European Network of
Transmission System Operators
for Electricity

TRANSMISSION NETWORK DOCUMENT
UML MODEL AND SCHEMA

2022-02-01
APPROVED DOCUMENT
VERSION 1.1

Table of Contents

List of figures

List of tables

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64

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.
1	1	2022-02-01	XSD version 4.1: • Quantity_Measure_Unit.name attribute was renamed to Quantity_Measurement_Unit.name to be compliant with the ESMP. • mRID of Document, Series and Timeseries (ID_String type) was enlarged from 35 to 60 characters. Approved by MC.

65

Objective

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

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

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

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

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

TransmissionNetwork_MarketDocument

2.1 TransmissionNetwork contextual model

2.1.1 Overview of the model

Figure 1 shows the model.

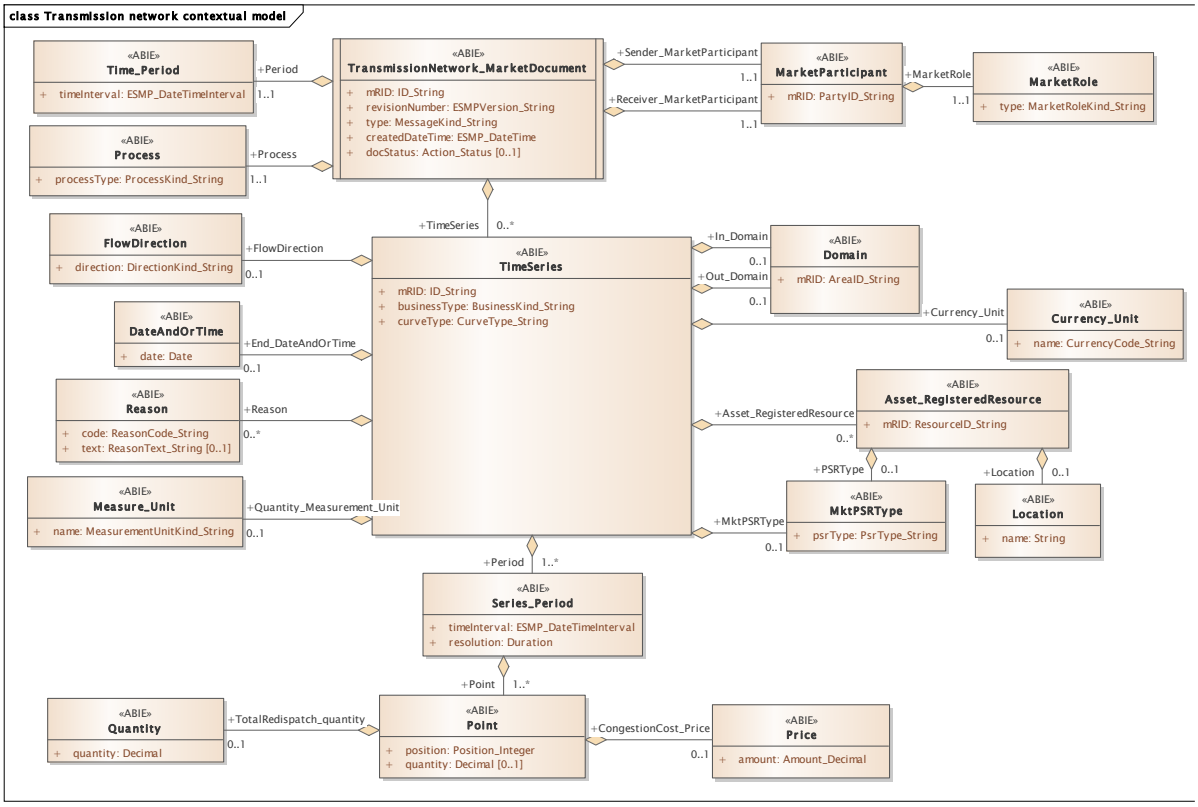

Figure 1 - TransmissionNetwork contextual model

2.1.2 IsBasedOn relationships from the European style market profile

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

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

2.2 TransmissionNetwork assembly model

2.2.1 Overview of the model

Figure 2 shows the model.

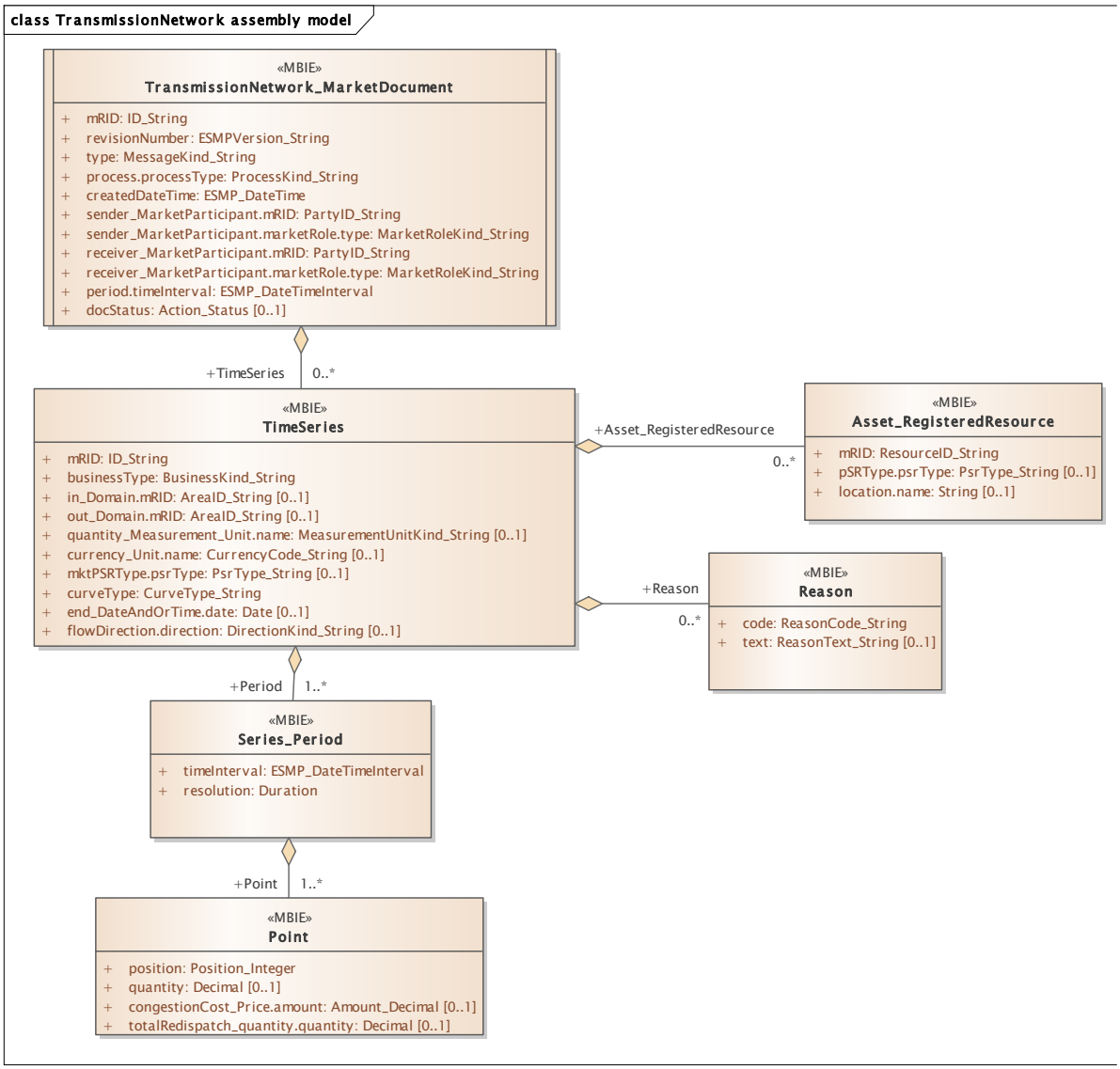

Figure 2 - TransmissionNetwork assembly model

2.2.2 IsBasedOn relationships from the European style market profile

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

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

2.2.3 Detailed TransmissionNetwork assembly model

2.2.3.1 TransmissionNetwork_MarketDocument root class

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

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

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

Table 3 shows all attributes of TransmissionNetwork_MarketDocument.

Table 3 - Attributes of TransmissionNetwork assembly 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.

Order	mult.	Attribute name / Attribute type	Description
7	[1..1]	receiver_MarketParticipant.mRID PartyID_String	The identification of a party in the energy market. --- Document recipient.
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.

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

Table 4 - Association ends of TransmissionNetwork assembly 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..*]

2.2.3.2 Asset_RegisteredResource

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

Table 5 shows all attributes of Asset_RegisteredResource.

Table 5 - Attributes of TransmissionNetwork assembly 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.

2.2.3.3 Point

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

Table 6 shows all attributes of Point.

139 **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.
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.

140

141 #### 2.2.3.4 Reason

142 The motivation of an act.

143 Table 7 shows all attributes of Reason.

144 **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.

145

146 #### 2.2.3.5 Series_Period

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

148 Table 8 shows all attributes of Series_Period.

149 **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.

150

151 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

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..*]

2.2.3.6 TimeSeries

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

Table 10 shows all attributes of TimeSeries.

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_Measurement_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.

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

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

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..*]
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..*]

2.2.4 Datatypes

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

- Action_Status compound
- ESMP_DateTimeInterval compound
- Amount_Decimal datatype
- AreaID_String datatype, codelist CodingSchemeTypeList
- BusinessKind_String datatype, codelist BusinessTypeList
- CurrencyCode_String datatype, codelist CurrencyTypeList
- CurveType_String datatype, codelist CurveTypeList
- DirectionKind_String datatype, codelist DirectionTypeList
- ESMP_DateTime datatype
- ESMPVersion_String datatype
- ID_String datatype
- MarketRoleKind_String datatype, codelist RoleTypeList
- MeasurementUnitKind_String datatype, codelist UnitOfMeasureTypeList
- MessageKind_String datatype, codelist MessageTypeList
- PartyID_String datatype, codelist CodingSchemeTypeList
- Position_Integer datatype
- ProcessKind_String datatype, codelist ProcessTypeList
- PsrType_String datatype, codelist AssetTypeList
- ReasonCode_String datatype, codelist ReasonCodeTypeList
- ReasonText_String datatype
- ResourceID_String datatype, codelist CodingSchemeTypeList
- Status_String datatype, codelist StatusTypeList

188 • YMDHM_DateTime datatype

2.3 TransmissionNetwork_MarketDocument XML schema

2.3.1 TransmissionNetwork_MarketDocument XML schema structure

Figure 3 provides the structure of the schema.

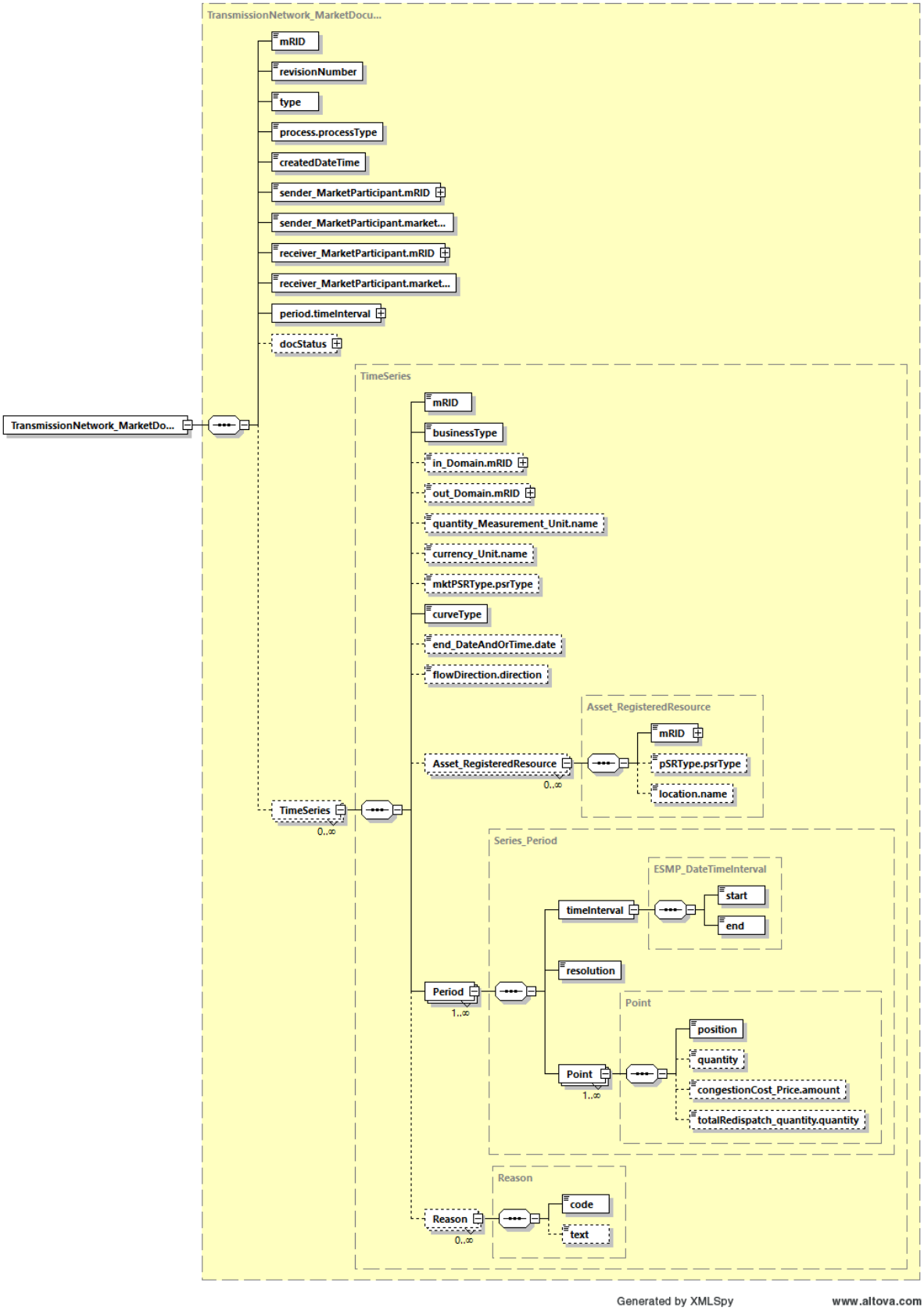

Figure 3 - TransmissionNetwork_MarketDocument schema structure

2.3.2 TransmissionNetwork_MarketDocument XML schema

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

urn:iec62325.351:tc57wg16:451-6:transmissionnetworkdocument:4:1

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema xmlns:ecl="urn:entsoe.eu:wgedi:codelists"
xmlns="urn:iec62325.351:tc57wg16:451-6:transmissionnetworkdocument:4:1"
xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:cimp="http://www.iec.ch/cimprofile"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="urn:iec62325.351:tc57wg16:451-6:transmissionnetworkdocument:4:1"
elementFormDefault="qualified" attributeFormDefault="unqualified">
	<xs:import namespace="urn:entsoe.eu:wgedi:codelists" schemaLocation="urn-
entsoe-eu-wgedi-codelists.xsd"/>
	<xs:element name="TransmissionNetwork_MarketDocument"
type="TransmissionNetwork_MarketDocument"/>
	<xs:simpleType name="ResourceID_String-base"
sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
		<xs:restriction base="xs:string">
			<xs:maxLength value="60"/>
		</xs:restriction>
	</xs:simpleType>
	<xs:complexType name="ResourceID_String"
sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
		<xs:simpleContent>
			<xs:extension base="ResourceID_String-base">
				<xs:attribute name="codingScheme"
type="ecl:CodingSchemeTypeList" use="required"/>
			</xs:extension>
		</xs:simpleContent>
	</xs:complexType>
	<xs:simpleType name="PsrType_String"
sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
		<xs:restriction base="ecl:AssetTypeList"/>
	</xs:simpleType>
	<xs:complexType name="Asset_RegisteredResource"
sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
cim16#RegisteredResource">
		<xs:sequence>
			<xs:element name="mRID" type="ResourceID_String" minOccurs="1"
maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
cim16#IdentifiedObject.mRID"/>
			<xs:element name="pSRType.psrType" type="PsrType_String"
minOccurs="0" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
schema-cim16#MktPSRType.psrType"/>
			<xs:element name="location.name" type="xs:string" minOccurs="0"
maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
cim16#IdentifiedObject.name"/>
		</xs:sequence>
	</xs:complexType>
	<xs:simpleType name="Position_Integer"
sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Integer">
		<xs:restriction base="xs:integer">
			<xs:maxInclusive value="999999"/>
			<xs:minInclusive value="1"/>
		</xs:restriction>
	</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"
258   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Point">
259               <xs:sequence>
260                     <xs:element name="position" type="Position_Integer"
261   minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
262   schema-cim16#Point.position"/>
263                     <xs:element name="quantity" type="xs:decimal" minOccurs="0"
264   maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
265   cim16#Point.quantity"/>
266                     <xs:element name="congestionCost_Price.amount"
267   type="Amount_Decimal" minOccurs="0" maxOccurs="1"
268   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Price.amount"/>
269                     <xs:element name="totalRedispatch_quantity.quantity"
270   type="xs:decimal" minOccurs="0" maxOccurs="1"
271   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
272   cim16#Quantity.quantity"/>
273               </xs:sequence>
274         </xs:complexType>
275         <xs:simpleType name="ReasonCode_String"
276   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
277               <xs:restriction base="ecl:ReasonCodeTypeList"/>
278         </xs:simpleType>
279         <xs:simpleType name="ReasonText_String"
280   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
281               <xs:restriction base="xs:string">
282                     <xs:maxLength value="512"/>
283               </xs:restriction>
284         </xs:simpleType>
285         <xs:complexType name="Reason"
286   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Reason">
287               <xs:sequence>
288                     <xs:element name="code" type="ReasonCode_String" minOccurs="1"
289   maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
290   cim16#Reason.code"/>
291                     <xs:element name="text" type="ReasonText_String" minOccurs="0"
292   maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
293   cim16#Reason.text"/>
294               </xs:sequence>
295         </xs:complexType>
296         <xs:simpleType name="YMDHM_DateTime"
297   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#DateTime">
298               <xs:restriction base="xs:string">
299                     <xs:pattern value="((([0-9]{4})[\-](0[13578]|1[02])[\-](0[1-
300   9]|[12][0-9]|3[01])|([0-9]{4})[\-]((0[469])|(11))[\-](0[1-9]|[12][0-
301   9]|30))T(([01][0-9]|2[0-3]):[0-5][0-
302   9])Z)|(([13579][26][02468][048]|[13579][01345789](0)[48]|[13579][01345789][2468][0
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304   0-9][0-9][13579][26])[\-](02)[\-](0[1-9]|1[0-9]|2[0-9])T(([01][0-9]|2[0-3]):[0-
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306   9])Z)|(([13579][26][02468][1235679]|[13579][01345789](0)[01235679]|[13579][0134578
307   9][2468][1235679]|[02468][048][02468][1235679]|[02468][1235679](0)[01235679]|[0246
308   8][1235679][2468][1235679]|[0-9][0-9][13579][01345789])[\-](02)[\-](0[1-9]|1[0-
309   9]|2[0-8])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 name="start" type="YMDHM_DateTime" minOccurs="1"
316   maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
317   cim16#DateTimeInterval.start"/>
318                     <xs:element name="end" type="YMDHM_DateTime" minOccurs="1"
319   maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
320   cim16#DateTimeInterval.end"/>
321               </xs:sequence>
322         </xs:complexType>
323         <xs:complexType name="Series_Period"
324   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Period">
325               <xs:sequence>
326                     <xs:element name="timeInterval" type="ESMP_DateTimeInterval"
327   minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
328   schema-cim16#Period.timeInterval"/>
329                     <xs:element name="resolution" type="xs:duration" minOccurs="1"
330   maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
331   cim16#Period.resolution"/>
332                     <xs:element name="Point" type="Point" minOccurs="1"
333   maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
334   cim16#Period.Point"/>
335               </xs:sequence>
336         </xs:complexType>
337         <xs:simpleType name="ID_String"
338   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
339               <xs:restriction base="xs:string">
340                     <xs:maxLength value="60"/>
341               </xs:restriction>
342         </xs:simpleType>
343         <xs:simpleType name="BusinessKind_String"
344   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
345               <xs:restriction base="ecl:BusinessTypeList"/>
346         </xs:simpleType>
347         <xs:simpleType name="AreaID_String-base"
348   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
349               <xs:restriction base="xs:string">
350                     <xs:maxLength value="18"/>
351               </xs:restriction>
352         </xs:simpleType>
353         <xs:complexType name="AreaID_String"
354   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
355               <xs:simpleContent>
356                     <xs:extension base="AreaID_String-base">
357                           <xs:attribute name="codingScheme"
358   type="ecl:CodingSchemeTypeList" use="required"/>
359                     </xs:extension>
360               </xs:simpleContent>
361         </xs:complexType>
362         <xs:simpleType name="MeasurementUnitKind_String"
363   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
364               <xs:restriction base="ecl:UnitOfMeasureTypeList"/>
365         </xs:simpleType>
366         <xs:simpleType name="CurrencyCode_String"
367   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
368               <xs:restriction base="ecl:CurrencyTypeList"/>
369         </xs:simpleType>
```

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

```
430         <xs:simpleType name="MessageKind_String"
431   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
432                <xs:restriction base="ecl:MessageTypeList"/>
433         </xs:simpleType>
434         <xs:simpleType name="ProcessKind_String"
435   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
436                <xs:restriction base="ecl:ProcessTypeList"/>
437         </xs:simpleType>
438         <xs:simpleType name="ESMP_DateTime"
439   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#DateTime">
440                <xs:restriction base="xs:dateTime">
441                      <xs:pattern value="((([0-9]{4})[\-](0[13578]|1[02])[\-](0[1-
442   9]|[12][0-9]|3[01])|([0-9]{4})[\-]((0[469])|(11))[\-](0[1-9]|[12][0-
443   9]|30))T(([01][0-9]|2[0-3]):[0-5][0-9]:[0-5][0-
444   9])Z)|(([13579][26][02468][048]|[13579][01345789](0)[48]|[13579][01345789][2468][0
445   48]|[02468][048][02468][048]|[02468][1235679](0)[48]|[02468][1235679][2468][048]|[
446   0-9][0-9][13579][26])[\-](02)[\-](0[1-9]|1[0-9]|2[0-9])T(([01][0-9]|2[0-3]):[0-
447   5][0-9]:[0-5][0-
448   9])Z)|(([13579][26][02468][1235679]|[13579][01345789](0)[01235679]|[13579][0134578
449   9][2468][1235679]|[02468][048][02468][1235679]|[02468][1235679](0)[01235679]|[0246
450   8][1235679][2468][1235679]|[0-9][0-9][13579][01345789])[\-](02)[\-](0[1-9]|1[0-
451   9]|2[0-8])T(([01][0-9]|2[0-3]):[0-5][0-9]:[0-5][0-9])Z)"/>
452                </xs:restriction>
453         </xs:simpleType>
454         <xs:simpleType name="PartyID_String-base"
455   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
456                <xs:restriction base="xs:string">
457                      <xs:maxLength value="16"/>
458                </xs:restriction>
459         </xs:simpleType>
460         <xs:complexType name="PartyID_String"
461   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
462                <xs:simpleContent>
463                      <xs:extension base="PartyID_String-base">
464                            <xs:attribute name="codingScheme"
465   type="ecl:CodingSchemeTypeList" use="required"/>
466                      </xs:extension>
467                </xs:simpleContent>
468         </xs:complexType>
469         <xs:simpleType name="MarketRoleKind_String"
470   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
471                <xs:restriction base="ecl:RoleTypeList"/>
472         </xs:simpleType>
473         <xs:simpleType name="Status_String"
474   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
475                <xs:restriction base="ecl:StatusTypeList"/>
476         </xs:simpleType>
477         <xs:complexType name="Action_Status"
478   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Status">
479                <xs:sequence>
480                      <xs:element name="value" type="Status_String" minOccurs="1"
481   maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
482   cim16#Status.value"/>
483                </xs:sequence>
484         </xs:complexType>
485         <xs:complexType name="TransmissionNetwork_MarketDocument"
486   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#MarketDocument">
487                <xs:sequence>
```

```
488                     <xs:element name="mRID" type="ID_String" minOccurs="1"
489   maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
490   cim16#IdentifiedObject.mRID"/>
491                     <xs:element name="revisionNumber" type="ESMPVersion_String"
492   minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
493   schema-cim16#Document.revisionNumber"/>
494                     <xs:element name="type" type="MessageKind_String" minOccurs="1"
495   maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
496   cim16#Document.type"/>
497                     <xs:element name="process.processType"
498   type="ProcessKind_String" minOccurs="1" maxOccurs="1"
499   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
500   cim16#Process.processType"/>
501                     <xs:element name="createdDateTime" type="ESMP_DateTime"
502   minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
503   schema-cim16#Document.createdDateTime"/>
504                     <xs:element name="sender_MarketParticipant.mRID"
505   type="PartyID_String" minOccurs="1" maxOccurs="1"
506   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
507   cim16#IdentifiedObject.mRID"/>
508                     <xs:element name="sender_MarketParticipant.marketRole.type"
509   type="MarketRoleKind_String" minOccurs="1" maxOccurs="1"
510   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#MarketRole.type"/>
511                     <xs:element name="receiver_MarketParticipant.mRID"
512   type="PartyID_String" minOccurs="1" maxOccurs="1"
513   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
514   cim16#IdentifiedObject.mRID"/>
515                     <xs:element name="receiver_MarketParticipant.marketRole.type"
516   type="MarketRoleKind_String" minOccurs="1" maxOccurs="1"
517   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#MarketRole.type"/>
518                     <xs:element name="period.timeInterval"
519   type="ESMP_DateTimeInterval" minOccurs="1" maxOccurs="1"
520   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
521   cim16#Period.timeInterval"/>
522                     <xs:element name="docStatus" type="Action_Status" minOccurs="0"
523   maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
524   cim16#Document.docStatus"/>
525                     <xs:element name="TimeSeries" type="TimeSeries" minOccurs="0"
526   maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
527   cim16#MarketDocument.TimeSeries"/>
528                 </xs:sequence>
529           </xs:complexType>
530   </xs:schema>
531
```