WiMAX network of the Service
38 Provider.
- 39 6. The Surveillance Camera receives the updated QoS attributes from the SiCom server or
40 from the WiMAX network and adopts a lower video quality.

- 1 7. After some time, the congestion eases. The SiCom server provides another QoS attributes
- 2 update to the Surveillance Cameras.
- 3 8. The Surveillance Camera receives the updated QoS attributes from the SiCom server or
- 4 from the WiMAX network and adopts a higher video quality.

5 5.5 **Use Case 5 – Remote Diagnostics (Informative)**

6 5.5.1 Short Description

7 Monitor and analyze patient’s medical status during the way to the hospital for emergency

8 treatment.

9 5.5.2 Actors

- 10 John – Patient who needs emergency treatment.
- 11 Tommy - Doctor waiting in the hospital.
- 12 WiMAX Service Provider.
- 13 Ambulance equipped with WiMAX enabled medical devices.
- 14 Hospital server.

15 5.5.3 Pre-conditions

16 Ambulance equipped with WiMAX enabled medical devices measures electro-cardiograph and

17 other medical data while the ambulance is moving towards hospital. These medical devices send

18 John’s medical status to medical server located in the hospital. John’s medical information is

19 sent to the relevant doctors for immediate treatment and Tommy prepares emergency treatment

20 applicable to John’s current medical status. As John arrives hospital, Tommy starts instant

21 treatment as prepared.

22 5.5.4 Post-conditions

23 After the emergency treatment, medical server saves patient’s medical information and this

24 information are used for future treatment.

25 5.5.5 Normal Flow

- 26 1. Medical data is sent through WiMAX network.
- 27 2. Data size sent is usually very large and requires high uplink throughput.
- 28 3. Data needs to be sent in vehicular condition which requires seamless connection with fast
- 29 mobility.

30 5.5.6 Sub Flow

- 31 1. Medical data is saved in Hospital Server.
- 32 2. Saved medical data is used for future treatment.

1 **5.6 Use Case 6 – Traffic Information**

2 5.6.1 Short Description

3 Bus Management System (BMS)/Bus Information System (BIS) provides real-time arrival
4 information of buses in each bus stop.

5 5.6.2 Actors

- 6 John – Passenger waiting for bus.
- 7 Bus A – Bus with BMS/BIS terminal.
- 8 WiMAX Service provider.
- 9 BMS/BIS terminal with WiMAX and GPS enabled.
- 10 BMS/BIS server located in the bus company.
- 11 Bus stop with a WiMAX enabled display showing the estimated arrival time of buses.

12 5.6.3 Pre-conditions

13 BMS/BIS terminal is installed in each bus. BMS/BIS terminal is equipped with WiMAX
14 module which is certified in the network of WiMAX Service provider, and GPS module which
15 can track the exact location of BMS/BIS terminal.

16 5.6.4 Post-conditions

17 BMS/BIS terminal sends GPS coordinate to BMS/BIS server located in the bus company.
18 BMS/BIS server sends estimated arrival time of the bus to the bus top which has WiMAX
19 enabled display.

20 5.6.5 Normal Flow

- 21 1. BMS/BIS terminal receives exact coordinate via GPS module.
- 22 2. BMS/BIS terminal sends GPS coordinate to BMS/BIS server via WiMAX Service
23 Provider.
- 24 3. BMS/BIS server receives coordinate information of Bus A.
- 25 4. BMS/BIS server sends estimated arrival time of Bus A to the Bus stop.
- 26 5. John is informed when Bus A will arrive.

27 **5.7 Use Case 7 – Mobile Payment**

28 5.7.1 Short Description

29 Mobile Payment allows credit card payment at any location within WiMAX coverage.

30 5.7.2 Actors

- 31 John – Customer who wants to make a payment.

1 Tommy – Delivery service person with a WiMAX enabled credit card checker.
 2 Credit card checker provided with a WiMAX M2M capabilities.
 3 WiMAX Service Provider.
 4 Billing server located in the credit card company.

5 5.7.3 Pre-conditions

6 John needs to make payment for item ordered out from his office. John does not have enough
 7 money but carries his credit card. Tommy delivers ordered item to John and asks for the
 8 payment. Payment is made with credit card checker equipped with WiMAX module which is
 9 certified in the network of WiMAX Service Provider. Credit card information is sent to billing
 10 server located in credit card company. Billing server checks credit card information and makes
 11 authentication for the credit card.

12 5.7.4 Post-conditions

13 After Billing server authorizes payment, a receipt is issues to John.

14 5.7.5 Normal Flow

- 15 1. Credit card checker reads credit card information.
- 16 2. Credit card checker sends credit card information via WiMAX Service Provider.
- 17 3. Billing server receives credit card information from the WiMAX SP.
- 18 4. Billing server confirms credit card payment and informs credit card checker.
- 19 5. Receipt is issued from credit card checker.

20 **6 Machine to machine communication Aspects (Informative)**

21 **6.1 M2M Applications**

22

23 The list of M2M applications depends on the vertical market where they are adopted.

24

Industry	Example application	Description
Transportation/Automotive	Vehicle/Asset Tracking	This category includes public and private transportation business. The example of public transportation business is bus and train operators. The example of private transportation is equivalent to logistics.(e.g. DHL, etc)
Security & Safety	Home Alarm, Surveillance	This category includes CCTV cameras and other remote sensors that may monitor the presence of

		person or functions of equipment.
Smartgrid and Smart Metering	Electricity, Gas, Water, industrial metering	This category includes metering applications provided by utilities operators.
Healthcare	Monitoring vital signs, Remote diagnostics, supporting of seniors or handicapped	This category includes hospitals and other entities applications that provide healthcare services either their premise or remotely.
Remote Management/Control	Industrial Automation, Vending machine, Elevator control, Traffic Lighting, Flood management, Telemetry	This category includes manufacturing, in-vehicle, in-building and roadside machines.
Telematics	Roadside assistance & remote diagnosis	This category includes automobile systems that combine Global Positioning System (GPS) technology and other wireless communication systems for automatic roadside assistance and remote diagnostics
Mobile Payment	Credit card or debit card payment	This category includes the street meter post payment, the vending machine payment and credit card swipe for any wireless payment.

1

2 6.2 M2M Features

3 6.2.1 Low Mobility Feature

4 The Low Mobility feature is used by the M2M Devices that are configured in a fixed location or
5 move within a specific defined geographic distance.

6 6.2.2 Time Controlled Feature

7 The Time Controlled feature is used by the M2M Devices that are configured to send or receive
8 data only at certain pre-defined access time and avoid unnecessary signalling outside this pre-
9 defined access time.

10 6.2.3 Monitoring Feature

11 The Monitoring feature is used by the M2M devices to inform the network of tampering or
12 damage to the M2M device.

1 6.2.4 Small Data Transmission Feature

2 The Small Data Transmissions is used by the M2M Devices that send or receive small data
3 bursts.

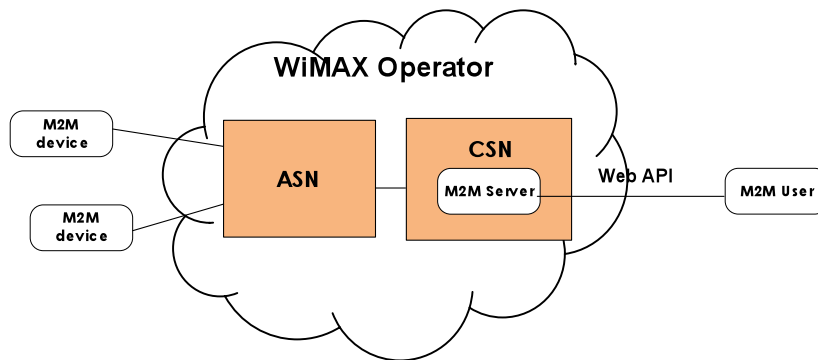
4 6.2.5 Low Power Consumption Feature

5 Low power consumption is used for M2M device that are designed to have low operational
6 power over long periods of time. This feature is required for example for battery-limited M2M
7 devices, i.e., those that have no access to power sources or those with infrequent human
8 interaction so that replacement of the battery is costly or not feasible.

9 **6.3 M2M Communication with M2M Server Scenarios**

10 6.3.1 M2M server(s) operated by the WiMAX Operator

11 The M2M server may reside in the M2M CSN. In communication scenarios where the M2M
12 sever resides in the CSN, the WiMAX operator (the same NAP & NSP) is responsible for
13 deploying the M2M communication services and thus, the M2M server will offer the web
14 portal interface for the M2M subscriber (M2M application) as shown in Figure 1.



15

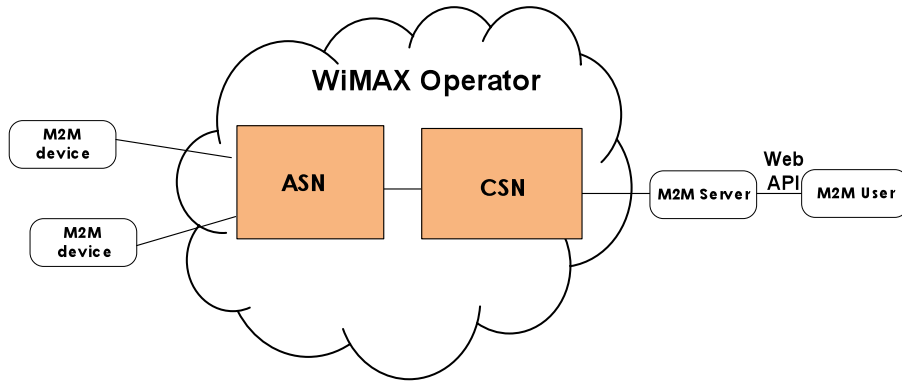
16

Figure 1: M2M device communicates with M2M server within CSN.

17 6.3.2 M2M Server not operated by the WiMAX Operator

18 In communication scenarios where the M2M server resides outside the CSN, the WiMAX
19 operator provides optimized data transport for the M2M device. The M2M operator may

1 deploy M2M communication service as shown in Figure 2. Note: the M2M Server may be
2 operated by a separate operator; therefore, a standardized API will be needed to interconnect
3 the M2M Server and the CSN network entity.
4



5
6 Figure 2: M2M device communicates with M2M server outside CSN.

7 7 Requirements (Conditional Normative)

8 7.1 Service Requirements

9 7.1.1 General Requirements

10 [R-001] The WiMAX M2M Service SHALL support point to point communication from the
11 WiMAX M2M Server to the M2M Device.

12 [R-002] The WiMAX M2M Service SHALL support point to point communication from the
13 WiMAX M2M Device to the M2M Server.

14 [R-003] The WiMAX M2M Service SHOULD support point to multipoint communication from
15 the WiMAX M2M Server to the M2M Device or M2M Group.

16 [R-004]The WiMAX M2M Service MAY support point to multipoint communication from the
17 WiMAX M2M Device to the M2M Server.

18 [R-005] The M2M device SHALL be able to use one or more M2M Features for a given M2M
19 Application.
20
21
22
23
24

1 [R-006] The WiMAX M2M Service SHALL provide a mechanism for the network operator to
2 restrict the usage of each M2M Feature.

3
4 [R-007] The WiMAX M2M Service Provider SHALL be able to control M2M service access
5 initiated either by the M2M Server or By M2M Devices.

6
7
8 [R-008] The WiMAX System SHALL support different priority levels for M2M Application
9 traffic (e.g., alarm message).

10
11 [R-009] The WiMAX M2M Service SHALL inform the subscriber or a designated party of the
12 enabled/disabled status of any M2M feature.

13
14 R-[010] The WiMAX M2M Service SHALL be able to inform the subscriber or designate party
15 of status of any M2M feature.

16

17 7.1.2 Naming, identification and Addressing Requirements

18 [R-011] The WiMAX Network SHALL be able to identify each M2M Device and its M2M
19 Group if configured.
20 Note: The device identity within the WiMAX Network should be identified based on MAC
21 address of the device.

22

23 [R-012] A M2M Device SHALL be able to subscribe to one or more M2M Groups.

24

25 [R-013] The M2M device SHALL have unique identifier in the WiMAX Network.

26

27 [R-014] Communication with a M2M Device that has either private non-routable IPv4 address
28 or public IPv4 or IPv6 address SHALL be supported.

29 7.2 Functional Requirements

30 7.2.1 System Requirements

31 [R-015] The M2M Subscriber SHOULD be allowed to subscribe to multiple M2M features (e.g.
32 Time Control and Low Mobility).

33

34 [R-016] The WiMAX Network SHALL be able to activate and provision M2M Service on a
35 particular M2M Device.

36

37 [R-017] The WiMAX Network SHALL be able to de-activate and de-provision M2M Service
38 on a particular M2M Device.

39

40 [R-018] The WiMAX Network SHALL provide a mechanism to reduce network congestion or
41 overload from large numbers of M2M Devices simultaneously or near simultaneously
42 attempting data or signaling transmission. For example:

43

- Air interface access control

- 1 – Core Network access control
- 2 – M2M Server access control
- 3 – Universal Service Interface access control

4
5 [R-019] The M2M device MAY notify the M2M Server of its connection preference (e.g.
6 maintain the L1/L2 or L3 connection or discard the L1/L2/L3 connection when not interacting
7 with the M2M Server). Note: It is assumed when in idle mode, the default is to maintain the L3
8 connection.

9
10 [R-020] Based on a trigger indication from the M2M Server, the M2M System SHALL support
11 a mechanism to trigger the M2M Device to initiate communication (i.e. network initiate or
12 mobile initiate method) with the M2M Server.

13 7.2.2 Low Mobility Requirements

14 [R-021] The WiMAX M2M System SHALL support the capability to reduce the frequency of
15 mobility management traffic.

16
17 [R-022] The WiMAX M2M Service SHALL enable the M2M service provider to define the
18 frequency of location updates performed by the M2M Device.

19
20 [R-023] The WiMAX M2M service provider SHALL be able to define mobility configuration
21 (e.g. fixed, low mobility, high mobility) for each M2M Device.

22 7.2.3 Time Controlled Requirements

23 [R-024] The WiMAX M2M Service SHALL be able to restrict service access (e.g. WiMAX
24 network (re)entry or setup data connection) to be available only on certain defined time.

25
26 [R-025] The WiMAX M2M Service SHALL be able to restrict access by terminating the
27 connection (e.g. de-registration or release of a data connection) at the end of defined access time
28 periods.

29
30 [R-026] The WiMAX M2M Service SHALL support the modification of the defined access
31 time periods for the M2M Device.

32
33 [R-027] The WiMAX M2M Service SHALL be able to reject access requests outside the
34 defined access time periods.

35 7.2.4 Monitoring Requirements

36 [R-028] The WiMAX M2M Device SHALL report the event that may indicate possible theft
37 (e.g. removing of WiMAX SIM) or damage.

38
39 [R-029] The WiMAX M2M Service SHALL be able to define which monitoring events to
40 detect (e.g. change of location, unable to connect to the M2M device).

41
42 [R-030] The M2M Subscriber MAY select one or more of the available follow-up actions to be
43 performed by the system when an event is detected.

1 7.2.5 Small Data Transmission Requirements

2 [R-031] The WiMAX system SHALL support the transmission of small data bursts while
3 reducing signaling overhead, network resource allocation and establishment.

4
5 [R-032] The WiMAX M2M service provider SHALL be able to configure the maximum size of
6 small data burst transmitted to the M2M device.

7 7.2.6 Low Power Consumption Requirements

8 [R-032] The WiMAX M2M System SHALL support a mechanism to save power consumption
9 on M2M devices that are designed for low power consumption (e.g. invoke idle and sleep mode
10 of operation).

11 7.3 **Roaming Requirements**

12 [R-034] The M2M subscriber SHOULD have similar user experience of subscribed M2M feature
13 when roaming while utilizing WiMAX Service.

14 7.4 **Accounting and Management Requirements**

15 7.4.1 Accounting Requirements

16 [R-035] The M2M System MAY be able to count M2M Device initiated signaling per signaling
17 type (e.g. mobility signaling such as location update, connection set up signaling, M2M feature
18 activation/de-activation).

19
20 [R-036] The M2M System SHALL be able to generate bearer accounting information per M2M
21 device or group based on the criteria in the M2M feature subscription (e.g. volume, time of day,
22 location).

23 7.4.2 Operation and Management Requirements

24 [R-037] The WiMAX Network SHALL support over the air activation and provisioning of
25 M2M Device.

26
27 [R-038] The WiMAX Network SHALL support over the air de-activation and de-provisioning
28 of M2M Device.

29
30 [R-039] The WiMAX M2M Server SHALL support mechanism for the M2M Device to activate
31 and deactivate M2M Features e.g. over the air or web-based.

32 7.5 **Security Requirements**

33 [R-040] The WiMAX System SHALL support the M2M Device only authentication.

34

1 [R-041] The WiMAX Network SHALL support integrity protection and privacy of M2M
2 application traffic which requires secure connection e.g. NIST (National Institute of Standard
3 Technology) Action Plan 2 for Wireless standards for Smart Grid.

4 7.6 Regulatory Requirements

5 Lawful Interception must always be done in accordance with the applicable national/regional laws
6 and technical regulations.

7 R-[042] WiMAX M2M Service implementation SHALL comply with the Lawful Intercept
8 requirements of [Recommendation and Requirements for Networks based on WiMAX Forum
9 Certified Products, 080717_SPWG_Req_Release_1.5.doc].

10 R-[043] The WiMAX network SHALL be able to perform lawful intercepts based on
11 identification of specific M2M devices, M2M groups defined in the WiMAX network, or the
12 subscriber of a WiMAX M2M Service.

13 8 Guidance and Recommendation to other WiMAX WGs

14

15 GR-[001] It is recommended the WiMAX Network has a single web API between the M2M server and the
16 M2M User.

17

18 GR-[002] The M2M System NEED to support an efficient signaling architecture, which may change the
19 existing signalling procedures designed for the use by the mass market.

20 Annex A Document History (*Informative*)

Date	Subject History	Version
2009-12-10	Initial template	A
2010-01-06	Revised template, contribution 10_00006 and 10_00005R1	B
2010-01-26	Incorporated contributions 10_00014R1, 10_00015R1, and 10_00016R1	C
2010-03-04	Incorporated contribution 10_00041R1	D
2010-03-24	Incorporated contribution 10_00068R1 and 10_00069R1	E
2010-04-14	Incorporated contribution 10_00080R1	F
2010-06-09	Incorporated contribution 10_00090R1	G

2010-06-24	Incorporated contribution 10_00099R1, 10_00100, 10_00101R1, 10_00102R2, 10_00108R2, 10_00109R1,	H
2010-08-12	Incorporated contribution 10_00125R2	I
2010-09-08	Incorporated contribution 10_00127R1, add acronyms	J
2010-09-20	Incorporated contribution 10_00129R1	K
2010-09-24	Incorporated modification of 10_00133	L
2010-11-02	Incorporated accepted ballot comments	M
2010-11-30	Incorporated TSC and SPWG plenary comments	N

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