



European Network of
Transmission System Operators
for Electricity

**TRANSMISSION NETWORK
DOCUMENT
UML MODEL AND SCHEMA**

2017-01-27
VERSION 1.0

2

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Revision History

| Version | Release | Date | Comments |
|---------|---------|------------|---|
| 0 | 0 | 2017-01-27 | First drafting of the document. |
| 1 | 0 | 2017-01-30 | Version to be submitted to Market Committee following WG EDI meeting in March 2017. |

67

68 1 Objective

69 The purpose of this document is to provide the contextual and assembly UML models and the
70 schema of the TransmissionNetwork_MarketDocument.

71 The schema of the TransmissionNetwork_MarketDocument could be used in various business
72 processes.

73 It is not the purpose of this document to describe all the use cases, sequence diagrams,
74 business processes, etc. for which this schema is to be used.

75 This document shall only be referenced in an implementation guide of a specific business
76 process. The content of the business process implementation guide shall be as follows:

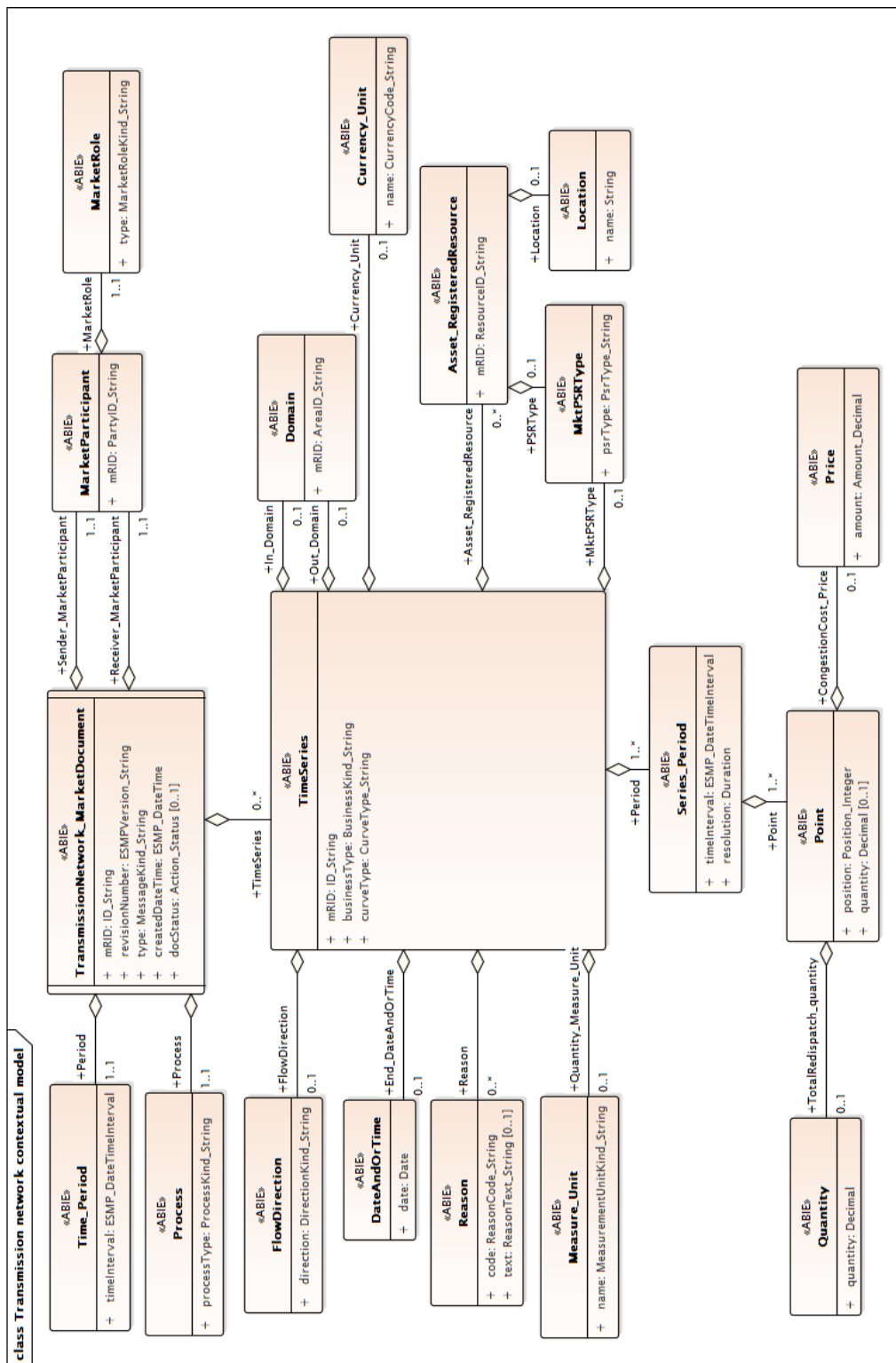
- 77 • Description of the business process;
- 78 • Use case of the business process;
- 79 • Sequence diagrams of the business process;
- 80 • List of the schema (XSD) to be used in the business process and versions of the
81 schema;
- 82 • For each schema, dependency tables providing the necessary information for the
83 generation of the XML instances, i.e. when the optional attributes are to be used, which
84 codes from which ENTSO-E codelist are to be used.

85 **2 TransmissionNetwork_MarketDocument**

86 **2.1 TransmissionNetwork contextual model**

87 **2.1.1 Overview of the model**

88 Figure 1 shows the model.



89

90

Figure 1 - TransmissionNetwork contextual model

91 **2.1.2 IsBasedOn relationships from the European style market profile**

92 Table 1 shows the traceability dependency of the classes used in this package towards the
93 upper level.

94 **Table 1 - IsBasedOn dependency**

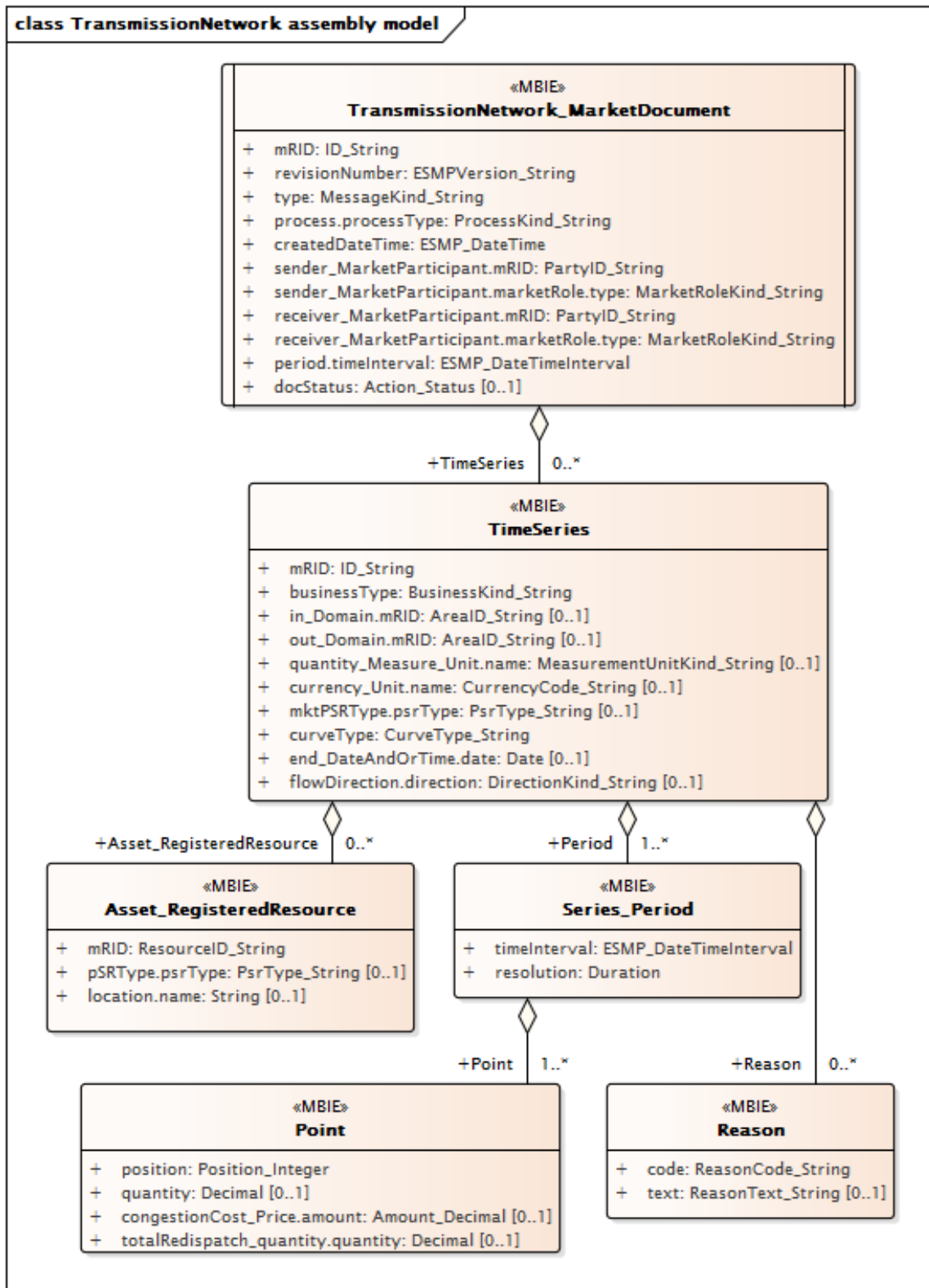
| Name | Complete IsBasedOn Path |
|------------------------------------|---|
| Asset_RegisteredResource | TC57CIM::IEC62325::MarketCommon::RegisteredResource |
| Currency_Unit | TC57CIM::IEC62325::MarketManagement::Unit |
| DateAndOrTime | TC57CIM::IEC62325::MarketManagement::DateAndOrTime |
| Domain | TC57CIM::IEC62325::MarketManagement::Domain |
| FlowDirection | TC57CIM::IEC62325::MarketManagement::FlowDirection |
| Location | TC57CIM::IEC61968::Common::Location |
| MarketParticipant | TC57CIM::IEC62325::MarketCommon::MarketParticipant |
| MarketRole | TC57CIM::IEC62325::MarketCommon::MarketRole |
| Measure_Unit | TC57CIM::IEC62325::MarketManagement::Unit |
| MktPSRType | TC57CIM::IEC62325::MarketManagement::MktPSRType |
| Point | TC57CIM::IEC62325::MarketManagement::Point |
| Price | TC57CIM::IEC62325::MarketManagement::Price |
| Process | TC57CIM::IEC62325::MarketManagement::Process |
| Quantity | TC57CIM::IEC62325::MarketManagement::Quantity |
| Reason | TC57CIM::IEC62325::MarketManagement::Reason |
| Series_Period | TC57CIM::IEC62325::MarketManagement::Period |
| Time_Period | TC57CIM::IEC62325::MarketManagement::Period |
| TimeSeries | TC57CIM::IEC62325::MarketManagement::TimeSeries |
| TransmissionNetwork_MarketDocument | TC57CIM::IEC62325::MarketManagement::MarketDocument |

95

96 **2.2 TransmissionNetwork assembly model**

97 **2.2.1 Overview of the model**

98 Figure 2 shows the model.



99

100

Figure 2 - TransmissionNetwork assembly model

101 **2.2.2 IsBasedOn relationships from the European style market profile**

102 Table 2 shows the traceability dependency of the classes used in this package towards the
103 upper level.

104 **Table 2 - IsBasedOn dependency**

| Name | Complete IsBasedOn Path |
|------------------------------------|---|
| Asset_RegisteredResource | TC57CIM::IEC62325::MarketCommon::RegisteredResource |
| Point | TC57CIM::IEC62325::MarketManagement::Point |
| Reason | TC57CIM::IEC62325::MarketManagement::Reason |
| Series_Period | TC57CIM::IEC62325::MarketManagement::Period |
| TimeSeries | TC57CIM::IEC62325::MarketManagement::TimeSeries |
| TransmissionNetwork_MarketDocument | TC57CIM::IEC62325::MarketManagement::MarketDocument |

105

106 **2.2.3 Detailed TransmissionNetwork assembly model**

107 **2.2.3.1 TransmissionNetwork_MarketDocument root class**

108 An electronic document containing the information necessary to satisfy the requirements of a
109 given business process.

110 The TransmissionNetwork_MarketDocument is used to transmit the transmission network
111 information concerning future changes to the network elements including expansion and
112 dismantling of the transmission grids over a three year period, and the yearly information on
113 the critical network elements.

114 The TransmissionNetwork_MarketDocument is also used to transmit information relating to
115 congestion management.

116 Table 3 shows all attributes of TransmissionNetwork_MarketDocument.

117 **Table 3 - Attributes of TransmissionNetwork assembly
118 model::TransmissionNetwork_MarketDocument**

| Order | mult. | Attribute name / Attribute type | Description |
|-------|--------|---|---|
| 0 | [1..1] | mRID ID_String | The unique identification of the document being exchanged within a business process flow. |
| 1 | [1..1] | revisionNumber ESMPVersion_String | The identification of the version that distinguishes one evolution of a document from another. |
| 2 | [1..1] | type MessageKind_String | The coded type of a document. The document type describes the principal characteristic of the document. |
| 3 | [1..1] | process.processType ProcessKind_String | The identification of the nature of process that the document addresses. |
| 4 | [1..1] | createdDateTime ESMP_DateTime | The date and time of the creation of the document. |
| 5 | [1..1] | sender_MarketParticipant.mRID PartyID_String | The identification of a party in the energy market. --- Document owner. |
| 6 | [1..1] | sender_MarketParticipant.marketRole.type MarketRoleKind_String | The identification of the role played by a market player. --- Document owner. --- The role associated with a MarketParticipant. |
| 7 | [1..1] | receiver_MarketParticipant.mRID PartyID_String | The identification of a party in the energy market. --- Document recipient. |

| Order | mult. | Attribute name / Attribute type | Description |
|-------|--------|---|--|
| 8 | [1..1] | receiver_MarketParticipant.marketRole.type MarketRoleKind_String | The identification of the role played by a market player. --- Document recipient. --- The role associated with a MarketParticipant. |
| 9 | [1..1] | period.timeInterval ESMP_DateTimeInterval | The start and end date and time for a given interval. --- The beginning and ending date and time of the period that the transmission network document is covering. |
| 10 | [0..1] | docStatus Action_Status | The identification of the condition or position of the document with regard to its standing. |

119

120 Table 4 shows all association ends of TransmissionNetwork_MarketDocument with other
121 classes.

122 **Table 4 - Association ends of TransmissionNetwork assembly**
123 **model::TransmissionNetwork_MarketDocument with other classes**

| Order | mult. | Class name / Role | Description |
|-------|--------|--------------------------|--|
| 11 | [0..*] | TimeSeries TimeSeries | Association Based On: TransmissionNetwork contextual model::TransmissionNetwork_MarketDocument.[] ----- TransmissionNetwork contextual model::TimeSeries.TimeSeries[0..*] |

124

125 2.2.3.2 Asset_RegisteredResource

126 A resource that is registered through the market participant registration system. Examples
127 include generating unit, load, and non-physical generator or load.

128 Table 5 shows all attributes of Asset_RegisteredResource.

129 **Table 5 - Attributes of TransmissionNetwork assembly**
130 **model::Asset_RegisteredResource**

| Order | mult. | Attribute name / Attribute type | Description |
|-------|--------|-----------------------------------|---|
| 0 | [1..1] | mRID ResourceID_String | The unique identification of a resource. |
| 2 | [0..1] | pSRType.psrType PsrType_String | The coded type of a power system resource. --- The coded type of the Asset_RegisteredResource. |
| 3 | [0..1] | location.name String | The name is any free human readable and possibly non unique text naming the object. --- The location of the Asset_RegisteredResource. |

131

132 2.2.3.3 Point

133 The identification of the values being addressed within a specific interval of time.

134 Table 6 shows all attributes of Point.

135 **Table 6 - Attributes of TransmissionNetwork assembly model::Point**

| Order | mult. | Attribute name / Attribute type | Description |
|-------|--------|---------------------------------|--|
| 0 | [1..1] | position Position_Integer | A sequential value representing the relative position within a given time interval. |

| Order | mult. | Attribute name / Attribute type | Description |
|-------|--------|---|---|
| 1 | [0..1] | quantity Decimal | The principal quantity identified for a point. This information defines the quantity related to the impact on cross zonal capacity. |
| 2 | [0..1] | congestionCost_Price.amount Amount_Decimal | A number of monetary units specified in a unit of currency. --- The congestion costs related to a congestion management action. |
| 3 | [0..1] | totalRedispatch_quantity.quantity Decimal | The quantity value. The association role provides the information about what is expressed. --- The Quantity information associated with a given Point. The total redispatch value expressed in the measure unit. |

136

137 2.2.3.4 Reason

138 The motivation of an act.

139 Table 7 shows all attributes of Reason.

140

Table 7 - Attributes of TransmissionNetwork assembly model::Reason

| Order | mult. | Attribute name / Attribute type | Description |
|-------|--------|---------------------------------|---|
| 0 | [1..1] | code ReasonCode_String | The motivation of an act in coded form. |
| 1 | [0..1] | text ReasonText_String | The textual explanation corresponding to the reason code. |

141

142 2.2.3.5 Series_Period

143 The identification of the period of time corresponding to a given time interval and resolution.

144 Table 8 shows all attributes of Series_Period.

145

Table 8 - Attributes of TransmissionNetwork assembly model::Series_Period

| Order | mult. | Attribute name / Attribute type | Description |
|-------|--------|---------------------------------------|--|
| 0 | [1..1] | timeInterval ESMP_DateTimeInterval | The start and end time of the period. |
| 1 | [1..1] | resolution Duration | The definition of the number of units of time that compose an individual step within a period. |

146

147 Table 9 shows all association ends of Series_Period with other classes.

Table 9 - Association ends of TransmissionNetwork assembly model::Series_Period with other classes

148

| Order | mult. | Class name / Role | Description |
|-------|--------|-------------------|---|
| 2 | [1..*] | Point Point | The Point information associated with a given Series_Period.within a TimeSeries. Association Based On: TransmissionNetwork contextual model::Series_Period.[] ----- TransmissionNetwork contextual model::Point.Point[1..*] |

150

151 **2.2.3.6 TimeSeries**

152 A set of time-ordered quantities being exchanged in relation to a product.

153 Table 10 shows all attributes of TimeSeries.

154 **Table 10 - Attributes of TransmissionNetwork assembly model::TimeSeries**

| Order | mult. | Attribute name / Attribute type | Description |
|-------|--------|--|---|
| 0 | [1..1] | mRID ID_String | A unique identification of the time series. |
| 1 | [1..1] | businessType BusinessKind_String | The identification of the nature of the time series. |
| 2 | [0..1] | in_Domain.mRID AreaID_String | The unique identification of the domain. --- The domain where energy is going associated with a TimeSeries. |
| 3 | [0..1] | out_Domain.mRID AreaID_String | The unique identification of the domain. --- The domain where energy is coming from associated with a TimeSeries. |
| 4 | [0..1] | quantity_Measure_Unit.name MeasurementUnitKind_String | The identification of the formal code for a measurement unit (UN/ECE Recommendation 20). --- The unit of measure associated with the quantities in a TimeSeries. |
| 5 | [0..1] | currency_Unit.name CurrencyCode_String | The identification of the formal code for a currency (ISO 4217). --- The currency associated with a TimeSeries. |
| 6 | [0..1] | mktPSRType.psrType PsrType_String | The coded type of a power system resource. --- The classification for a type of network element. |
| 7 | [1..1] | curveType CurveType_String | The identification of the coded representation of the type of curve being described. |
| 8 | [0..1] | end_DateAndOrTime.date Date | The date as "YYYY-MM-DD", which conforms with ISO 8601. --- An end date associated with a TimeSeries. |
| 9 | [0..1] | flowDirection.direction DirectionKind_String | The coded identification of the direction of energy flow. --- The flow direction associated with a TimeSeries. |

155

156 Table 11 shows all association ends of TimeSeries with other classes.

157 **Table 11 - Association ends of TransmissionNetwork assembly model::TimeSeries with other classes**
158

| Order | mult. | Class name / Role | Description |
|-------|--------|--|--|
| 10 | [0..*] | Asset_RegisteredResource Asset_RegisteredResource | An asset registered resource class should exist to identify the transmission assets involved in the document. Association Based On: TransmissionNetwork contextual model::TimeSeries.[] ----- TransmissionNetwork contextual model::Asset_RegisteredResource.Asset_RegisteredResource[0..*] |
| 11 | [1..*] | Series_Period Period | The time interval and resolution for a period associated with a TimeSeries. The series period class provides the market time unit information for the the impact on cross zonal capacity. Association Based On: TransmissionNetwork contextual model::TimeSeries.[] ----- TransmissionNetwork contextual model::Series_Period.Period[1..*] |

| Order | mult. | Class name / Role | Description |
|-------|--------|-------------------|---|
| 12 | [0..*] | Reason Reason | The reason information associated with a TimeSeries providing motivation information. Association Based On: TransmissionNetwork contextual model::TimeSeries.[] ----- TransmissionNetwork contextual model::Reason.Reason[0..*] |

159

160 2.2.4 Datatypes

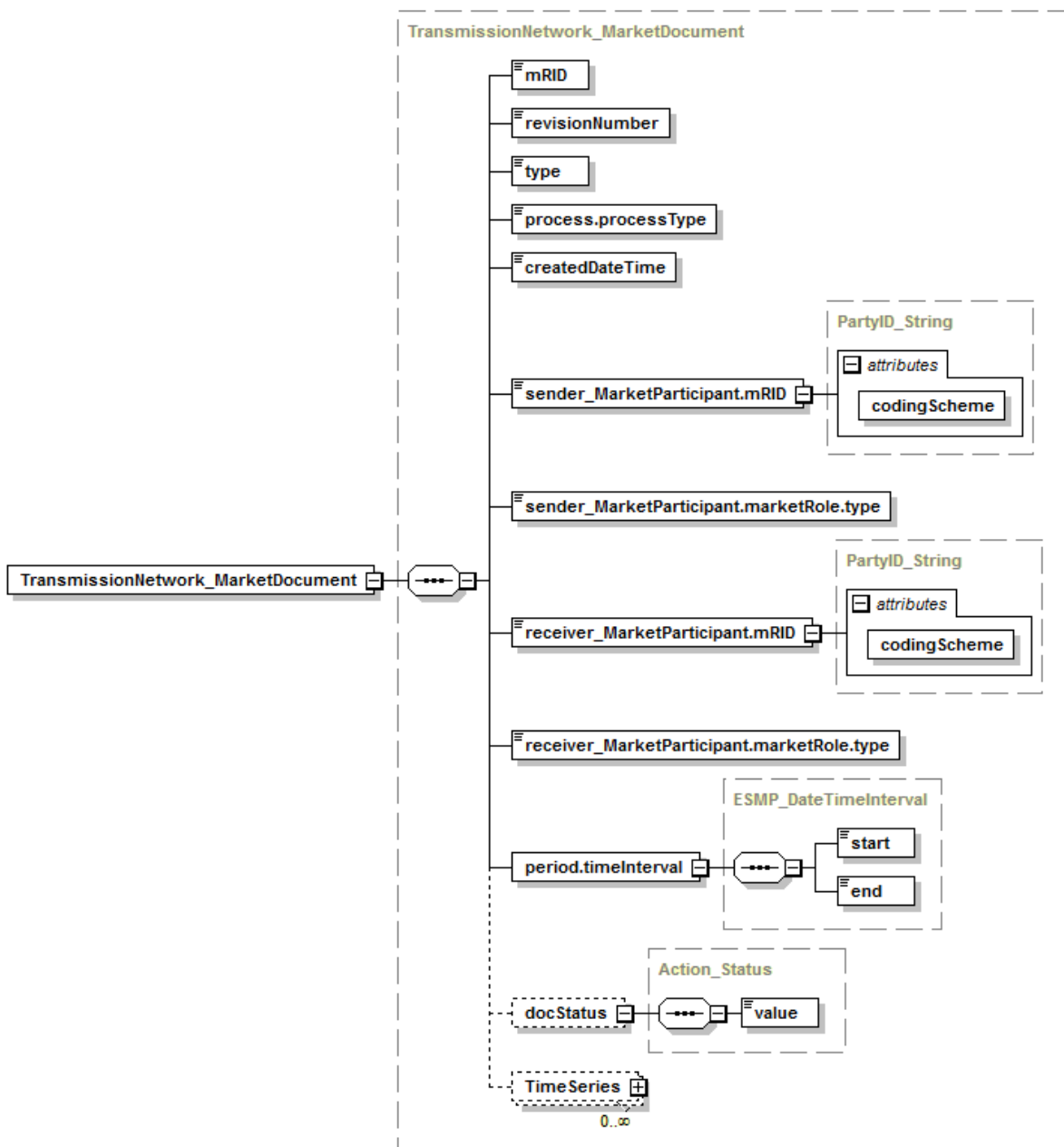
161 The list of datatypes used for the TransmissionNetwork assembly model is as follows:

- 162 • Action_Status compound
- 163 • ESMP_DateTimeInterval compound
- 164 • Amount_Decimal datatype
- 165 • AreaID_String datatype, codelist CodingSchemeTypeList
- 166 • BusinessKind_String datatype, codelist BusinessTypeList
- 167 • CurrencyCode_String datatype, codelist CurrencyTypeList
- 168 • CurveType_String datatype, codelist CurveTypeList
- 169 • DirectionKind_String datatype, codelist DirectionTypeList
- 170 • ESMP_DateTime datatype
- 171 • ESMPVersion_String datatype
- 172 • ID_String datatype
- 173 • MarketRoleKind_String datatype, codelist RoleTypeList
- 174 • MeasurementUnitKind_String datatype, codelist UnitOfMeasureTypeList
- 175 • MessageKind_String datatype, codelist MessageTypeList
- 176 • PartyID_String datatype, codelist CodingSchemeTypeList
- 177 • Position_Integer datatype
- 178 • ProcessKind_String datatype, codelist ProcessTypeList
- 179 • PsrType_String datatype, codelist AssetTypeList
- 180 • ReasonCode_String datatype, codelist ReasonCodeTypeList
- 181 • ReasonText_String datatype
- 182 • ResourceID_String datatype, codelist CodingSchemeTypeList
- 183 • Status_String datatype, codelist StatusTypeList
- 184 • YMDHM_DateTime datatype

185 **2.3 TransmissionNetwork_MarketDocument XML schema**

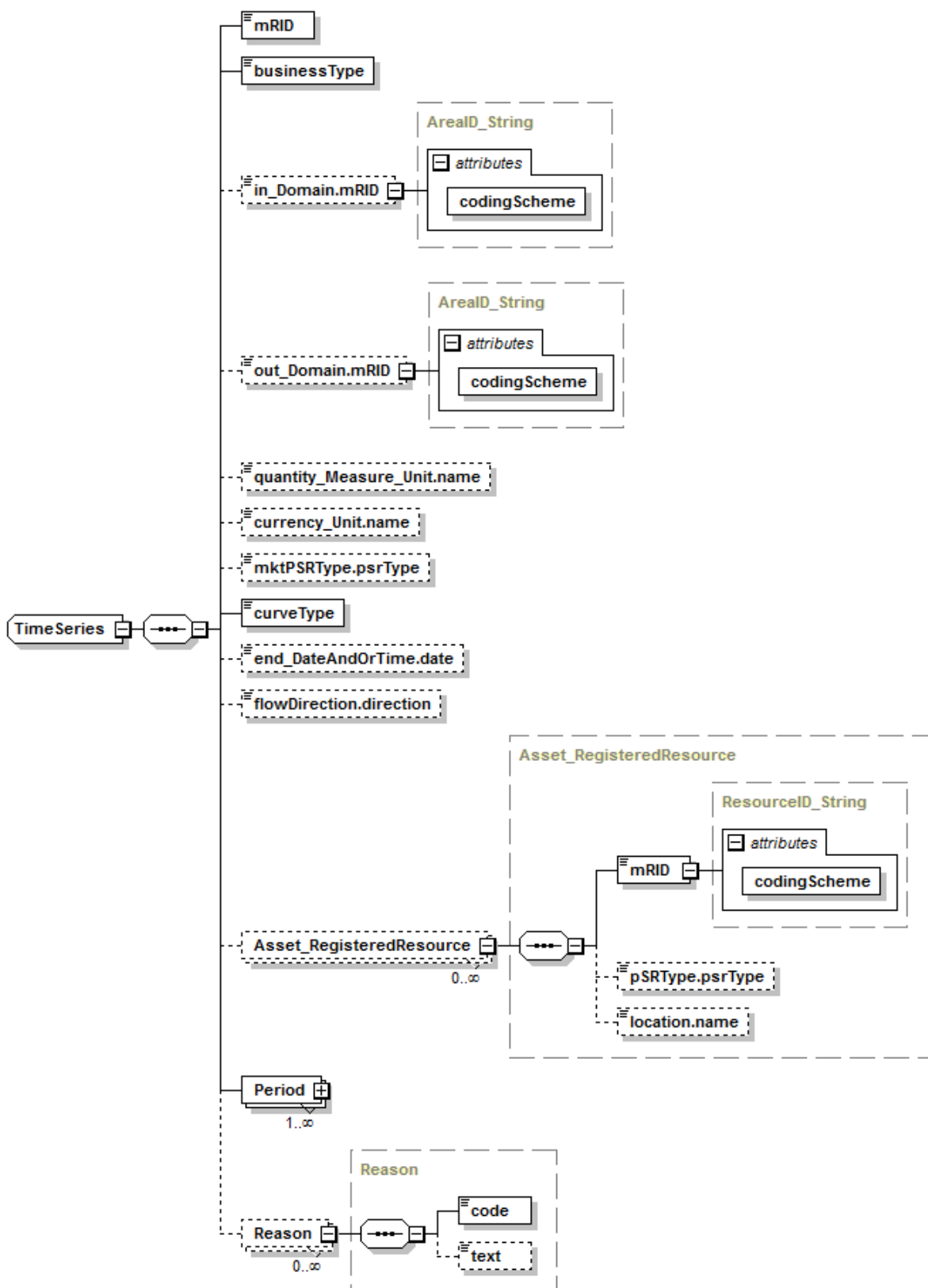
186 **2.3.1 TransmissionNetwork_MarketDocument XML schema structure**

187 Figure 3 to Figure 5 provide the structure of the schema.



188

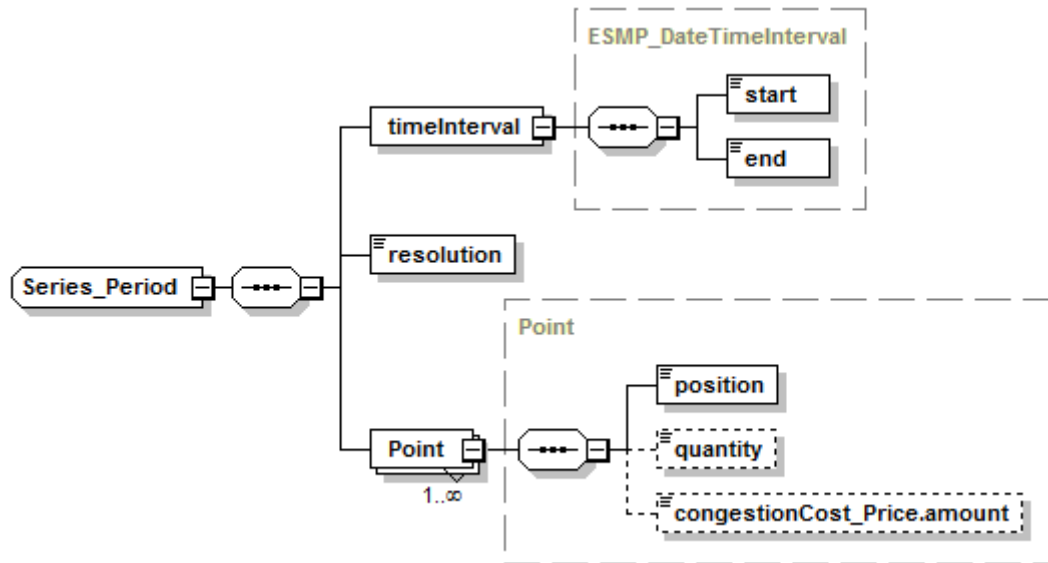
189 **Figure 3 - TransmissionNetwork_MarketDocument schema structure 1/3**



190

191

Figure 4 - TransmissionNetwork_MarketDocument schema structure 2/3



192

193

Figure 5 - TransmissionNetwork_MarketDocument schema structure 3/3

194 2.3.2 TransmissionNetwork_MarketDocument XML schema

195 The schema to be used to validate XML instances is to be identified by:

196 urn:iec62325.351:tc57wg16:451-6:transmissionnetworkdocument:4:0

```

197 <?xml version="1.0" encoding="utf-8"?>
198 <xs:schema xmlns:cl="urn:entsoe.eu:wgedi:codelists"
199 xmlns:sawsdl="http://www.w3.org/ns/sawsdl" xmlns="urn:iec62325.351:tc57wg16:451-
200 6:transmissionnetworkdocument:4:0" xmlns:cimp="http://www.iec.ch/cimprofile"
201 attributeFormDefault="unqualified" elementFormDefault="qualified"
202 targetNamespace="urn:iec62325.351:tc57wg16:451-6:transmissionnetworkdocument:4:0"
203 xmlns:xs="http://www.w3.org/2001/XMLSchema">
204   <xs:import schemaLocation="urn-entsoe-eu-wgedi-codelists.xsd"
205 namespace="urn:entsoe.eu:wgedi:codelists" />
206   <xs:element name="TransmissionNetwork_MarketDocument"
207 type="TransmissionNetwork_MarketDocument" />
208   <xs:simpleType name="ResourceID_String-base"
209 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
210     <xs:restriction base="xs:string">
211       <xs:maxLength value="60" />
212     </xs:restriction>
213   </xs:simpleType>
214   <xs:complexType name="ResourceID_String"
215 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
216     <xs:simpleContent>
217       <xs:extension base="ResourceID_String-base">
218         <xs:attribute name="codingScheme" type="cl:CodingSchemeTypeList"
219 use="required" />
220       </xs:extension>
221     </xs:simpleContent>
222   </xs:complexType>
223   <xs:simpleType name="PsrType_String"
224 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
225     <xs:restriction base="cl:AssetTypeList" />
226   </xs:simpleType>
227   <xs:complexType name="Asset_RegisteredResource"
228 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#RegisteredResource">
229     <xs:sequence>
230       <xs:element minOccurs="1" maxOccurs="1" name="mRID" type="ResourceID_String"
231 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
232 cim16#IdentifiedObject.mRID">
233     </xs:element>

```

```

234         <xs:element minOccurs="0" maxOccurs="1" name="psRType.psrType"
235 type="PsrType_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
236 cim16#MktPSRType.psrType">
237         </xs:element>
238         <xs:element minOccurs="0" maxOccurs="1" name="location.name" type="xs:string"
239 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
240 cim16#IdentifiedObject.name">
241         </xs:element>
242     </xs:sequence>
243 </xs:complexType>
244 <xs:simpleType name="Position_Integer"
245 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Integer">
246     <xs:restriction base="xs:integer">
247         <xs:maxInclusive value="999999" />
248         <xs:minInclusive value="1" />
249     </xs:restriction>
250 </xs:simpleType>
251 <xs:simpleType name="Amount_Decimal"
252 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Decimal">
253     <xs:restriction base="xs:decimal">
254         <xs:totalDigits value="17" />
255     </xs:restriction>
256 </xs:simpleType>
257 <xs:complexType name="Point" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
258 schema-cim16#Point">
259     <xs:sequence>
260         <xs:element minOccurs="1" maxOccurs="1" name="position" type="Position_Integer"
261 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Point.position">
262         </xs:element>
263         <xs:element minOccurs="0" maxOccurs="1" name="quantity" type="xs:decimal"
264 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Point.quantity">
265         </xs:element>
266         <xs:element minOccurs="0" maxOccurs="1" name="congestionCost_Price.amount"
267 type="Amount_Decimal" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
268 cim16#Price.amount">
269         </xs:element>
270         <xs:element minOccurs="0" maxOccurs="1"
271 name="totalRedispatch_quantity.quantity" type="xs:decimal"
272 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Quantity.quantity">
273         </xs:element>
274     </xs:sequence>
275 </xs:complexType>
276 <xs:simpleType name="ReasonCode_String"
277 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
278     <xs:restriction base="cl:ReasonCodeTypeList" />
279 </xs:simpleType>
280 <xs:simpleType name="ReasonText_String"
281 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
282     <xs:restriction base="xs:string">
283         <xs:maxLength value="512" />
284     </xs:restriction>
285 </xs:simpleType>
286 <xs:complexType name="Reason" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
287 schema-cim16#Reason">
288     <xs:sequence>
289         <xs:element minOccurs="1" maxOccurs="1" name="code" type="ReasonCode_String"
290 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Reason.code">
291         </xs:element>
292         <xs:element minOccurs="0" maxOccurs="1" name="text" type="ReasonText_String"
293 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Reason.text">
294         </xs:element>
295     </xs:sequence>
296 </xs:complexType>
297 <xs:simpleType name="YMDHM_DateTime"
298 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#DateTime">
299     <xs:restriction base="xs:string">
300         <xs:pattern value="((( [0-9]{4} ) [ - ] ( 0 [13578] | 1 [02] ) [ - ] ( 0 [1-9] | [12] [0-
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304 | [02468] [048] [02468] [048] | [02468] [1235679] (0) [48] | [02468] [1235679] [2468] [048] | [0-
305 9] [0-9] [13579] [26] [\ -] (02) [\ -] (0 [1-9] | 1 [0-9] | 2 [0-9]) T (( [01] [0-9] | 2 [0-3] ) : [0-5] [0-
306 9] ) Z) | (( [13579] [26] [02468] [1235679] | [13579] [01345789] (0) [01235679] | [13579] [01345789] [
307 2468] [1235679] | [02468] [048] [02468] [1235679] | [02468] [1235679] (0) [01235679] | [02468] [123
308 5679] [2468] [1235679] | [0-9] [0-9] [13579] [01345789] ) [\ -] (02) [\ -] (0 [1-9] | 1 [0-9] | 2 [0-
309 8] ) T (( [01] [0-9] | 2 [0-3] ) : [0-5] [0-9] ) Z) " />
310 </xs:restriction>
311 </xs:simpleType>
312 <xs:complexType name="ESMP_DateTimeInterval"
313 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#DateTimeInterval">
314 <xs:sequence>
315 <xs:element minOccurs="1" maxOccurs="1" name="start" type="YMDHM_DateTime"
316 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
317 cim16#DateTimeInterval.start">
318 </xs:element>
319 <xs:element minOccurs="1" maxOccurs="1" name="end" type="YMDHM_DateTime"
320 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
321 cim16#DateTimeInterval.end">
322 </xs:element>
323 </xs:sequence>
324 </xs:complexType>
325 <xs:complexType name="Series_Period"
326 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Period">
327 <xs:sequence>
328 <xs:element minOccurs="1" maxOccurs="1" name="timeInterval"
329 type="ESMP_DateTimeInterval" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
330 schema-cim16#Period.timeInterval">
331 </xs:element>
332 <xs:element minOccurs="1" maxOccurs="1" name="resolution" type="xs:duration"
333 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Period.resolution">
334 </xs:element>
335 <xs:element minOccurs="1" maxOccurs="unbounded" name="Point" type="Point"
336 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Period.Point">
337 </xs:element>
338 </xs:sequence>
339 </xs:complexType>
340 <xs:simpleType name="ID_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
341 schema-cim16#String">
342 <xs:restriction base="xs:string">
343 <xs:maxLength value="35" />
344 </xs:restriction>
345 </xs:simpleType>
346 <xs:simpleType name="BusinessKind_String"
347 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
348 <xs:restriction base="cl:BusinessTypeList" />
349 </xs:simpleType>
350 <xs:simpleType name="AreaID_String-base"
351 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
352 <xs:restriction base="xs:string">
353 <xs:maxLength value="18" />
354 </xs:restriction>
355 </xs:simpleType>
356 <xs:complexType name="AreaID_String"
357 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
358 <xs:simpleContent>
359 <xs:extension base="AreaID_String-base">
360 <xs:attribute name="codingScheme" type="cl:CodingSchemeTypeList"
361 use="required" />
362 </xs:extension>
363 </xs:simpleContent>
364 </xs:complexType>
365 <xs:simpleType name="MeasurementUnitKind_String"
366 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
367 <xs:restriction base="cl:UnitOfMeasureTypeList" />
368 </xs:simpleType>
369 <xs:simpleType name="CurrencyCode_String"
370 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
371 <xs:restriction base="cl:CurrencyTypeList" />

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372     </xs:simpleType>
373     <xs:simpleType name="CurveType_String"
374     sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
375       <xs:restriction base="cl:CurveTypeList" />
376     </xs:simpleType>
377     <xs:simpleType name="DirectionKind_String"
378     sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
379       <xs:restriction base="cl:DirectionTypeList" />
380     </xs:simpleType>
381     <xs:complexType name="TimeSeries"
382     sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#TimeSeries">
383       <xs:sequence>
384         <xs:element minOccurs="1" maxOccurs="1" name="mRID" type="ID_String"
385         sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
386         cim16#IdentifiedObject.mRID">
387           </xs:element>
388         <xs:element minOccurs="1" maxOccurs="1" name="businessType"
389         type="BusinessKind_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
390         cim16#TimeSeries.businessType">
391           </xs:element>
392         <xs:element minOccurs="0" maxOccurs="1" name="in_Domain.mRID"
393         type="AreaID_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
394         cim16#IdentifiedObject.mRID">
395           </xs:element>
396         <xs:element minOccurs="0" maxOccurs="1" name="out_Domain.mRID"
397         type="AreaID_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
398         cim16#IdentifiedObject.mRID">
399           </xs:element>
400         <xs:element minOccurs="0" maxOccurs="1" name="quantity_Measure_Unit.name"
401         type="MeasurementUnitKind_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
402         schema-cim16#Unit.name">
403           </xs:element>
404         <xs:element minOccurs="0" maxOccurs="1" name="currency_Unit.name"
405         type="CurrencyCode_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
406         cim16#Unit.name">
407           </xs:element>
408         <xs:element minOccurs="0" maxOccurs="1" name="mktPSRType.psrType"
409         type="PsrType_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
410         cim16#MktPSRType.psrType">
411           </xs:element>
412         <xs:element minOccurs="1" maxOccurs="1" name="curveType"
413         type="CurveType_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
414         cim16#TimeSeries.curveType">
415           </xs:element>
416         <xs:element minOccurs="0" maxOccurs="1" name="end_DateAndOrTime.date"
417         type="xs:date" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
418         cim16#DateAndOrTime.date">
419           </xs:element>
420         <xs:element minOccurs="0" maxOccurs="1" name="flowDirection.direction"
421         type="DirectionKind_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
422         schema-cim16#FlowDirection.direction">
423           </xs:element>
424         <xs:element minOccurs="0" maxOccurs="unbounded" name="Asset_RegisteredResource"
425         type="Asset_RegisteredResource" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
426         schema-cim16#TimeSeries.Asset_RegisteredResource">
427           </xs:element>
428         <xs:element minOccurs="1" maxOccurs="unbounded" name="Period"
429         type="Series_Period" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
430         cim16#TimeSeries.Period">
431           </xs:element>
432         <xs:element minOccurs="0" maxOccurs="unbounded" name="Reason" type="Reason"
433         sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#TimeSeries.Reason">
434           </xs:element>
435       </xs:sequence>
436     </xs:complexType>
437     <xs:simpleType name="ESMPVersion_String"
438     sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
439       <xs:restriction base="xs:string">
440         <xs:pattern value="[1-9]([0-9]){0,2}" />

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441     </xs:restriction>
442 </xs:simpleType>
443 <xs:simpleType name="MessageKind_String"
444 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
445   <xs:restriction base="cl:MessageTypeList" />
446 </xs:simpleType>
447 <xs:simpleType name="ProcessKind_String"
448 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
449   <xs:restriction base="cl:ProcessTypeList" />
450 </xs:simpleType>
451 <xs:simpleType name="ESMP_DateTime"
452 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#DateTime">
453   <xs:restriction base="xs:dateTime">
454     <xs:pattern value="((([0-9]{4})[\-](0[13578]|1[02])[\-](0[1-9]|12)[0-
455 9]|3[01])|([0-9]{4})[\-]((0[469])|(11))[\-](0[1-9]|12)[0-9]|30))T(([01][0-9]|2[0-
456 3]):[0-5][0-9]:[0-5][0-
457 9])Z)|((([13579][26][02468][048]|13579][01345789])(0[48]|13579][01345789][2468][048]
458 |[02468][048][02468][048]|02468][1235679])(0[48]|02468][1235679][2468][048]|[0-
459 9][0-9][13579][26])[\-](02)[\-](0[1-9]|1[0-9]|2[0-9])T(([01][0-9]|2[0-3]):[0-5][0-
460 9]:[0-5][0-
461 9])Z)|((([13579][26][02468][1235679]|13579][01345789])(0[01235679]|13579][01345789][
462 2468][1235679]|02468][048][02468][1235679]|02468][1235679])(0[01235679]|02468][12
463 5679][2468][1235679]|[0-9][0-9][13579][01345789])[\-](02)[\-](0[1-9]|1[0-9]|2[0-
464 8])T(([01][0-9]|2[0-3]):[0-5][0-9]:[0-5][0-9])Z)" />
465   </xs:restriction>
466 </xs:simpleType>
467 <xs:simpleType name="PartyID_String-base"
468 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
469   <xs:restriction base="xs:string">
470     <xs:maxLength value="16" />
471   </xs:restriction>
472 </xs:simpleType>
473 <xs:complexType name="PartyID_String"
474 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
475   <xs:simpleContent>
476     <xs:extension base="PartyID_String-base">
477       <xs:attribute name="codingScheme" type="cl:CodingSchemeTypeList"
478 use="required" />
479     </xs:extension>
480   </xs:simpleContent>
481 </xs:complexType>
482 <xs:simpleType name="MarketRoleKind_String"
483 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
484   <xs:restriction base="cl:RoleTypeList" />
485 </xs:simpleType>
486 <xs:simpleType name="Status_String"
487 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
488   <xs:restriction base="cl:StatusTypeList" />
489 </xs:simpleType>
490 <xs:complexType name="Action_Status"
491 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Status">
492   <xs:sequence>
493     <xs:element minOccurs="1" maxOccurs="1" name="value" type="Status_String"
494 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Status.value">
495     </xs:element>
496   </xs:sequence>
497 </xs:complexType>
498 <xs:complexType name="TransmissionNetwork_MarketDocument"
499 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#MarketDocument">
500   <xs:sequence>
501     <xs:element minOccurs="1" maxOccurs="1" name="mRID" type="ID_String"
502 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
503 cim16#IdentifiedObject.mRID">
504     </xs:element>
505     <xs:element minOccurs="1" maxOccurs="1" name="revisionNumber"
506 type="ESMPVersion_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
507 cim16#Document.revisionNumber">
508     </xs:element>

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509     <xs:element minOccurs="1" maxOccurs="1" name="type" type="MessageKind_String"
510 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Document.type">
511     </xs:element>
512     <xs:element minOccurs="1" maxOccurs="1" name="process.processType"
513 type="ProcessKind_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
514 cim16#Process.processType">
515     </xs:element>
516     <xs:element minOccurs="1" maxOccurs="1" name="createdDateTime"
517 type="ESMP_DateTime" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
518 cim16#Document.createdDateTime">
519     </xs:element>
520     <xs:element minOccurs="1" maxOccurs="1" name="sender_MarketParticipant.mRID"
521 type="PartyID_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
522 cim16#IdentifiedObject.mRID">
523     </xs:element>
524     <xs:element minOccurs="1" maxOccurs="1"
525 name="sender_MarketParticipant.marketRole.type" type="MarketRoleKind_String"
526 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#MarketRole.type">
527     </xs:element>
528     <xs:element minOccurs="1" maxOccurs="1" name="receiver_MarketParticipant.mRID"
529 type="PartyID_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
530 cim16#IdentifiedObject.mRID">
531     </xs:element>
532     <xs:element minOccurs="1" maxOccurs="1"
533 name="receiver_MarketParticipant.marketRole.type" type="MarketRoleKind_String"
534 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#MarketRole.type">
535     </xs:element>
536     <xs:element minOccurs="1" maxOccurs="1" name="period.timeInterval"
537 type="ESMP_DateTimeInterval" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
538 schema-cim16#Period.timeInterval">
539     </xs:element>
540     <xs:element minOccurs="0" maxOccurs="1" name="docStatus" type="Action_Status"
541 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Document.docStatus">
542     </xs:element>
543     <xs:element minOccurs="0" maxOccurs="unbounded" name="TimeSeries"
544 type="TimeSeries" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
545 cim16#MarketDocument.TimeSeries">
546     </xs:element>
547 </xs:sequence>
548 </xs:complexType>
549 </xs:schema>
```