



## Certificate EN 50438/2007 with Irish deviations

### European Standard

Manufacturer	<b>SMA Solar Technology AG</b>
Address	Sonnenallee 1, 34266 Niestetal (Germany)

Type Tested reference number	ZE_EN50438_2007_IE_SB xx00TL-21_en_10
Generating Unit technology	Single phase inverter
Test house details	<b>SMA Solar Technology AG</b>
Test period	From 2014-09-04 until 2014-09-09

Type reference	Max. apparent AC power (VA)	Rated AC power (W)	From FW Pack
SB 5000TL-21	5000	4600	1.0.0.R
SB 4000TL-21	4000	4000	1.0.0.R
SB 3600TL-21	3680	3680	1.0.0.R
SB 3000TL-21	3000	3000	1.0.0.R

The results of the EN 50438/2007 are summarized in this certificate. SMA declares that all units shipped to Ireland, with at least the aforementioned FW version, are within the specifications and parameters set by the EN 50438/2007 European Standard with the Irish deviations. Note that all tests were carried out in the biggest inverter of the family under test. The results for the other inverters of the family are equivalent.



## Test Results

### Power quality

Harmonics as per EN 61000-3-2						
Order	Frequency [Hz]	Thresholds [A]	P/Pn [%]		Max. NV / Limit [%]	
			50	100		
			MV [A]	MV [A]		
2	100	1,08	0,008	0,022	2,04%	✓
3	150	2,3	0,117	0,214	9,30%	✓
4	200	0,43	0,004	0,011	2,56%	✓
5	250	1,14	0,049	0,058	5,09%	✓
6	300	0,3	0,003	0,007	2,33%	✓
7	350	0,77	0,041	0,055	7,14%	✓
8	400	0,23	0,003	0,006	2,61%	✓
9	450	0,4	0,032	0,046	11,50%	✓
10	500	0,184	0,003	0,006	3,26%	✓
11	550	0,33	0,024	0,035	10,61%	✓
12	600	0,153	0,003	0,006	3,91%	✓
13	650	0,21	0,02	0,028	13,33%	✓
14	700	0,131	0,003	0,005	3,80%	✓
15	750	0,15	0,017	0,024	16,00%	✓
16	800	0,115	0,003	0,005	4,35%	✓
17	850	0,132	0,017	0,02	15,11%	✓
18	900	0,102	0,003	0,005	4,89%	✓
19	950	0,118	0,014	0,015	12,67%	✓
20	1000	0,092	0,003	0,005	5,43%	✓
21	1050	0,107	0,013	0,013	12,13%	✓
22	1100	0,084	0,003	0,005	5,98%	✓
23	1150	0,098	0,011	0,01	11,24%	✓
24	1200	0,077	0,003	0,005	6,52%	✓
25	1250	0,09	0,01	0,011	12,22%	✓
26	1300	0,071	0,003	0,005	7,07%	✓
27	1350	0,083	0,009	0,01	12,00%	✓
28	1400	0,066	0,003	0,005	7,61%	✓
29	1450	0,078	0,008	0,009	11,60%	✓
30	1500	0,061	0,003	0,005	8,15%	✓
31	1550	0,073	0,007	0,009	12,40%	✓
32	1600	0,058	0,006	0,01	17,39%	✓
33	1650	0,068	0,006	0,007	10,27%	✓
34	1700	0,054	0,006	0,009	16,63%	✓
35	1750	0,064	0,005	0,008	12,44%	✓
36	1800	0,051	0,002	0,003	5,87%	✓
37	1850	0,061	0,005	0,006	9,87%	✓
38	1900	0,048	0,002	0,003	6,20%	✓
39	1950	0,058	0,004	0,006	10,40%	✓
40	2000	0,046	0,001	0,003	6,52%	✓

MV - Measured Value

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## Test Results

### Power quality

Voltage fluctuations and flicker as per EN 61000-3-3				
	Starting	Stopping	Running	
	dmax	dmax	Pst	Plt (2hours)
Limit	4,0%	4,0%	1	0,65
MV	0,0%	0,0%	0,21	0,21
Verification	✓	✓	✓	✓

Power factor			
	Voltage [V]		
	218,2	230	253
Limit	0,95	0,95	0,95
MV	1,00	1,00	1,00
Verification	✓	✓	✓

MV - Measured value

### Protection - Grid monitoring and reconnection time

Trip Tests	EN 50438:2007		Setting		Measures Values		Verification
	Magnitude	Time	Magnitude	Time	Magnitude	Time	
Undervoltage	207 V	500 ms	207 V	1500 ms	208 V	486 ms	✓
Overvoltage	253 V	500 ms	253 V	200 ms	252,73 V	467 ms	✓
Underfrequency	48 Hz	500 ms	48 Hz	500 ms	48,05 Hz	485 ms	✓
Overfrequency	50,5 Hz	500 ms	50,5 Hz	500 ms	50,47 Hz	482 ms	✓

Loss of mains test according to the EN 62116							
Test power / imbalance	Time (ms)	L1 (ms) <sup>1</sup>	L2 (ms) <sup>1</sup>	L3 (ms) <sup>1</sup>	L1-L2-L3(ms) <sup>12</sup>	Verification	
29% / -5%Q (Test 22)	500	136	N/A	N/A	N/A	✓	
58% / -5%Q (Test 12)	500	153	N/A	N/A	N/A	✓	
100% / -5%P (Test 5)	500	150	N/A	N/A	N/A	✓	
29% / +5%Q (Test 31)	500	164	N/A	N/A	N/A	✓	
58% / +5%Q (Test 21)	500	178	N/A	N/A	N/A	✓	
100% / +5%P (Test 10)	500	147	N/A	N/A	N/A	✓	

<sup>1</sup> indicates the stop of feed in

<sup>2</sup> only applicable for three phase inverters

Fault level contribution		
Time after fault	Voltage (V)	Current (A)
< 50 ms	230,7	24,77
100 ms	12,6	0,03
250 ms	10,65	0,03
500 ms	11,57	0,03

Reconnection time			
Limit	Setting	MV	Verification
20 s	20 s	22.01 s	✓