



# **WiMAX FORUM® WiMAX™ ROAMING INTERFACE**

*based on WiMAX Forum Certified™ Products*

*Stage 2 Part 2: Wholesale Rating Release 1.0 Version 2*

**WMF-T42-003-R010v02**

*WiMAX Forum Approved*

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# 1 WiMAX™ Wholesale Rating Reference Point

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## 1.1 Introduction and Scope

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The purpose of this document is to describe the process for calculating and assigning a monetary value to a WiMAX™ subscriber session. The WiMAX™ Roaming Interface (WRI) Wholesale Rating logical function applies wholesale charging principles including taxes to the usage information of WiMAX subscriber sessions and provides information to other WRI logical functions or applications.

The scope of this document is to address functions and processes related to receiving X2 Reference Point files, rating WiMAX subscriber sessions, and generating X3 Reference Point files. See WRI Stage 2: Part 0 for a high-level description of the WRI architecture and a list of commonly used references, acronyms, and terms.

## 1.2 Control Plane Protocols and Procedures

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This section provides a detailed description of WRI Wholesale Rating process.

### 1.2.1 X3 Flow

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The WRI AAA Proxy logical function sends an X2 Reference Point file to the WRI Wholesale Rating logical function. The X2 Reference Point file contains aggregated and correlated sessions. Once the X2 Reference Point file is received by the WRI Wholesale Rating logical function, the WRI Wholesale Rating logical function will validate the file and create a X2R (Reject) Reference Point file if it detects any validation errors. If no errors are detected, the WRI Wholesale Rating logical function will process these sessions by applying the wholesale charging principle as described in the roaming agreement and by calculating the charges and taxes. These processed sessions are then summarized and used to create an X3 Reference Point file, which is then forwarded to the WRI Clearing logical function. The WRI Clearing logical function will validate the X3 Reference Point file and create a X3R (Reject) Reference Point file if it detects any validation errors. If no errors are detected, the WRI Clearing logical function will accept the X3 Reference Point file. **Figure 1** describes the WRI Wholesale Rating process.

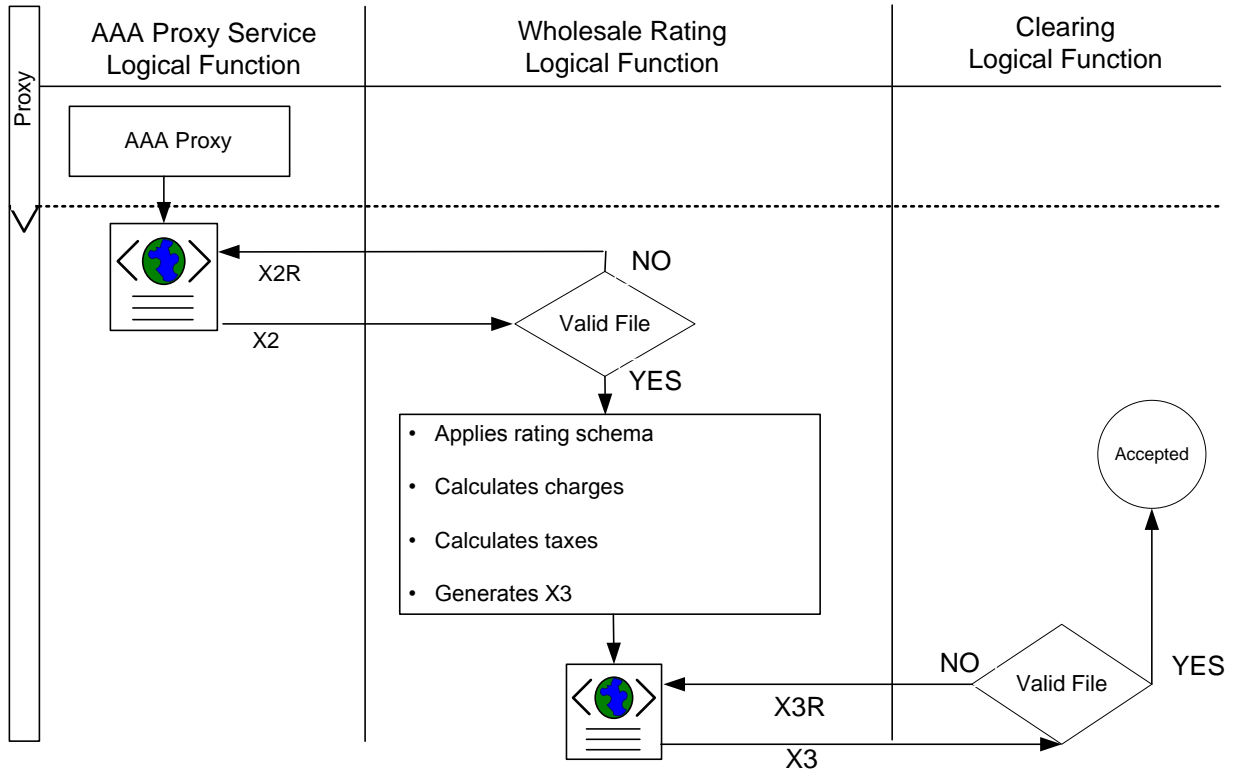


Figure 1: X3 Flow

## 1.2.2 Business Rules

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R-[X3-S2-1] At least one instance of the Charge Information element SHALL be present in every rated session within the X3 Reference Point file. One Charge Information element contains charges related to one particular session within the X3 Reference Point file.

R-[X3-S2-2] Tax Information is optional and one or more instances MAY be present in a session record.

R-[X3-S2-3] Unless the applicable WiMAX™ Roaming Agreement indicates otherwise, no session older than 21 days (as determined by the stop time) SHALL be rated.

R-[X3-S2-4] An X3 Reference Point file SHALL be rejected if the X3 Reference Point file naming convention is not followed.

R-[X3-S2-5] An X3 Reference Point file validation SHALL be performed to assure the consistency of the records contained within the X3 Reference Point file with the trailer record.

## 1.2.3 Procedures

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### 1.2.3.1 File Naming Conventions

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#### Charge Files

- Charge files must use the following naming convention

#### Wholesale Charges (Charge)

- WCC\_<Sender><Recipient>\_<Seqno (999999)>

#### Wholesale Rejects (Charge)

- WRC\_<Sender><Recipient>\_<Seqno (999999)>

#### Wholesale Acknowledge (Charge)

- WAC\_<Sender><Recipient>\_<Seqno (999999)>

#### Test Files

Test files must use the following naming convention

- Wholesale Charges (Test)
  - WCT\_<Sender ><Recipient>\_<Seqno (999999)>
- Wholesale Rejects (Test)
  - WRT\_<Sender><Recipient>\_<Seqno (999999)>

#### Wholesale Acknowledge (Test)

- WAT\_<Sender><Recipient>\_<Seqno (999999)>

### 1.2.3.2 Delivery Mechanism

#### 1.2.3.2.1 FTP

R-[X3-S2-6] FTP and secure FTP SHALL be supported as default protocols unless otherwise agreed between the responsible entities exchanging X3 Reference Point files.

R-[X3-S2-7] The initial transmission of a X3 Reference Point file SHOULD use a temporary name until the process is over.

R-[X3-S2-8] Once the X3 Reference Point file has been successfully transferred, it SHOULD be renamed following the agreed naming convention.

### 1.2.4 X3 Reference Point

The X3 Reference Point file related procedures define the elements calculated in the rating process and shared with the WRI Clearing logical function.

R-[X3-S2-9] A file exchanged via the X3 Reference Point SHALL contain only the information rated for a particular roaming pair of business entities.

#### 1.2.4.1 Elements

This specification assumes the understanding and notion of the previous interfaces/reference points. Unless otherwise stated these elements are optional.

R-[X3-S2-10] The calculated or derived elements MAY be based on values passed on the X2 Reference Point, defined in the WiMAX Roaming Interface Stage 2: Part 1 AAA Proxy document referenced in WiMAX™ Roaming Interface (WRI) Stage 2 Part 0.

R-[X3-S2-11] All date and time elements in the X3 Reference Point file SHALL be in GMT format.

##### 1.2.4.1.1 Header – (Mandatory)

Element Name	Element Description and Requirement	Mandatory or Optional Element
Sending WRI Code	R-[X3-S2-64] The Sending WRI Code field identifies the Serving operator and SHALL be populated before the Wholesale Rating file, i.e., the X3 Reference Point file, is received by the Home or Home exchange provider. The Sending WRI Code SHALL have a unique ID.	Mandatory
Receiving WRI Code	R-[X3-S2-65] The Receiving WRI Code field identifies the Home operator and SHALL be populated before the Wholesale Rating file, i.e., the X3 Reference Point file, is received by the Home or Home exchange provider. The Receiving WRI Code SHALL have a unique ID.	Mandatory
Sending WRX WRI Code	R-[X3-S2-12] The Sending WRX WRI Code field identifies the Sending Exchange Provider and SHALL be populated before the Wholesale Rating file, i.e., the X3 Reference Point file, is received by the Home or Home exchange provider, if applicable. This field is a unique code by which the sending CSN's Exchange Provider is identified. If there is no Sending Exchange Provider, this field is null. An Exchange Provider SHALL have a unique ID.	Mandatory

Element Name	Element Description and Requirement	Mandatory or Optional Element
Receiving WRX WRI Code	R-[X3-S2-13] The Receiving WRX WRI Code field identifies the Receiving Exchange Provider and SHALL be populated before the Wholesale Rating file, i.e., the X3 Reference Point file, is received by the Home or Home exchange provider. This field is a unique code that identifies the receiving CSN's Exchange Provider. If there is no Receiving Exchange Provider, this field is null. An Exchange Provider SHALL have a unique ID.	Mandatory
Visited NSP ID	R-[X3-S2-14] The Visited NSP ID SHALL be populated before the X3 Reference Point file is received by the Home or Home exchange provider. This field is a unique code that identifies the visited CSN.	Mandatory
Home NSP ID	R-[X3-S2-15] The Home NSP ID SHALL be populated before the X3 Reference Point file is received by the Home or Home exchange provider. The field is a unique code that identifies the home CSN.	Mandatory
NAP ID	R-[X3-S2-16] The NAP ID SHALL be populated before the X3 Reference Point file is received by the Home or Home exchange provider. The field is a unique code identifying the visited NAP.	Mandatory
IOT Currency	R-[X3-S2-17] The Visited operator's IOT Currency SHALL always be populated. This information is derived from the WiMAX Roaming Agreement document as referenced in WRI Stage 2 Part 0.	Mandatory
Decimal Places	<p>Decimal Places field identifies the number of decimal places used to represent all the monetary values within the X3 Reference Point file. The decimal place applies to the following elements within this file: charges and taxes.</p> <p>R-[X3-S2-19] The default value of the Decimal Places for charges and taxes SHALL be 2 unless otherwise specified.</p>	Optional
File Creation Timestamp	<p>The File Creation Timestamp represents the time this X3 Reference Point file was created by the WRI Wholesale Rating logical function.</p> <p>R-[X3-S2-20] The File Creation Timestamp SHALL be populated.</p>	Mandatory
Tax Information	<p>The Tax Information is used to define various taxes applied within the X3 Reference Point file.</p> <p>R-[X3-S2-21] The Tax Information SHALL be populated if there are any tax charges.</p>	Conditional Mandatory
Tax ID	<p>The Tax ID is a key associated with Tax Rate, Tax Rate Type and Tax Type.</p> <p>R-[X3-S2-22] If there are tax charges in any record within the X3 Reference Point file, a unique Tax ID SHALL be generated for every distinct Tax Rate Type.</p>	Mandatory

Element Name	Element Description and Requirement	Mandatory or Optional Element
Tax Rate	Tax Rate defines the rate of the Tax being applied to the charges.  R-[X3-S2-23] For every Tax ID, a distinct Tax Rate SHALL be populated with a % value if Tax Rate type is variable (V) or a monetary value if Tax Rate Type is fixed (F).	Mandatory
Tax Rate Type	Tax Rate Type defines the type of Tax Rate.  R-[X3-S2-24] The Tax Rate Type SHALL be populated with either F (Fixed) or V (Variable). The Tax Rate Type values are: F=Fixed amount to be charge in a monetary figure V=Variable tax applied in a percentage figure.	Mandatory
Tax Type	Tax Type defines the type of Tax.  R-[X3-S2-25] The Tax Type SHALL be populated with one of the below mentioned values. Possible Tax Type values are: National, Regional, State, County, Province, Local/City.	Mandatory
Release	R-[X3-S2-26] The Release SHALL be populated with the WRI Stage 3 Wholesale Rating Specification Release used to create the X3 Reference Point file.	Mandatory
Version	R-[X3-S2-27] The Version SHALL be populated with the WRI Stage 3 Wholesale Rating Specification Version used to create the X3 Reference Point file.	Mandatory

**1.2.4.1.2 Session Information – (Mandatory)**

Element Name	Element Description and Requirement	Mandatory or Optional Element
Session ID	Session ID is used to match accounting Start, Stop, and Interim messages. It is generated by the accounting NAS client and is unique per accounting Start/Stop pair. Value is passed via X2 Reference Point.  R-[X3-S2-28] The Session ID SHALL be the value of the Acct-Session-Id attribute SHALL be the value of the first RADIUS Start\Stop message pair for the same Acct-Multi-Session-Id processed and extracted by the WRI AAA Proxy logical function.	Optional
Multi-Session ID	Multi-Session ID is set to the value of WiMAX-Session-Id which is generated by the home AAA (hAAA) after successful authentication and delivered to the NAS in an Access-Accept message.  R-[X3-S2-29] The Multi-Session ID, derived from the Acct-Multi-Session-Id attribute processed by the WRI AAA Proxy logical function, SHALL be unique per CSN and is used to match all accounting records within a session.	Mandatory
Username	R-[X3-S2-30] The Username SHALL be extracted	Mandatory

Element Name	Element Description and Requirement	Mandatory or Optional Element
	<p>from the Outer NAI by the WRI AAA Proxy logical function if applicable.</p> <p>R-[X3-S2-31] The Home MAY provide a mapping table indexed on on CUI to derive the User-Name.</p>	
Subscriber Identity	<p>The Subscriber Identity field could be mapped to Chargeable User Identity (CUI) or Class processed and extracted by the WRI AAA Proxy logical function.</p> <p>R-[X3-S2-32] The Subscriber Identity SHALL be a unique temporary handle to the user responsible for paying the bill.</p>	Mandatory
Mobile Station identifier	R-[X3-S2-33] Mobile Station Identifier SHALL be the MAC address in binary format extracted from Calling Station Id attribute by WRI AAA Proxy logical function.	Mandatory
NAS Identifier	<p>The NAS Identifier is the identifier of the NAS that generated this record.</p> <p>R-[X3-S2-34] The NAS Identifier SHALL be the value of the first accounting Start\Stop message pair for the same Acct-Multi-Session-Id processed by the WRI AAA Proxy logical function.</p>	Optional
NAP Identifier	R-[X3-S2-35] The NAP Identifier SHALL be the value of the first accounting Start\Stop message pair for the same Acct-Multi-Session-Id processed and extracted by the WRI AAA Proxy logical function.	Optional
Base Station ID	R-[X3-S2-36] The Base Station ID SHALL be the value of the first accounting Start\Stop message pair for the same Acct-Multi-Session-Id processed and extracted by the WRI AAA Proxy logical function.	Optional
Session Duration	R-[X3-S2-37] The Session Duration, derived from Acct-Session-Time of the accounting Stop messages processed and extracted by the WRI AAA Proxy logical function, SHALL be the number of seconds the flow or the session was active.	Mandatory
GMT Time-Zone Offset	R-[X3-S2-38] The GMT Time-Zone Offset SHALL be the value of the first accounting Start\Stop message pair for the same Acct-Multi-Session-Id processed and extracted by the WRI AAA Proxy logical function.	Mandatory
Session End Time	<p>R-[X3-S2-39] The Session End Time SHALL be the value representing the time the event occurred and is extracted from the final accounting Stop record by the WRI AAA Proxy logical function.</p> <p>R-[X3-S2-40] The Session End Time SHALL be populated in GMT.</p>	Mandatory
Session Active Time	R-[X3-S2-41] The Session Active Time SHALL be derived from Active-Time from all accounting Stop messages processed and extracted by the WRI AAA Proxy logical function.	Mandatory
Mobile Originated Volume	Mobile Originated Volume is the number of bytes derived from Acct-Input-Octets and Acct-Input-	Mandatory

Element Name	Element Description and Requirement	Mandatory or Optional Element
	<p>Gigawords from all accounting Stop messages processed by the WRI AAA Proxy logical function.</p> <p>R[X3-S2-42] The Mobile Originated Volume SHALL be present.</p>	
Mobile Terminated Volume	<p>Mobile Terminated Volume is derived from Acct-Output-Octets and Acct-Output-Gigawords from all accounting Stop messages processed by the WRI AAA Proxy logical function.</p> <p>R[X3-S2-44] The Mobile Terminated Volume SHALL be present.</p>	Mandatory
Session Start Time	<p>Session Start Time is calculated from the last stop record timestamp minus the duration (Acct-Session-Time) by the WRI AAA Proxy logical function.</p> <p>Session Start Time is calculated is derived using Event-Timestamp of first accounting Start message potentially modified based on NAS support of Idle-Timeout period subtraction.</p> <p>R-[X3-S2-46] The Session Start Time SHALL be populated in GMT.</p>	Mandatory
IP Technology	<p>R-[X3-S2-47] The IP Technology SHALL be from the first accounting Start message processed and extracted by the WRI AAA Proxy logical function.</p>	Optional
Termination Cause	<p>The Termination Cause identifies the cause of the session termination. It is derived from the Acct-Terminate-Cause attribute from the last Accounting Stop message processed and extracted by the WRI AAA Proxy logical function.</p> <p>Valid values for the Termination Cause field are defined by IETF RFC 2866 Section 5.10.</p> <p>R-[X3-S2-48] The Termination Cause SHALL be set to the Acct-Terminate-Cause attribute value from the last Accounting Stop message processed and extracted by the WRI AAA Proxy logical function.</p>	Optional
Usage Unit Indicator	<p>The Usage Units Indicator identifies the units of measurements for Chargeable Usage and Charged Usage.</p> <p>R-[X3-S2-49] The Usage Unit Indicator SHALL contain only one valid value.</p> <p>Valid Usage Unit Indicator values are:                      M1: Megabytes - Downloaded                      M2: Megabytes – Uploaded                      M3: Megabytes Downloaded + uploaded                      K1: Kilobytes – Downloaded                      K2: Kilobytes - Uploaded                      K3: Kilobytes Downloaded + uploaded                      B1: Bytes Downloaded                      B2: Bytes Uploaded                      B3: Bytes Downloaded + uploaded                      H0: Hours.</p>	Mandatory

Element Name	Element Description and Requirement	Mandatory or Optional Element
	M0: Minutes S0: Seconds	
Chargeable Usage	The Chargeable Usage field identifies the actual usage without rounding. This field will be calculated based on one or more of the the following record elements from WRI Stage 2 Part 1 Table on “Mapping of X2 elements and RADIUS attributes” and as per the Inter-Operator Tarrifs defined in the roaming agreement: <ul style="list-style-type: none"> <li>• Session Start Time</li> <li>• Session End Time</li> <li>• Session Duration</li> <li>• Session Active Time</li> <li>• Mobile Originated Volume</li> <li>• Mobile Terminated Volume</li> </ul> R-[X3-S2-66] The Chargeable Usage SHALL always be present.	Mandatory
Charged Usage	The Charged Usage element indicates the rounded number of units which are actually charged for within the WiMAX session. R-[X3-S2-50] The Charged Usage SHALL always be present. <ul style="list-style-type: none"> <li>• If Usage Indicator = M1, Then (Acct-Output-Octets * 1024*1024)+(Acct-Ouput-Gigawords*4294967296) applied in accordance with Roaming Agreement.</li> <li>• If Usage Indicator = M2 , Then (Acct-Input-Octets * 1024*1024)+(Acct-Input-Gigawords*4294967296) applied in accordance with Roaming Agreement.</li> <li>• If Usage Indicator = M3 , Then Megabytes in + Megabytes out + (Acct-Input-Gigawords*4294967296) + (Acct-Output-Gigawords*4294967296) applied in accordance with Roaming Agreement.</li> <li>• If Usage Indicator = K1, Then (Acct-Output-Octets * 1024)+(Acct-Ouput-Gigawords*4294967296) applied in accordance with Roaming Agreement.</li> <li>• If Usage Indicator = K2 , Then (Acct-Input-Octets * 1024)+(Acct-Input-Gigawords*4294967296) applied in accordance with Roaming Agreement.</li> <li>• If Usage Indicator = K3, Then (Acct-Input-Octets * 1024)+(Acct-Input-Gigawords*4294967296) + (Acct-Output-Octets * 1024)+(Acct-Ouput-Gigawords*4294967296).</li> <li>• If Usage Indicator = B1, Then Acct-Output-Octets + (Acct-Ouput-Gigawords*4294967296) applied in accordance with Roaming Agreement.</li> <li>• If Usage Indicator = B2, Then Acct-Input-Octets + (Acct-Input-Gigawords*4294967296) applied in</li> </ul>	Mandatory

Element Name	Element Description and Requirement	Mandatory or Optional Element
	<p>accordance with Roaming Agreement.</p> <ul style="list-style-type: none"> <li>• If Usage Indicator = B3, Then Acct-Output-Octets + (Acct-Output-Gigawords*4294967296) + Acct-Input-Octets + (Acct-Input-Gigawords*4294967296) applied in accordance with Roaming Agreement.</li> <li>• If Usage Indicator = H0, Then Acct-Session-Time / 60 / 60 applied in accordance with Roaming Agreement.</li> <li>• If Usage Indicator = M0, Then Acct-Session-Time / 60 applied in accordance with Roaming Agreement.</li> <li>• If Usage Indicator = S0, Then Acct-Session-Time applied in accordance with Roaming Agreement.</li> </ul>	
Charge	<p>Charge is the calculated charge for the usage before any taxation. Charge is calculated as Charged usage * Tariff (Tariff as defined in the Roaming Agreement).</p> <p>R-[X3-S2-51] The Charge field SHALL contain a positive numeric value.</p>	Mandatory
File Currency	<p>R-[X3-S2-52] The File Currency field SHALL be always present if the currency used is not Special Drawing Right (SDR) as defined by the International Monetary Fund (IMF).</p>	Conditionally Mandatory
Location	<p>R-[X3-S2-53] The Location SHALL be from the first accounting Start message processed by the WRI AAA Proxy logical function.</p> <p>Recommendation is to adopt a known format to avoid compatibility issues when roaming in other technologies. An example would be location information following IETF RFC 1876. This attribute is not implemented in this release and will be a place holder for a future GRWG release.</p>	Optional
Tax Detail	<p>Tax detail contains information about the tax applied for this session.</p>	Conditionally Mandatory
Taxable Amount	<p>The Taxable Amount field identifies the amount of monies that is taxable</p> <p>R-[X3-S2-67] The Taxable Amount SHALL be present.</p>	Mandatory
Tax Value	<p>Tax Value is the calculated value of the tax based on the tax rate and the charge.</p>	Mandatory

**1.2.4.1.3 Trailer Information, Generated in X3 MANDATORY**

The trailer information facilitates the validation and audit of the X3 Reference Point file. For more information, see business rules and validation.

Element Name	Element Description and Requirement	Mandatory or Optional Element
Total Records Transmitted	<p>Total Records Transmitted is the sum of total sessions contained within the X3 Reference Point file.</p> <p>R-[X3-S2-54] Total Records Transmitted SHALL be equal to the sum of total sessions contained within the X3 Reference Point file.</p>	Mandatory
Total Duration	<p>Total Duration is the sum of all Active-Time within the file.</p> <p>R-[X3-S2-55] Total Duration SHALL be equal to sum of all Active-Time within the X3 Reference Point file.</p>	Mandatory
Total Mobile Originated Volume	<p>Total Mobile Originated Volume is the sum of all Mobile Originated values.</p> <p>R-[X3-S2-56] Total Mobile Originated Volume SHALL be sum of all Mobile Originated Volume values within the X3 Reference Point file.</p>	Mandatory
Total Mobile Terminated Volume	<p>Total Mobile Terminated Volume is the sum of all Mobile Terminated values.</p> <p>R-[X3-S2-57] Total Mobile Terminated Volume SHALL be sum of all Mobile Terminated Volume values within the X3 Reference Point file.</p>	Mandatory
Total Charges	<p>Total Charges is the sum of all charges for each session without taxes.</p> <p>R-[X3-S2-58] Total Charges SHALL be sum of all Charges without taxes within the X3 Reference Point file.</p>	Mandatory
Total Taxes	<p>Total Taxes is the sum of all taxes for each session.</p> <p>R-[X3-S2-59] Total Taxes SHALL be sum of all taxes for each session within the X3 Reference Point file.</p>	Mandatory

## 1.2.4.2 Validation

### 1.2.4.2.1 Rejection WR files

#### 1.2.4.2.1.1 Reasons

##### 1.2.4.2.1.1.1 File Level Error

- Invalid name
- Invalid sequence
- Invalid sender/receiver (exchange provider/Operator)
- Roaming Agreement not found
- Invalid format
- Trailer does not match with file content

#### **1.2.4.2.1.1.2 Session Level Error**

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- Field number
- Reason (business rule or Roaming Agreement driven)

### **1.2.5 Session Rating and Transfer Frequency - X3 Reference Point**

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The transfer frequency of rated session is agreed between the two parties involved.

R-[X3-S2-60] The transfer frequency of rated session exchanged via the X3 Reference Point SHALL be configurable.

It is recommended to be close to real time.

### **1.2.6 Wholesale Charging Principles**

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R-[X3-S2-61] At least one of the following charging principles: volume, duration, sessions, or flat rate, SHALL be used unless otherwise specified in the roaming agreement.

Note: In the WRI Release 1, Flat Rate is NOT supported.

R-[X3-S2-62] The charging principles SHALL be specified in the roaming agreement.

R-[X3-S2-63] Flat rate charging principles SHALL be based on Volume within a Session, Duration within a Session or Session(s).

Note: In the WRI Release 1, Requirement R-[X3-S2-63] is NOT supported.

#### **1.2.6.1 Volume**

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The charging for volume is based on the data being transferred between the terminal and the network in the uplink, downlink, or any combination of the two as agreed by the roaming partners in the roaming agreement.

#### **1.2.6.2 Duration**

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The charging for duration is based on the session time as agreed by the roaming partners in the roaming agreement.

#### **1.2.6.3 Sessions**

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The charging for sessions is based on the number of established sessions as agreed by the roaming partners in the roaming agreement.

## **1.3 Tax Calculations**

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Applying taxes to the rated session is optional. Taxes will depend upon various factors, such as, country, state/province, city and other jurisdictional tax rules.

## **1.4 Limitations of this Specification**

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This specification is not intended as a development or test document. It describes the reference point rules and procedures. Any specific implementation, code unit or system testing consideration should be addressed in a separate document.

## 2 Revision History

Revision	Changes	Date
1	Initial Publication	August 4, 2008
2	<p>Modifications to align with WRI Release 1.0 Stage 3</p> <p>1) WRI Release 1.0 Stage 3: Part 2 Wholesale Comments: 1675, 1680, 1682, 1685, 1686, 1687, 1694, 1701, 1702, 1704, 1709, 17111722, 1723, 1735</p> <p>2) WRI Release 1.0 Stage 3: Part 1 AAA Proxy Comment 1594</p> <p>3) Editorial changes include:</p> <p>a) Add the letter S2 to all requirements.</p> <p>b) Change “Copyright ©” to “Copyright”</p> <p>c) Apply the recommended ® and TM where appropriate</p> <p>d) Changed interface with Reference Point/reference point where appropriate</p> <p>e) Expand SDR and make reference to IMF</p> <p>f) Introduce Revision History section</p>	March 23, 2009
2	<p>Modifications:</p> <p>1) Editorial changes:</p> <p>a) Introduced new numbering format in header and title page</p> <p>b) Ensured that the text uses the words to WRI 'logical functions' when describing WRI logical entity functionality.</p> <p>c) Changed X2, X2R, X3, X3R files to X2, X2R, X3, X3R Reference Point files</p> <p>d) Assigned requirement numbers where appropriate</p> <p>e) Cleaned up Figure 1</p> <p>f) Replaced the word 'module' with 'logical function'</p> <p>g) Updated the Cover Page.</p> <p>Technical Modifications:</p> <p>a) Requirements on the Release and Version were reworded to state that the Release and Version of the WRI Stage 3 Wholesale Rating are to be used.</p> <p>b) Changed FROM: R-[X3-S2-19] The default value of the Decimal Places for charges, taxes and currency exchange SHALL be 2 unless otherwise specified. TO: R-[X3-S2-19] The default value of the Decimal Places for charges and taxes SHALL be 2 unless otherwise specified.</p> <p>c) Changed FROM: R-[X3-S2-48] The Acct-Terminate-Cause SHALL be from the last accounting Stop message processed by the WRI AAA Proxy logical function. TO: R-[X3-S2-48] The Termination Cause SHALL be set to the Acct-Terminate-Cause attribute value from the last accounting Stop message processed and extracted by the WRI AAA Proxy logical function.</p> <p>d) Changed FROM: R-[X3-S2-33] The Calling Station Id SHALL be the MAC address in binary format. TO R-[X3-S2-33] Mobile Station Identifier SHALL be the MAC address in binary format extracted from Calling Station Id attribute by WRI AAA Proxy logical function.</p>	May 3, 2009

Revision	Changes	Date
	e) Changed FROM: R-[X3-S2-28] The Acct-Session-Id SHALL be the value of the first RADIUS Start\Stop message pair for the same Acct-Multi-Session-Id processed and extracted by the WRI AAA Proxy logical function. TO: R-[X3-S2-28] The Session ID SHALL be the value of the Acct-Session-Id attribute of the first RADIUS Start\Stop message pair for the same Acct-Multi-Session-Id processed and extracted by the WRI AAA Proxy logical function.	
2	Modifications include editorial changes recommended during May 11, 2009 Dublin meeting.	May 15, 2009
2	WiMAX Forum Board of Directors Approved	June 24, 2009