Review of FCAS metering test and certification requirements

Brief Prepared for AEMO

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1. Scope

Assist AEMO to include FCAS meter testing and or certification requirements in the Market Ancillary Service Specification (MASS).

2. Introduction

Traditionally, FCAS in the National Electricity Market (NEM) have been provided by utility-scale transmission connected plant that have high-speed data recorders in place as standard to confirm they are able to meet their registered Generator Performance Standard. These data recorders meet or exceed the telemetry requirements of the Market Ancillary Service Specification (MASS). They may have also been used for FCAS measurement requirements.

With the inclusion of VPP's for FCAS provision there is a requirement to ensure by validation all FCAS metering (including utility scale highspeed data recorders) comply with the accuracy and performance requirements specified in the MASS.

3. Approach.

Desktop review of existing AEMO FCAS performance requirements for testing and certification of the assets.

Documents reviewed and observation.

1: Market Ancillary Services Specification v70
2: Battery Energy Storage System requirements for contingency FCAS registration v2.0
3: VPP Demonstrations FCAS Specification v1.1

MARKET ANCILLARY SERVICES SPECIFICATION

Section 5.3 table 4, specifies the measurement and accuracy requirements for the different FCAS types. The measured quantities are frequency and active power with the range of OFTB for frequency and as appropriate to the Ancillary Service Facility for active power.

Comment 1: The MASS does not specify any testing or certification requirements for the metering / instruments used to perform the measurements.
Testing and or certification is needed to provide confidence in the measurements made.

BATTERY ENERGY STORAGE SYSTEM GUIDE FOR CONTINGENCY FCAS REGISTRATION

Section 2 (h), (i), (j) describes the requirements for the desktop simulation and onsite testing of batteries and states that;

> *the metering facilities must comply with the MASS requirements specified under Table 4 of the MASS. The data provided following the tests during the commissioning process will be used to confirm whether the facility complies with the MASS*

See Comment 1: Above

VPP DEMONSTRATIONS FCAS SPECIFICATION

Historical document not current, only referenced to review other test methods if any.

Appendix B describes the requirements for the frequency injection tests with measurement requirements from MASS v5.0 which are moved to, Table 4 (in the Mass v7.0).

See Comment 1: Above.

4. Summary

To date the MASS relies on the assumption that the highspeed meters in utility scale installations are used for FCAS measurements and that these highspeed meters meet or exceed the accuracy requirements of the MASS. Whilst this may be a reasonable assumption for utility scale installations it is still an assumption.
This assumption could not be validated as there is no register of FCAS meters and needs to be qualified.

A market participant seeking to register in the FCAS markets undergoes an assessment process and has ongoing compliance requirements. As part of this process, they are required to complete a lab test of the different battery types and in the case of a VPP, an area wide test to demonstrate the aggregated FCAS response. Measurements performed as part of the assessment process must comply with Table 4 of the Mass.
Mass Table 4 specifies measurement accuracy requirements, however there is no requirement for traceability of the measurement to ensure the measurement itself is of a known accuracy.

Without a test and or certification regime to validate the FCAS meters used the measurement should not be relied on, or considered consistent across all participants.

5. Recommendation.

- That each FCAS meter model used for FCAS measurement is type tested to a common standard to ensure that all measurements made can be relied on and are consistent for all participants.

- The requirement to type test the FCAS meter for compliance to the adopted standard is included in the MASS.

- IEC 61557-12 edition 2.1-2021-05 is adopted for performance and test requirements. Requirements apply for standalone meters and metering embedded in other devices.

- Table 4 of the MASS is modified to use the metrology nomenclature and definitions from IEC 61557-12 ensuring consistency in their application.

- To ensure that the type test does not add a significant cost burden to the participant, type tests from the adopted standard will only apply to frequency and active power measurements. Furthermore, as these are type tests, they are only performed on a single unit of each FCAS meter model.

Application of IEC 61557-12 type tests				
Measurement Parameters	Requirements Clause	Comment	Type Test Clause	Comment
Active Power and Frequency			6.2.1 6.2.2 6.2.3 6.2.4	General test and acceptance requirements and temperature influence. Where the meter is embedded in another device the respective clause in Annex H applies.
Active Power	4.8.2	Specifies the limits of uncertainty, over the rated measuring range, under reference conditions and influence quantities, environmental and electromagnetic. Sample rate, measurement range and uncertainty as specified in Table 4 of the MASS	6.2.5 6.2.16	Specific tests for active power measurement and EMC test. Where the meter is embedded in another device the respective clause in Annex H applies
Frequency	4.8.5	Specifies the limits of uncertainty, over the rated measuring range, under reference conditions and influence quantities, environmental and electromagnetic.	6.2.9	Specific test for frequency measurement. Where the meter is embedded in another device the respective clause in Annex H applies.

		Sample rate, measurement range and uncertainty as specified in Table 4 of the MASS		

- All other measurement requirements in table 4 remain unchanged except for settling time. Following advice from AEMO that the settling time requirement is ambiguous and often considered as a requirement of the asset rather than the FCAS meter measurement performance. To avoid confusion the settling time requirement can be removed from Table 4 of the MASS, as the metering sampling rate and accuracy are specified elsewhere in Table 4 with certainty of measurement once the appropriate standard is adopted.

- A register of FCAS meters is created and maintained by AEMO to ensure all FCAS meters meet a required standard.

- Add a new definition: FCAS Meter -The equipment required to measure and record the delivery of FCAS. Measurement performance certified to IEC 61557-12

END