APPENDIX 2 Type Test Certification Test Result Sheet

Micro-generator details

MICRO-GENERATOR Type reference: *Fronius Symo 8.2-3-M*		
Maximum continuous rating: 8200W		
Manufacturer: *Fronius International GmbH*	Tel: *+43-7242-241-0* Fax: *+43-7242-241-224*	Address: *Guenter Fronius Str 1* *4600 Wels-Thalheim, Austria*
Technical file reference No.:		

Test house details

Name and address of test house	*Fronius R&D Laboratories, Fronius International GmbH, Guenter Fronius Str 1, A-4600 Wels-Thalheim, Austria*
Telephone number	*+43-7242-241-0*
Facsimile number	*+43-7242-241-224*
E-mail address	*pv@fronius.com*

POWER QUALITY

Harmonic current emissions (A) Maximum permissible harmonic current as per BS EN 61000-3-2								
Harmonic	2nd	3rd	5th	7th	9th	11th	13th	15th – 39th
Limit	1,08	2,3	1,14	0,77	0,4	0,33	0,21	0,15x(15/n)
Test value (max value of Phase1,2,3)	*0.027*	*0.060*	*0.088*	*0.043*	*0.049*	*0.035*	*0.040*	*PASS*

Voltage Fluctuations and Flicker				
	Starting	Stopping	Running	
Limit*	4%	4%	P_{st} = 1.0	P_{lt} = 0.65
Test value	-0.06**	- **	0.1260 **	0.0957 **

*Maximum permissible voltage fluctuation (expressed as a percentage of nominal voltage at 100% power) and flicker. As per BS EN 61000-3-11.

** The EUT itself does not produce flicker relevant variations of the line current, startup is made using a ramp function and does therefore not create relevant d_{MAX} values.
Solar power variations naturally lead to variations of the electric power fed into the grid, however these variations are not significant for P_{ST} and P_{LT}.

	Power factor		
Protection Limit	+0.95 lag–0,95 at three voltage levels		
	210 V	230 V	250 V
Test value	0.9924	0.9878	0.9959

Under / Over frequency tests

	Under Frequency		Over Frequency	
Parameter	Frequency (Hz)	Time (s)	Frequency (Hz)	Time (s)
Protection limit	48 Hz	500 msec	50,5 Hz	500 msec
Actual setting	48,02 Hz	480 msec	50,48 Hz	480 msec
Trip value	48,015 Hz	492 msec	50,493 Hz	498 msec

Under / Over voltage tests (single stage protection)

	Under Voltage		Over Voltage	
Parameter	Voltage (V)	Time (s)	Voltage (V)	Time (s)
Protection limit	207 V	500 msec	253 V	500 msec
Actual setting	209,00 V	480 msec	250,40 V	480 msec
Trip value	207,98 V	498 msec	252,62 V	498 msec

LoM test

Method used	Frequency shift		
Output power level*	10%	55%	100%
Trip setting clearance time	500 msec	500 msec	500 msec
Trip value clearance time	435 msec	498 msec	398 msec

*indicative values are shown for minimum, medium and maximum power levels.

Fault level contribution

Micro-generator short-circuit parameters					
For a directly coupled SSEG			For a Inverter SSEG		
Parameter	Symbol	Value	Time after fault	Volts	Amps
Peak Short Circuit current	i_p	--	20ms	65,5V	13,7A
Initial Value of aperiodic current	A	--	100ms	30,0V	11,3A
Initial symmetrical short-circuit current*	I_k	--	250ms	19,7V	12,4A
Decaying (aperiodic) component of short circuit current*	i_{DC}	--	500ms	14,8V	12,4A
Reactance/Resistance Ratio of source*	X/R	--	Time to trip	537,8ms	In milliseconds

COMMENTS

These tests have been carried out with specifications and parameters set to meet the requirements of CER/06/190. It is hereby declared by the manufacturer that all units shipped to Ireland will have identical parameter settings and that these parameters cannot be changed by a user, installer or by any person other than the manufacturer after the setup has been selected.

The protection settings of the inverter are in compliance with the Irish protection settings stated in EN50438 Annex A for Ireland.