APPENDIX 4 TYPE VERIFICATION TEST SHEET

SSEG DETAILS

SSEG Type reference:	*Fronius IG TL 3.6*	
SSEG Technology:	*Photo voltaic (Annex C)*	
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.:		
Maximum export capability (SSEG rating less parasitic load)	3680W	

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*

Test details

Date of test	Tuesday, 15 December 2009
Name of test Engineer	Riedler Peter
Signature of test Engineer	
Test location if different from above	

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)	*0,166*	*0,263*	*0,119*	*0,056*	*0,106*	*0,048*	*0,097*	*See TR LF_09042*

Harmonic current emissions (A) Maximum permissible harmonic current as per BS EN 61000-3-12								
Harmonic	2nd	3rd	5th	7th	9th	11th	13th	15th – 39th
Limit	1,73	8,86	5,19	3,24	2,59	2,16	1,73	0,15x(15/n)
Test value (max value of Phase1,2,3)	*0,2*	*0,424*	*0,178*	*0,103*	*0,147*	*0,081*	*0,128*	*See TR LF_09042*

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

*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}.

	DC injection*			**Power factor**		
G83/1 Limit	20mA, tested at three power levels			0.95 lag–0,95 lead at three voltage levels		
Test level	10%	55%	100%	212 V	230 V	248 V
Test value	±20mA	±20mA	±20mA	0,99	0,99	0,99

UNDER / OVER FREQUENCY TESTS

	Under Frequency		Over Frequency	
Parameter	Frequency (Hz)	Time (s)	Frequency (Hz)	Time (s)
G83/1 Limit	47 Hz	0,5 sec	50,5 Hz	0,5 sec
Actual setting	47,02 Hz	0,4 sec	50,48 Hz	0,4 sec
Trip value	>47Hz	<0,5 sec	<50,5 Hz	<0,5 sec

UNDER / OVER VOLTAGE TESTS

SSEG is configured to comply with the lower over voltage trip value.

	Under Voltage		Over Voltage	
Parameter	Voltage (V)	Time (s)	Voltage (V)	Time (s)
G83/1 Limit	207 V	1,5 sec (*)	264 V (*)	1,5 sec (*)
Actual setting	*209,07 V*	*1,2 sec*	*261,36 V*	*1,2 sec*
Trip value	>207V	<1,5 sec	<264 V	<1,5 sec

*The Fronius IG TL is configured by default in accordance with the “Engineering Recommendation G83/1”. The “Engineering Recommendation G59/1” applies if the following changes would be done. Please contact your Fronius Customer Service for further information.

- U inner Limit max — From 264V (G83/1) to 253V (G59/1)
- U inner Limit max Trip — From 1,5s (G83/1) to 0,5s (G59/1)
- U inner Limit min Trip — From 1,5s (G83/1) to 0,5s (G59/1)

LOSS OF MAINS TEST

Method used	Frequency shift		
Output power level*	10%	55%	100%
Trip setting	0,5 sec	0,5 sec	0,5 sec
Trip value	<0,5 sec	<0,5 sec	<0,5 sec

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

RECONNECTION TIMES

Parameter	Under/Over voltage	Under/Over Frequency	Loss of mains
Minimum value	180 seconds	180 seconds	180 seconds
Actual setting	*185* seconds	*185* seconds	*185* seconds
Recorded value	*>180 seconds*	*>180 seconds*	*>180 seconds*

SHORT CIRCUIT CURRENT CONTRIBUTION

As Photovoltaic SSEGs are inverter connected, they are deemed to automatically comply with clause 5.8 and no further tests are required.

COMMENTS