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Amtsgericht (District court) Kassel HRB (registration number) 3972
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Managing Board: Roland Grebe, Dr.-Ing. Jürgen Reinert, Lydia Sommer, Pierre-Pascal Urbon, Marko Werner

Certificate G59/2
Engineering Recommendation

Manufacturer:	SMA Solar Technology AG
Address:	Sonnenallee 1
Postal code, place:	34266 Niestetal
Country:	Germany

Test house Details	SMA Solar Technology AG

Type reference:	Max AC power	Nominal AC power
SI 8.0H-11	8000 VA	6000 VA
SI 6.0H-11	6000 VA	4600 VA

The results of the G59/2 tests are summarized in this certificate. SMA declares that all devices (with G59 setting) that are shipped to the UK comply with the requirements defined in engineering recommendation G59/2. These settings cannot be changed by an installer, user or by any other person without the use of a tool (password protected).
The complete documentation can be viewed at SMA (headquarters) after prior announcement.

Test details

- Power quality
- Harmonic current emissions as per BS EN 61000-3-12
- Voltage fluctuations and flicker as per BS EN 61000-3-11
- DC injection / Power factor
- Under / Over voltage switch off (based on requirement for LV connected)
- Under / Over frequency switch off
- Loss of mains test
- Reconnection time

Niestetal, 22. Mai 2014
SMA Solar Technology AG
ppa. Frank Greizer
ppa. Frank Greizer
(Vice President MPTPD)

Test results:

Power quality

Harmonic current emissions as per BS EN 61000-3-12		
Minimal Short Circuit Ratio R_{SCE} :		33 Ohm
Value of Short Circuit Power S_{SC} corresponding to R_{SCE} :	SI 8.0H-11	198 kVA
	SI 6.0H-11	151.8 kVA

Description			Harmonic Current % = 100 I_n/I_1						Harmonic Current Distortion Factors (%)	
Harmonic			3rd	5th	7th	9th	11th	13th	THD	PWHD
Limit BS EN 6100-3-12 Table 2 -4			21.6	10.7	7.2	3.8	3.1	2	23 (13)	23 (22)
Actual Values:	SI 8.0H-11	L1	1.74	0.64	0.40	0.18	0.01	0.04	2.099	0.259
	SI 6.0H-11	L1	1.41	0.47	0.39	0.09	0.03	0.04	1.728	0.373

Voltage Fluctuations and Flicker				
	starting	stopping	Running (at rated power)	
BS EN 61000-3-11	4 %	4 %	P_{st} = 1.0	P_{lt} = 0.65
Test value	< 1 %	< 1 %	< 1	< 0,65

DC Injection			
G59/2 Limit	20 mA		
Test level (% of rated power)	10%	55%	100%
Test value	-*	-*	-*
→*: these inverters have a galvanic isolated low frequency transformer which prevents any DC component			
Power factor			
G59/2 Limit	0.95 lag – 0.95 lead		
Test level (AC voltage)	212 V	230 V	248 V
Test value (at rated power)	> 0.99	> 0.99	> 0.99

Under / Over voltage

Over voltage test						
	G59/2 Limit		Setting		Test Results	
	Voltage	Time	Voltage	Time	Voltage	Time
Over voltage	264 V	0,5 s	260.4 V	0.2	260.35 V	<0.15 s
Under voltage test						
	G59/2 Limit		Setting		Test Results	
	Voltage	Time	Voltage	Time	Voltage	Time
Under voltage	208.8 V	0.5 s	212.4 V	0.2	210.70 V	<0.1 s

Under / Over frequency

Under / Over frequency test						
	G59/2 Limit		Setting		Test Results	
	Frequency	Time	Frequency	Time	Frequency	Time
Under frequency	47.5 Hz	20 s	47.5 Hz	0.2	47.54 Hz	<0.15 s
Over frequency	51.5 Hz	90 s	51.5 Hz	0.2	51.46 Hz	<0.15 s

Loss of mains test

Loss of mains test (method used: frequency shift)			
Test level (% of rated power)	10 %	55 %	100 %
G59/2 Limit	2.5 s	2.5 s	2.5 s
Actual setting	1.0 s	1.0 s	1.0 s
Trip values	1.43 s	1.45 s	1.44 s

Reconnection times

Reconnection times			
Test level (% of rated power)	Under/Over Voltage	Under/Over Frequency	Loss of mains
G59/2 Limit	180 s	180 s	180 s
Actual setting	180 s	180 s	180 s
Recorded values	183 s	184 s	186 s

Fault level contribution

As SSEGs (small-scale embedded generators) for PV or wind turbine systems are inverter-connected, they are deemed to automatically comply with regulations and no further tests are required.

Self monitoring – solid state switching

Not applicable as electro-mechanical relays used.