Alpha·ESS *Your Smart Energy*

Declaration of Irish Deviations According to EN50438

We

Company name:	Alpha ESS Co., Ltd.
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declare that the DoC is issued under our sole responsibility and belongs to the following product:

Product:	Hybrid Inverter
Model(s)	SMILE5-INV
Description:	Nominal output power: 5000 W Rated voltage: 230 V Grid voltage range: 180 ~ 270 Vac Max. charge current: 112 A Rated frequency: 50/60 Hz

Object of the declaration described above is in conformity with EN 50438:2013, Requirements for micro-generating plants to be connected in parallel with public low-voltage distribution networks.

Notified body:
Alpha ESS Co., Ltd.

Singed for and on behalf of:

Nantong	Aug. 17. 2018	Aviya Wang
Place of issue	Date of issue	Name, signature

TEST Results

Power quality

Harmonic current emissions as per EN 61000-3-2 Class A								
Harmonic Order n	2nd	3rd	5th	7th	9th	11th	13th	15th ... 39th
EN 61000-3-2 Limit	1.08	2.30	1.14	0.77	0.40	0.33	0.21	0.15 x (15/n)
Test value	0.05	0.15	0.16	0.18	0.14	0.13	0.11	< limit

Voltage fluctuations and flicke ras per EN 61000-3-3				
	starting	stopping	running (at rated power)	
EN 61000-3-3 Limit	3.3%	4%	P_{st} = 1.0	Plt = 0.65
Test value	< 0.7%	< 1.7%	0.272	0.275

Power factor	
EN 50438 Limit	0.95 lag - 0.95 lead
Test level (AC voltage)	210 V 230 V 250 V
Test value (at rated power)	> 0.99 > 0.99 > 0.99

Grid monitoring

Under / Over Frequency Tests				
	Under Frequency		Over Frequency	
Parameter	Frequency	Disconnection time	Frequency	Disconnection time
EN 50438 Limit	48Hz	0.5s	50.5Hz	0.5s
Actual setting	48Hz	0.06s	50.5Hz	0.06s
Trip value (test result)	47.93Hz	0.08s	50.52Hz	0.07s

Over /Under Voltage Tests				
	Under Voltage		Over Voltage	
Parameter	Voltage	Disconnection time	Voltage	Disconnection time
EN 50438 Limit	207V	0.5s	253V	0.5s
Actual setting	207V	0.4s	253V	0.4s
Trip value (test result)	206.5V	0.46s	253.5V	0.44s

LoM test			
Output power level	Min (10%)	Medium (50%)	Max (100%)
Trip setting clearance time	2s	2s	2s
Trip value clearance time	0.12s	0.09s	0.17s
Indicative values are shown for minimum, medium and maximum power levels. —			

Type testing of a micro-generator

Operating Range				
Test sequence	Voltage	Frequency	Output power	Primary power source
Test 1	**208V**	**47.7Hz**	**5000W**	DC source
Teat 2	**255V**	**51.6Hz**	**5000W**	DC source

Active power at under-frequency			
Test sequence	Output Power	Frequency	Primary power source
Test a)	**5000W**	**50.01Hz**	DC source
Test b)	**5000W**	**49.53Hz**	DC source
Test c)	/	/	/

Power response to over-frequency				
Test sequence at power level >80%	Out Power	Frequency	Primary Power source	Power gradient
Step a)	**5000W**	**50.00Hz**	DC source	**40%Pm/Hz**
Step b)	**4800W**	**50.30 Hz**	DC source	**40%Pm/Hz**
Step c)	**4600W**	**50.40 Hz**	DC source	**40%Pm/Hz**
Step d)	**4500W**	**50.45Hz**	DC source	**40%Pm/Hz**
Step e)	**4600W**	**50.40 Hz**	DC source	**40%Pm/Hz**
Step f)	**4800W**	**50.30Hz**	DC source	**40%Pm/Hz**
Step g)	**5000W**	**50.00Hz**	DC source	**40%Pm/Hz**

Test sequence at power level 40%-60%	Out Power	Frequency	Primary Power source	Power gradient
Step a)	**2500W**	**50.00Hz**	DC source	**40%Pm/Hz**
Step b)	**2440W**	**50.30 Hz**	DC source	**40%Pm/Hz**
Step c)	**2350W**	**50.40 Hz**	DC source	**40%Pm/Hz**
Step d)	**2300W**	**50.45Hz**	DC source	**40%Pm/Hz**
Step e)	**2350W**	**50.40 Hz**	DC source	**40%Pm/Hz**
Step f)	**2450W**	**50.30Hz**	DC source	**40%Pm/Hz**
Step g)	**2500W**	**50.00Hz**	DC source	**40%Pm/Hz**