

TITLE: Primary Support in Finland (PPiF)		AUTHOR: Raphael CAIRE DATE: 30 th of June 2021	
Object under Investigation (Oul) "The component(s) Energy Boxes and coordination platform that are to be qualified by the test". They are named as Objects under Investigation (Oul)	Test Objectives Why is the test needed? What do we expect to find out? The idea of the project is to test and further develop, in the specificities of Finland, Primary Frequency Support. It is expected to find out that the performances of the implementation developed in Grenoble University is fully compliant with grid codes and the upstream reserve can be achieved thanks to electric heating ON control. The understanding of the load and the inertia of the building could be evaluated without any further endogenous sensors such as temperature sensor. Some external information from weather forecast should be able to complement and ease the model to be developed.	System under Test (SuT) Systems, subsystems, components included in the test case or test setup Household loads interconnected to an aggregation platform and the Primary Support™ system consisting in: <ul style="list-style-type: none">Several small similar loads with connection size up to 16 A.Coordination platform for primary supportEnergy boxes connected physically to the loads	
Function(s) under investigation (FuI) "The referenced specification of a function realized (operationalized) by the object under investigation". The Functionality under investigation is the correct and compliant procurement and activation of Frequency Containment Reserve fully distributed.		Functions under Test (FuT) Functions relevant to the operation of the system under test (SuT), including frequency Support and relevant interactions btw. the load/building and the SuT. Reserve procurement and correct anticipation of the load behavior as well as margins to be reduced are of major interest.	
Domain under Investigation (Dul): "The relevant domains of test parameters and connectivity" <ul style="list-style-type: none">Power System, ICT	Purpose of Investigation (PoI) The test purposes classified in with terms <i>Characterization, Verification, or Validation</i> As described in the project, Grenoble INP/G2Elab is willing to characterize the behaviour of a distributed Frequency Containment Reserve in the framework of a highly electric heating sensitive system and verify that electric heater, correctly modelled can safely procure upstream reserve without any further intrusive sensors. This validation will allow the interaction with Finish industrials for further developments.		
Target metrics (TM) Measures retrievable from SuT required to quantify each of the identified test criteria The final KPI is the ability to procure Frequency Containment Reserve ($\Delta P_{lim}=f(\text{frequency})$) and activate it on purpose. The performance metrics will thus be: <ul style="list-style-type: none">Frequency measurement and deviation from fundamentalLoad modelling in terms of flexibilityResponsiveness of the systemAssessment of over or under compensation	Test criteria (TCR) Formulation of criteria for each PoI based on properties of SuT; encompasses properties of test signals and output measures The test signal is directly sense from the Grid. It is indeed related to the frequency deviation. The KPI as described on the (TM) is directly related to the right amount of frequency support to be activate at the right time.	Variability attributes (VA) Identify relevant controllable or uncontrollable factors of the SuT and their required variability; refer to PoI <ul style="list-style-type: none">Load VariabilityHuman in the Loop interactionCommunication performances	
	Quality attributes (QA) Threshold levels for test result quality as well as pass/fail criteria The threshold to be considered is related to the under procurement of FCR at any time of the day or at targeted periods.		