

SCH200

IEC-61850-3, IEEE-1613 1U FANLESS
POWER AUTOMATION COMPUTER



IEC 61850-3 Pre-Test

Revision Date: Aug. 19th. 2020



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Electromagnetic compatibility (EMC)

-Testing and measurement techniques

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IEC 61850-3 EMC Pre-Test Result

Requirements	Testing items	Test Result
IEC 61000-4-2	Level : 3 Contact : 6kV±5% Air : 8kV±5%	A
IEC 61000-4-3	Level: 3 Electric field: 10V/m Frequency Sweep: 80MHz ~ 1GHz Spot: 80MHz, 160MHz, 380MHz, 450MHz, 900MH	A
IEC 61000-4-4	Level: 4 1) Accreditation voltage a) AC, DC Power, Input output port: 4.0kV b) Communication port: 2.0kV 2) Repetition Frequency: 5kHz 3) Burst Continued: 15ms±20% 4) Burst Cycle: 300ms±20% 5) Test polarity and cycle: Positive and negative polarity (more than 60 seconds per polarity)	A
IEC 61000-4-5	Level: 4 1) Voltage wave: 1.2×50 20 Splits 2) Applied voltage: Common mode (Differential mode) a) AC, DC power: 4.0kV(2.0kV) b) Input output port: 1.0kV(0.5kV) c) Communication port: 2.0kV	A
IEC 61000-4-6	Level: 1) Accreditation voltage: 10V 2) frequency: a) Sweep: 150kHz ~ 80MHz b) Spot: 27MHz, 68 MHz	A

Note:

a) Result A in red font:

EUT went through 1st trial and passed the test under Result B. After doing some enhancements on the EUT, it went through 2nd trial and passed the test under Result A.



IEC/EN 61000-4-2 Test Record

TO	7Starlake				· -				Mode: DC	
					Model	: <u>SCH200</u>			e No.:	
est Voltage:	125	Vdc					Test si	te: X 5F/	∐ 1F	
nvironmental (Condition	ıs:	22°C, 53	% RH			Tested b	y: <u>Eric</u>		
tmospheric Pro	essure:		1010 ml	bar		<u>_</u>				
est Specification	on 🖂	IEC 610	000-4-2	⊠ EN	61000-4-2	,		l Passing ance Criterio	В	
Simulate single	e ESD eve	nt (either	by air or o	contact dis	scharge), th	e charge on the			r to each applied ESD puls	
st Results of	Direct A	pplicati	ion							
		FF			Air D	ischarge				
T . D .			D	ischarge	Level (kV			m . n		
Test Point	±2	±4	±8					Test Resul	t Remark	
Front										
Back										
Left										
Right										
Тор										
Bottom										
Other										
						Discharge				
Test Point			D	ischarge	Level (kV	7)		Test	Remark	
168t FOIIII	±6							Result	Kemai K	
Front	Α							A	he brand of screen:	
Back	A							A	DELL	
Left	A							A	P/N: U2713HMt	
Right	A							A		
Тор	A							A	he brand of DP Cable	
Bottom	A							A	BizLink	
Other									P/N:E164571-ks	
et Doculte of	Indiract	Annline	tion							
st Results of	munect	лррпса	uoII		НСР І	Discharge				
m			D	ischarge	Level (kV					
Test Point	<u>±</u> 4			<i>S</i> -				Test Resul	lt Remark	
Front	A							A		
Back	A			<u> </u>				A		
Left	A		1					A		
Right	A		†					A		
						Discharge				
Test Point			D	ischarge	Level (kV	7)		Test Resul	t Remark	
rest rollit	±4							Test Kesu	Kelliark	
Front	A							A		
Back	A							A		
	Α							A		
Left										

Criteria A: The EUT function was correct during the test.

Criteria B: (#1). When EUT was under testing, it impacted on the screen, so the screen blinked or went black.

Once the test had been done, the screen returned to normal work automatically.

(#2).

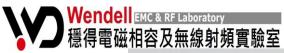
Criteria C: (#1).





Note:

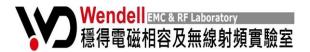
a) EUT went through 1st trial and passed the test under Result B. After investigation, we found the issue was caused by DP cable (P/N:E483319). Thus, we turned to use another DP cable (Brand: BizLink, P/N:E164571-ks), then EUT went through 2nd trial and passed the test under Result A.





Test Instrument

Use Equipment	Item	Equipment	Manufacturer	Model
	1	ESD Simulator	Teseq	NSG 437
	2	ESD Simulator/ Discharge Gun	NoiseKen	ESS-B3011
	3	ESD Simulator/ Discharge Gun	NoiseKen	ESS-2002
\boxtimes	3	Digital Thermo-Hygro Meter	N/A	HTC-8
\boxtimes	4	Atmosphere pressure meter	N/A	Kat.Nr.45.1000.01



IEC/EN 61000-4-3 Test Record

Project No.:	roject No.: /Starlake Test Date: 2020(y)/ 08(m)/ 05(d) Test Mode: DC									
EUT:	EUT: Model: <u>SCH200</u> Sample No.:									
Test Voltage:	125 Vdc			Tested by:	Eric					
Environmental	Conditions: 2	23°C, 52% RH		Approved by:						
Atmospheric Pressure: 1012 mbar										
	M IEC (100	0-4-3	000 4 2	D 4 F	Danaina					
Test Specification	n \boxtimes IEC 6100	U-4-3		Required F Performan	ce Criterion A					
					•					
Sweep Rate: ≤1	5×10-3 decades/s	Step size:	1 % of preceding	g frequency value	Dwell Time:	1 Sec.				
Test Frequency Ra	ange: 80 MHz	~ <u>1000</u> MHz	Antenna Hig	gh: <u>1.5</u> m						
Frequency Range (MHz)	Azimuth	Polarity	Field Strength (V/m)	Modulation	Test Result	Remark				
80-1000	0	H/V	10	80% AM (1kHz)	A	The brand of screen: DELL P/N: P2317H				
80-1000	90	H/V	10	80% AM (1kHz)	A	The brand of screen: DELL P/N: P2317H				
80-1000	180	H/V	10	80% AM (1kHz)	A	The brand of screen: DELL P/N: P2317H				
80-1000	270	H/V	10	80% AM (1kHz)	A	The brand of screen: DELL P/N: P2317H				

Note:

a) Description of Observation:

Criteria A: The EUT function was correct during the test.

Criteria B: (#1).

(#2).

(#3).

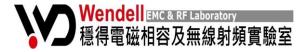
Criteria C: (#1).

(#2).

(#3).



Item	Equipment	Manufacturer	Model
1	RadiCentre ® Modular EMC Test Systems	DARE	CTR1004B
2	RF Signal Generator	DARE	RGN6000B
3	LINEAR POWER RF AMPLIFIER	OPHIR	5225
4	LINEAR POWER RF AMPLIFIER	OPHIR	5193
5	LINEAR POWER RF AMPLIFIER	OPHIR	5022A
6	Periodic Test-Antenna	Schwarzbeck Mess - Elektronik	STLP 9128 E
7	Stacked Microwave LogPer. Antenna	Schwarzbeck Mess - Elektronik	STLP 9149
8	Electric Field Probe	FRANKONIA	EFS-10
9	Measurement Software	EMC-RS	Ver: 2.02



IEC/EN 61000-4-4 Test Record

Project No.: 7Starlake	Test Date: 2020 (y)/08 (m)/1	4(d) Test Mode: DC
EUT:	Model: SCH200	Sample No.:
Test Voltage: 125 Vdc	Te	ested by: Eric
Environmental Conditions: 23°C , 54%	RH Appro	oved by:
Atmospheric Pressure: 1010 mbar		
Test Specification IEC 61000-4-4	EN 61000-4-4 R	equired Passing erformance Criterion B

Burst: <u>15</u> ms / <u>300</u>	_ ms Test D	uration: <u>1</u> min	Pulse Rat	te:5	kHz
Test Po	Pulse Voltage (kV)	Pulse Polarity (+/-)	Test Result	Remark	
					The brand of screen: DELL P/N: U2713HMt
	L	1,2,3,4	(+/-)	A	The brand of screen: DELL P/N: P2317H
					The brand of DP Cable:BizLinl P/N: E164571-ks
					The brand of screen: DELL P/N: U2713HMt
DC Power Port	N	1,2,3,4	(+/-)	A	The brand of screen: DELL P/N: P2317H
					The brand of DP Cable:BizLink P/N: E164571-ks
	L + N	1,2,3,4			The brand of screen: DELL P/N: U2713HMt
			(+/-)	A	The brand of screen: DELL P/N: P2317H
					The brand of DP Cable:BizLink P/N: E164571-ks
					The brand of screen: DELL P/N: U2713HMt
	RJ45	1,2	(+/-)	A	The brand of screen: DELL P/N: P2317H
gi. 1D					The brand of DP Cable:BizLin
Signal Ports Telecommunication Ports	Coaxial	0.5	(+/-)		
1 crocommunication 1 ofts					

Note:

a) Description of Observation:

Criteria A: The EUT function was correct during the test.

Criteria B: (#1). The screen connecting with DP Port of EUT blinked while under testing.

Once the test had been done, the screen returned to normal work automatically.

(#2).

(#3).

Criteria C: (#1).

(#2).

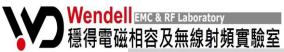
This data is for evaluation only, it cannot be used for EMC approvals unless it contains the approved signature. If you have any questions regarding the test data, please contact us.





Note:

a) EUT went through 1st trial and passed the test under Result B. After investigation, we found the issue was caused by DP cable (P/N:E483319). Thus, we turned to use another DP cable (Brand: BizLink, P/N:E164571-ks), then EUT went through 2nd trial and passed the test under Result A.





Test Instrument

Item	Equipment	Manufacturer	Model
1	EMS Generator	Thermo	EMC Pro
2	Clamp	KeyTek	CCL
3	Measurement Software	CEWare32	Ver: 4.1



Project No.:	Starlake	Test Date: $2020(y)/08(m)/03(d)$ Test Mode: DC					e: DC			
EUT:		Model: SCH200 Sample No.:							. :	
Test Voltage: 125 Vdc Test site:								site: <u>S</u> 5	F/ 🗌	1F
Environmental C	Conditions:	23°C,	53% RF	I			Teste	d by: Eric		
Atmospheric Pre	ssure: 10	10 mbar				App	proved	by:		
Test Specification	⊠ IEC	61000-4-5	⊠ EN	61000-4	-5	Required Result	l Passii			ower ports – B lecom ports – C
AC/DC Power P	ort:									
Waveform: 1.2/50	0μs(8/20μs) Re	petition	rate: 60	Sec.	Times:	5	time/each co	ondition	
				AC	Power P	ort				
Test Point	Phase	Polarity (+/-)	0.5	Test	Voltage 2	(kV)		Test Resu	ılt	Remark
	0°	+/-		_						
Y . NY	90°	+/-								
L to N	180°	+/-								
	270°	+/-								
	0°	+/-								
L to PE	90°	+/-								
LWFE	180°	+/-								
	270°	+/-								
	0°	+/-								
N to PE	90°	+/-								
TVIOTE	180°	+/-								
	270°	+/-								
					Power P					
Test Poir	nt	Polarity (+/-)	2	1 est	Voltage	(KV)		Test Resu	ılt	Remark
L-G		+/-	A	A				A		
		+/-								
		+/-								
Notas						•			•	

Note:

Description of Observation:

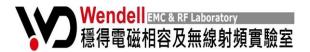
Criteria A: The EUT function was correct during the test.

Criteria B: (#1).

(#2).

Criteria C: (#1).

(#2).



IEC/EN 61000-4-5 Test Record

Project No.: 7Starlake		Test Date: 2020(g			$\frac{0(y)}{08(m)}$ 03(d) Test			Γest N	Mode: DC
EUT: Model: SC				lel: SCF	SCH200 Sample No.:				
Test Voltage: 125 V			Tested	by: Eric	:				
Environmental Conditions: 23°C, 53% RH Approved by:									
Atmospheric Pressure: 10	10 mbar								
Test Specification IEC	61000-4-5	⊠ EN	61000-4	l-5	Require Result	d Passing			OC Power ports – B al/Telecom ports – C
Signal Ports Telecommunic	cation Port	ts:							
Waveform: <u> \ 1.2/50μs(8/2</u>	.(0μs)	Repe	etition rat	te: 60	Sec.	Times:	5ti	me/ea	ch condition
<u> </u>	320µs)								
Test Point	Polarity	Test Voltage			(kV) Test R			sult	Remark
	(+/-)	0.5	1	2			T CSt TtC	Suit	TO HAT K
RJ45 L-G	+/-		В	В			В		
	+/-								
	+/-								
	+/-								
	+/-								
	+/-								
	+/-								
	+/-								
	+/-								
	+/-								
NI-4									

Note:

a) Description of Observation:

Criteria A: The EUT function was correct during the test.

Criteria B: (#1). The LAN port of EUT had encountered ping disconnect, but returned to normal work automatically.

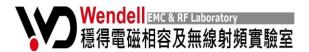
(#2).

Criteria C: (#1).

(#2).



Item	Equipment	Model	
1	EMS Generator	HAEFELY	AXOS8 (5F)
2	Surge CDN	3cTest	CDN-405T8A1 (5F)
3	20KV EMS Generator	3cTest	SG5020H (1F)
4	Surge CDN	3cTest	SGN2232S20 (1F)



IEC/EN 61000-4-6 Test Record

Project No.:	7Starlake	Test	Date: 2020	(y)/07 (m)/27 (d)	Test Mode:	DC
EUT:			Model: SCH	200	Sample No.:	-
Test Voltage:				Tested by:	: Eric	
Environmental	Conditions: 2	23 °C, 53% RH				
Atmospheric Pr	ressure: 101	0 mbar				
	M HEG (100	0.4.6. \(\sigma\) EN.61	000 4 6	D : 17		
Test Specification	$n \mid \square$ IEC 6100	0-4-6 🛛 EN 61	000-4-6	Required F Performan	ce Criterion A	
	, 			•	•	
Step size:	1 % of preced	ling frequency value	e Dwell 7	Time: 1 Sec.		
	ange: <u>0.15</u> MHz	~ <u>80</u> MHz				
Frequency Range (MHz)	Tested Port	Injection Method	Test Level (Vr.m.s.)	Modulation	Test Result	Remark
0.15 - 80	DC Power	CDN-M2	10	80% AM, 1kHz	A	
0.15 - 80	RJ45	CLAMP	10	80% AM, 1kHz	A	
		1		1		

a) Description of Observation:

Criteria A: The EUT function was correct during the test.

Criteria B: (#1).

(#2).

(#3).

Criteria C: (#1).

(#2).

(#3).



Item	Equipment	Manufacturer	Model
1	Coupling clamp according to IEC 6100-4-6	FRANKONIA	EMCL-20
2	CDN for power supply lines	FRANKONIA	CDN M2+M3
3	6 dB Attenuator	BIRD	75-A-FFN-06
4	Compact Immunity Test System acc	FRANKONIA	CIT-10/75
5	CDN for screened lines	FRANKONIA	RJ45S
6	50ohm Termination	N/A	N/A
7	Measurement Software	HUBERT	Ver: 1.1.2

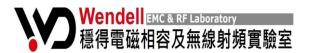


IEC/EN 61000-4-8 Test Record

Project No.: 7Starla	ke T	Test Date: 2020(y)/07	(m)/27(d) Te	st Mode: DC
EUT:		Model: SCH200	Sam	ple No.:
Test Voltage: 125	Vdc		Tested by: Eric	
Environmental Condit	ions: 23 °C, 53% RI	H A	Approved by:	
Atmospheric Pressure	: 1010 mbar			
Test Specification	IEC 61000-4-8	T 61000-4-8 Requi Resul	red Passing Test t	
Test Coil Position	Frequency (Hz)	Magnetic Strength (A/m)	Test Result	Remark
X - Axis	50/60	100	A	Note ⊠1 □2
Y - Axis	50/60	100	A	Note ⊠1 □2
Z - Axis	50/60	100	Δ	Note ⊠1 □2

Note:

- 1. There was no change compared with initial operation during the test.
- 2. The EUT was interrupted during the test. It could become normal after test stop.



Photographs of Test Configuration

Item	Equipment	Manufacturer	Model
1	PFMF	HAEFELY	MFS-100