ENERGINET FINGRID Statnett SVENSKA KRAFTNÄT

BRS
(Business Requirement Specification)

Nordic trading system

A market model for data exchange

Business process:	Nordic trading system
Version:	2.3.A
Status:	Approved by NMEG
Date:	June 14th, 2024

CONTENT

1 Introduction

1.1 Background

This document is made and maintained by the Nordic Market Expert Group (NMEG). NMEG is a continuation of earlier Nordic Ediel work started by Ediel Nordic Forum, established in 1995. “Ediel” is used as a term for Nordic data exchange standards, among others based on EDIFACT and XML formats.

Today the Nordic TSOs and the market actors, both in the retail and wholesale markets, exchange documents based on several different formats and standards, such as Ediel (XML and EDIFACT), NOIS (XML), ENTSO-E (XML), ebIX® XML, IEC (CIM/XML), Excel sheets etc. Further, there are several projects run in the Nordic energy market that will change the way the market participants do their work, such as the introduction of data hubs in all the Nordic countries and the introduction of new NEMOs (Nominated Electricity Market Operator). Hence, there is a huge need for identifying harmonisation potential of data exchange standards from various Nordic projects and to influence common exchange standards, in various international standardisation bodies, such as IEC (International Electrotechnical Commission, see www.iec.ch). Increasingly, organisations in the Nordic energy market needs to communicate with several external bodies, hence harmonisation is a necessity.

NMEG is responsible for the development and maintenance of the Nordic Ediel standards, based on available international standards and documented Nordic business processes for data exchange in the energy industry, supporting the Nordic TSOs strategies. NMEG documents existing business processes in a standardised way and will use internationally agreed procedures, where possible.

NMEG also works with harmonisation of communication protocols.

NMEG actively discusses and promotes positions, with a common Nordic voice, when participating in relevant European and worldwide organisations for data exchange standardisation, such as ebIX®, ENTSO-E and IEC.

This document is a Business Requirement Specification (BRS) detailing the document exchanges related to trade in the Nordic energy market. The focus of the document is the business aspects of the document exchanges and the basis for the document is the ENTSO-E ERRP Implementation Guide [1] and ECAN Implementation Guide [1], together with the ebIX®, EFET and ENTSO-E Harmonised role model [4].

Note: The documents used in this BRS is not necessarily the documents used today but should be the documents to be used in the future.

1.3 About Nordic Ediel BRSs

The NMEG Ediel Business Requirement Specifications (BRSs) describes business processes where data is exchanged between market participants in the Nordic energy market based on the UN/CEFACT Modelling Methodology (UMM). A BRS is a tool that helps the participants in the Nordic energy market to implement effective and harmonised data-exchange processes. The Ediel BRSs can be seen as a framework designed to improve communication between stakeholders, reduce development time, and minimise errors.

The Nordic Ediel BRSs covers all aspects of a business requirement specification for a specific data-exchange process and purpose, including functional requirements, non-functional requirements (partly), UseCases, and data flows.

NMEG Ediel BRSs will as far as possible be based on already available standards and best practices, such as:

1) ENTSO-E Implementation Guides (IGs) based on IEC 62325-451-n standards
2) ENTSO-E Implementation Guides (IGs) based on IEC 62325-351 standard
3) Other Implementation Guides (IGs) based on IEC 62325-351 standard
4) EU Implementation Regulations
5) Documents from the DSO Entity and the ENTSO-E and DSO Entity Joint Working Group (JWG)

6) Nordic BRSs, IGs, regulations etc.

In addition, the NMEG Ediel BRSs will document Nordic extensions and/or restrictions compared with the standards and best practices the BRS is based on.

1.2 Nordic Energy Domain Model

A Nordic Energy market Domain model, giving an overall overview of the structure and processes used in the Nordic Energy market, can be found in [8].

1.3 NMEG - Nordic Market Expert Group

The document is written by NMEG, see www.ediel.org.

1.4 Terms and notations

The term document is used instead of message when this is applicable. However, when referencing ENTSO-E document names, the ENTSO-E name will be used, e.g., message, report or document.

When the term TSO is used in this document, it normally also includes the Market Operator.

Documents are described by a class diagram showing the full set of attributes in the related xml schema. In addition, the usage of the document is described by one or more tables detailing the usage of each attribute. Optional attributes from the class diagram, not used in the specific data exchange, are omitted from the table. In addition the cardinalities, e.g., [0..1], may be stricter in the detailed descriptions than in the original ENTSO-E documents.

Some abbreviations used:

aFRR	Automatic frequency restoration reserve
BRP	Balance Responsible Party
BSP	Balancing Service Provider
DATCR	Direct Activated Tertiary Control Reserve
FCR-D	Frequency Containment Reserves for Disturbances
FCR-N	Frequency Containment Reserves for Normal operation
FRR	Frequency Restoration Reserve
HEMRM	Harmonised Electricity Market Role Model
mFRR	Manual Frequency Restoration Reserve
MOL	Merit Order List
NBM	Nordic Balancing Model
SATCR	Schedule Activated Tertiary Control Reserve
NUCS	Nordic Unavailability Collection System
NBIS	Nordic Balancing Information System
mFRR CM	Capacity Market

1.5 References

[1] ENTSO-E Electronic Data Interchange (EDI) Library, see https://www.entsoe.eu/publications/electronic-data-interchange-edi-library/.

[2] IEC 62325: Framework for energy market communications, Part 451, see http://www.iec.ch/:

- Part 451-1 Acknowledgement business process
- Part 451-2 Scheduling business process
- Part 451-3 Transmission capacity allocation business process (explicit or implicit auction)
- Part 451-4: Settlement and reconciliation business process
- Part 451-5: Problem statement and status request business processes
- Part 451-6 Publication of information on market
- Part 451-7 Balancing processes

[3] Area Configuration Document UML Model and Schema, 2019-12-11, Approved Document, Version 1.2.

[4] The Harmonised Role Model, ENTSO-E, ebIX® and EFET, see http://www.ebix.org/

[5] UN/CEFACT Unified Modelling Methodology (UMM), see http://www.unece.org/

[6] NMEG Ediel Common Nordic XML rules and recommendations, see http://www.ediel.org/

[7] NMEG Ediel BRS for the Nordic TSO Determine transfer capacity model, see http://www.ediel.org/

[8] NMEG Ediel BRS for the Nordic TSO Scheduling and Ancillary Services Process, see http://www.ediel.org/

[9] NMEG Ediel BRS for the Nordic operational system, see http://www.ediel.org/

[10] NMEG Ediel NBS BRS, see https://ediel.org/nordic-balance-settlement-nbs/

[11] Nordic Energy Market Domain Model, see http://www.ediel.org/

[12] Nordic Balancing Market, see https://nordic-balancing.pages.fifty.eu/information/index.html

[13] Technical Requirements for Frequency Containment Reserve (FCR) Provision in the Nordic Synchronous Area

1.6 Change log

Ver/rel/rev	Changed by	Date	Changes

2.3.A	Ove Nesvik	20240614	• Updated chapter 2, 3 and 4, such as:
			  ○ Corrected the naming of the document names (arrows) in chapter "2.3 Overview of information exchange for operational markets".
			  ○ Updated the FCR process to be in line with NBM.
			  ○ Update definition of from the Harmonised Electricity Market Role Model (HEMRM).
			• Added Process Type "**B40** Complete set of bids" and update of the attribute usage table for the Reserve Bid Document, incl. additional attributes, codes and explanatory text.
			• Removed Market agreement types "**Z01** First auction" and "**Z02** Second auction" for the Reserve Bid Document.
			• Added Market Product types "**Z02** Dynamic FCR-D product" and "**Z03** Static FCR-D product" to the Reserve Bid Document.
			• Added the Balancing Document.

Ver/rel/rev	Changed by	Date	Changes
			• Added Reason codes "**B22** System regulation" and "**B49** Balancing" to the Reserve Allocation Result Market Document
2.2.B	Ove Nesvik	20230626	• The IEC/CIM Reserve Bid Document (chapter 5.4) is aligned with the FCR Guide from Nordic MMS.
2.2.A	Ove Nesvik	20230202	• Update of the sender and receiver roles in all documents, to match the sender receiver in the sequence diagram in chapter 2.3.

2.1.A	Ove Nesvik	20220912	Update of the following documents to fit the mFRR energy activation market as implemented by NBM:
			• IEC/CIM Reserve Bid Document (ERRP)
			• IEC/CIM Bid availability document (ERRP)
			• IEC/CIM Ediel Reserve Allocation Result Document (ERRP)
			
			Added Bid availability document to mFRR EAM (Energy Activation Market) and as document in chapter 5.5.
			
			Added new attributes to the Reserve Bid Document:
			• Bid Time Series
			  ○ linkedBidsIdentification
			  ○ multipartBidsIdentification
			  ○ exclusiveBidsIdentification
			  ○ inclusiveBidsIdentification
			  ○ status
			• Linked_BidTimeSeries (associated with BidTimeSeries)
			  ○ mRID
			  ○ status
			• Reason
			  ○ code
			Updated attribute usage tables, such as added new codes, updated cardinalities and added clarifying text.
			
			Update of terms and roles:
			• Renamed FRR-A to aFRR
			• Renamed FRR-M to mFRR
			• Replaced Resource Provider with Balancing Service Provider
			• Renamed "Trade on balance regulation market" to "mFRR EAM (Energy Activation Market)"
			• Renamed "Trade on reserves option market" to "Trade on mFRR CM"
			• Added (FCR) after "Trade on frequency containment reserves market"
			• Addition of receiver role **A05** Imbalance settlement responsible in the Currency Exchange Rate Market Document
			• Addition of Merit Order List (MOL) document

2.0.A	Ove Nesvik	20210222	Complete recast of BRS, including: • TSO (SO) is replaced with LFC Operator.

Ver/rel/rev	Changed by	Date	Changes

			• Roles and domains are updated to the latest naming and definitions from the HRM [4]
			• A46 Balancing Service Provider is added to all documents where there is a BRP.
			• All "non-CIM" documents are replaced with CIM versions.
			• Detailed documentation for documents related to the MNA project and NEMO specific documents are removed, the data exchanges in the overviews (Sequence diagrams) are kept.
			• The Area Specification Document is replaced with the latest Area Configuration Document.
			• The ECAN Allocation Result document (Ediel version) is not used anymore in the Nordic trading processes
			• Corrected the Reserve Bid Document:
			  ○ Corrected sequence of attributes in the Bid Time Series according to the latest IEC 62325-451-7 version
			  ○ Added Sender Role **A39** Data Provider
			  ○ Corrected the Dependency matrix
			  ○ Added **Z49** and **A97** as Business Types

2.0.B	Ove Nesvik	20210315	• Correction of editorial error.
2.0.C	Ove Nesvik	20210623	• Correction of editorial errors.

2 Business Domain View: Business area Nordic trading system

2.1 Trade in the overall context (Domain model)

The Domain model describes the main business process areas needed to have a well-functioning energy market. The model is important for having a common and agreed understanding on how the energy market works as a basis for development of common methods for exchange of information.

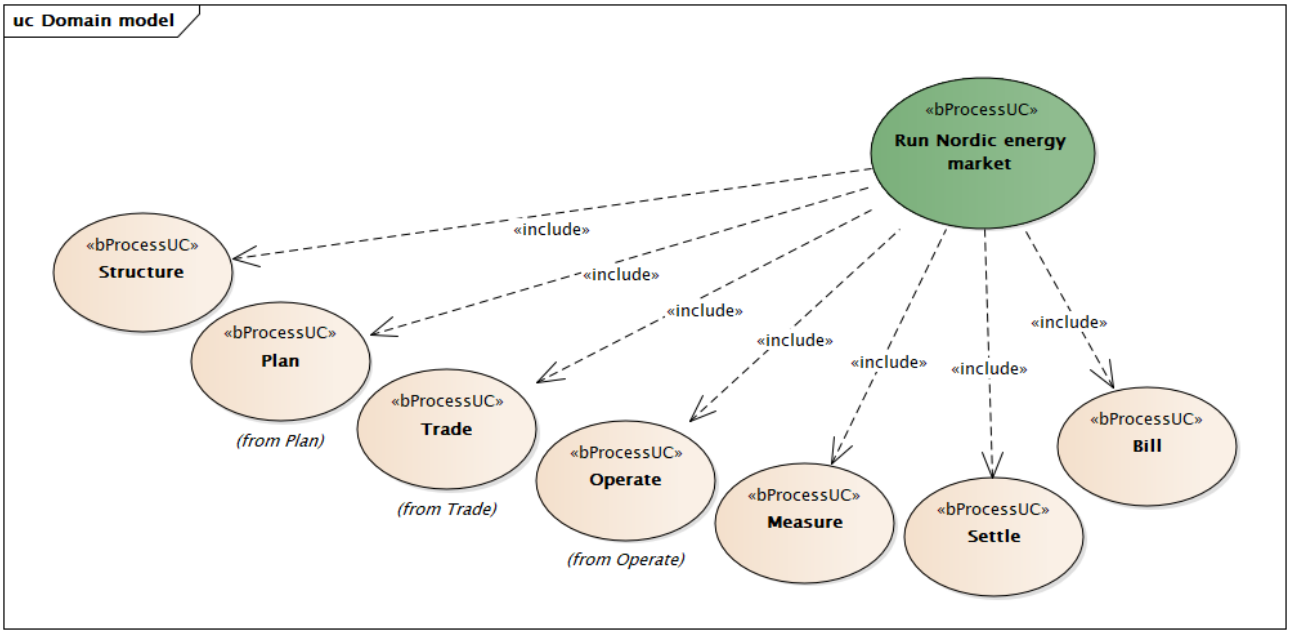

Figure 1: UseCase diagram: Domain model

The domain model of the energy market covers all stages from the structuring of the market until the settlement and billing of consumption and transport of energy, with a focus on the exchange of information:

- Exchange of master data including the Change of Supplier processes
- Trade on different markets, including ancillary services, bilateral trade, etc.
- Planning of production, consumption, exchange and transport
- Operation
- Measuring of production, consumption, exchange and transport
- Settlement
- Billing

The Nordic trading system process is a part of the process area Trade.

For a more elaborated description of the processes include in the domain model, see [11].

2.2 Breakdown of the trading phase

In the rest of this document the Business area (UseCase) Trade is further elaborated.

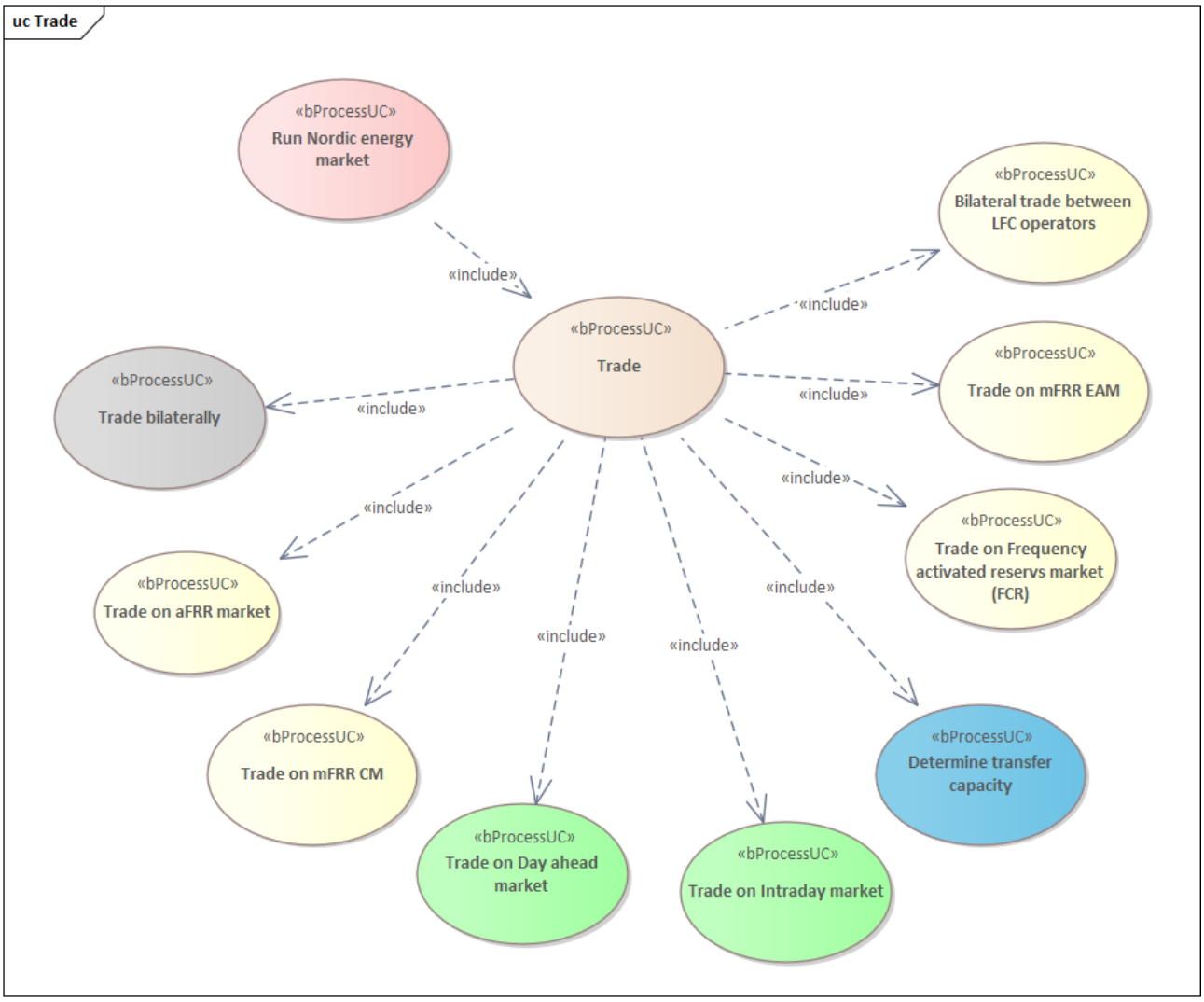

Figure 2: UseCase diagram: The Nordic trading system process

The Business Area Trade outlined in **Figure 2**, concerns principally buying and selling of energy between Balance responsible parties, including trade through the Market operators (e.g., Power exchanges), for fulfilling their contractual obligations. In addition, the trading phase includes the trade between Balance responsible parties and the LFC Operators for managing the operational need for regulation.

The grey UseCase, Trade Bilaterally, is document in BRS for NBS, see [8]

The green UseCase “Day-ahead market” balances the demand on the day-ahead market and assures that the predictable part of the difference between the participant's energy supply and obligations are outbalanced in the day-ahead market. This process is not further elaborated in the BRS.

The green UseCase “Intraday market” is a continuous cross border intra-day market. All trades done on intraday are implicit utilising cross border capacity. Available cross border capacity for intra-day trading is updated after each executed trade. The participants are, in some of the countries obligated to report the trades done on intraday to their local LFC Operator (SO). This process is not further elaborated in the BRS.

In the rest of this document the yellow UseCases, i.e.:

- Trade on **aFRR** (automatic Frequency Restoration Reserves, earlier **LFC**) market,
- Trade on **mFRR CM** (manual Frequency Restoration Reserves Capacity Market),
- Trade on Frequency containment reserves market (**FCR**),
- Trade on **mFRR EAM** (manual Frequency Restoration Reserves Energy Activation Market)
- Bilateral trade between LFC Operators

are further elaborated, while the UseCase Determine transfer capacity is documented in a separate BRS [7].

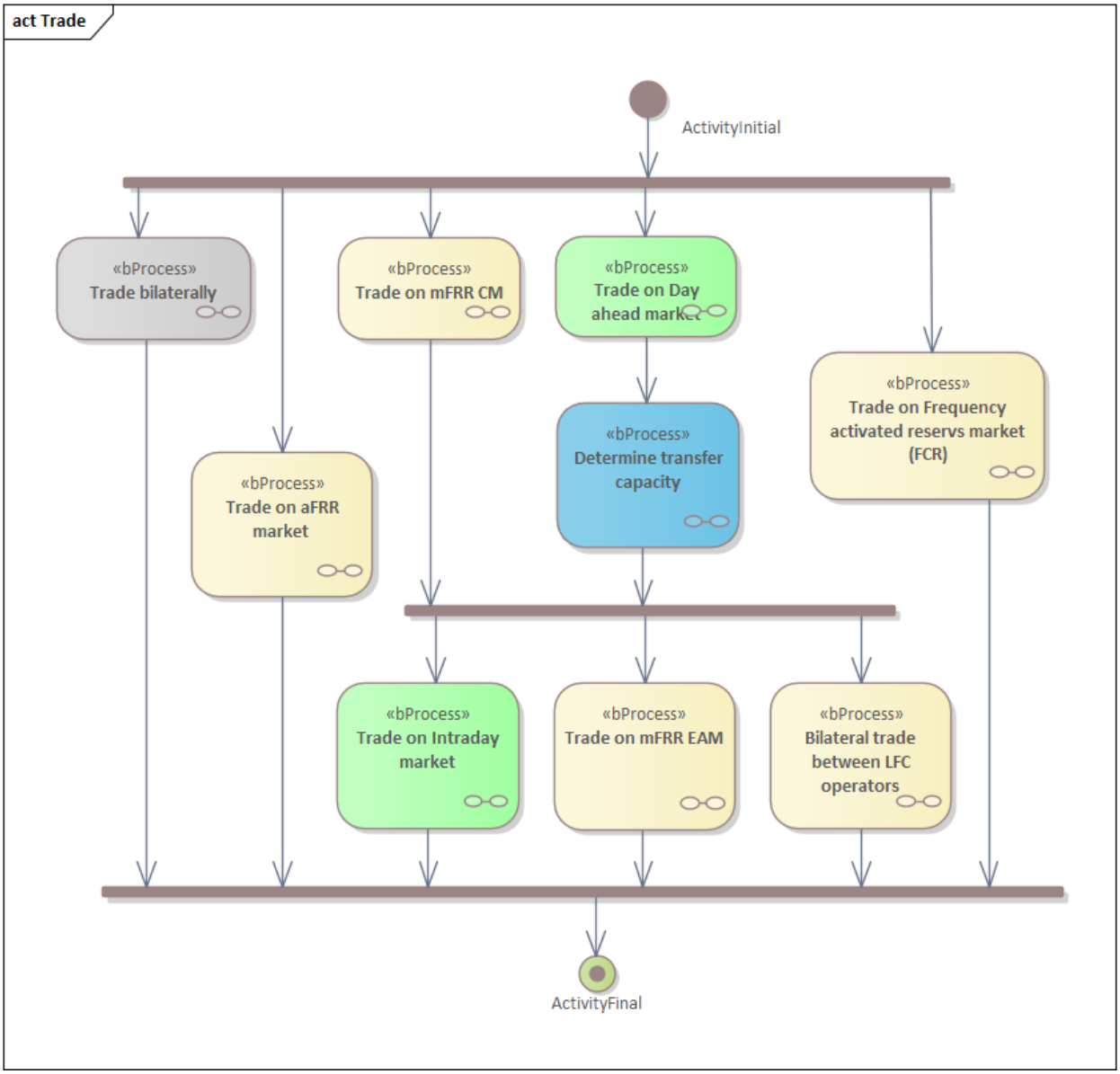

Figure 3 Activity diagram: The Nordic trading system process

Bilateral trade is restricted to a given Bidding Zone, while trade on the day-ahead, Adjustment and mFRR EAM may be between Bidding Zones, i.e., through the Market operator, LFC Operators or between LFC Operators.

The mFFR CM is a tool to ensure enough fast reserves for the mFRR EAM, especially during wintertime when the load is high. The market is based on weekly contracts. There is no common mFRR CM within the Nordic power system and currently only used in Denmark and Norway.

The Frequency containment reserves market (FCR) is a market that is weekly, daily and hourly based. In addition to national markets, the Frequency containment reserves (FCR) are traded between the Nordic TSO's on a bilateral basis.

2.3 Overview of information exchange for operational markets

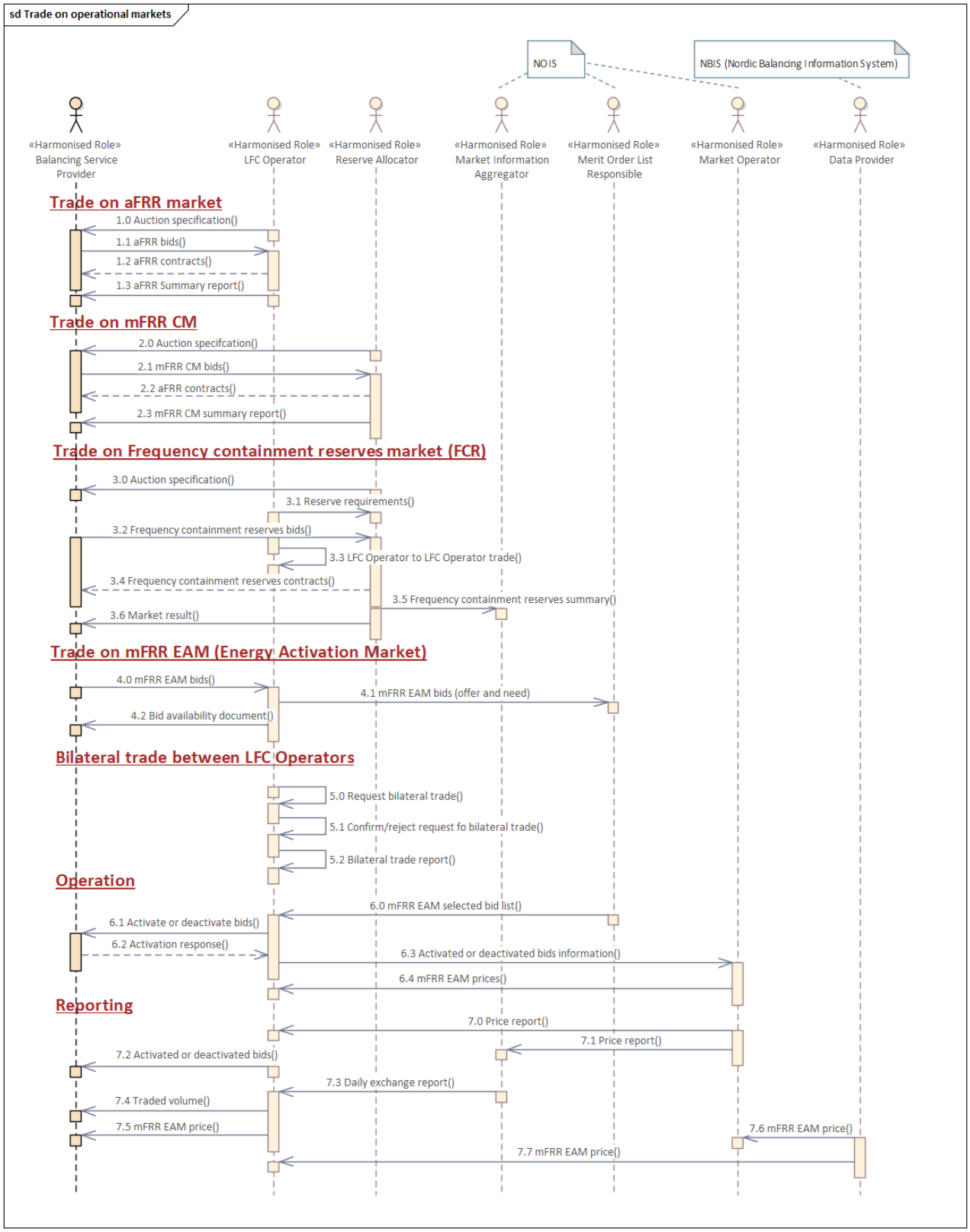

Figure 4 Sequence diagram: Overview of information exchange for operational markets[1]

[1] For historic reasons, the BSP may be sent as BRP in the documents exchanged.

Process area	Arrow	Documentation
Trade on aFRR market	1.0 Auction Specification	IEC/CIM Ediel Capacity Auction Specification Document, see 4.3.
	1.1 aFRR bids	IEC/CIM Reserve Bid Document (IEC/CIM 62325-451-7 Reserve Bid Document), see 4.4.
	1.2 aFRR contracts	IEC/CIM Reserve Allocation Result Document (ERRP), see 4.6.
	1.3 aFRR summary report	IEC/CIM Ediel Publication Document (ECAN), see 4.7.
Trade on mFRR CM	2.0 Auction specification	4.3, see: IEC/CIM Ediel Capacity Auction Specification Document.
	2.1 mFRR CM bids	IEC/CIM Reserve Bid Document (IEC/CIM 62325-451-7 Reserve Bid Document), see 4.4.
	2.2 mFRR CM contracts	IEC/CIM Reserve Allocation Result Document (ERRP), see 4.6.
	2.3 mFRR CM market summary report	IEC/CIM Ediel Publication Document (ECAN), see 4.7.
Trade on Frequency containment reserves market (FCR)	3.0 Auction specification	IEC/CIM Ediel Capacity Auction Specification Document, see 4.3.
	3.1 Reserve requirements	IEC/CIM Reserve Bid Document (IEC/CIM 62325-451-7 Reserve Bid Document), see 4.4.
	3.2 Frequency containment reserves bids	IEC/CIM Reserve Bid Document (IEC/CIM 62325-451-7 Reserve Bid Document), see 4.4.
	3.3 LFC Operator to LFC Operator trade	Currently by telephone.
	3.4 Frequency containment reserves contracts	IEC/CIM Reserve Allocation Result Document (ERRP), see 4.6.
	3.5 Frequency containment reserves summary	IEC/CIM Ediel Publication Document (ECAN), see 4.7.
	3.6 Market result	IEC/CIM Balancing Market Document (IEC/CIM 62325-451-6, Ed. 2.1), see 4.9.
mFRR EAM (Energy Activation Market)	4.0 mFRR EAM bids	IEC/CIM Reserve Bid Document (IEC/CIM 62325-451-7 Reserve Bid Document), see 4.4
	4.1 mFRR EAM bids (offer and need)	IEC/CIM Reserve Bid Document (IEC/CIM 62325-451-7 Reserve Bid Document), see 4.4
	4.2 Bid availability document	IEC/CIM Bid availability document (ERRP), see 4.5

Process area	Arrow	Documentation
Bilateral trade between LFC Operators	5.0 Request bilateral trade	Currently: By telephone Later: ERRP Activation Document (Status = **A10**, Ordered), See [8]
	5.1 Confirm/Reject bilateral trade	ERRP Activation Document (Status = **A07**, Activated or **A09**, cancelled) See [8]
	5.2 Bilateral trade report	IEC/CIM Ediel Publication Document (ECAN), see 4.7
Operation (activation)	6.0 mFRR EAM bid list	IEC/CIM Merit Order List Document, see 4.8
	6.1 Activate or deactivate bids	IEC/CIM 62325-451-7 Activation Document (Status = **A10**, Ordered), documented in BRS for Nordic operational system [8]
	6.2 Activation response	IEC/CIM 62325-451-7 Activation Document (Status = **A07**, Activated or **A09**, cancelled), documented in BRS for Nordic operational system [8]
	6.3 Activated or deactivated bids information	ERRP Activation Document, documented in BRS for Nordic operational system [8]
	6.4 mFRR EAM price	NEG ECAN Publication Document, documented in BRS for Nordic operational system [8]
Reporting	7.0 Price report	NEG ECAN Publication Document, documented in BRS for Nordic operational system [8]
	7.1 Price report	NEG ECAN Publication Document, documented in BRS for Nordic operational system [8]
	7.2 Activated or deactivated bids	NEG ECAN Publication Document, documented in BRS for Nordic operational system [8]
	7.3 Daily exchange report	NEG ECAN Publication Document, documented in BRS for Nordic operational system [8]
	7.4 Traded volume	NEG ECAN Publication Document, documented in BRS for Nordic operational system [8]
	7.5 mFRR EAM market price	NEG ECAN Publication Document, documented in BRS for Nordic operational system [8]
	7.6 Currency Exchange Rate	IEC/CIM Ediel Currency Exchange Rate Document v2.0, see 4.1
	7.7 Currency Exchange Rate	IEC/CIM Ediel Currency Exchange Rate Document v2.0, see 4.1

Table 1: ENTSO-E documents used in the Nordic trading system

Figure 4 shows the main electronic documents exchanged between the Balancing Service Providers (market participants), LFC Operators, Market information aggregator, Merit Order List Responsible and the Market operator. Reporting to the Imbalance settlement responsible is shown in a separate BRS.

As seen from the diagram the basic information exchange is similar for the Trade on aFRR market, the mFRR CM and the Frequency containment reserves market (FCR). First an Auction specification document is sent from the LFC Operator to the Balancing Service Providers (market participants), then the Balancing Service Providers send in their bids to the LFC Operator and finally the resulting contracts are sent to the

Balancing Service Providers. The Auction specification document contains information about the available auctions, products, areas and cut-off times.

Trade in the Frequency containment reserves market (FCR)can in addition be executed between the LFC Operators. Summary of the trade on the Frequency containment reserves market (FCR)is sent to the Market information aggregator.

For the mFRR EAM, the Auction specification is not sent explicitly, but follows the area definitions from the day-ahead market. In addition to the bids, the Balancing Service Providers must send Production schedules and Ancillary services schedules; including the result from the Frequency containment reserves market (FCR)see [8]. The mFRR EAM bids are sent from the LFC Operators to the Merit Order List Responsible and made available for the LFC Operators as a sorted list of bids.

When needed the LFC Operators may, in addition to the trade on the mFRR EAM, trade bilaterally. Today this trade is executed using telephone.

After the bids have been received the bids may be activated. Each activated bid is reported back to the Balancing Service Provider in question and reported to the Market information aggregator. Daily, after the operational phase, the activated and deactivated bids, and mFRR EAM prices are distributed to the Balancing Service Providers.

Summaries of traded volumes for consumption and production per Bidding area may be sent from the LFC Operator to the Balancing Service Provider.

In addition to the information exchange shown in the diagram above, the marginal prices and total quantity bought are made available on a webserver for the different markets.

A Balancing Service Provider is contracted with a Balance Responsible Party being responsible for consumption, production or both.

2.4 Market implementations

2.4.1 aFRR

aFRR (Automatic Frequency Restoration Reserves) market bids are based on Bidding Zones, prices and sizes. aFRR regulation is always carried out where it is cheapest, provided there are no network restrictions.

2.4.2 mFRR CM (only used in Denmark and Norway)

mFRR capacity bids are based on area, product (production and reduced consumption), option price, and size (a minimum of 25 MW). Offers must state potential restrictions regarding duration of continuous activation and interval between activations. Such restrictions result in price reductions based on agreed terms.

One marginal price is set for each bidding area. This means that the production reserves and decreased consumption reserves always get the same price although the Reserve Allocator might choose to buy just production, just reduced consumption or both. Unavailability of contracted resources shall be reported immediately to the Reserve Allocator. The option price will then be reduced according to agreed terms.

2.4.3 Frequency containment reserves market (FCR)

Imbalances in the power system are first regulated by means of Frequency Containment Reserves (FCR), see [13]. The Nordic LFC Operators (TSOs), Energinet Fingrid, Statnett and Svenska kraftnät are responsible for ensuring that there are always sufficient FCR in the system. These reserves are activated automatically based on measured frequency.

The immediate reaction to a change/outage of production or consumption is captured by converting the rotating mass (rotating energy) in the power system into electrical energy. In turn, the frequency will change, which in turn activates FCR. The FCR regulation is fully linked to automatic functions and is divided into normal operating reserves (FCR-N) and disturbance reserve (FCR-D).

The FCR-N is activated within the normal frequency band, 49.9 Hz – 50.1 Hz, and aims to limit frequency deviations in the event of structural imbalances between production and consumption. In the event of major imbalances in connection with fault events at production plants, consumption sites or transmission components, FCR-D is activated. The FCR-D is divided between FCR-D up for lower frequency, activated in the frequency range 49.9 Hz – 49.5 Hz, and FCR-D down for upper frequency, activated in the frequency range 50.1 Hz – 50.5 Hz. The Frequency Containment Reserves shall remain activated until the secondary and tertiary reserves (aFRR and mFRR) bring the system back into balance.

2.4.3.1 D-2 and D-1 Market

A separate market has been established to ensure that there is sufficient FCR response in the system. The FCR market consists of a D-2 and a D-1 market. Market participants choose whether to participate in one or both sub-markets. The D-2 market is run before the spot market and is used by those players where this order is most appropriate, while the D-1 market is run after the spot market to meet "residual demand" from the energy trading in Elspot, including exchange requests from other LCF Operators (TSOs).

2.4.4 mFRR EAM (Energy Activation Market)

mFRR EAM bids are based on bidding area, price and size and must state restrictions regarding duration of continuous activation and interval between activations. Activation time, minimum duration, maximum duration and resting time is based on national rules. The participants are allowed to correct the bids until 45 minutes before the hour. It is not allowed to correct bids back in time.

mFRR activations are always carried out where it is cheapest, provided there are no network restrictions. All the regulations are implemented in the national markets. This means there can be different rules for the national markets, which obviated the need to harmonise all the market rules before the start of the Nordic (international) mFRR EAM. All imbalance prices are set per Bidding Zone.

2.4.5 Bilateral trade between LFC Operators

There are two types of trade, and related exchange, as a result of ramping deviations for HVDC cables. The two types of trade are trade for system reasons (counter purchases) and trade for balance reasons. Ramping deviation is the calculated deviation from the trading plan because of ramping of HVDC cable. This discrepancy is cleared by trade rules for the connection.

Trade for system reasons and trade for balance reasons are based on the terms of the mFRR EAM.

The agreements are between national and foreign bidding areas.

Trade for system reasons and trade for balance reasons have two different purposes. Trade for balance reasons is a part of the handling of the mFRR EAM in the Nordic area.

Trade for system reasons is trade to deal with bottlenecks and errors.

For system reasons, the price is agreed for each trade and calculated using the "pay as bid" principle. For trade for balance reasons there are separate agreements for the exchange and pricing (market conditions for mFRR EAM).

2.4.6 Operation

Data exchange in the operational phase is documented in the Ediel BRS for the Nordic operational system [9].

2.4.7 Reporting

Data exchange in the operational phase is documented in the Ediel BRS for the Nordic operational system [9].

2.5 Process Areas within the Nordic trading system

2.5.1 Process area: Trade on aFRR market

The Trade on **aFRR** (Automatic Frequency Restoration Reserves) market will be specified when available and agreed by the Nordic countries.

2.5.2 Process area: Trade on mFRR CM (Norway and Denmark)

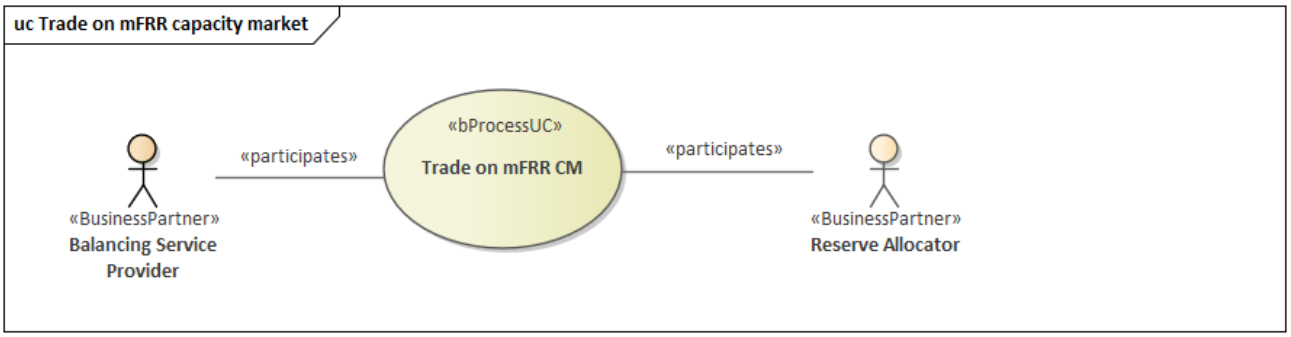

Figure 5: UseCase: Trade on Trade on mFRR CM

The documents exchanged within the Trade on mFRR CM process are sent between Balancing Service Providers and the Reserve Allocator. Today the role Reserve Allocator is played by the TSOs, i.e., Energinet and Statnett.

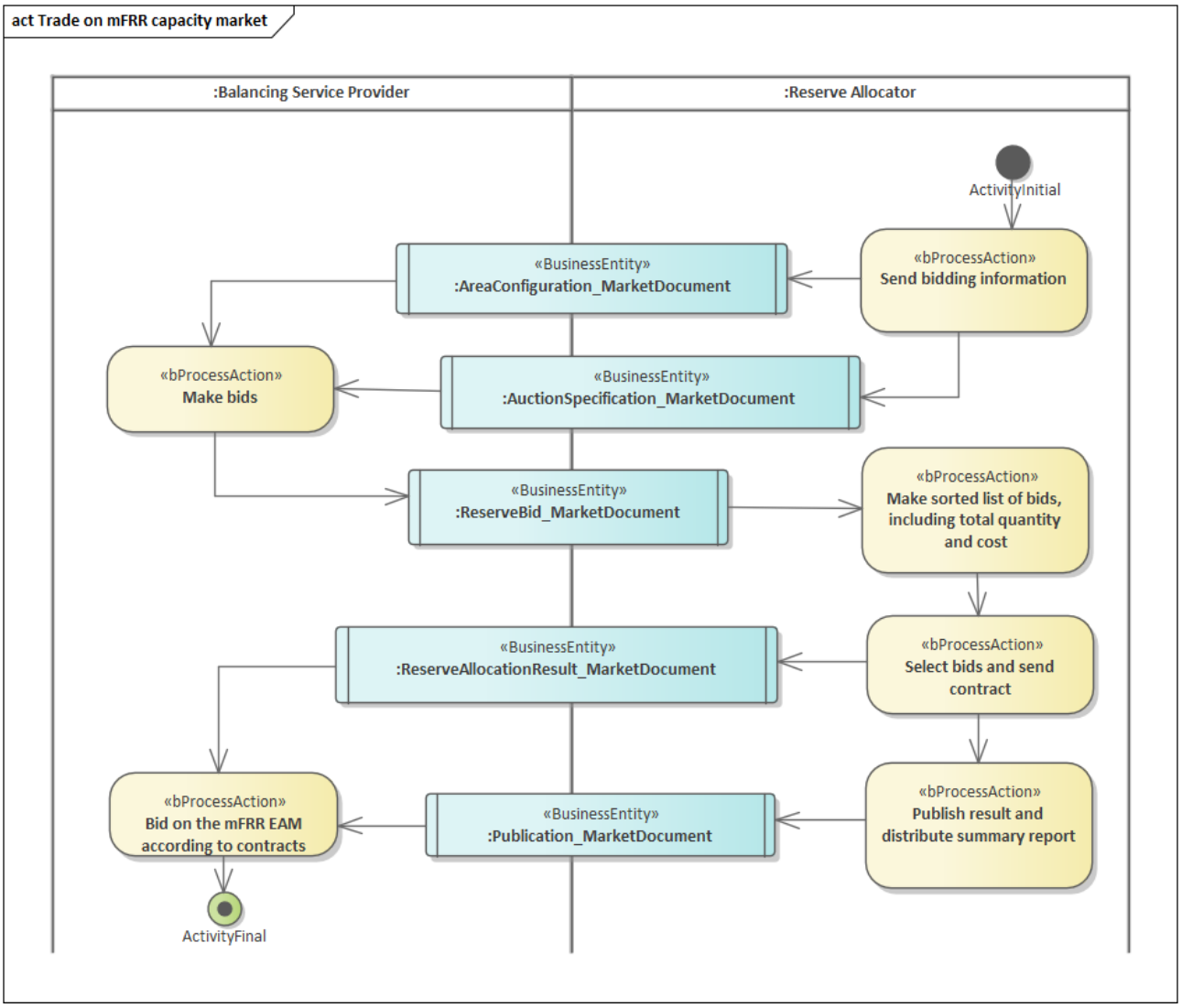

Figure 6: Activity diagram: Trade on mFRR CM

As seen from the diagram above, the bids are collected, accumulated by the Reserve Allocator as a merit order list (sorted list of bids) for each area, with accumulated quantity and cost shown along with each bid. The Reserve Allocator selects the highest bid to use to fulfil the requirements for mFRR CM. Once satisfied the contracts are sent to the Balancing Service Provider and the price and total quantity are published on the web.

2.5.3 Process area: Trade on Frequency containment reserves market (FCR)

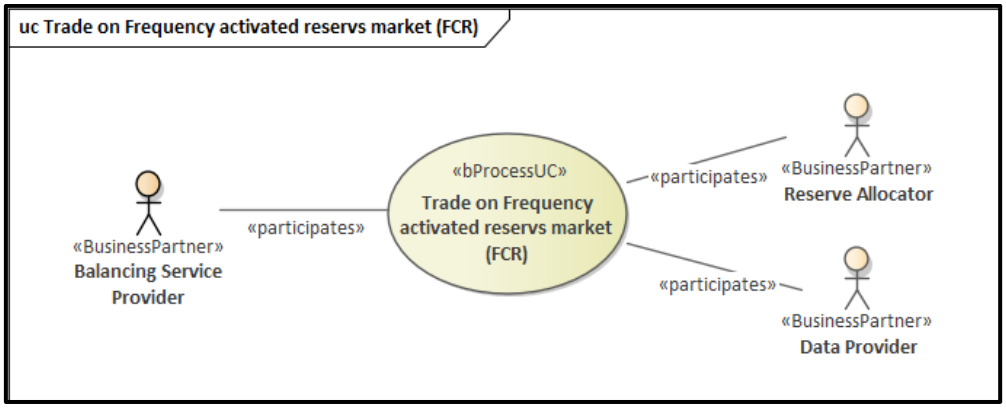

Figure 7: UseCase diagram: The Nordic Frequency containment reserves market (FCR) process

Figure 7 shows the process Trade on Frequency Containment Reserves market (FCR) and the participating actors. The Data Provider role is used when agents, such as the TSOs, are sending on behalf of the BSPs. The Business process is further described below.

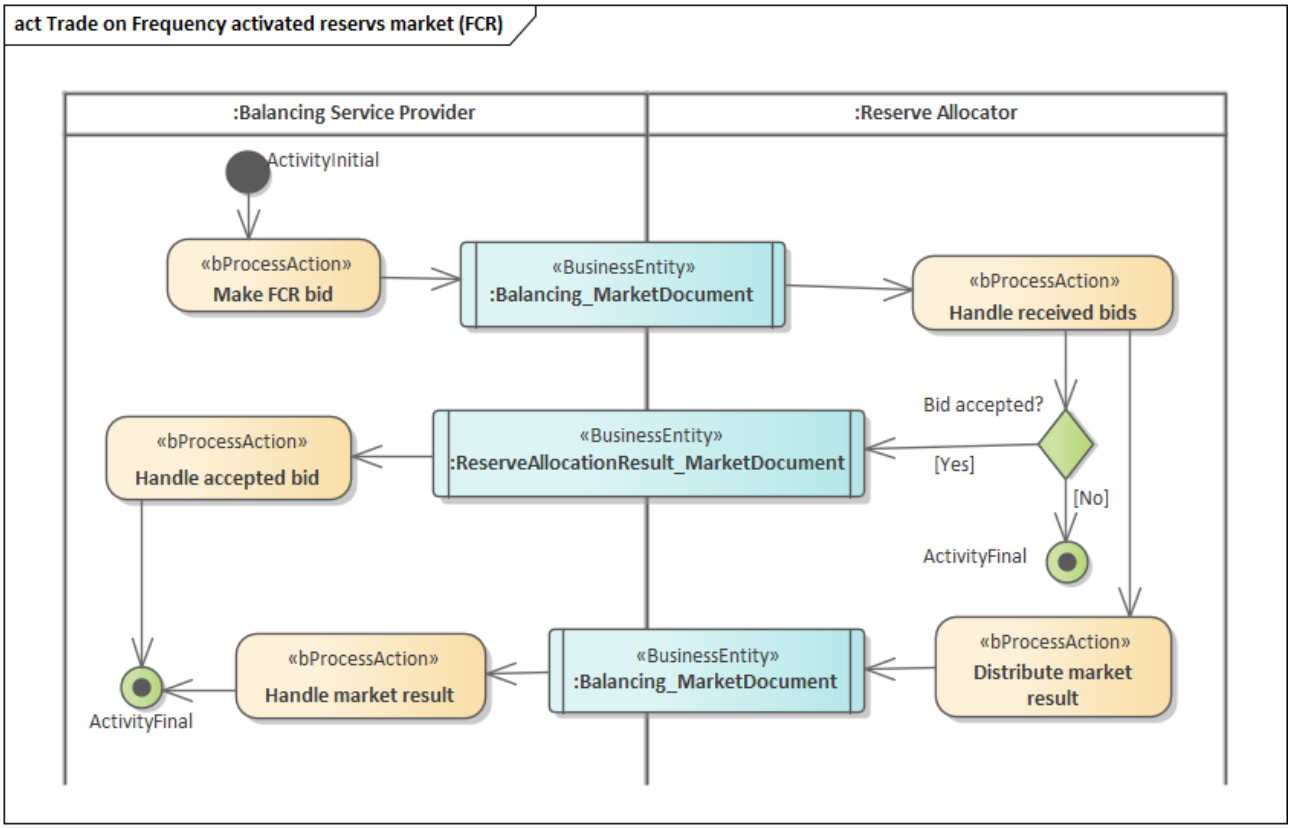

Figure 8: Activity diagram: The Nordic Frequency Containment Reserves market (FCR) process

2.5.4 Process area: Trade on the mFRR EAM

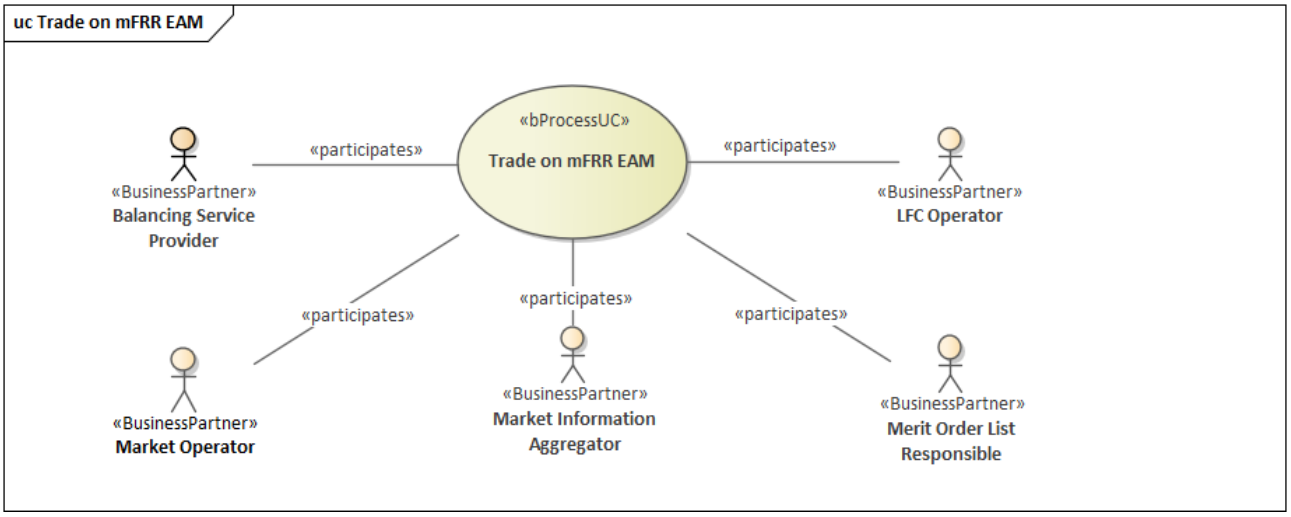

Figure 9: UseCase diagram: The Nordic mFRR EAM process

Figure 9 shows the process Trade on the Nordic mFRR EAM and the participating actors. The Business process is further described below.

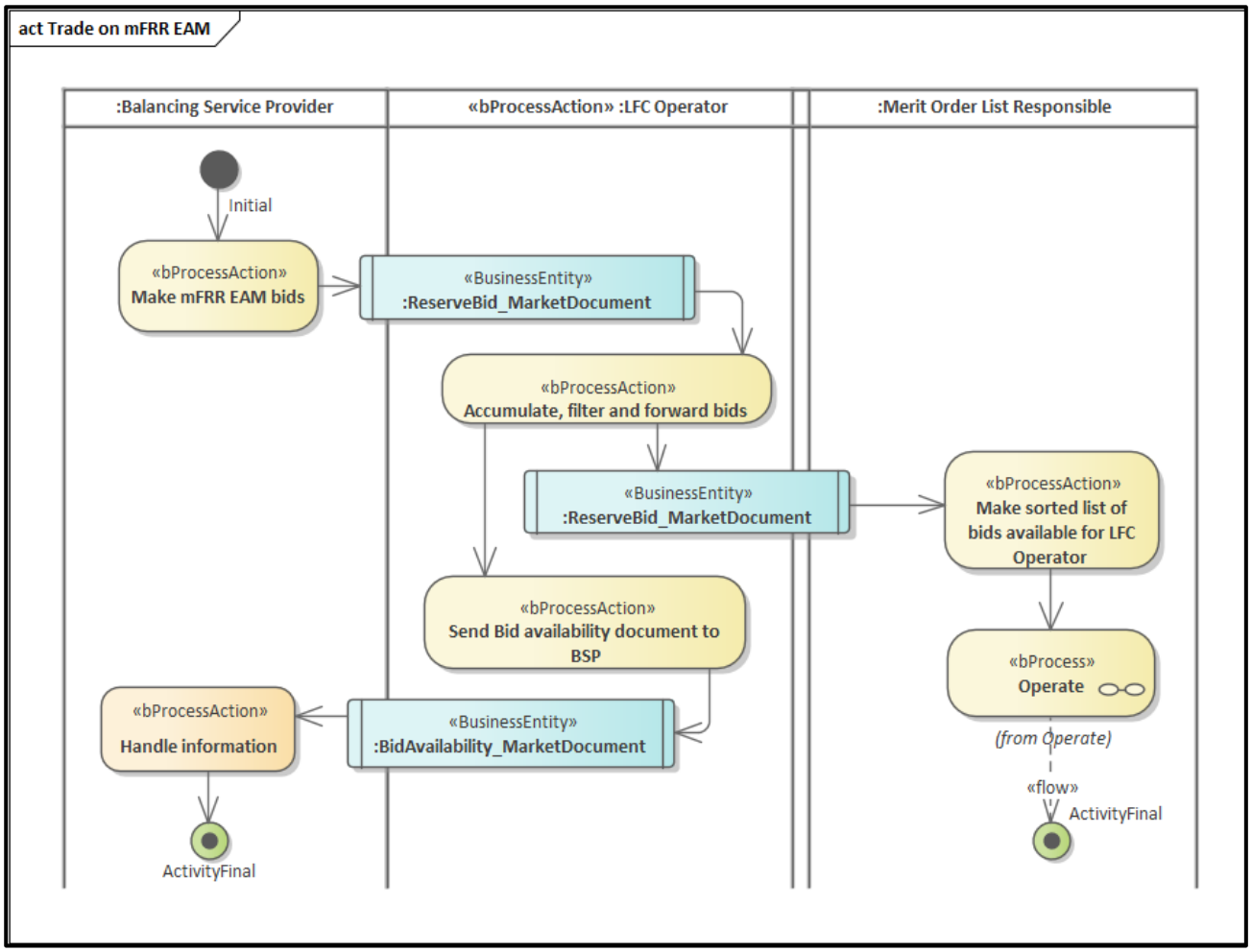

Figure 10: Activity diagram: The Nordic mFRR EAM process

The mFRR EAM is a tool for the LFC Operators and must be able to handle all unpredictable differences between planned and actual exchange in the delivery phase on short notice.

Active bidders on the mFRR EAM must be able to regulate their delivery and usage within a given time defined by the market rules. This means that only producers and large consumers bid actively without the buyers responding to the price. All other participants remain passive. Their purchases/sales are settled deriving from the imbalance between weighed values for delivery, usage and contracted fixed energy supplies/obligations.

As seen from **Figure 10**, the bids are collected, accumulated and then presented for the LFC Operator, by the Merit Order List Responsible, as a sorted list of bids.

The Nordic mFRR EAM document transmission cycle is composed of the following phases:

1. In the national mFRR EAM, Balancing Service Providers sends bids to the LFC Operators on a day-ahead basis. Bids may be for both up and down regulation and be corrected during the operational phase (e.g., within 45 minutes before operation). The LFC Operator activates up or down regulation according to the lowest bids.
2. The national LFC Operator forwards all the bids to the Merit Order List Responsible.

Related documents are defined, according to the UMM Business Data View [5], in chapter 4.

In the Nordic market NOIS act as Market operator and Merit Order List responsible.

Manual Frequency Restoration Reserve (mFFR) is a rescheduling action to cater for a high rate of change of demand or generation, demand forecast errors or short-term plant losses.

Two types of mFFR activation are possible:

- Schedule Activated mFRR Reserve (SATCR): is activated with relation to the predefined timeframe of exchange schedules, e.g., 15 minutes. A special exchange scheduling procedure is used. It may include exchange rescheduling between TSOs, a special kind of exchange schedule is used.
- Directly Activated mFFR Reserve (DATCR): can be activated at any time, independent from a timeframe of exchange schedules. It is activated by manual action at any time and may also include call-up reserve contracts between TSOs. In this case, the activation procedure results in a dynamically changing exchange pattern.

2.5.5 Process area: Bilateral trade between LFC Operators

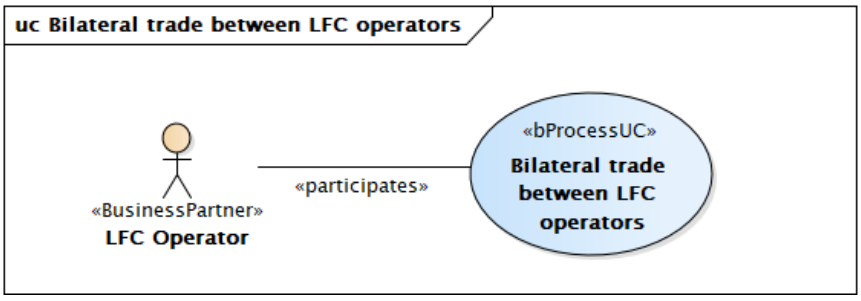

Figure 11: UseCase diagram: Bilateral trade between LFC Operators

Figure 11 shows the process Bilateral trade between LFC Operators and the participating actors (LFC Operators). The Business process is further described below.

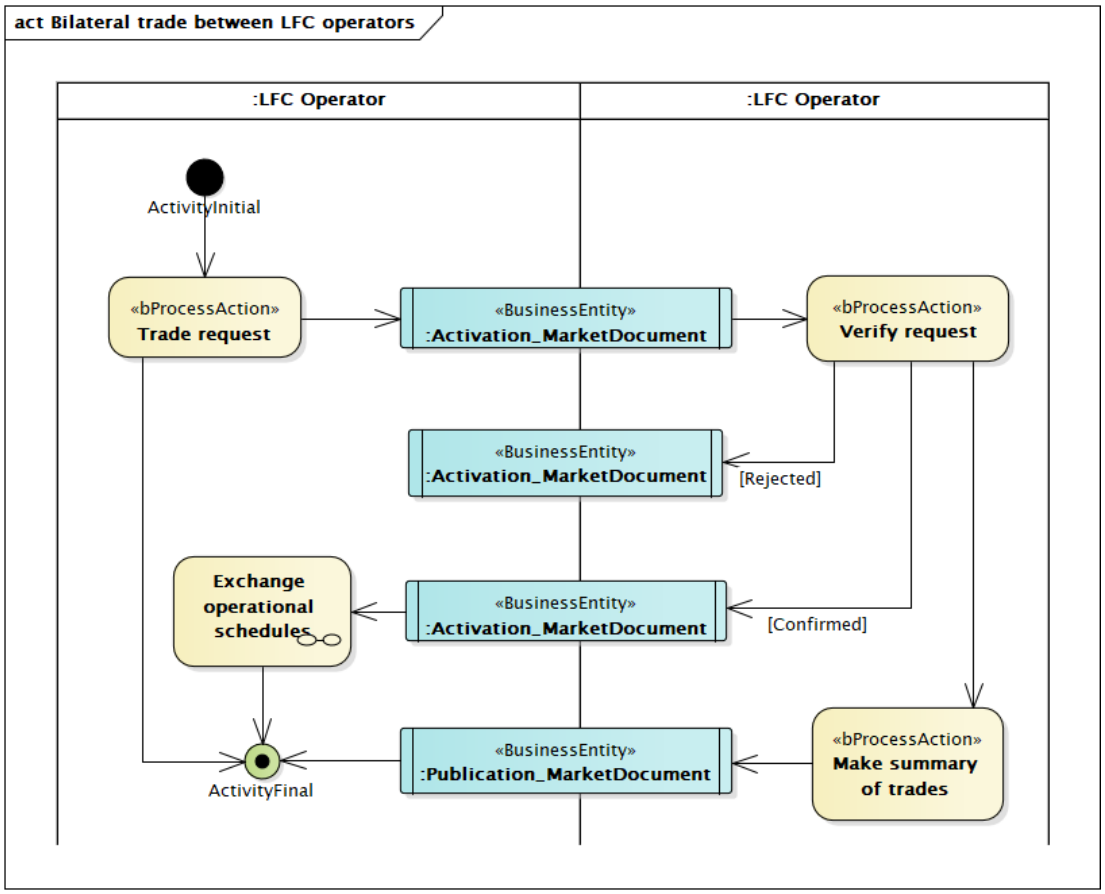

Figure 12: Activity diagram: Bilateral trade between LFC Operators

The request for Bilateral trade between LFC Operators is currently mostly done by telephone. Specification of the actual documents to be exchanged is postponed to a later stage.

A Bilateral trade between LFC Operators may result in an update of break point plans and/or operational schedules see NMEG Ediel BRS for the Nordic TSO Scheduling and Ancillary Services Process, see http://www.ediel.org/ [8].

The Trade rejected state occurs if there is a negative answer on a request for a bilateral trade.

3 Business Partner View: Nordic Trading system

3.1 Harmonised roles used in Nordic trading system

In **Figure 13** and in definitions below the relevant parts of the ebIX®, EFET and ENTSO-E Harmonised role model are outlined.

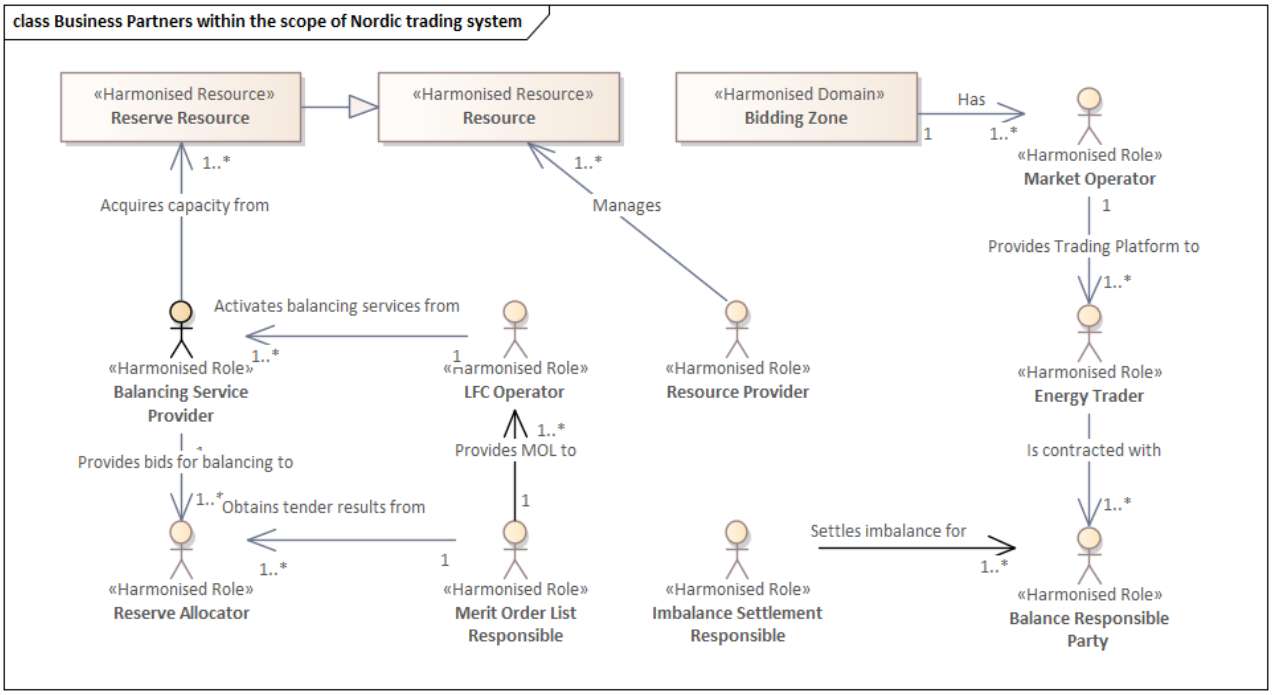

Figure 13: Outline of the Harmonised role model within the scope of the Nordic trading system

3.2 Definitions (from the ebIX®, EFET and ENTSO-E Harmonised role model):

Role/domain	Definition
Roles	
Balance Responsible Party	A party financially accountable for its imbalances. **Based on:** Consolidated text: Commission Regulation (EU) 2017/2195 - Art.2 Definitions. **Additional information:** A balance responsibility requires a contract proving financial security with the Imbalance Settlement Responsible of the Scheduling Area entitling the party to operate in the market. Imbalance means an energy volume calculated for a Balance Responsible Party and representing the difference between the allocated volume attributed to that Balance Responsible Party and the final position of that Balance Responsible Party, including any imbalance adjustment applied to that Balance Responsible Party, within a given imbalance settlement period.
Balancing Service Provider	A party providing energy balancing services to the energy market.

	Additional information: Balancing services can be balancing energy and/or balancing capacity. This is a type of Flexibility Service Provider. **Based on:** Consolidated text: Commission Regulation (EU) 2017/2195 - Art.2 Definitions and Consolidated text: Regulation (EU) 2019/943.
Energy Trader	A party that is selling or buying energy.
Imbalance Settlement Responsible	A party that is responsible for settlement of the difference between the contracted quantities with physical delivery and the established quantities of energy products for the Balance Responsible Parties in a Scheduling Area. **Note:** The Imbalance Settlement Responsible may delegate the invoicing responsibility to a more generic role such as a Billing Agent.
LFC Operator	Responsible for the load frequency control for its LFC Area or LFC Block. **Additional information:** This role is typically performed by a TSO.
Market Information Aggregator	A party that provides market related information that has been compiled from the figures supplied by different actors in the market. This information may also be published or distributed for general use. **Note:** The Market Information Aggregator may receive information from any market participant that is relevant for publication or distribution.
Market Operator	A party that provides a service whereby the offers to sell energy are matched with bids to buy energy. **Based on:** Consolidated text: Regulation (EU) 2019/943. **Additional information:** This activity can be conducted in the forward, days-ahead and/or intraday timeframes, and can be combined with transmission capacity allocation in the context of market coupling. This is usually an energy/power exchange or platform.
Merit Order List Responsible	Responsible for the management of the available tenders for all Acquiring LFC Operators to establish the order of the reserve capacity that can be activated.
Reserve Allocator	Informs the market of reserve requirements, receives bids against the requirements and in compliance with the prequalification criteria, determines which bids meet requirements and assigns bids.
Resource Provider	A role that manages a resource and provides production/consumption schedules for it, if required.
Trade Responsible Party	A party who can be brought to rights, legally and financially, for any imbalance between energy nominated and consumed for all associated Accounting Points.

	Note: A power exchange without any privileged responsibilities acts as a Trade Responsible Party. **Additional information:** This is a type of Balance Responsible Party.
Domains	
Bidding Zone	The largest geographical area within which market participants are able to exchange energy without capacity allocation. **Source:** Consolidated text: Commission Regulation (EU) No 543/2013.
Resources	
Reserve Resource	A resource technically pre-qualified using a uniform set of standards to supply reserve capabilities to a System Operator and is associated with one or more tele-measuring devices. **Additional information:** This is a type of Resource.
Resource	A resource technically pre-qualified using a uniform set of standards to supply reserve capabilities to a System Operator and is associated with one or more tele-measuring devices. **Additional information:** This is a type of Resource.

Table 2: Definitions (from the ebIX®, EFET and ENTSO-E Harmonised role model)

In the Nordic countries NOIS will perform the roles of Data Provider, Market operator, Market information aggregator and Merit Order List Responsible.

4 Business Data View; Nordic trading system

4.1 IEC/CIM Ediel Currency Exchange Rate Document v2.0

The IEC/CIM Ediel Currency Exchange Rate Document described below is a Nordic document, which not is expected to be specified by ENTSO-E.

The document is used in the following exchanges:

- **Table 1:** ENTSO-E documents used in the Nordic trading system:
    - 7.6, Currency Exchange Rate
    - 7.7, Currency Exchange Rate

The NEG Currency Exchange Rate Document is sent daily from the Market Operator to the LFC Operators and to other actors on request. The Document must cover a full market day and contain exchange rates for all Nordic currencies and Euro.

The general rule for calculating the Currency Exchange Rate is:

Reference Currency * Currency Exchange Rate = Target Currency

4.1.1 Class diagram (contextual model): IEC/CIM Ediel Currency Exchange Rate Document v2.0

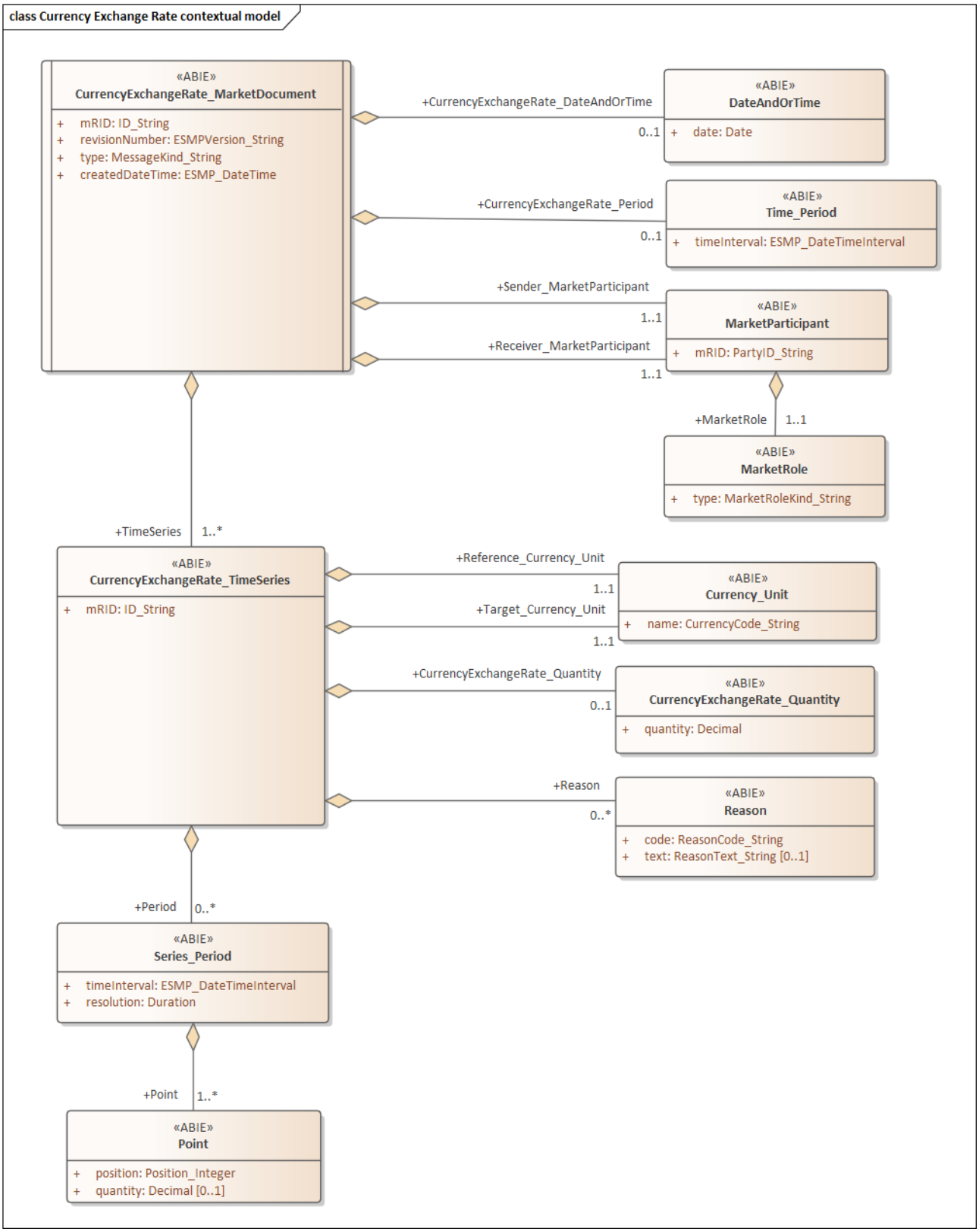

Figure 14: Class diagram (contextual model): IEC/CIM Ediel Currency Exchange Rate Document v2.0

4.1.2 Class diagram (assembly model): IEC/CIM Ediel Currency Exchange Rate Document v2.0

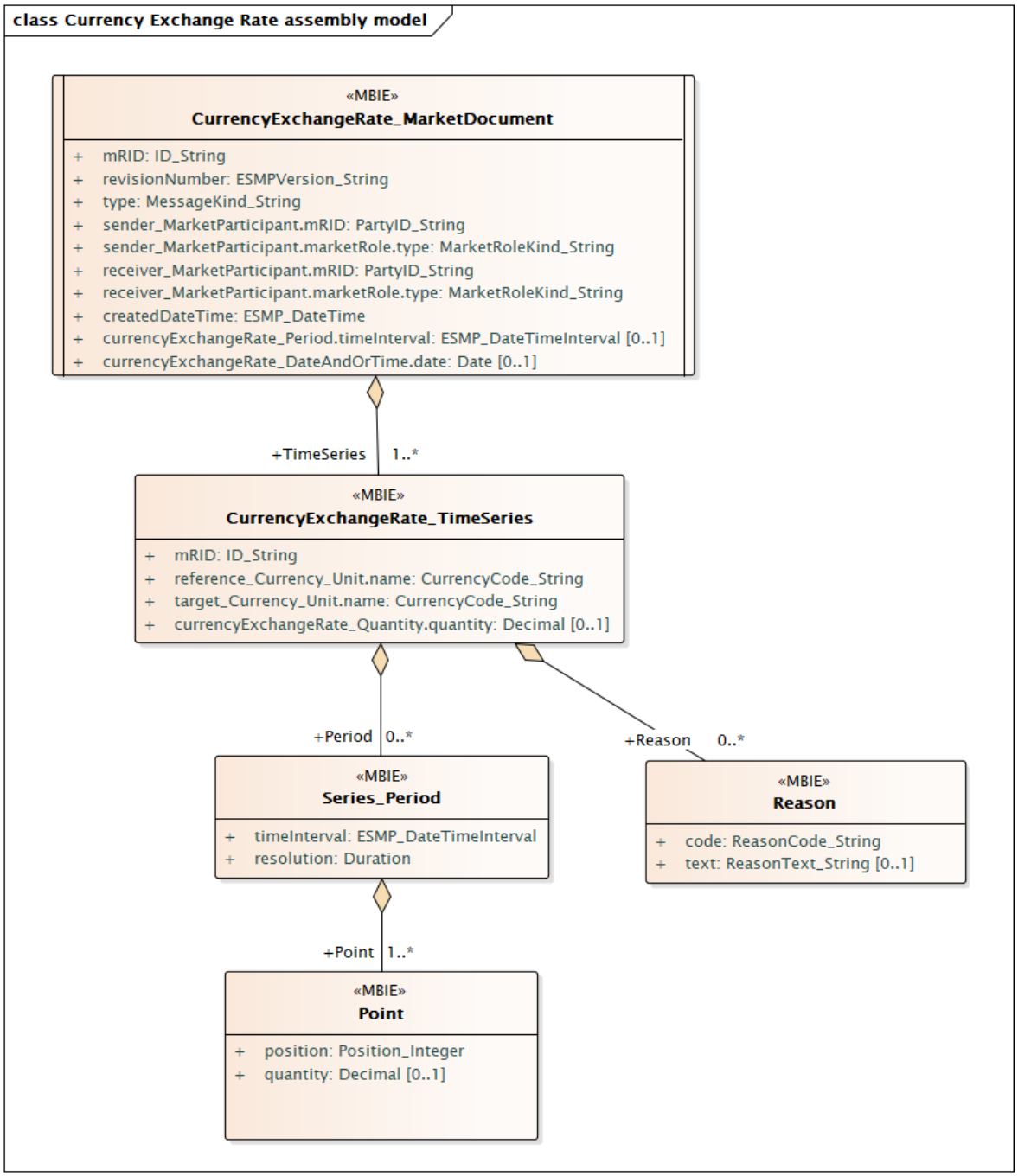

Figure 15: Class diagram (assembly model): IEC/CIM Ediel Currency Exchange Rate Document v2.0

4.1.3 Attribute usage: IEC/CIM Ediel Currency Exchange Rate Document v2.0

Attribute	Cl.	Code and description
Ediel Currency Exchange Rate Document v2.0		
mRID	[1]	The unique identification of the document being exchanged. **Note:** The maximum length of the mRID is 35 characters.
type	[1]	**Z07** Currency exchange rate document
process.processType	[1]	
sender_MarketParticipant.mRID	[1]	Identification of the party who is sending the document.
sender_MarketParticipant.marketRole.type	[1]	**A39** Data Provider as sender
receiver_MarketParticipant.mRID	[1]	Identification of the party who is receiving the schedules.
receiver_MarketParticipant.marketRole.type	[1]	**A11** Market operator **A48** LFC Operator (replaces **A04** System Operator)
createdDateTime	[1]	Date and time for creation of the document.
currencyExchangeRate_Period.timeInterval	[0..1]	The beginning and ending date and time of the period covered by the document. Shall be used if the Series_Period level is used. Else, not used.
currencyExchangeRate_DateAndOrTime.date	[0..1]	The day for which the Currency Exchange Rate is valid. Shall be used if the currencyExchangeRate_ Quantity.quantity attribute is used. Else, not used.
CurrencyExchangeRate_TimeSeries	**[1..*]**	
mRID	[1]	Unique ID of the Time Series.
reference_Currency_Unit.name	[1]	The reference currency may be any valid ISO 3 letter currency code, such as: **DKK** Danish Kroner **EUR** EURO **NOK** Norwegian Kroner **SEK** Swedish Kronor
target_Currency_Unit.name	[1]	The target currency may be any valid ISO 3 letter currency code, such as: **DKK** Danish Kroner **EUR** EURO **NOK** Norwegian Kroner **SEK** Swedish Kronor
currencyExchangeRate_Quantity.quantity	[0..1]	Currency Exchange Rate. Either this attribute or the Series_Period shall be used (XOR).
Reason	**[0..1]**	

Attribute	Cl.	Code and description
code	[1]	**B17** Price based on preliminary exchange rate (The exchange rate is preliminary and will be updated when an official currency exchange rate is available) **B21** Official exchange rate approved (The official exchange rate has been approved)
Series_Period	**[0..*]**	Either the Series_Period or the attribute currencyExchangeRate_Quantity.quantity shall be used (XOR).
timeInterval	[1]	The start and end date and time of the time interval of the period in question.
resolution	[1]	The resolution defining the number of periods that the time interval is divided. The resolution is expressed in compliance with ISO 8601 in the following format: PnYnMnDTnHnMnS. Where nY expresses a number of years, nM a number of months, nD a number of days. The letter "T" separates the date expression from the time expression and after it nH identifies a number of hours, nM a number of minutes and nS a number of seconds. E.g., **PT1H** or **PT60M**
Point	**[1..*]**	
position	[1]	The relative position of a period within an interval.
quantity	[1]	Currency Exchange Rate.

Table 3: Attribute usage: IEC/CIM Ediel Currency Exchange Rate Document v2.0

4.2 IEC/CIM Area Configuration Document[2]

The IEC/CIM Area Configuration Market Document described below is specified by CIM EG (ENTSO-E) [1].

The document is currently not used in any Nordic exchanges:

4.2.1 Class diagram (contextual model): Area Configuration Market Document, v1.1

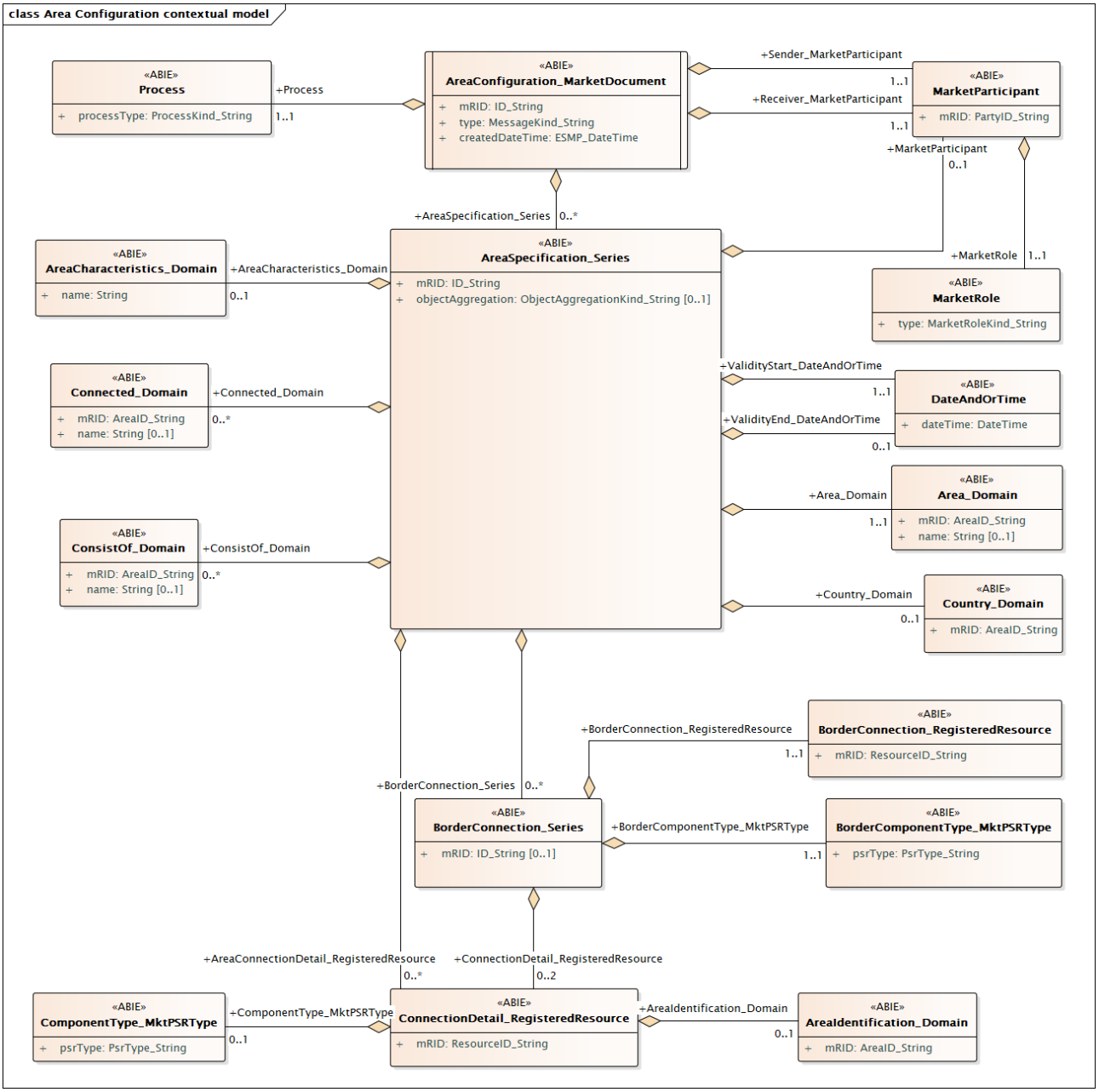

Figure 16: Class diagram (contextual model): IEC/CIM Area Configuration Market Document, v1.1

[2] The Area Configuration Market Document is currently not used in the Nordic countries, but it is expected to be used in the future.

4.2.2 Class diagram (assembly model): IEC/CIM Area Configuration Market Document, v1.1

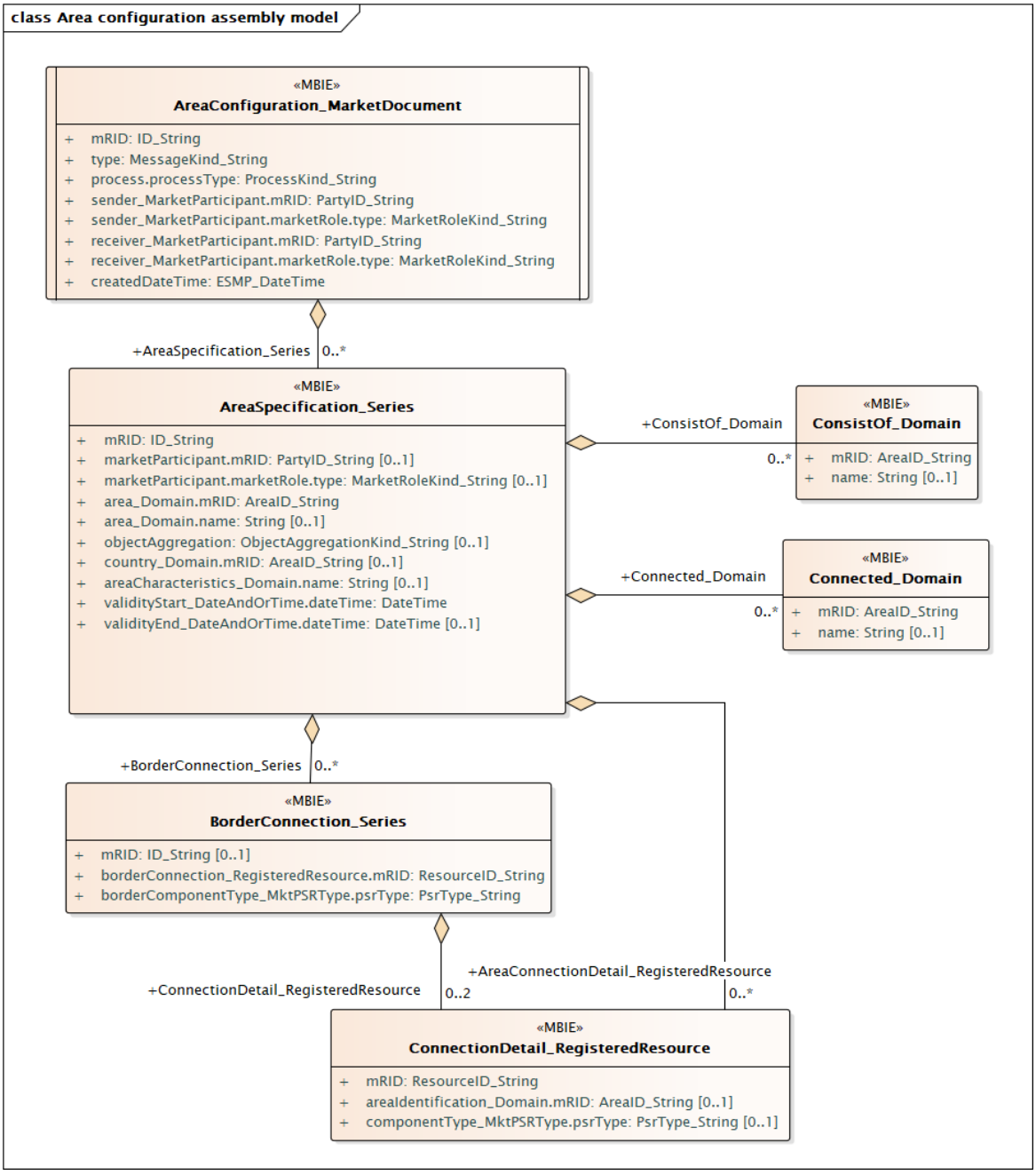

Figure 17: Class diagram (assembly model): IEC/CIM Area Configuration Market Document, v1.1

4.2.3 Attribute usage: IEC/CIM Area Configuration Market Document, v1.1

Attribute	Cl.	Code and description
Area Configuration Market Document		
mRID	[1]	The unique identification of the document being exchanged. **Note:** The maximum length of the mRID is 35 characters.
type	[1]	**B35** Area Configuration Document **Z06** Market connection points document
process.processType	[1]	Currently used: **A01** Day-ahead **A58** mFRR capacity market (mFRR CM) Possible future use: **A02** Intraday (The area specification defined for the day-ahead market (A01, Day-ahead) is used today) **A47** Manual frequency restoration reserve (replacing **A30** Tertiary reserve process) **A51** Automatic frequency restoration reserve (replacing **A29** Secondary reserve process) **A52** Frequency containment reserve (replacing **A28** Primary reserve process)
sender_MarketParticipant.mRID	[1]	Identification of the party who is sending the document.
sender_MarketParticipant.marketRole.type	[1]	**A34** Reserve Allocator **A48** LFC Operator (replaces **A04** System Operator)
receiver_MarketParticipant.mRID	[1]	Identification of the party who is receiving the schedules.
receiver_MarketParticipant.marketRole.type	[1]	**A08** Balance responsible party **A11** Market operator **A46** Balancing Service Provider **A47** Energy Trader
createdDateTime	[1]	Date and time for creation of the document.
AreaSpecification_Series	**[0..*]**	
mRID	[1]	Unique ID of the Area Specification Series.
area_Domain.mRID	[1]	Unique ID of the area.
areaCharacteristics_Domain.name	[0..1]	
BorderConnection_Series	[0..*]	**Dependency:** Only used for "**B35** Area Configuration Document".
mRID	[1]	The unique identification of the component.
borderComponentType_MktPSRType.PSRType	[1]	**A01** Tieline **A02** Line

Attribute	Cl.	Code and description
		A08 Busbar **B23** Substation **B24** Transformer
ConnectionDetail_RegisteredResource	[1..*]	**Dependency:** Always two repetitions for type = **B35** (Area Configuration Document).
mRID	[1]	Unique ID of the Registered Resource (Border Component).
areaIdentification_Domain.mRID	[0..1]	Identification of the Area.
componentType_PSRType.PSRType	[0..1]	Component type: **A02** Line **A08** Busbar **B23** Substation **B24** Transformer

Table 4: Attribute usage: IEC/CIM Area Configuration Market Document, v1.1

4.2.4 Dependency matrix for Area Configuration Document, v1.1

Area Configuration Market Document type	Process Type	Sender role	Receiver role	borderComponentType (Asset Type List)	componentType (Asset Type List)
B35 Area configuration document	**A01**	**A48**	**A08** **A11** **A46** **A47**	**A01** **A02** **A08** **B23** **B24**	**A02** **A08** **B23** **B24**
	A58	**A34**	**A08** **A11** **A46** **A47**	**A01** **A02** **A08** **B23** **B24**	**A02** **A08** **B23** **B24**
Z06 Market connection points document	**A01**	**A48**	**A08** **A11** **A46** **A47**	**A01** **A02** **A08** **B23** **B24**	**A02** **A08** **B23** **B24**

Table 5: Dependency matrix for NEG Area Configuration Market Document, v1.1

4.3 IEC/CIM Ediel Capacity Auction Specification Document

4.3.1 Class diagram (assembly model): Ediel Capacity Auction Specification Document

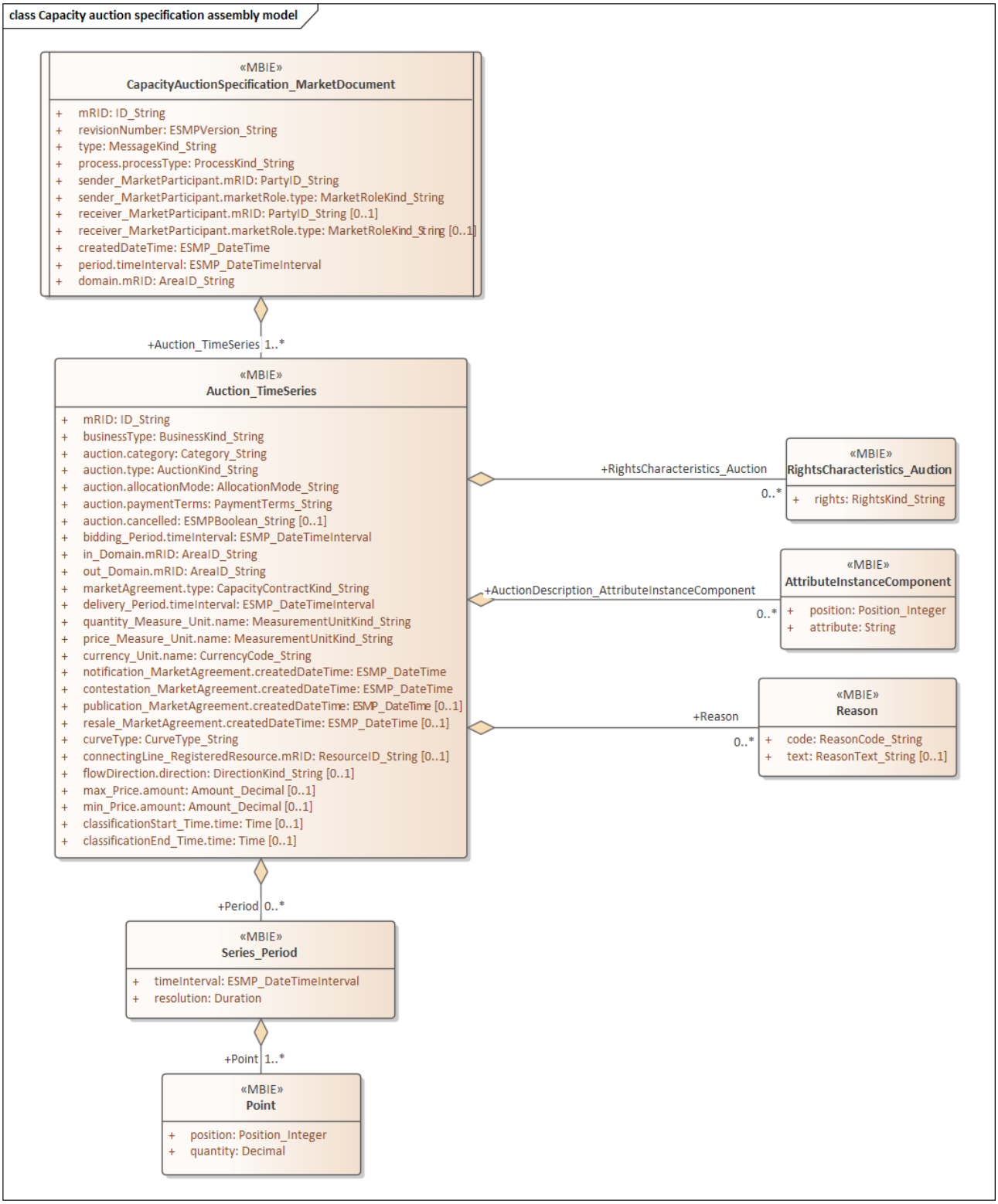

Figure 18: Class diagram (assembly model): Ediel Capacity Auction Specification Document

4.3.2 Attribute usage: Ediel Capacity Auction Specification Document

Attribute	Cl.	Code and description
Ediel Capacity Auction Specification Document		
mRID	[1]	Unique identification of the document.
revisionNumber	[1]	Fixed 1
type	[1]	**A51** Capacity Auction Specification Document
process.processType	[1]	**A47** Manual frequency restoration reserve (replacing **A30** Tertiary reserve process) **A51** Automatic frequency restoration reserve (replacing **A29** Secondary reserve process) **A52** Frequency containment reserve (replacing **A28** Primary reserve process) **A58** mFRR capacity market (mFRR CM)
sender_MarketParticipant.mRID	[1]	Identification of the party who is sending the document.
sender_MarketParticipant.marketRole.type	[1]	**A34** Reserve Allocator **A48** LFC Operator
receiver_MarketParticipant.mRID	[0..1]	Identification of the party who is receiving the schedules. Required except when used for "general publication".
receiver_MarketParticipant.marketRole.type	[0..1]	**A08** Balance responsible party **A46** Balancing Service Provider Required except when used for "general publication".
createdDateTime	[1]	Date and time for creation of the document.
period.timeInterval	[1]	The beginning and ending date and time of the period covered by the document.
Domain.mRID	[1]	The domain that covers the time series in the document.
Auction Time Series	**[1..*]**	
mRID	[1]	Unique ID of the auction.
businessType	[1]	**A01** Production **A04** Consumption **A12** Secondary control (used for Frequency Restoration Reserve, **aFRR**) **A95** Frequency containment reserve **A97** Manual frequency restoration reserve **C25** Frequency bias **C26** Frequency Containment Reserve-Normal (FCR-N) **C27** Frequency Containment Reserve-Disturbance (FCR-D)
auction.category	[1]	The product category of an auction. **A04** Hourly

Attribute	Cl.	Code and description
auction.type	[1]	**A01** Implicit
auction.allocationMode	[1]	**A01** Order by price with pro rata **A03** First come – First served
auction.paymentTerms	[0..1]	**A01** Pay as bid **A02** Pay as cleared Usage: see dependency matrix below.
auction.cancelled	[0..1]	**A01** True **A02** False Only required if a cancellation, i.e., if cancelled, the content shall be "**A01** = true".
bidding_Period.timeInterval	[1]	The beginning and ending date and time of the bidding period within which Capacity Traders can submit a bid to the Transmission Capacity Allocator.
in_Domain.mRID	[1]	Bidding Zone as defined for the relevant market. The Bidding Zone must be within the Domain (see header).
Out_Domain.mRID	[1]	Same as In Area
marketAgreement.type	[1]	**A01** Daily **A02** Weekly **A03** Monthly **A07** Intraday contract
delivery_Period.timeInterval	[1]	This information provides the start and end date and time when the energy is consumed or produced.
quantity_Measure_Unit.name	[1]	**MAW** MW
price_Measure_Unit.name	[1]	See ENTSO-E code list
currency_Unit.name	[1]	Any valid ISO 3 letter currency code, such as: **DKK** Danish Kroner **EUR** EURO **NOK** Norwegian Kroner **SEK** Swedish Kronor
Notification_MarketAgreement.createdDateTime	[1]	The date and time related to conditions of the agreement. The date and time of the creation of the agreement. --- The date and time that the participants will be notified of the results prior to the contestation period.
Contestation_MarketAgreement.createdDateTime	[1]	The date and time related to conditions of the agreement. The date and time of the creation of the agreement. --- The period in which contestations may be provided starts with the notification date time and ends with the contestation date and time. If there is no possibility of contestation both dates and times must be the same.

Attribute	Cl.	Code and description
curveType	[1]	**A01** Sequential fixed size block **A03** Variable sized Block **A04** Overlapping breakpoint **A05** Non-overlapping breakpoint
flowDirection.direction	[0..1]	**A01** Up **A02** Down **A03** Up and down Dependent on market. **Note:** Added for the Nordic countries.
Max_Price.amount	[0..1]	Dependent on market. Usage: see dependency matrix below. **Note:** Added for the Nordic countries.
Min_Price.amount	[0..1]	Dependent on market. **Usage:** see dependency matrix below. **Note:** Added for the Nordic countries.
classificationStart_Time.time	[0..1]	Start and End time within a day for the time frame relevant for the Auction Identification in question. **Note:** Added for the Nordic countries.
classificationEnd_Time	[0..1]	End time within a day for the time frame relevant for the Auction Identification in question. **Note:** Added for the Nordic countries.
Period	**[0..*]**	
timeInterval	[1]	The start and end date and time of the time interval of the period in question.
resolution	[1]	The resolution defining the number of periods that the time interval is divided. The resolution is expressed in compliance with ISO 8601 in the following format: PnYnMnDTnHnMnS. Where nY expresses a number of years, nM a number of months, nD a number of days. The letter "T" separates the date expression from the time expression and after it nH identifies a number of hours, nM a number of minutes and nS a number of seconds. E.g., **PT1H** or **PT60M**
Point	**[1..*]**	
position	[1]	The position of the observation in a time series.
quantity	[1]	The quantity for the interval in question.

Attribute	Cl.	Code and description
Reason (Time Series level)	**[0..1]**	The Reason class provides coded and optionally textual information, such as: • description of the auction and its market rules, to clarify information that is not formally defined (e.g., the time constraints for a peak product). • description that is necessary to completely describe a change to the auction specification or its eventual cancellation.
code	[1]	A code providing the information in respect to a change or cancellation of an auction. **999** Errors not specifically identified (used for changes and/or cancellation). **A95** Complementary information (textual description of the auction).
text	[0..1]	Textual explanation of the reason code. Shall be used for error code **999.**

Table 6: Usage of NEG Auction Specification Document, version 1.1

4.3.3 Dependency matrix for Ediel Capacity Auction Specification Document

Process type	businessType	marketAgreement. Type	auction. Pay-ment-Terms	max_ Price. Amount	min_ Price. Amount
A52 Frequency containment reserve	**C25** Frequency bias	**A01** Daily	**A02**		
	A95 Frequency containment reserve **C26** Frequency Containment Reserve-Normal (FCR-N) **C27** Frequency Containment Reserve-Disturbance	**A01** Daily **A02** Weekly **A03** Monthly **A07** Intraday contract	**A01** **A02**		
A51 Automatic frequency restoration reserve	**A12** Secondary control	**A02** Weekly	**A01** **A02**		
A47 Manual frequency restoration reserve	**A01**, Production **A02** Internal trade **A04**, Consumption **A97,** Manual frequency restoration reserve	**A07** Intraday contract	**N/A**		
A58 mFRR capacity market (mFRR CM)	**A01**, Production **A02** Internal trade **A04**, Consumption	**A01** Daily **A02** Weekly	**A02**		

Table 7: Dependency matrix for NEG Auction Specification Document, version 1.1

4.4 IEC/CIM Reserve Bid Document (IEC/CIM 62325-451-7 Reserve Bid Document)

The IEC/CIM 62325-451-7 Reserve Bid Document is taken from the draft ENTSO-E 62325-451-7 package, see [1].

The document is used in the following exchanges:

- **Table 1:** ENTSO-E documents used in the Nordic trading system:
    - 1.1, aFRR bids
    - 2.1, mFRR CM bids
    - 3.2, Frequency containment reserves bids
    - 4.0, mFRR EAM bids
    - 4.1, mFRR EAM bids

4.4.1 Class diagram: Reserve Bid Document contextual model

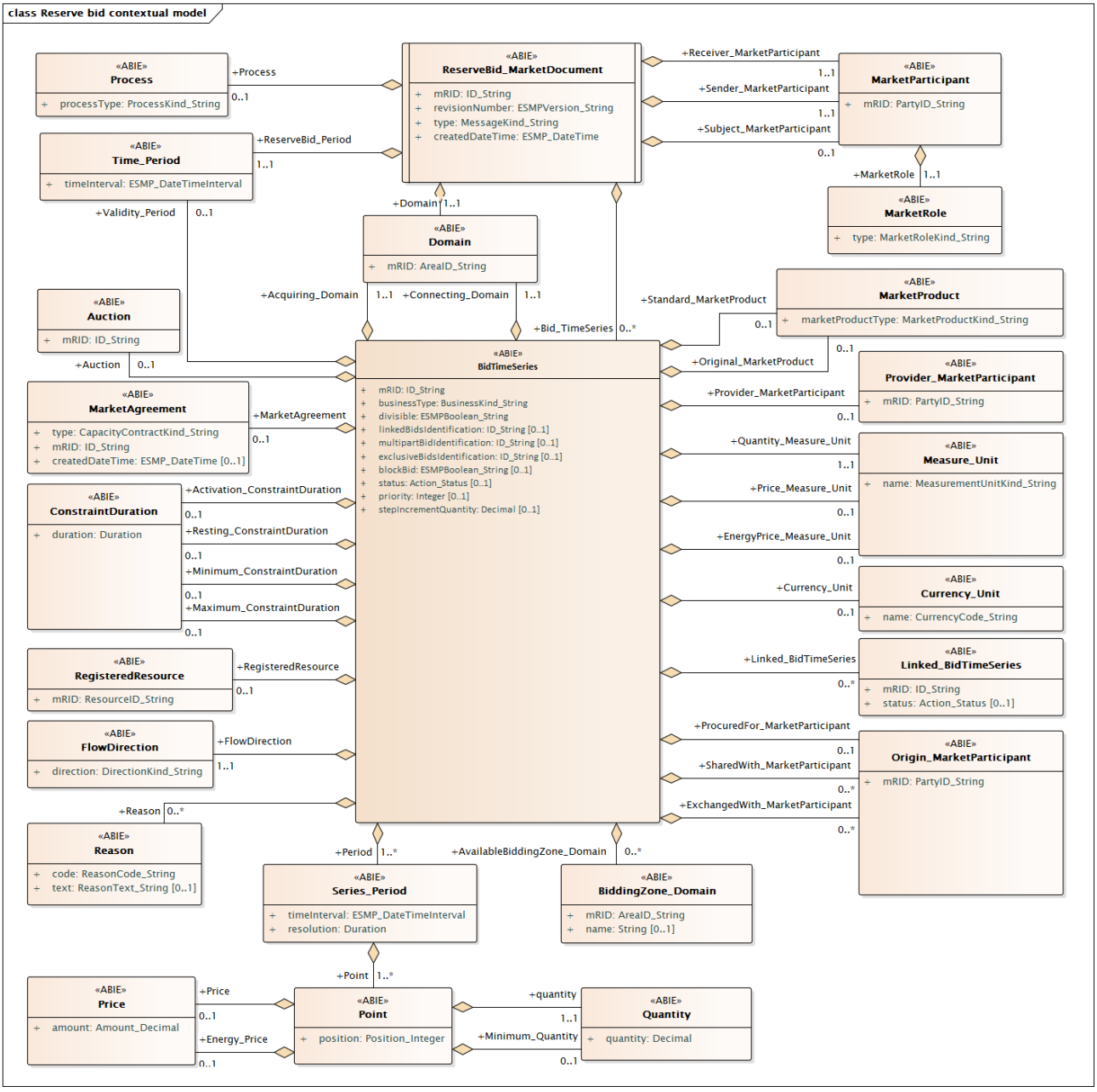

Figure 19: Class diagram: Reserve Bid Document contextual model

4.4.2 Class diagram: Reserve Bid Document assembly model

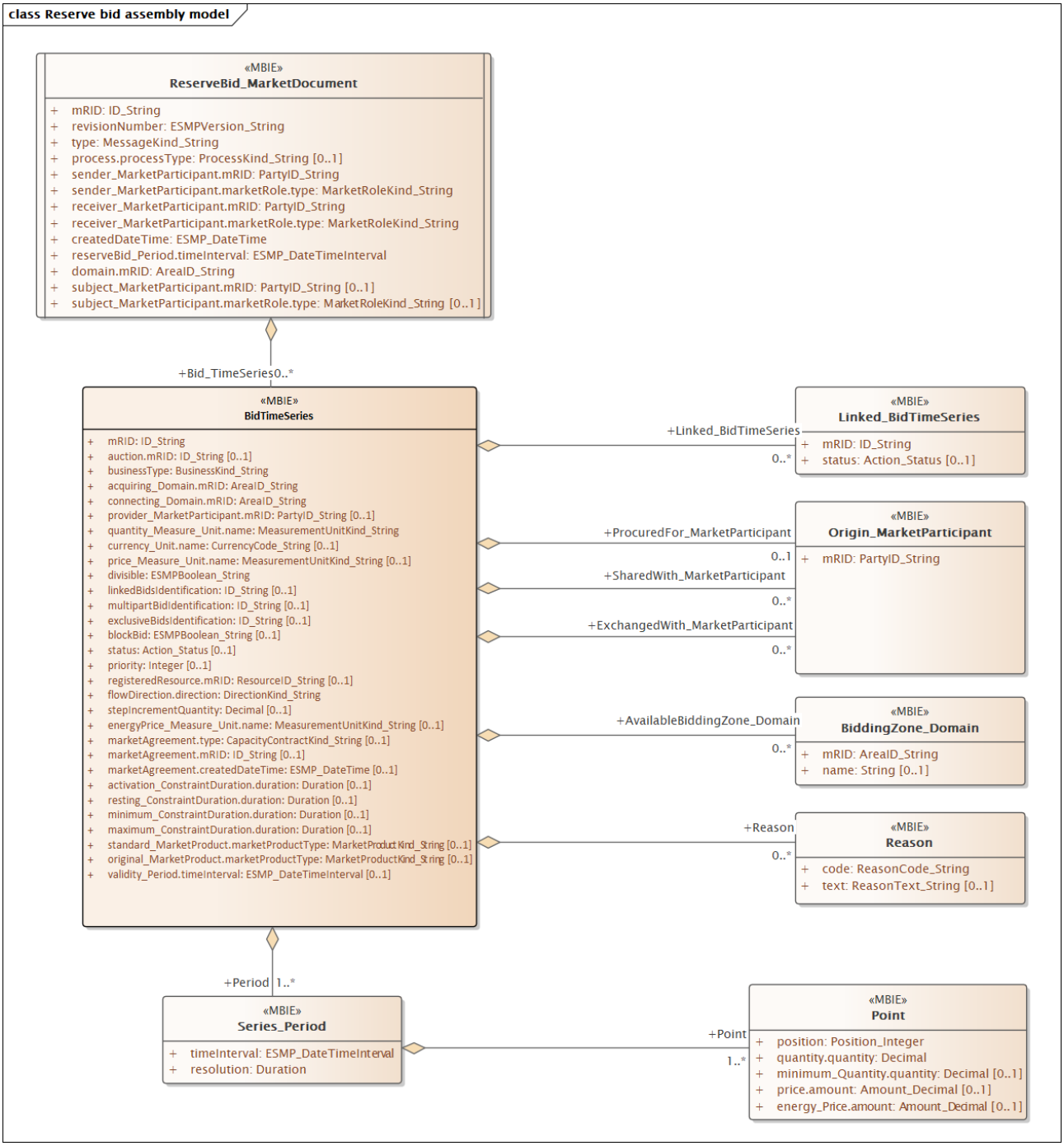

Figure 20: Class diagram: Reserve Bid Document assembly model

4.4.3 Attribute usage: Reserve Bid Document

Attribute	Cl.	Code and description
Reserve Bid Document		
mRID	[1]	Unique identification of the document.
revisionNumber	[1]	Fixed 1.
type	[1]	**A24** Bid document **A37** Reserve Bid document
process.processType	[1]	**A47** Manual frequency restoration reserve (replacing **A30** Tertiary reserve process) **A51** Automatic frequency restoration reserve (replacing **A29** Secondary reserve process) **A52** Frequency containment reserve (replacing **A28** Primary reserve process) **A58** mFRR capacity market (mFRR CM) **B40** Complete set of bids (to be used for the capacity markets FCR, aFRR and mFRR)
sender_MarketParticipant.mRID	[1]	Identification of the party who is sending the document.
sender_MarketParticipant.marketRole.type	[1]	**A08** Balance responsible party **A39** Data Provider **A46** Balancing Service Provider **A48** LFC Operator (replaces **A04** System Operator)
receiver_MarketParticipant.mRID	[1]	Identification of the party who is receiving the schedules.
receiver_MarketParticipant.marketRole.type	[1]	**A32** Market information aggregator **A34** Reserve Allocator **A35** Merit Order List (MOL) Responsible (NOIS) **A48** LFC Operator
createdDateTime	[1]	Date and time for creation of the document.
reserveBid_Period.timeInterval	[1]	The beginning and ending date and time of the period covered by the document.
domain.mRID	[1]	National or Nordic market area (in the future).
subject_MarketParticipant.mRID	[1]	The party responsible for the bid.
subject_MarketParticipant.marketRole.type	[1]	**A08** Balance responsible party **A46** Balancing Service Provider
Bid Time Series	**[1..*]**	
mRID	[1]	Unique ID of the bid.
auction.mRID	[1]	Auction identification from the connected Auction specification document if available, else a code identifying the auction or market (to be defined when implemented). For instance: FCR_CAPACITY_MARKET

Attribute	Cl.	Code and description
businessType	[1]	**A01** Production **A04** Consumption **A12** Secondary control (aFRR, Frequency Restoration Reserve (earlier LFC)) **A95** Frequency containment reserve **A97** Manual frequency restoration reserve **B74** Offer **B75** Need **B91** Flexible need **C25** Frequency bias **C26** Frequency Containment Reserve-Normal (FCR-N) **C27** Frequency Containment Reserve-Disturbance (FCR-D) **Z35** Commercial **Z36** Reserve **Z49** Commercial production **Z50** Commercial wind production **Z51** Commercial consumption
acquiring_Domain.mRID	[1]	The area where the resource is contracted for use. For instance: 10Y1001A1001A91G (Nordic Market Area)
connecting_Domain.mRID	[1]	The area where the resource is located.
quantity_Measure_Unit.name	[1]	**MAW** megawatt (MW) The unit of measurement used for the quantities expressed within the time series. It is recommended that this be always expressed in megawatts (code MAW).
currency_Unit.name	[0..1]	Any valid ISO 3 letter currency code, such as: **DKK** Danish Kroner **EUR** EURO **NOK** Norwegian Kroner **SEK** Swedish Kronor The currency used for the monetary amount expressed within the time series. Required if a price is stated.
price_Measure_Unit.name	[0..1]	**MWH** MWh **KWH** kWh **MAW** MW **KWT** kW The unit of measurement used for the price expressed within the time series (e.g., MWh or kW per unit). Required if a price is stated.
divisible	[1]	**A01** Yes **A02** No
linkedBidsIdentification	[0..1]	Unique identification used to associate technically linked bids. Not used if bid is not technically linked.

Attribute	Cl.	Code and description
multipartBidsIdentification	[0..1]	Unique identification used to associate multipart bids. If bid with flowDirection.direction=A01 (Up) is accepted, then all associated bids with inferior price must also be accepted. If bid with flowDirection.direction=A02 (Down) is accepted, then all associated bids with superior price must also be accepted. Not used if bid is not multipart.
exclusiveBidsIdentification	[0..1]	Unique identification used to associate exclusive group bids. If one bid is selected, then none of the other with the same "bid family" identification can be selected. Not used if bid is not part of exclusive group bid.
inclusiveBidsIdentification[3]	[0..1]	Unique identification used to associate inclusive group bids. All or none of the bids with the same “bid family” identification must be selected.
blockBid	[0..1]	**A01** Yes **A02** No Constraints: • The minimum_ConstraintDuration.duration attribute must be used for block bids.
status	[0..1]	**A06** Available For conditionally linked bids, having one or several instances of Linked Bid Timeseries: **A65** Conditionally available **A66** Conditionally unavailable
registeredResource.mRID	[0..1]	EIC or national code for the resource (regulation object), e.g., Station Group or Regulation object. Usage: see dependency matrix below.
flowDirection.direction	[1]	**A01** Up **A02** Down **A03** Up and down
energyPrice_Measure_Unit.name	[0..1]	**MWH** Megawatt hours The unit of measurement used for the price of energy expressed within the time series. (MW per unit (code MAW), MWh per unit (code MWH), etc.)**.** A Measure Unit Energy Price is required only if there is an Energy Price specified.

[3] This is currently a Nordic extension, however a MR has been sent to CIM EG and is expected approved in the near future.

Attribute	Cl.	Code and description
marketAgreement.type	[0..1]	**A01** Daily **A02** Weekly **A03** Monthly **A07** Intraday contract Usage must be specified when implemented.
marketAgreement.mRID	[0..1]	Optional element. Usage must be specified when implemented.
activation_ConstraintDuration.duration	[0..1]	The time needed before a regulation is effective. Number of minutes for up or down regulation. Only used in the mFRR EAM. Required used if the unit has this constraint. Activation time - The minimum time for full activation of the physical resource including preparation time and ramping time. For bids that have a standard FAT (Full Activation Time) of 12,5 min (or 15 min in Automated operation) activation time shall be left blank or omitted. Applicable only to bids in Norway: For bids that can be activated faster than 12,5 minutes the activation time should be specified and should assume a preparation time of 1 minute. E.g. PT3M (if ramping time is 2 min) PT5M (if ramping time is 4 min) PT10M (if ramping time is 9 min). Applicable only to slower activation bids (in Denmark and Sweden): For bids with slower full activation time than 12,5 minutes (15 minutes in Automated operation) the activation time must be specified.
resting_ConstraintDuration.duration	[0..1]	The time between the end of activation and the start of the next activation. Number of minutes for the resting time. Only used in the mFRR EAM. Required used if the unit has this constraint. Applicable only to bids in Norway, Sweden, (not yet decided for Denmark): Resting time for the resource object after an activation, in number of minutes, divisible by 15. E.g.: PT45M, PT60M, PT90M
minimum_ConstraintDuration.duration	[0..1]	The minimum time a regulation can be effective. Number of minutes an up or down regulation at least must be effective. Constraints: • Only used in the mFRR EAM. • Required used if the unit has this constraint. • Required for block bids.

Attribute	Cl.	Code and description
maximum_ConstraintDuration.duration	[0..1]	The maximum time a regulation can be effective. Number of minutes an up or down regulation maximum can be effective. Only used in the mFRR EAM. Required used if the unit has this constraint. Applicable only to bids in Norway, Sweden, (not yet decided for Denmark): Maximum duration of activation for the resource object, in number of minutes, divisible by 15. E.g.: PT45M, PT60M, PT90M. If maximum duration is specified and resting time is not specified, a resting time of 15 minutes will be assumed.
standard_MarketProduct.marketProductType	[0..1]	**Z02** Dynamic product **Z03** Static product Only used together with process type **A52.**
Period	**[1..*]**	
timeInterval	[1]	The start and end date and time of the time interval of the period in question.
resolution	[1]	The resolution defining the number of periods that the time interval is divided. The resolution is expressed in compliance with ISO 8601 in the following format: PnYnMnDTnHnMnS. Where nY expresses a number of years, nM a number of months, nD a number of days. The letter "T" separates the date expression from the time expression and after it nH identifies a number of hours, nM a number of minutes and nS a number of seconds. E.g., **PT1H** or **PT60M**
Point	**[1..*]**	
position	[1]	The position of the observation in a time series.
quantity	[1]	The quantity for the interval in question.
minimum_Quantity.quantity	[0..1]	Dependent on national rules. The minimum quantity of energy that can be activated at a given time position. It must be used for divisible bids and can be 0 (fully divisible) but must not be used for indivisible bids.
price.amount	[0..1]	The price expressed for each unit of quantity. Usage must be specified when implemented.
energy_Price.amount	[0..1]	The price of the energy if used. Usage must be specified when implemented.
Reason	**[0..*]**	

Attribute	Cl.	Code and description
code	[1]	Optional for mFRR standard product bids in Norway and Sweden. Period shift activation may be ordered. **Z64** Period shift, beginning of period **Z65** Period shift, end of period
Linked_BidTimeSeries (associated with BidTimeSeries)	**[0..*]**	No more than three instances referring to each of MTU-1 and MTU-2, respectively
mRID	[1]	mRID of a simple bid in MTU-1 or MTU-2.
status	[0..1]	One of the following values shall be used when bid in MTU-0 is conditionally available, i.e. BidTimeSeries.status = A65: **A55** Not available if linked bid activated **A56** Not available if linked bid rejected **A59** Not available if linked bid subject to SA **A60** Not available if linked bid subject to DA **A57** Not available for DA if linked bid subject to DA **A58** Not available for DA if linked bid subject to SA One of the following values shall be used when bid in MTU0 is conditionally unavailable, i.e. BidTimeSeries.status = A66: ¨ **A67** Available if linked bid activated **A68** Available if linked bid rejected **A69** Available if linked bid subject to SA **A70** Available if linked bid subject to DA **A71** Available for DA if linked bid subject to DA **A72** Available for DA if linked bid subject to SA (SA = scheduled activation, DA = direct activation, MTU = market time unit)[4].

Table 8: Attribute usage of Reserve Bid Document

[4] Rules for evaluation of availability of conditional linked bids:

- A conditionally available bid in MTU0 (i.e. bid with status A65) becomes completely unavailable when at least one of the conditional links indicate unavailability due to the outcome of the linked bid in MTU-1 or MTU-2
- A conditionally available bid in MTU0 becomes unavailable for direct activation when at least one of the conditional links indicate unavailability for direct activation due to the outcome of the linked bid in MTU-1 or MTU-2
- A conditionally unavailable bid in MTU0 (i.e. bid with status A66) becomes available when at least one of the conditional links indicate availability due to the outcome of the linked bid in MTU-1 or MTU-2
- A conditionally unavailable bid in MTU0 becomes available for direct activation when at least one of the conditional links indicate availability for direct activation due to the outcome of the linked bid in MTU-1 or MTU-2

4.4.4 Class diagram (contextual model): Ediel Capacity Auction Specification Document

The Ediel Capacity Auction Specification Document is based on the IEC 62325-451-3 Ed.1 Amendment 1 Capacity auction specification document, see [2].

The document is used in the following exchanges:

- **Table 1:** ENTSO-E documents used in the Nordic trading system:
  - 1.0, Auction Specification
  - 2.0, Auction specification
  - 3.0, Auction specification

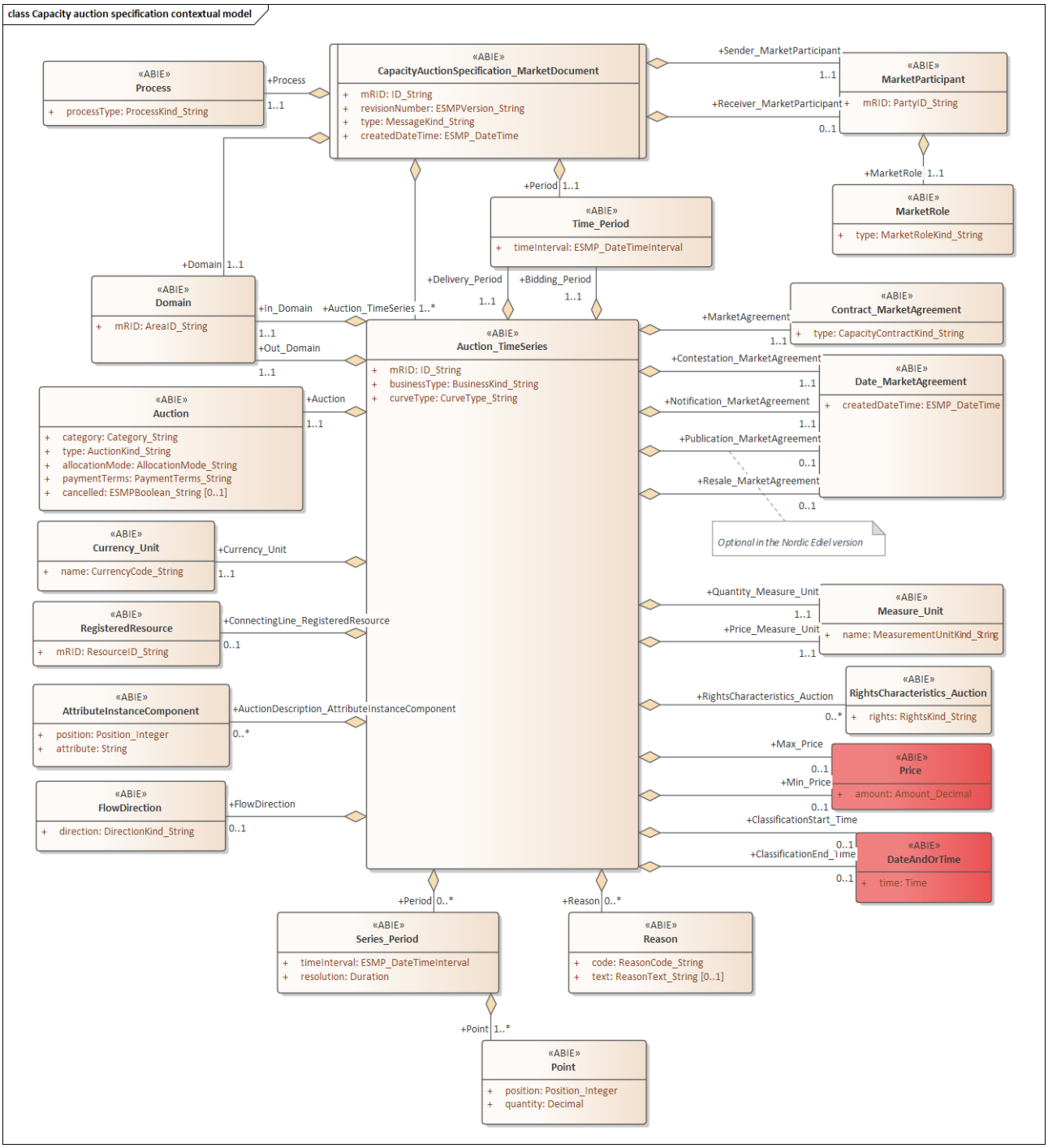

Figure 21: Class diagram (contextual model): Ediel Capacity Auction Specification Document

4.4.5 Dependency matrix for Reserve Bid Document

type	process.processType	businessType	Registered Resource. mRID
A24 Bid document	**A47** mFRR (replacing **A30** Tertiary reserve process)	**A95** Frequency containment reserve **A97** Manual frequency restoration reserve **Z35** Commercial **Z36** Reserve **Z49** Commercial production **Z50** Commercial wind production **Z51** Commercial consumption	✓
	A51 aFRR (replacing **A29** Secondary reserve process)	**A12** Secondary control (A time series concerning secondary reserve) (**aFRR**)	**Optional**
	A52 FCR (replacing **A28** Primary reserve process)	**C25** Frequency bias **C26** FCR-N	**Optional**
		C27 FCR-D	**Optional**
	A58 mFRR capacity market (mFRR CM)	**A01** Production **A04** Consumption	**Not used**
A37 Reserve Bid document	**A47** mFRR	**B74** Offer	Mandatory for bids in Finland, Norway and Sweden. Optional in Denmark
		B75 Need **B91** Flexible need	

Table 9: Dependency matrix for NEG ERRP Reserve Bid Document, version 1.0

4.5 IEC/CIM Bid availability document (ERRP)

The IEC/CIM Bid availability document is taken from the “Common Platform for manually activated restoration reserves (MARI) Implementation Guide”, see [1].

The document is used in the following exchanges:

- **Table 1:** ENTSO-E documents used in the Nordic trading system:
    - 4.2, Bid availability document

4.5.1 Class diagram: Bid availability document contextual model

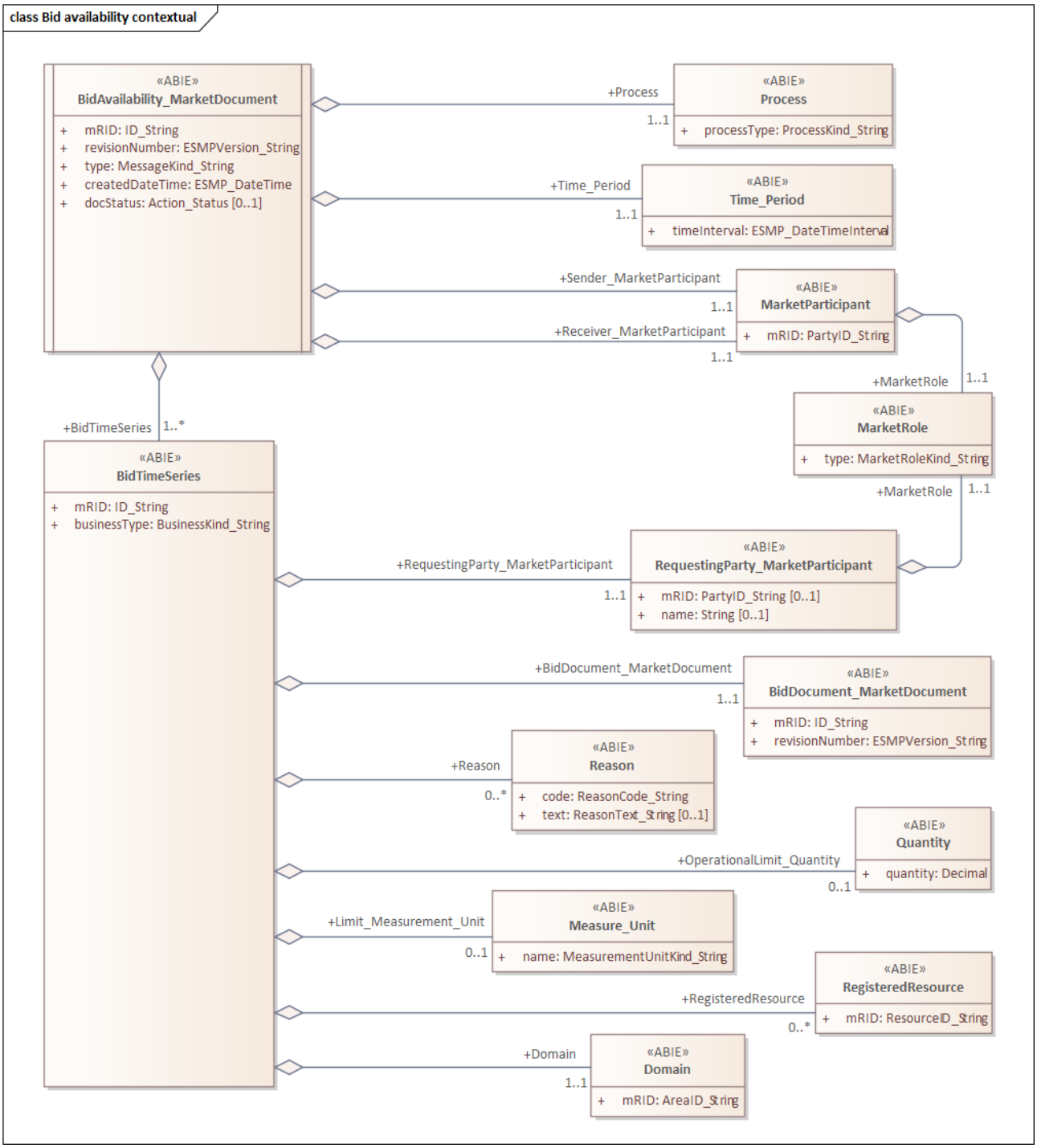

Figure 22: Class diagram: Bid availability document contextual model

4.5.2 Class diagram: Bid availability document assembly model

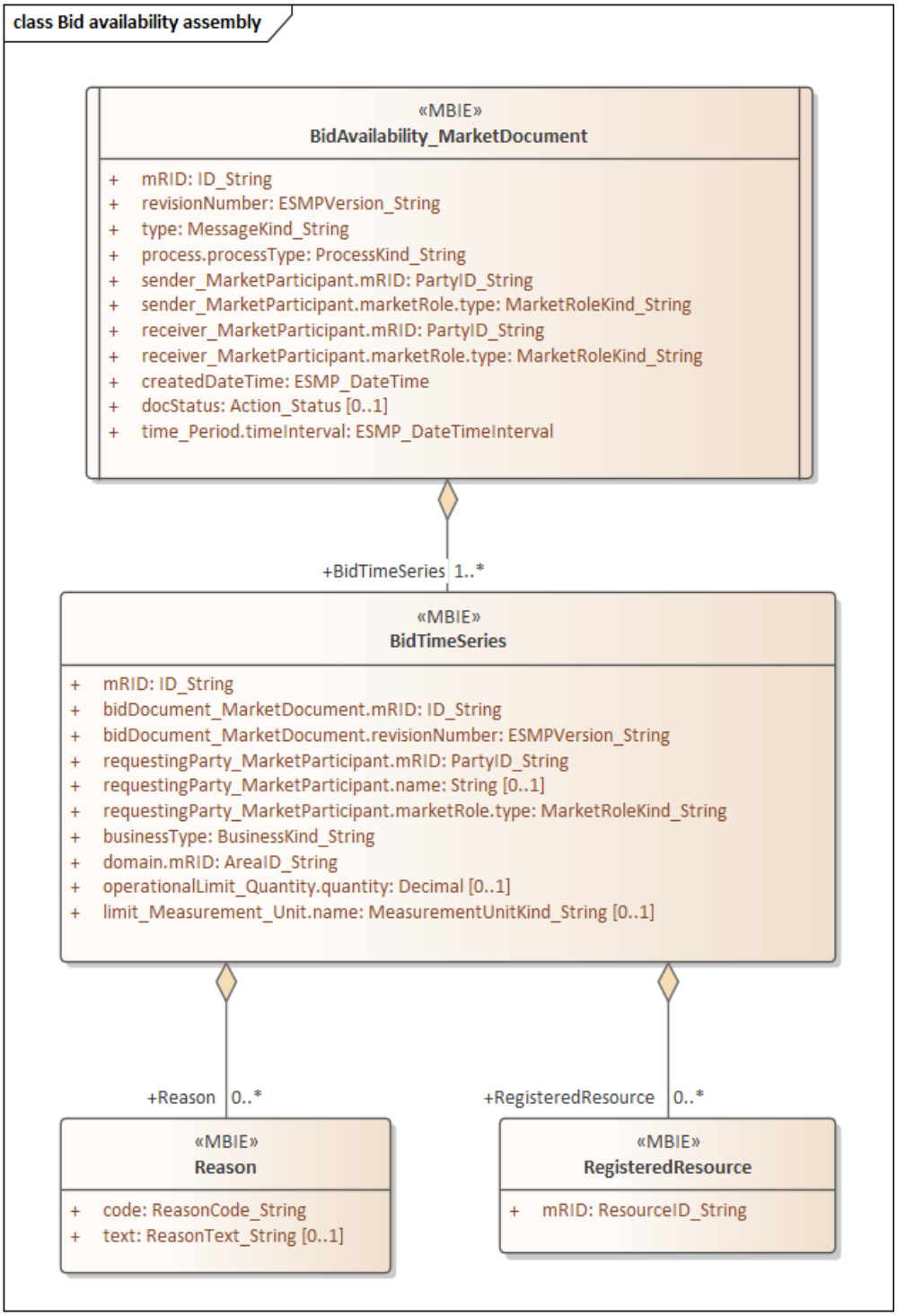

Figure 23: Class diagram: Bid availability document assembly model

4.5.3 Attribute usage: Bid availability document

Attribute	Cl.	Code and description
Bid availability document		
mRID	[1]	Unique identification of the document. Proper UUID is required.
revisionNumber	[1]	Constant value of **1**.
Type	[1]	**B45** Bid availability document
process.processType	[1]	**A47** Manual frequency restoration reserve
sender_MarketParticipant.mRID	[1]	Identification of the party sending the document. One of: • Energinet • Fingrid • Statnett • Svenska kraftnät
	[1]	**A01** EIC coding scheme
sender_MarketParticipant.marketRole.type	[1]	**A48** LFC Operator (replaces **A04** System Operator)
receiver_MarketParticipant.mRID	[1]	Identification of the party receiving the document.
receiver_MarketParticipant.marketRole.type	[1]	**A46** Balancing Service Provider (BSP)
createdDateTime	[1]	Date and time of document creation (in ISO 8601 UTC format) YYYY-MM-DDTHH:MM:SSZ
Bid Time Series	**[1..*]**	
mRID	[1]	Unique identification of the bid.
bidDocument_MarketDocument.mRID	[1]	Constant value of **NA**
bidDocument_MarketDocument.revisionNumber	[1]	Constant value of **1**
requestingParty_MarketParticipant.mRID		EIC code of Party that requested the update of bid availability.
requestingParty_MarketParticipant.marketRole.type		**A46** Balancing Service Provider **A49** Transmission System Operator **A50** Distribution System Operator
businessType		**C40** Conditional bid **C41** Thermal limit **C42** Frequency limit **C43** Voltage limit **C44** Current limit **C45** Short-circuit current limits **C46** Dynamic stability limit

Attribute	Cl.	Code and description
acquiring_Domain.mRID		The EIC identification of the Nordic Market Area: **10Y1001A1001A91G**
domain.mRID	[1]	The EIC identification of the bidding zone where the resource is located
Reason[5]	**[1]**	
code		When business type = **C40** the following reasons apply: **B16** Tender unavailable in MOL list When business type = **C42** one of the following reasons apply: **B58** Insufficiency of reserves **B59** Unavailability of reserve providing units When business type = **C41**, **C43**, **C44**, **C45** or **C46** one of the following reasons apply: **B18** Failure **B46** Internal congestion **B47** Operational security constraints **B60** Unavailability of automatic protection systems
text	[0..1]	May be populated to provide additional explanation in free text format
RegisteredResource (BidTimeSeries level)	**[0..1]**	only when BusinessType is Thermal Limit = **C41**
mRID	[1]	EIC code of concerned network element

[5] The business types and reasons can be subject to changes to do the development of the MARI project.

4.6 IEC/CIM Reserve Allocation Result Document (ERRP)

The basis for the IEC/CIM Reserve Allocation Result Document is the draft ENTSO-E ESMP package, which is expected to be published as part of the 62325-451-7 standard, see [1].

The document is used in the following exchanges:

- **Table 1:** ENTSO-E documents used in the Nordic trading system:
    - 1.2, aFRR contracts
    - 2.2, mFRR CM contracts
    - 3.4, Frequency containment reserves contracts

4.6.1 Class diagram: Reserve Allocation Result Document contextual model

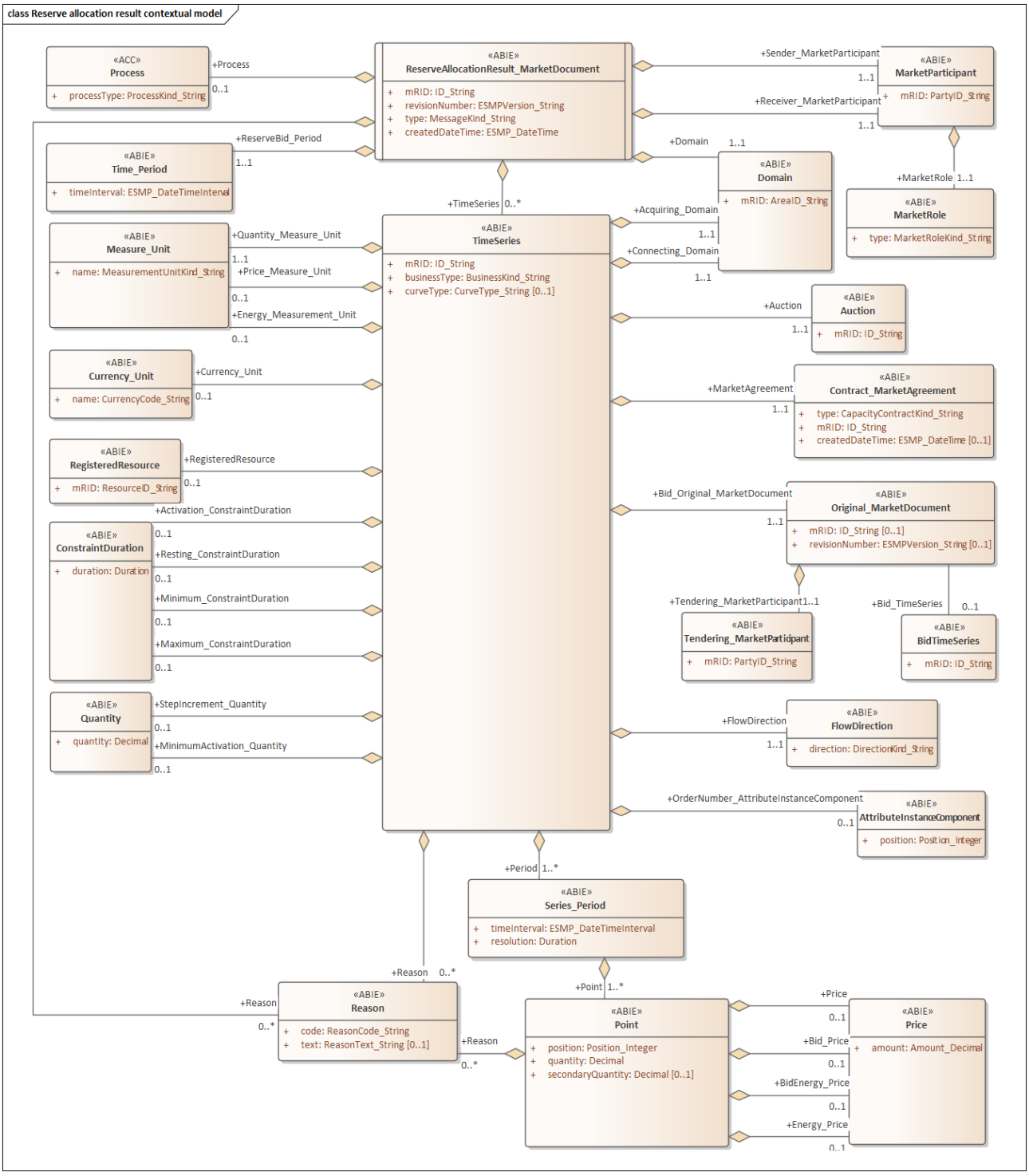

Figure 24: Class diagram: Reserve Allocation Result Document contextual model

4.6.2 Class diagram: Reserve Allocation Result Document assembly model

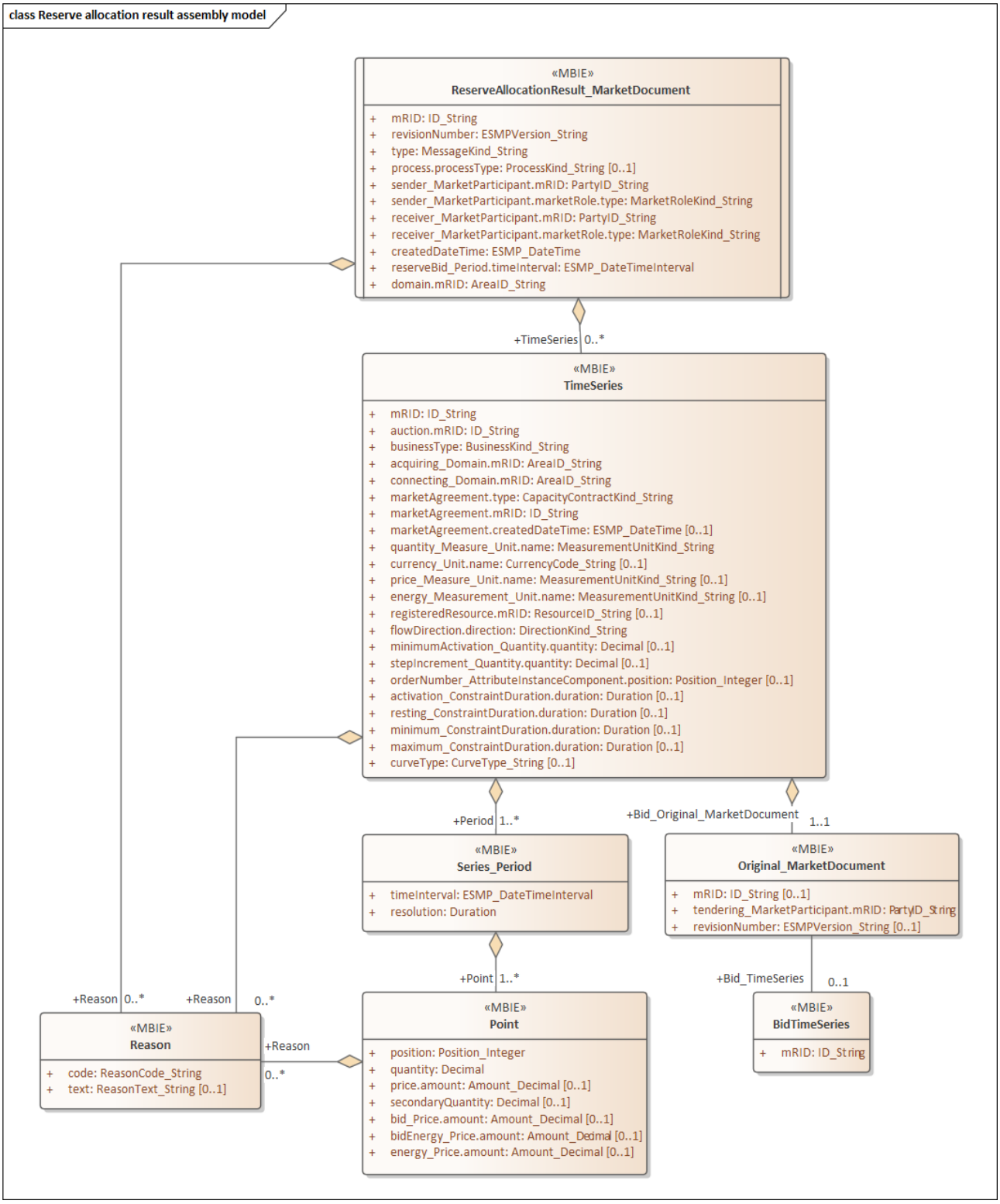

Figure 25: Class diagram: Reserve Allocation Result Document assembly model

4.6.3 Attribute usage: Reserve Allocation Result Document

Attribute	Cl.	Code and description
Reserve Allocation Result Document		
mRID	[1]	Unique identification of the document.
revisionNumber	[1]	Fixed 1
type	[1]	**A38** Reserve Allocation Result (Operational bids)
process.processType	[1]	**A47** Manual frequency restoration reserve **A51** Automatic frequency restoration reserve **A52** Frequency containment reserve **A58** mFRR capacity market (mFRR CM) **A59** Internal trade reporting
sender_MarketParticipant.mRID	[1]	Identification of the party who is sending the document.
Sender_MarketParticipant. marketRole.type	[1]	**A04** System Operator **A11** Market operator (TSO) **A34** Reserve Allocator
receiver_MarketParticipant.mRID	[1]	Identification of the party who is receiving the schedules.
receiver_MarketParticipant. marketRole.type	[1]	**A08** Balance responsible party **A11** Market operator (NOIS) **A46** Balancing Service Provider **A48** LFC Operator (replaces **A04** System Operator)
createdDateTime	[1]	Date and time for creation of the document.
reserveBid_Period.timeInterval	[1]	The beginning and ending date and time of the period covered by the document.
Domain.mRID	[1]	Nordic market area, National Area, Bidding Zone.
TimeSeries	**[0..*]**	
mRID	[1]	The identification of the time series instance.
bid_Original_MarketDocument. mRID	[0..1]	mRID from the original MarketDocument
bid_Original_MarketDocument .revisionNumber	[0..1]	revisionNumber from the original MarketDocument
bid_Original_MarketDocument. bid_TimeSeries.mRID	[0..1]	bid_TimeSeries mRID from the original MarketDocument
bid_Original_MarketDocument. tendering _MarketParticipant. mRID	[1]	The ID of the tendering party, i.e., LFC Operator or Balancing Service Provider. Usage must be specified when implemented.
auction.mRID	[1]	If there is no Auction Specification Document, the usage of the Auction ID must be specified by the implementation project.
businessType	[1]	**A01** Production **A04** Consumption **A12** Secondary control (aFRR, Frequency Restoration Reserve (earlier LFC)) **A95** Frequency containment reserve **A97** Manual frequency restoration reserve **C25** Frequency bias **C26** Frequency Containment Reserve-Normal (FCR-N) **C27** Frequency Containment Reserve-Disturbance (FCR-D)
acquiring_Domain.mRID	[1]	The area where the resource is contracted for use.

Attribute	Cl.	Code and description
connecting_Domain.mRID	[1]	The area where the resource is located.
marketAgreement.type	[1]	**A01** Daily **A02** Weekly **A03** Monthly **A06** Long term contract Usage must be specified when implemented. If not obtainable, use constant value of "NA".
marketAgreement.mRID	[1]	If not obtainable, use constant value of "NA".
quantity_Measure_Unit. name	[1]	**MWH** MWh **MAW** MW
currency_Unit.name	[1]	Any valid ISO 3 letter currency code, such as: **DKK** Danish Kroner **EUR** EURO **NOK** Norwegian Kroner **SEK** Swedish Kronor
price_Measure_Unit.name	[0..1]	**MWH**MWh **MAW**MW Shall be used if a price is stated.
registeredResource.mRID	[0..1]	Relevant object within the market, e.g., Station group or Resource, see Table 11 below.
flowDirection.direction	[1]	**A01** Up **A02** Down **A03** Up and down Usage: See Table 11 below.
curveType	[0..1]	**A01** Sequential fixed size block
Reason (TimeSeries level)	**[0..*]**	
code	[1]	**B22** System regulation **B49** Balancing **B49** is used for normal bids (pay-as-cleared) and **B22** is used for bids when system regulations are needed (typically used for bottlenecks)
Period	**[1..*]**	
timeInterval	[1]	The start and end date and time of the time interval of the period in question.
resolution	[1]	The resolution defining the number of periods that the time interval is divided. The resolution is expressed in compliance with ISO 8601 in the following format: PnYnMnDTnHnMnS. Where nY expresses a number of years, nM a number of months, nD a number of days. The letter “T” separates the date expression from the time expression and after it nH identifies a number of hours, nM a number of minutes and nS a number of seconds. E.g., **PT1H** or **PT60M**
Point	**[1..*]**	
position	[1]	The position of the observation in a time series.

Attribute	Cl.	Code and description
quantity	[1]	Quantity
price.amount	[0..1]	Price Usage must be specified when implemented.
Reason (Point level)	**[0..*]**	
code	[1]	**A73** Bid accepted **B09** Bid not accepted **B22** System regulation **B49** Balancing **Z58** Scheduled activation **Z59** Direct activation **Z60** Faster than standard FAT **Z61** Faster than standard deactivation **Z62** Slower than standard FAT **Z63** Period shift activation

Table 10: Attribute usage of Ediel Reserve Allocation Result Document

4.6.4 Dependency matrix for Ediel Reserve Allocation Result Document

process. processType	businessType	market Agreement. type	registered Resource.mRID	flow Direction. direction
A52 Frequency containment reserve (replacing **A28** Primary reserve process)	**C25** Frequency bias	**A01**	Not used	Not used
	A95 Frequency containment reserve			
	C26 FCR-N	**A01** or **A02**	Dependent on national rules	Required
	C27 FCR-D	**A01** or **A02**	Dependent on national rules	Required
A51 Automatic frequency restoration reserve (replacing **A29** Secondary reserve process)	**A12** aFRR	**A02** or **A03**	Not used	Required
A47 Manual frequency restoration reserve (replacing **A30** Tertiary reserve process)	**A01** Production	**A01**	Not used	Required
	A97 Manual frequency restoration reserve			
	A04 Consumption	**A01** or **A06**	Not used	Required
A58 mFRR capacity market (mFRR CM)	**A01** Production	**A01, A02** or **A06**	Not used	Required
	A04 Consumption		Not used	
A59 Internal trade reporting	**A01** Production	**A01**	Not used	Not used
	A04 Consumption	**A01**	Not used	Not used

Table 11: Dependency matrix for Ediel Reserve Allocation Result Document

4.7 IEC/CIM Ediel Publication Document (ECAN)

The basis for the IEC/CIM Ediel Publication Document is the IEC62325-451-3 Ed.1 standard, see [2].

The document is used in the following exchanges:

- **Table 1:** ENTSO-E documents used in the Nordic trading system:
    - 1.3, aFRR summary report
    - 2.3, mFRR CM market summary report
    - 3.5, Frequency containment reserves summary
    - 5.2, Bilateral trade report

4.7.1 Class diagram: Ediel Publication Document contextual model

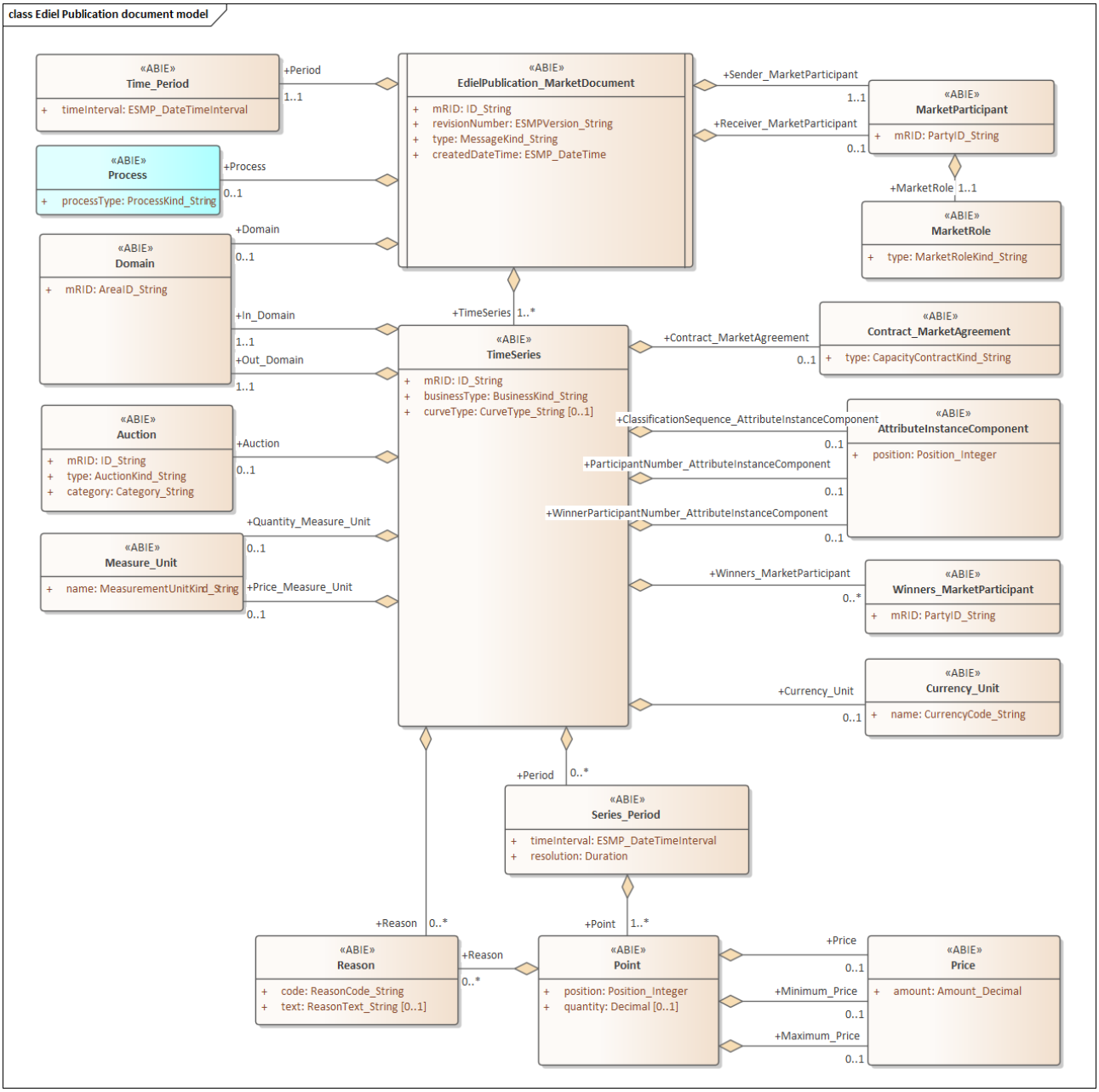

Figure 26: Class diagram: Ediel Publication Document contextual model

4.7.2 Class diagram: Ediel Publication Document assembly model

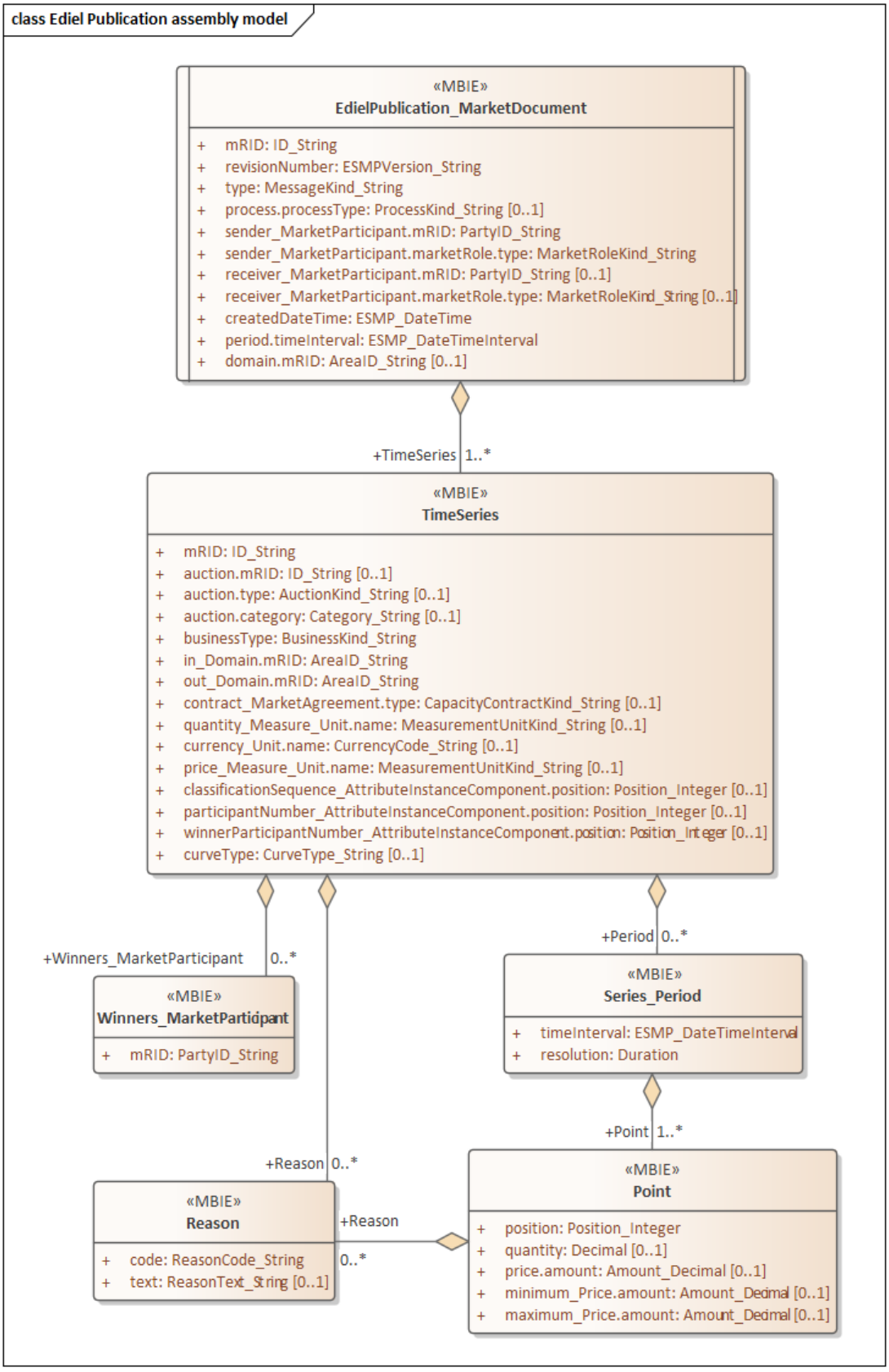

Figure 27: Class diagram: Ediel Publication Document assembly model

4.7.3 Attribute usage: Ediel Publication Document (CIM version)

Attribute	Cl.	Code and description
Ediel Publication Document		
mRID	[1]	Unique identification of the document.
revisionNumber	[1]	Fixed 1
type	[1]	**A25** Allocation result **A38** Reserve Allocation Result **A44** Price document
process.processType	[1]	**A01** Day-ahead **A17** Schedule day - The process concerns the day ahead, intraday and eventually ex-post scheduling in a single document. The schedule will be transferred within the total position including historic information (The trade balance of a party at a given time) **A19** Intraday accumulated **A51** Automatic frequency restoration reserve (replacing **A29** Secondary reserve process) **A52** Frequency containment reserve (replacing **A28** Primary reserve process) **A58** mFRR capacity market (mFRR CM) **A59** Internal trade reporting **Note**: This is a Nordic Ediel extension.
sender_MarketParticipant.mRID	[1]	Identification of the party who is sending the document.
Sender_MarketParticipant.marketRole.type	[1]	**A11** Market operator (or TSO)
receiver_MarketParticipant.mRID	[0..1]	Identification of the party who is receiving the schedules. Not used when the document is published at a web site.
receiver_MarketParticipant.marketRole.type	[0..1]	**A08** Balance responsible party **A11** Market operator (NOIS) **A38** Reconciliation Responsible **A46** Balancing Service Provider **A47** Energy Trader (non-balance responsible party) **A48** LFC Operator (replaces **A04** System Operator) Not used when the document is published at a web site.
createdDateTime	[1]	Date and time for creation of the document.
period.timeInterval	[1]	The beginning and ending date and time of the period covered by the document.

Attribute	Cl.	Code and description
domain.mRID	[0..1]	Nordic area, National Area, Bidding Zone.
TimeSeries	[1..*]	
mRID	[1]	Unique ID of the time series.
businessType	[1]	**A01** Production **A04** Consumption **A06** External trade without explicit capacity **A08** Net internal trade (ENTSO-E definition: "Net internal trade - where the direction from out party (seller) to in party (buyer) is positive and the opposite direction is negative (with minus signs)") **A12** Secondary control (A time series concerning secondary reserve) (**aFRR,** earlier **LFC**) **A24** Total trade (ENTSO-E definition: "A time series concerning the total of both the internal and external trades) (Usage in Sweden: The trade balance of a party at a given time) **A62** Spot Price **C25** Frequency bias **C26** Frequency Containment Reserve-Normal (FCR-N) **C27** Frequency Containment Reserve-Disturbance (FCR-D)
in_Domain.mRID	[1]	Relevant area for the market.
out_Domain.mRID	[1]	The same area as "In-area" (Required in ECAN Publication Document).
contract_MarketAgreement.type	[0..1]	**A01** Daily **A02** Weekly **A07** Intraday contract Usage must be specified when implementing.
quantity_Measure_Unit.name	[0..1]	**MWH** MWh Shall be used when a quantity is stated.
currency_Unit.name	[0..1]	Any valid ISO 3 letter currency code, such as: **DKK** Danish Kroner **EUR** EURO **NOK** Norwegian Kroner **SEK** Swedish Kronor Shall be used when a price is stated.
price_Measure_Unit.name	[0..1]	**MWH** MWh Shall be used when a price is stated.
Series_Period	**[0..*]**	
timeInterval	[1]	Time Interval.

Attribute	Cl.	Code and description
resolution	[1]	The resolution defining the number of periods that the time interval is divided. The resolution is expressed in compliance with ISO 8601 in the following format: PnYnMnDTnHnMnS. Where nY expresses a number of years, nM a number of months, nD a number of days. The letter "T" separates the date expression from the time expression and after it nH identifies a number of hours, nM a number of minutes and nS a number of seconds. E.g., **PT1H** or **PT60M**
Point	**[1..*]**	
position	[1]	The relative position of a period within an interval Usage must be specified when implementing.
quantity	[0..1]	The quantity for the interval in question Usage must be specified when implementing.
Price.amount	[0..1]	The price expressed per currency per unit of price measure Usage must be specified when implementing.
Maximum_Price.amount	[0..1]	Maximum Price Usage must be specified when implementing. **Note**: This is a Nordic Ediel extension.
Minimum_Price.amount	[0..1]	Minimum Price Usage must be specified when implementing. **Note**: This is a Nordic Ediel extension.

Table 12: Attribute usage of Ediel Publication Document (CIM version)

4.7.4 Dependency matrix for Ediel Publication Document

Publication Document type	Process.Type	businessType	market Agreement. type
A25 Allocation result	**A01** Day-ahead	**A06** External trade without explicit capacity	Not used
		A08 Net internal trade	Not used
	A19 Intraday accumulated	**A06** External trade without explicit capacity	Not used
		A08 Net internal trade	Not used
	A17 Schedule day	**A08** Net internal trade	Not used
A38 Reserve Allocation Result (Operational bids)	**A52** Frequency containment reserve (replacing **A28** Primary reserve process)	**C26** Frequency Containment Reserve-Normal (FCR-N)	**A01** Daily **A02** Weekly **A07** Intraday contract
		C27 Frequency Containment Reserve-Disturbance (FCR-D)	
	A51 Automatic frequency restoration reserve (replacing **A29** Secondary reserve process)	**A12** Secondary control (A time series concerning secondary reserve) (**aFRR,** earlier **LFC**)	Not used
	A58 mFRR capacity market (mFRR CM)	**A01** Production	Not used
		A04 Consumption	Not used
	A59 Internal trade reporting	**A01** Production	Not used
		A04 Consumption	Not used
A44 Price document	**A01** Day-ahead	**A06** External trade without explicit capacity	Not used
	A19 Intraday accumulated	**A06** External trade without explicit capacity	Not used
	A52 Frequency containment reserve (replacing **A28** Primary reserve process)	**C26** Frequency Containment Reserve-Normal (FCR-N)	Not used
		C27 Frequency Containment Reserve-Disturbance (FCR-D)	Not used
	A51 Automatic frequency restoration reserve (replacing **A29** Secondary reserve process)	**A12** Secondary control (A time series concerning secondary reserve) (**aFRR,** earlier **LFC**)	Not used
	A58 mFRR capacity market (mFRR CM)	**A01** Production	Not used
		A04 Consumption	Not used
	A59 Internal trade reporting (Bilateral trade)	**A01** Production	Not used
		A04 Consumption	Not used

Table 13: Dependency matrix for Ediel Publication Document

4.8 IEC/CIM Merit Order List Document

This description is based on the Merit Order List Document found in IEC62325-451-7 Ed.1 see [2] and the subset for MOL AOF described by NBM, see [12].

The document is used in the following exchanges:

- **Table 1:** ENTSO-E documents used in the Nordic trading system:
    - 6.0, mFRR EAM bid list

4.8.1 Class diagram Merit Order List Document contextual model

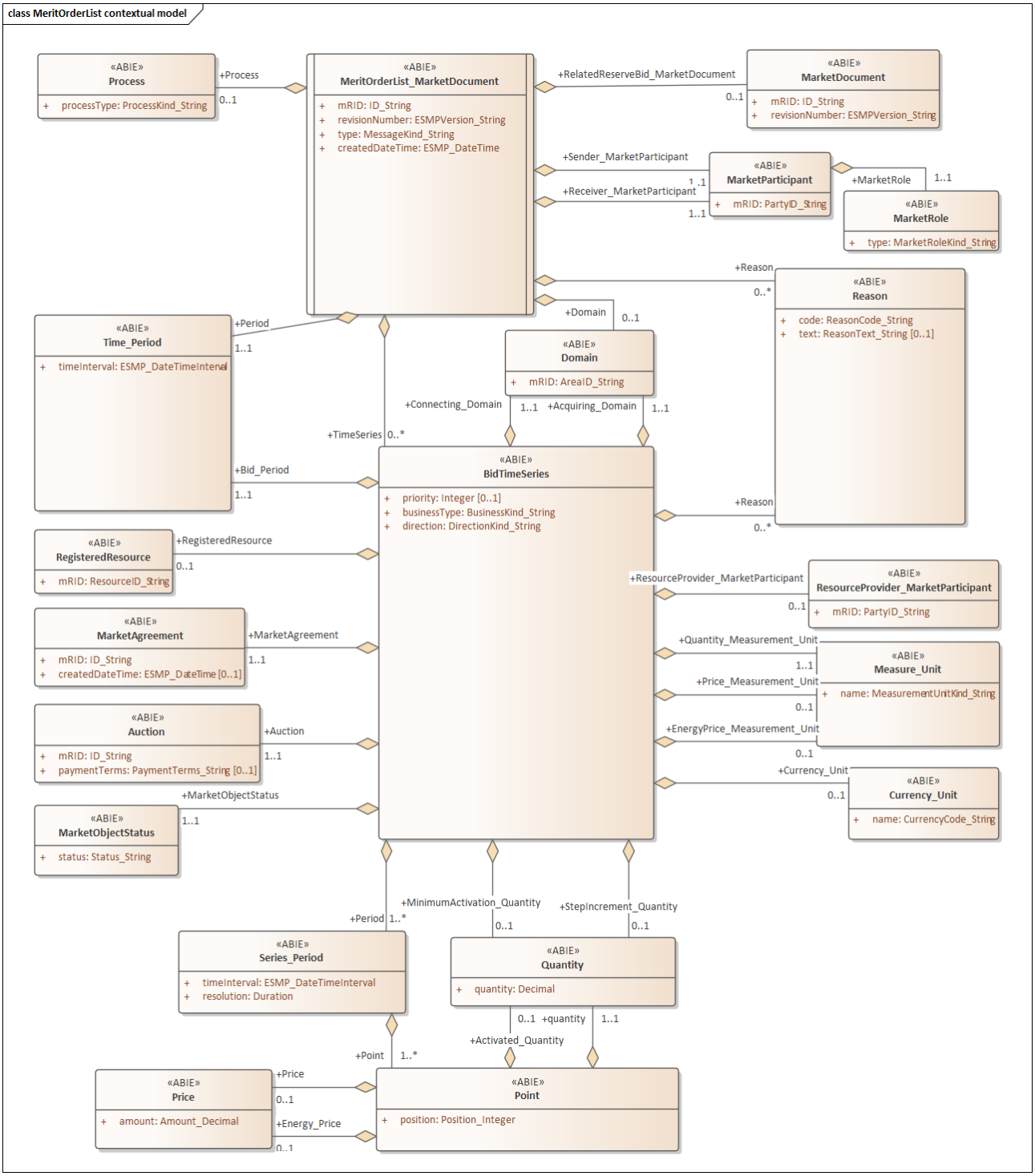

Figure 28: Class diagram: Merit OrderL ist Document contextual model

4.8.2 Class diagram: Ediel Merit Order List Document assembly model

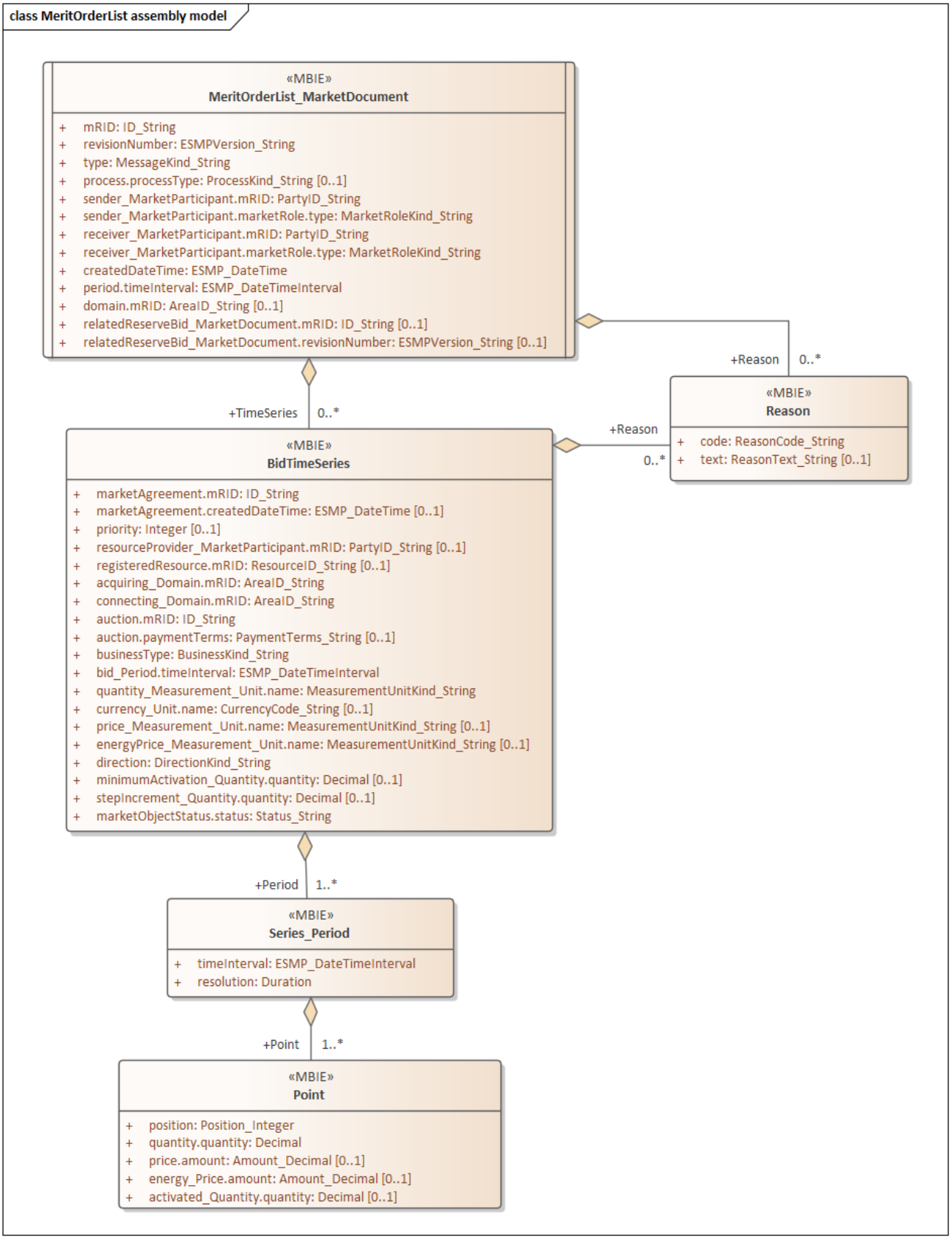

Figure 29: Class diagram: Merit Order List Document assembly model

4.8.3 Attribute usage: Merit Order List Document

Attribute	Cl.	Code and description
MeritOrderList_MarketDocument		
mRID	[1]	The unique identification of the document being exchanged within a business process flow.
revisionNumber	[1]	The identification of the version that distinguishes one evolution of a document from another.
type	[1]	The coded type of a document. The document type describes the principal characteristic of the document. NBM(TERRE): **A66** Final MOL
process.processType	[1]	The identification of the nature of process that the document addresses. The process dealt with in the document. NBM(TERRE/MARI): **A60** mFRR with scheduled activation
sender_MarketParticipant.mRID	[1]	Identification of the party who is sending the document.
Sender_MarketParticipant.marketRole.type	[1]	The identification of the role played by the document owner (MarketParticipant). NBM(TERRE/MARI): **A35** MOL Responsible **A48** LFC Operator
receiver_MarketParticipant.mRID	[1]	Identification of the party who is receiving the document.
receiver_MarketParticipant.marketRole.type	[1]	The identification of the role played by the document recipient (MarketParticipant). NBM(TERRE/MARI): **A04** System Operator
createdDateTime	[1]	Date and time of the creation of the document.
period.timeInterval	[1]	The beginning and ending date and time of the period covered by the document.
domain.mRID	[0..1]	The unique identification of the domain that is covered by the document.

Attribute	Cl.	Code and description
relatedReserveBid_MarketDocument.mRID	[0..1]	The identification of the Reserve Bid market document that has been taken into account. In the ESMP context, the "model authority" is defined as a party (originator of the exchange) that provides an identification in the context of a business exchange such as document identification. Master resource identifier issued by a model authority. The mRID is globally unique within an exchange context. Global uniqueness is easily achieved by using a UUID for the mRID. It is strongly recommended to do this. For CIMXML data files in RDF syntax, the mRID is mapped to rdf:ID or rdf:about attributes that identify CIM object elements.
relatedReserveBid_MarketDocument.revisionNumber	[0..1]	The revision number (the version that distinguishes one evolution of a document from another) of the Reserve Bid market document that has been taken into account.
Reason (MeritOrderList_MarketDocument level)	[0..*]	
code	[1]	The motivation of an act in coded from.
text	[0..1]	The textual explanation corresponding to the reason code.
BidTimeSeries	[0..*]	
marketAgreement.mRID	[1]	The unique identification of the agreement.
marketAgreement.createdDateTime	[0..1]	The date and time of the creation of the agreement.
priority	[0..1]	The numeric local priority given to a bid. Lower numeric values will have higher priority.
resourceProvider_MarketParticipant.mRID	[0..1]	The identification of the party that supplied the reserve.
registeredResource.mRID	[0..1]	The unique identification of a resource. This is the resource used to provide the reserve. The identification of a resource associated with a TimeSeries.
acquiring_Domain.mRID	[1]	The unique identification of the domain (area) where the product is being delivered.
connecting_Domain.mRID	[1]	The unique identification of the domain (area) where the resource is located.
auction.mRID	[1]	The unique identification of the auction.

Attribute	Cl.	Code and description
auction.paymentTerms	[0..1]	The terms which dictate the determination of the bid payment price.
businessType	[1]	The identification of the nature of the time series. NBM(TERRE): **B74** Offer **B75** Need
bid_Period.timeInterval	[1]	The beginning and ending date and time of the period covered by the tender.
quantity_Measurement_Unit.name	[1]	The measurement unit associated with the quantities in the TimeSeries as defined by UN/ECE Recommendation 20.
currency_Unit.name	[0..1]	The formal ISO 4217 code identifying the currency associated with the TimeSeries.
price_Measurement_Unit.name	[0..1]	The measurement unit associated with the power price in the TimeSeries as defined by UN/ECE Recommendation 20.
energyPrice_Measurement_Unit.name	[0..1]	The measurement unit associated with the energy price in the TimeSeries as defined by UN/ECE Recommendation 20.
Direction	[1]	The coded identification of the energy flow. It states how the energy flows from the perspective of the acquiring domain's system operator. NBM(TERRE): **A01** Up **A02** Down
minimumActivation_Quantity.quantity	[0..1]	The minimum quantity of the product that can be activated.
stepIncrement_Quantity.quantity	[0..1]	The minimum step quantity permitted.
marketObjectStatus.status	[1]	The coded condition or position (status) of an object (TimeSeries) with regard to its standing. NBM(TERRE): **A06** Available (the offer has not been required) **A10** Ordered (i.e. common platform has requested that the TSO activate an offer) **A33** Not satisfied (i.e. The need cannot be satisfied by the common platform)
Reason (BidTimeSeries level)	[0..*]	
code	[1]	The motivation (reason) of an act in coded form. NBM(TERRE): **A95** Complementary information
text	[1]	The textual explanation corresponding to the reason code.

Attribute	Cl.	Code and description
Series_Period	**[1..*]**	
timeInterval	[1]	The start and end time of the period.
resolution	[1]	The resolution defining the number of periods that the time interval is divided. The resolution is expressed in compliance with ISO 8601 in the following format: PnYnMnDTnHnMnS. Where nY expresses a number of years, nM a number of months, nD a number of days. The letter "T" separates the date expression from the time expression and after it nH identifies a number of hours, nM a number of minutes and nS a number of seconds. E.g., **PT1H** or **PT60M**
Point	**[1..*]**	
position	[1]	A sequential value representing the relative position within a given time interval.
quantity.quantity	[1]	The quantity that is tendered for the interval in question.
price.amount	[0..1]	This is the power price for each unit of quantity.
energy_Price.amount	[0..1]	The price of the energy that is used.
activated_Quantity.quantity	[0..1]	The quantity that has been activated for the interval in question.

Table 14: Attribute usage of Merit Order List Document (CIM version)

4.9 IEC/CIM Balancing Market Document (IEC/CIM 62325-451-6, Ed. 2.1)

The Balancing Market Document (CIM version) is developed by ENTSO-E/WG-EDI, see [1].

The document is used in the following exchanges:

- **Table 1:** ENTSO-E documents used in the Nordic trading system:
  - 3.6, Market result

4.9.1 Class diagram: Balancing Market Document contextual model

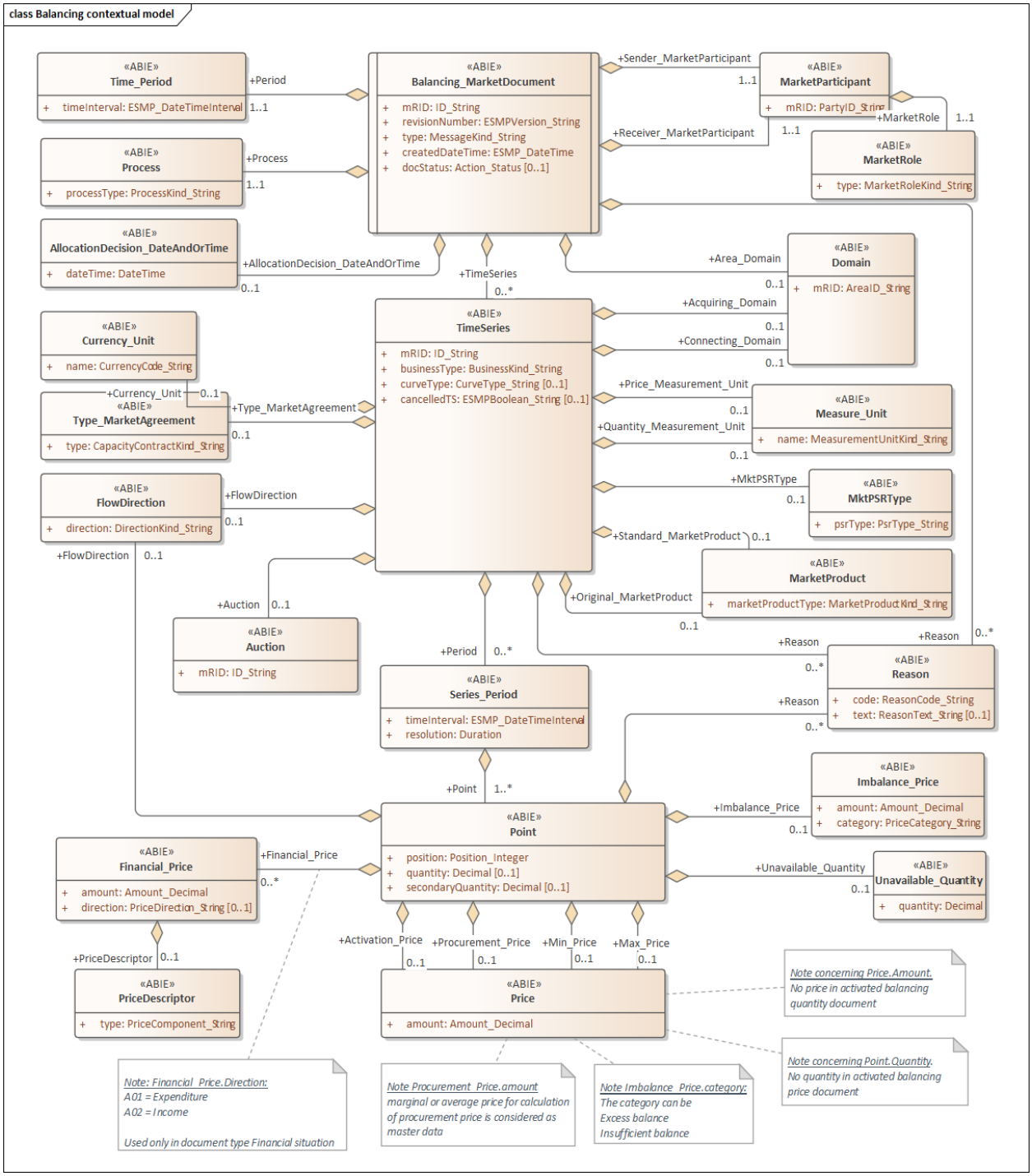

Figure 30: Class diagram: Balancing Market Document contextual model

4.9.2 Class diagram: Balancing Market Document assembly model

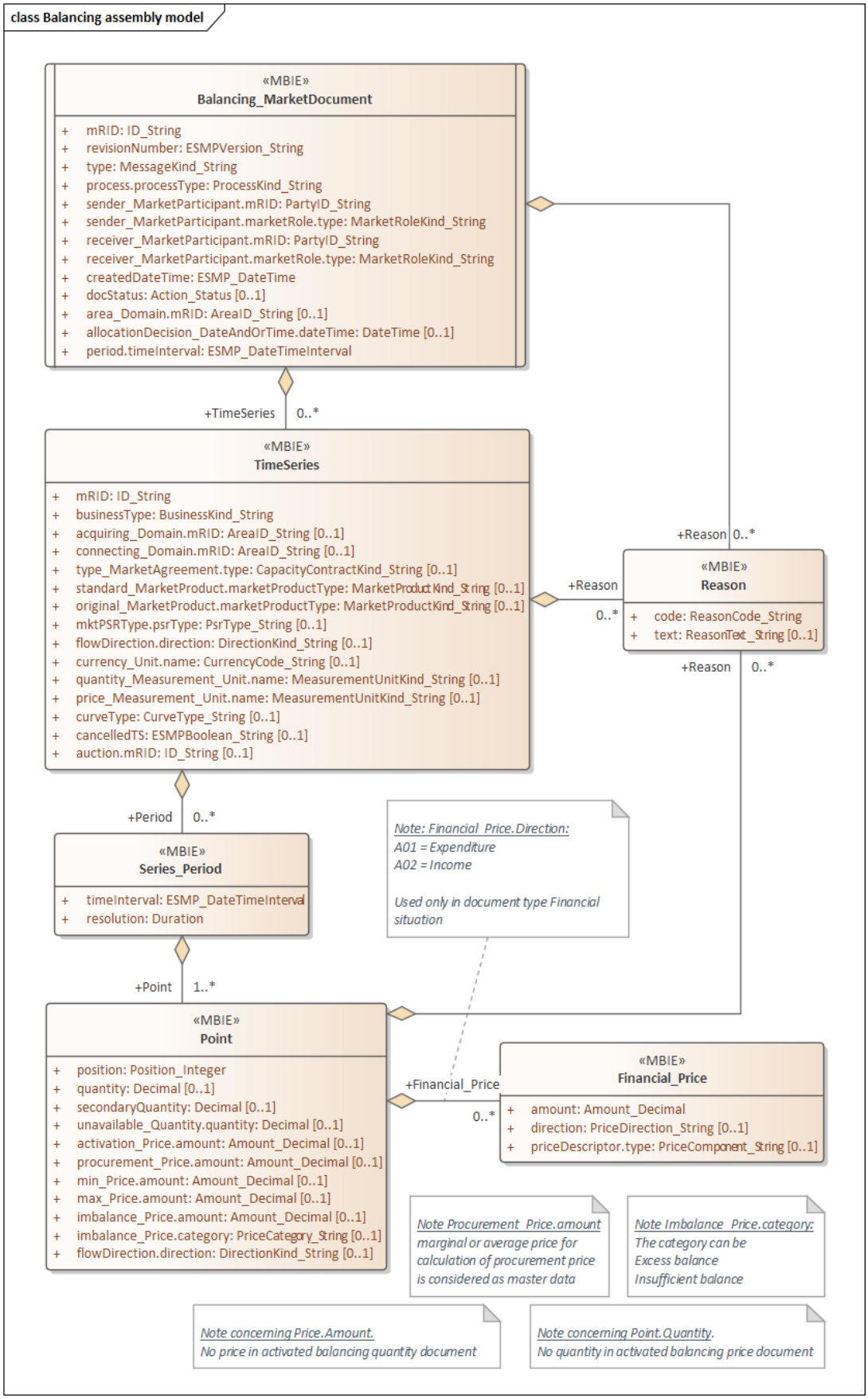

Figure 31: Class diagram: Balancing Market Document assembly model

4.9.3 Attribute usage: Balancing Market Document

Attribute	Cl.	Code and description
Balancing _MarketDocument		
mRID	[1]	Unique identification of the document.
revisionNumber	[1]	Fixed 1.
type	[1]	**B34** Market result document
process.processType	[1]	**A52** Frequency containment reserve
sender_MarketParticipant.mRID	[1]	Identification of the party who is sending the document. E.g.: **10V1001C--000284** (Nordic MMS)
sender_MarketParticipant. marketRole.type	[1]	**A34** Reserve allocator
receiver_MarketParticipant.mRID	[1]	Identification of the party who is receiving the schedules.
receiver_MarketParticipant. marketRole.type	[1]	**A46** Balancing Service Provider (BSP) **A39** Data Provider Agents sending on behalf of BSPs will use market role **A39.**
createdDateTime	[1]	Date and time for creation of the document (in ISO 8601 UTC format): YYYY-MM-DDTHH:MM:SSZ
area_Domain.mRID	[1]	The identification of the control area of the issuer. E.g.: **10Y1001A1001A91G** (Nordic Market Area)
period. TimeInterval	[1]	The period covered by the document (in ISO 8601 UTC format): YYYY-MM-DDTHH:MMZ Example.: <start>2024-01-17T22:00Z</start> <end>2024-01-18T22:00Z</end>
Time Series	**[1..*]**	
mRID	[1]	Unique ID of the time series.
businessType	[1]	**C26** Frequency Containment Reserve –Normal (FCR-N) **C27** Frequency Containment Reserve -Disturbance (FCR-D)
acquiring_Domain.mRID	[1]	The identification of the acquiring area. E.g.: **10Y1001A1001A91G** (Nordic Market Area)
connecting_Domain.mRID	[1]	The identification of the acquiring area. E.g.: **10Y1001A1001A91G** (Nordic Market Area)
type_marketAgreement.type	[1]	**A01** Daily
standard_MarketProduct.marketProductType	[0..1]	**Z02** Dynamic product **Z03** Static product Only used for FCR-D.

Attribute	Cl.	Code and description
flowDirection.direction	[1]	**A01** UP (signifies that the available power can be used by the Acquiring area to increase energy) **A02** DOWN (signifies that the available power can be used by the Acquiring area to decrease energy) **A03** UP and DOWN (signifies that the UP and Down values are equal) Dependency: **A01** and **A02 are** only used for FCR-D **A03** is only used for FCR-N (Symmetric)
currency_Unit.name	[1]	Any valid ISO 3 letter currency code, e.g.: **EUR** EURO
quantity_Measure_Unit.name	[1]	**MAW** megawatt
price_Measure_Unit.name	[1]	**MAW** megawatt
auction.mRID	[1]	The unique identification of the auction. E.g. use one of the following values: **"FCR_CAPACITY_MARKET_1ST_SE_DK"**[6] **"FCR_CAPACITY_MARKET_1ST_NO"** **"FCR_CAPACITY_MARKET_2ND_COMMON"**
Period	**[1..*]**	
timeInterval	[1]	The start and end date and time of the time interval of the period in question.
resolution	[1]	The time resolution is always the difference between the Time Interval End and the Time Interval Start. E.g.: **PT60M**
Point	**[1..*]**	
position	[1]	The position of the observation in a time series. Sequential value beginning with 1 and increased by 1 for each repetition of Point.
quantity	[1]	The quantity for the interval in question. E.g.: Total volume procured.
procurement_Price.amount	[1]	Market price

Table 15: Attribute usage of Balancing Market Document

[6] The information corresponds to D-2 and D-1 respectively in older Swedish user guides.

5 Business rules

5.1 General ground rules

The process flow assumes that a certain number of basic rules are respected. This does not include the specific rules that have been defined in an interchange agreement. These basic rules are:

1. The last valid document (latest Creation date) received before cut-off time is the valid document.
2. Reserve bids for mFRR EAM can be changed until 45 minutes before the hour.
3. All version numbers shall be positive integer values and leading zeros shall be suppressed.
4. All documents received shall have an acknowledgement (acceptance, rejection, or errors).
5. All the times related to energy products in the documents are expressed in Coordinated Universal Time (the acronym of which is UTC) in compliance with ISO 8601. This is restricted to YYYY-MM-DDTHH:MMZ in order to remain in conformity with XML schema requirements.
6. All the time intervals in the documents are expressed in compliance with ISO 8601 This is restricted to YYYY-MM-DDTHH:MMZ/YYYY-MMDDTHH:MMZ. The time interval has an inclusive start time and an exclusive end time and is expressed in minutes (i.e., 00:00Z to 00:00Z is exactly a 24-hour period).
7. The time interval defined in the period class shall always be a multiple of its resolution.
8. Negative quantities for a time series are only permitted for certain categories of time series.
9. It is preferred that the quantity for a Balance responsible time series in a day-ahead and an intraday is given in power units' as the average value over the time interval.
10. Whenever a coded value within a document is associated with a coding scheme, the coding scheme must always be supplied. The coding scheme is an independent attribute with a size of 3 alphanumeric characters.
11. To cancel bids, the Bid Document shall be resubmitted with "0"-values in the quantity of the relevant time series.
12. One legal entity can be identified by different id's for different purposes, apart from in Sweden.
13. All the documents use UTF-8, hence supporting all Scandinavian characters.