



TEST REPORT

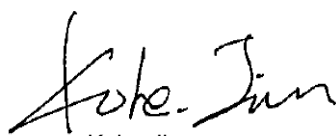
Application No.: GZEM2110006199HS
Applicant: Guangdong Carrier Heating, Ventilation & Air Conditioning Company Limited
Address of Applicant: NO.1, Helangsha Village, Shengli Industrial Zone, Lishui Town, Nanhai District, Foshan City, Guangdong 528244, P. R. China
Manufacturer: The same as Applicant
Address of Manufacturer: The same as Applicant
Factory: The same as Applicant
Address of Factory: The same as Applicant
Equipment Under Test (EUT):
EUT Name: Air conditioner
Model No.: CLS-F30HW/ZR1B, CLS-F65HW/ZR1B, CLS-F130HW/ZR1B. □
□ Please refer to section 2 of this report for details.
Trade Mark: GCHV
Standard(s) : EN 61000-6-4:2007+A1:2011
EN 61000-6-2:2005
Date of Receipt: 2017-11-02
Date of Test: 2017-11-10
Date of Issue: 2018-01-18 (for the report GZEM171100640801)
2021-10-22 (for the report GZEM171100640802)

Test Result:	Pass*
---------------------	--------------

* In the configuration tested, the EUT complied with the standards specified above.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EU Declaration of Conformity and compliance with all relevant EU Directives.




Kobe Jian

EMC Laboratory Manager





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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2018-01-18		Original
01		2021-10-22		Copy report: changed the name of Applicant & Manufacturer & Factory, product description and Trade Mark.

Authorized for issue by:				
Tested By		 Simon Cai / Project Engineer		2017-11-10 Date
Checked By		 Cherie Luo / Reviewer		2021-10-14 Date





3 Test Summary

Electromagnetic Interference (EMI)				
Test	Test Requirement	Test Method	Class / Severity	Result
Conducted Emission (150KHz to 30MHz)	EN 61000-6-4:2007 +A1:2011	CISPR 16-2-1:2008	Table clause2.1, Column 4	PASS
Conducted Emission on Telecommunication (150KHz to 30MHz)	EN 61000-6-4:2007 +A1:2011	CISPR 22:2008	Table clause3.1, Column 4	N/A
Discontinuous Interference on AC (150kHz to 30MHz)	EN 61000-6-4:2007 +A1:2011	CISPR 14-1:2005 +A1:2008+A2:2011	Clause 4.2 of CISPR14-1	N/A
Radiated Emission (30MHz to 1GHz)	EN 61000-6-4:2007 +A1:2011	CISPR 16-2-3:2006	Table clause1.1, Column 4	PASS
Radiated Emission above 1 GHz	EN 61000-6-4:2007 +A1:2011	CISPR 16-2-3:2006	Table clause1.4, Column 4	N/A
Electromagnetic Susceptibility (EMS)				
Test	Test Requirement	Test Method	Class / Severity	Result
ESD (Electrostatic Discharge)	EN 61000-6-2:2005	EN 61000-4-2:2009	Contact ±4 kV Air ±8 kV	PASS
Radiated Immunity (80MHz to 2.7 GHz)	EN 61000-6-2:2005	EN 61000-4-3:2006 + A1:2008+ A2:2010	80MHz to 1GHz 10V/m 1.4GHz to 2GHz 3V/m 2GHz to 2.7GHz 1V/m 80%, 1kHz, AM	PASS
Electrical Fast Transients (EFT) on AC and Signal	EN 61000-6-2:2005	EN 61000-4-4:2012	AC ± 2.0kV Signal ± 1.0kV	PASS
Surge Immunity on AC	EN 61000-6-2:2005	EN 61000-4-5:2014	±1kV D.M.† ±2kV C.M.‡	PASS
Surge Immunity on telecommunication	EN 61000-6-2:2005	EN 61000-4-5:2014	±1kV C.M.‡	N/A
Injected Currents (150kHz to 80MHz)	EN 61000-6-2:2005	EN 61000-4-6:2014	10V r.m.s (emf), 80%, 1kHz Amp. Mod.	PASS
Voltage Dips and Interruptions on AC	EN 61000-6-2:2005	EN 61000-4-11:2004	0 % U _T * for 1.0 per 0 % U _T * for 250per 40% U _T * for 10 per 70% U _T * for 25per	PASS
* U _T is the nominal supply voltage				
† D.M. – Differential Mode		‡ C.M. – Common Mode		
N/A: Not applied, please refer to clause 7.2 & 7.3 & 7.5 & 8.6 of this report for details				
EUT: In this whole report EUT means Equipment Under Test.				





Remark for the report: GZEM171100640801

Model No.: CLS-F30HW/ZR1B, CLS-F65HW/ZR1B, CLS-F130HW/ZR1B

According to the declaration from the applicant, the main boards of the models above are the same, just different as below:

MODEL	/	CLS-F30HW/ZR1B	CLS-F65HW/ZR1B	CLS-F130HW/ZR1B
Cooling capacity	kW	30	65	130
Heating capacity	kW	35	70	132
Max. input consumption (Rated)	kW	15	28	60
Max. current (Rated)	A	30	51	106
Power supply	V/Ph/Hz	380~415V/3Ph/50Hz		
Compressor	Type	/	Scroll	
	Brand	/	Emerson	
	Model	/	ZP144KFE-TFD-522	ZP144KFE-TFD-422
	Quantity	pieces	1	2
Condenser (air side)	Type	/	Fin coil	
	Motor	/	YDK-550-6G31	YLS160-800-8P6
	Motor quantity	pieces	1	2

Therefore models **CLS-F65HW/ZR1B, CLS-F130HW/ZR1B** were tested in this report.

Remark for the report: GZEM171100640802

This test report GZEM171100640802 was an additional report based on the original test report GZEM171100640801, just changed the name of Applicant & Manufacturer & Factory, product description and Trade Mark.

1. Changed the name of Applicant & Manufacturer & Factory:

Name of Applicant & Manufacturer & Factory in original report	Name of Applicant & Manufacturer & Factory in updated report
Guangdong Chigo Heating & Ventilation Equipment Co., Ltd	Guangdong Carrier Heating, Ventilation & Air Conditioning Company Limited

Changed the name to 'Guangdong Carrier Heating, Ventilation & Air Conditioning Company Limited', which have the same quality system, manufacturing process and tooling is maintained.

2. Changed the product description:

Product description in original report	Product description in updated report
AIR-COOLED (HEAT PUMP) MODULAR UNIT	Air conditioner



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3. Changed Trade Mark:

Trade Mark in original report	Trade Mark in updated report
Chigo	GCHV

This was considered to be none technical changed and no tests were performed on the product.
Therefore original data was kept in this report GZEM171100640802.



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5 General Information

5.1 General Description of E.U.T.

Product Description: AIR-COOLED (HEAT PUMP) MODULAR UNIT
Model No: CLS-F65HW/SR1A, CLS-F130HW/SR1A

5.2 Details of E.U.T.

Rated Supply (Voltage): AC 380-415V 50Hz
Power Port: > 3m unscreened AC mains cable

5.3 Description of Support Units

The EUT has been tested as an independent unit.

5.4 Deviation from Standards

None.

5.5 General Test Climate During Testing

Temperature: 15-30 °C Humidity: 30~70 %RH Atmospheric Pressure: 860-1060 mbar

5.6 Abnormalities from Standard Conditions

None.

5.7 Monitoring of EUT for All Immunity Test

Audio: N/A
Visual: Monitor running of EUT

5.8 Test Location

All tests were performed at:
Guangdong Chigo Heating & Ventilation Equipment Co., Ltd
NO.1, Helangsha village, Shengli Industrial Zone, lishui Town, Nanhai District, Foshan City,
Guangdong, 528244, china.



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6 Equipment List

Test Item	Test Equipment	Model	Manufacturer	Serial No.	Cal until
EFT/Burst, Surge Test	EMS test system	NSG3060-MF	TESEQ	ZNSPSY1501	2018-05-20
	CDN	CDN3063-C32	TESEQ	ZNSPSY1502	2018-05-20
	CDN	CDN3425	TESEQ	ZNSPSY1503	2018-05-20
	CDN	CDN117-M	TESEQ	ZNSPSY1504	2018-05-20
CS(Conducted Susceptibility)	Conducted disturbance generator	CWS 500N1	NEMTEST	ZNSPSY1505	2018-05-20
	CDN	CDN-M2/M3N	NEMTEST	ZNSPSY1506	2018-05-20
	CDN	CDN-M5/32A	NEMTEST	ZNSPSY1507	2018-05-20
	Electromagnetic injection clamp	EM 101	NEMTEST	ZNSPSY1508	2018-05-20
	Attenuator	ATT6/75	NEMTEST	ZNSPSY1521	2018-05-20
Voltage dips and interruption immunity	EMS test system	NSG3060-MF	TESEQ	ZNSPSY1501	2018-05-20
CE(Conducted Emission)	EMI receiver	ESCI	R&S	ZNSPSY1509	2018-05-20
	Converter	RSU-M2	CDSI	ZNSPSY1510	2018-05-20
	NI	NI-GPIB	NI	ZNSPSY1511	2018-05-20
	EMI	EMI-LAB	CDSI	ZNSPSY1512	2018-05-20
	LISN	NSLK 8128	Schwarzbeck	ZNSPSY1513	2018-05-20
	Impulse limiter	PLA-10N	CDSI	ZNSPSY1514	2018-05-20
	Voltage probe Assembly	TK 9420	Schwarzbeck	ZNSPSY1515	2018-05-20
	Voltage probe Assembly	VT 9420	Schwarzbeck	ZNSPSY1516	2018-05-20
	Communication line	Cable-CE	H+S	ZNSPSY1517	2018-05-20
Power Clamp Radiation	EMI receiver	ESCI	R&S	ZNSPSY1509	2018-05-20
	Converter	RSU-M2	CDSI	ZNSPSY1510	2018-05-20
	NI	NI-GPIB	NI	ZNSPSY1511	2018-05-20
	EMI	EMI-LAB	CDSI	ZNSPSY1512	2018-05-20
	Absord Power Clamp	MDS 21B	Luethi	ZNSPSY1518	2018-05-20
	Communication line	CBL2-NN-9.0m	H+S	ZNSPSY1519	2018-05-20



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On site test equipment					
Item	Equipment No.	Equipment Name	Manufacturer	Model No.	Cal.Due date
Radiated Emission	EMC2026	Horn Antenna 1-18GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	2019-09-08
	EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	2018-01-19
	EMC0056	EMI Test Receiver	Rohde & Schwarz	ESCI	2018-01-19
	EMC2065	Amplifier	HP	8447F	2018-06-18
	EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	2018-05-04
Conducted Emission	EMC2046	Artificial Mains Network (LISN)	AFJ Instruments	LT32C	2018-11-19
	EMC0106	Voltage Probe	SGS	N/A	2018-04-04
ESD	EMC2071	ESD Simulator	TESEQ AG	NSG 435	2018-01-19
	EMC0804	ESD Ground Plane	SGS	3m x 3m	N/A
EFT	EMC1009	Capacitive Coupling Clamp	Thermo KeyTek	Pro-CCL	2018-01-19
	SEM018-01	EMC Immunity Test System	Thermo KeyTek	Pro-Plus	2018-03-16
Surge Immunity	EMC2059	Modular Impulse Generator	EMC PARTNER	MIG0603EN	2018-01-19
	SEM018-01	EMC Immunity Test System	Thermo KeyTek	Pro-Plus	2018-03-16
CI	EMC1101	Signal Generator	Rohde & Schwarz	SMY01	2018-06-18
	EMC1102	Amplifier 0.15-230MHz	SCHAFFNER	GRF5048	2018-06-18
	EMC1103	Power Meter	Rohde & Schwarz	NRVS	2018-12-03
	EMC0071	URV5-Z2 Insert. Unit	R&S	URV5-Z2	2018-01-19
	EMC1105	Dual Directional coupler	Werlatone Inc.	C1795	2018-01-19
	EMC2055	Oscilloscope 500MHz	Tektronix	TDS3052C	2018-01-19
	EMC2048	CDN	Elektronik- Feinmechanik	L-801:M2/M3	2018-09-24
Radiated Immunity	OnT-013	27MHz Controller	SGS	N/A	N/A
	OnT-014	49MHz Controller	SGS	N/A	N/A
	OnT-015	433MHz Controller	SGS	N/A	N/A
	OnT-016	446MHz Controller	SGS	N/A	N/A
	OnT-017	863 to 865 MHz radio microphones	SGS	N/A	N/A
	OnT-018	GSM mobile phone	SGS	N/A	N/A
	OnT-019	2.4GHz transmitter	SGS	N/A	N/A
V-dips	SEM018-01	EMC Immunity Test System	Thermo KeyTek	Pro-Plus	2018-03-16



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7 Emission Test Results

7.1 Conducted Emissions on Mains Terminals, 150 KHz to 30MHz

Test Requirement: EN 61000-6-4
Test Method: CISPR 16-2-1
Test Voltage: AC 380V 50Hz
Test Date: 2017-11-10
Frequency Range: 150kHz to 30MHz
Detector: Peak for pre-scan
Quasi-Peak and Average for final measurement
(9 kHz resolution bandwidth)

Class / Limit:

Frequency range MHz	Limits dB (μV)	
	Quasi-peak	Average
0.15 to 0.50	79	66
0.50 to 30	73	60

NOTE 1: The lower limit is applicable at the transition frequency.

7.1.1 E.U.T. Operation

Pre-test the EUT in cooling mode and heating mode to find the worst case.

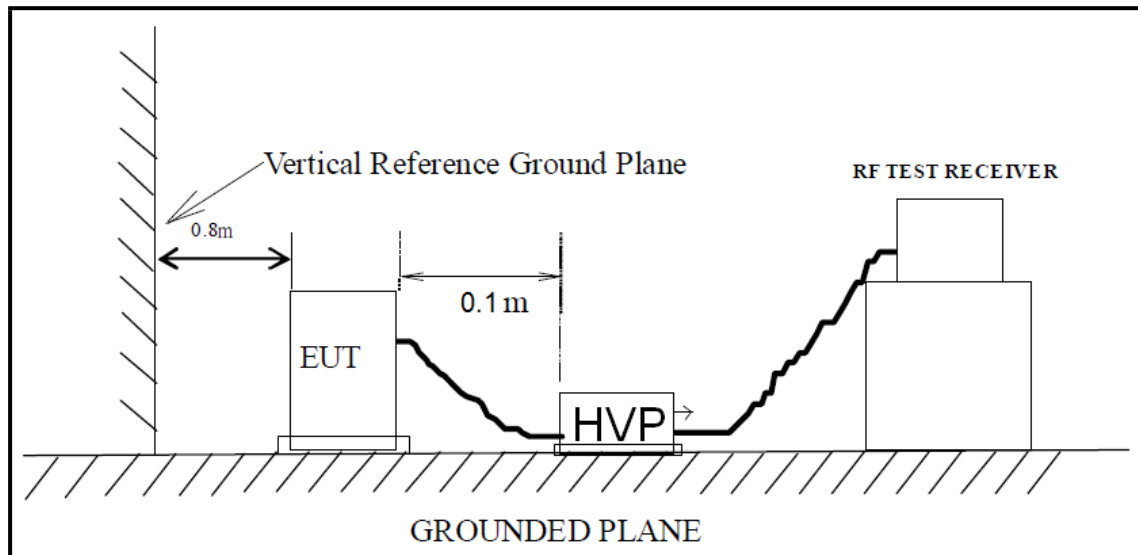
Test the EUT in cooling mode as the worst case was found.



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7.1.2 Test Setup and Procedure



1. The EUT input terminal was connected to nominal power supply and nominal Battery. The EUT output terminal was connected to physical load box.
2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
3. The voltage probe shall be connected to the reference ground plane terminal using a conductor as short as possible.
4. With EUT switched off, perform a background measurement and ensure the background is 6 dBuV below the quasi-peak limit. If EUT or background Noise exceeds 90 dBuV, the attenuation between the Voltage probe and the transient limiter must be increased to prevent the transient limiter and the pre-amp from overdriving. The transducer factors in the software must be adjusted to account for this.
5. With the EUT turned on, operate the EUT so as to maximize the interference generated while still conforming with the normal operating procedures as provided in the operating manual of the EUT.
6. Record the conducted emissions on each AC phase and neutral if any.



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7.1.3 Measurement Data

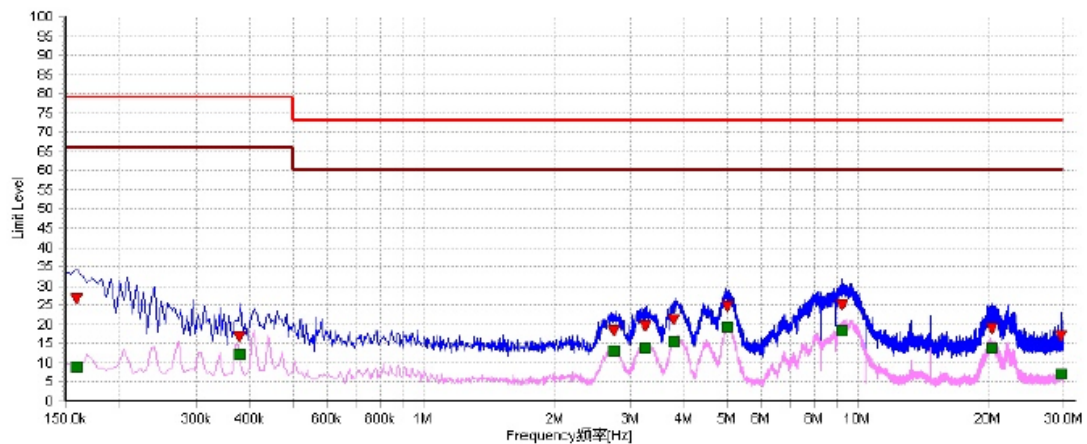
Pre-scan was performed with peak detected on both live and neutral cable. Quasi-peak & average measurements were performed at the frequencies which maximum peak emission level was detected.

Please see the attached Quasi-peak and Average test results.

For model CLS-F65HW/ZR1B

Live Line 1

Peak Scan:



Quasi-peak and Average measurement



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	Frequency (MHz)	Value read	Factor (dB)	Real value	Limit	Over Limit	Over Margin	Detector	Comments
1	0.158459	16.84	9.92	26.76	79.00	-52.24	-46.24	QP	Final Measure
2	0.158459	-1.04	9.92	8.88	66.00	-57.12	-51.12	AV	Final Measure
3	0.376343	6.12	10.67	16.79	79.00	-62.21	-56.21	QP	Final Measure
4	0.376343	1.44	10.67	12.11	66.00	-53.89	-47.89	AV	Final Measure
5	2.749839	8.18	10.26	18.44	73.00	-54.56	-48.56	QP	Final Measure
6	2.749839	2.82	10.26	13.08	60.00	-46.92	-40.92	AV	Final Measure
7	3.232796	9.19	10.28	19.47	73.00	-53.53	-47.53	QP	Final Measure
8	3.232796	3.67	10.28	13.95	60.00	-46.05	-40.05	AV	Final Measure
9	3.783763	10.77	10.30	21.07	73.00	-51.93	-45.93	QP	Final Measure
10	3.783763	5.07	10.30	15.37	60.00	-44.63	-38.63	AV	Final Measure
11	5.020358	14.33	10.33	24.66	73.00	-48.34	-42.34	QP	Final Measure
12	5.020358	9.10	10.33	19.43	60.00	-40.57	-34.57	AV	Final Measure
13	9.200102	14.68	10.56	25.24	73.00	-47.76	-41.76	QP	Final Measure
14	9.200102	7.74	10.56	18.30	60.00	-41.70	-35.70	AV	Final Measure
15	20.500006	8.13	10.99	19.12	73.00	-53.88	-47.88	QP	Final Measure
16	20.500006	2.76	10.99	13.75	60.00	-46.25	-40.25	AV	Final Measure
17	29.602499	5.80	11.27	17.07	73.00	-55.93	-49.93	QP	Final Measure
18	29.602499	-4.23	11.27	7.04	60.00	-52.96	-46.96	AV	Final Measure



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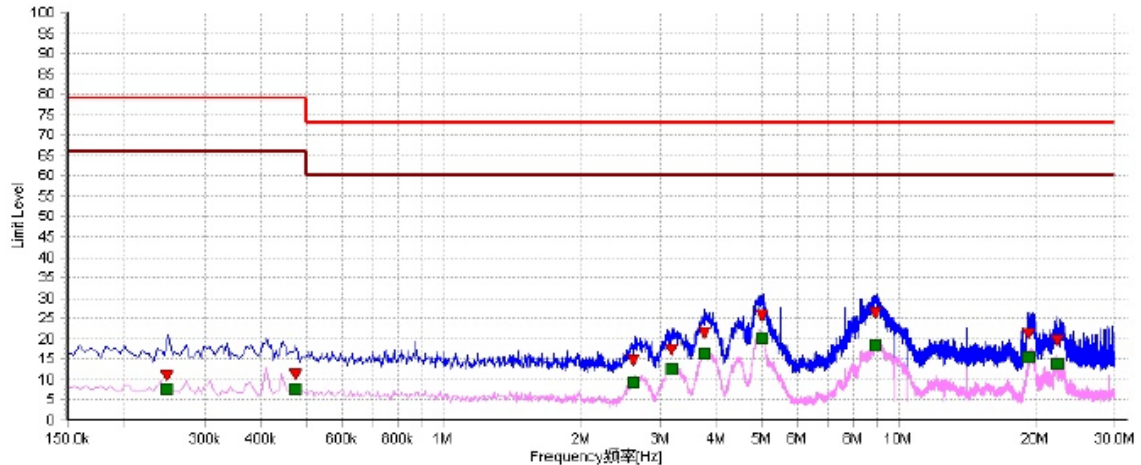
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Live Line 2

Peak Scan:



Quasi-peak and Average measurement

	Frequency (MHz)	Value read	Factor (dB)	Real value	Limit	Over Limit	Over Margin	Detector	Comments
1	0.249000	10.58	10.34	20.92	79.00	-58.08	-52.08	Peak	Pre-scan
2	0.474000	7.45	10.82	18.27	79.00	-60.73	-54.73	Peak	Pre-scan
3	2.638500	10.23	10.26	20.49	73.00	-52.51	-46.51	Peak	Pre-scan
4	0.247108	0.74	10.33	11.07	79.00	-67.93	-61.93	QP	Final Measure
5	0.247108	-2.73	10.33	7.60	66.00	-58.40	-52.40	AV	Final Measure
6	0.475062	0.46	10.82	11.28	79.00	-67.72	-61.72	QP	Final Measure
7	0.475062	-3.01	10.82	7.81	66.00	-58.19	-52.19	AV	Final Measure
8	2.617814	4.39	10.26	14.65	73.00	-58.35	-52.35	QP	Final Measure
9	2.617814	-0.84	10.26	9.42	60.00	-50.58	-44.58	AV	Final Measure
10	3.164387	7.23	10.28	17.51	73.00	-55.49	-49.49	QP	Final Measure
11	3.164387	2.18	10.28	12.46	60.00	-47.54	-41.54	AV	Final Measure
12	3.744000	11.20	10.30	21.50	73.00	-51.50	-45.50	QP	Final Measure
13	3.744000	5.99	10.30	16.29	60.00	-43.71	-37.71	AV	Final Measure
14	5.026932	15.32	10.33	25.65	73.00	-47.35	-41.35	QP	Final Measure
15	5.026932	9.81	10.33	20.14	60.00	-39.86	-33.86	AV	Final Measure
16	8.926226	15.79	10.55	26.34	73.00	-46.66	-40.66	QP	Final Measure
17	8.926226	7.81	10.55	18.36	60.00	-41.64	-35.64	AV	Final Measure
18	19.385676	10.20	10.95	21.15	73.00	-51.85	-45.85	QP	Final Measure
19	19.385676	4.61	10.95	15.56	60.00	-44.44	-38.44	AV	Final Measure
20	22.379728	8.49	11.07	19.56	73.00	-53.44	-47.44	QP	Final Measure
21	22.379728	2.60	11.07	13.67	60.00	-46.33	-40.33	AV	Final Measure

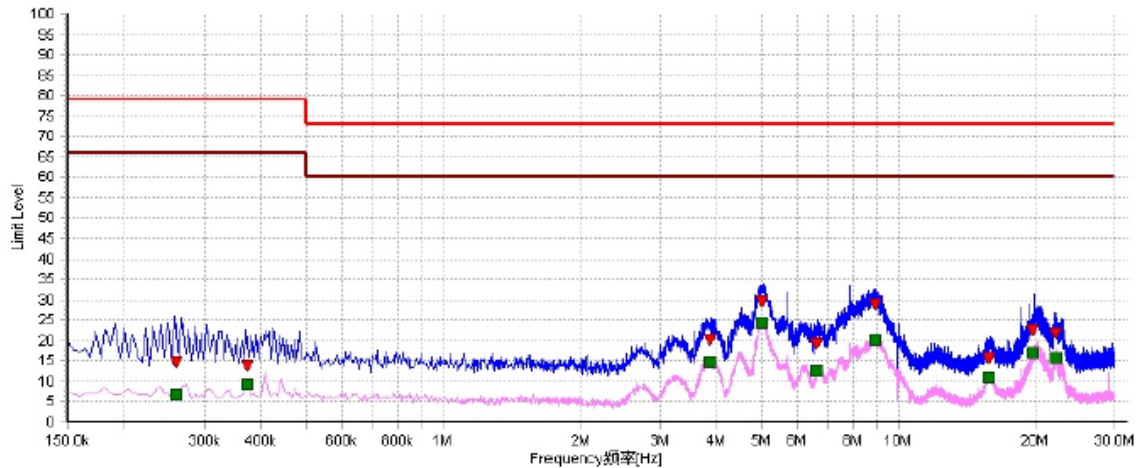


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Live Line 3

Peak Scan:



Quasi-peak and Average measurement

	Frequency (MHz)	Value read	Factor (dB)	Real value	Limit	Over Limit	Over Margin	Detector	Comments
1	0.259558	4.48	10.38	14.86	79.00	-64.14	-58.14	QP	Final Measure
2	0.259558	-3.63	10.38	6.75	66.00	-59.25	-53.25	AV	Final Measure
3	0.371612	3.05	10.66	13.71	79.00	-65.29	-59.29	QP	Final Measure
4	0.371612	-1.23	10.66	9.43	66.00	-56.57	-50.57	AV	Final Measure
5	3.858427	10.07	10.30	20.37	73.00	-52.63	-46.63	QP	Final Measure
6	3.858427	4.37	10.30	14.67	60.00	-45.33	-39.33	AV	Final Measure
7	4.997155	19.27	10.33	29.60	73.00	-43.40	-37.40	QP	Final Measure
8	4.997155	13.95	10.33	24.28	60.00	-35.72	-29.72	AV	Final Measure
9	6.607675	8.90	10.43	19.33	73.00	-53.67	-47.67	QP	Final Measure
10	6.607675	2.01	10.43	12.44	60.00	-47.56	-41.56	AV	Final Measure
11	8.899528	18.36	10.55	28.91	73.00	-44.09	-38.09	QP	Final Measure
12	8.899528	9.81	10.55	20.36	60.00	-39.64	-33.64	AV	Final Measure
13	19.854964	11.45	10.96	22.41	73.00	-50.59	-44.59	QP	Final Measure
14	19.854964	5.95	10.96	16.91	60.00	-43.09	-37.09	AV	Final Measure
15	22.227522	10.71	11.06	21.77	73.00	-51.23	-45.23	QP	Final Measure
16	22.227522	4.79	11.06	15.85	60.00	-44.15	-38.15	AV	Final Measure
17	15.851787	4.91	10.86	15.77	73.00	-57.23	-51.23	QP	Final Measure
18	15.851787	0.04	10.86	10.90	60.00	-49.10	-43.10	AV	Final Measure

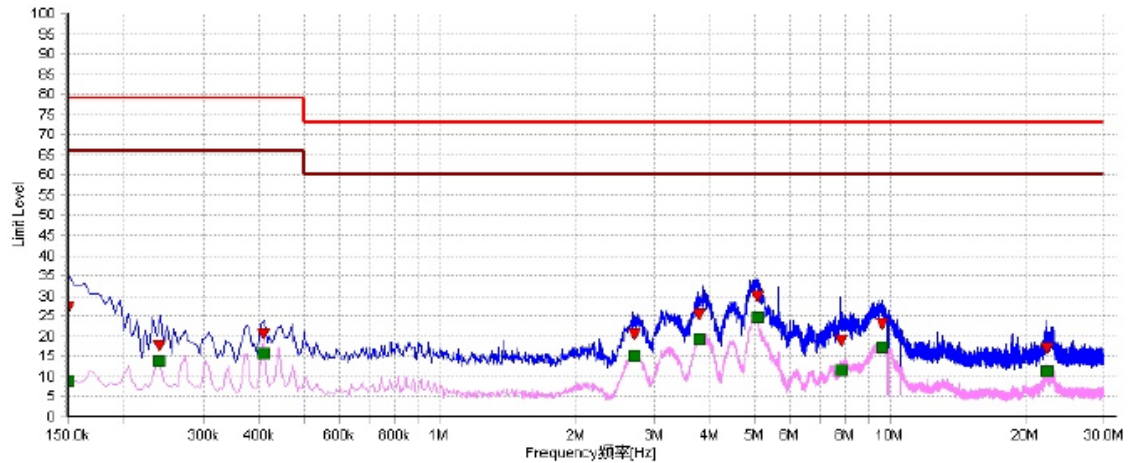


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Line: Neutral Line

Peak Scan:



Quasi-peak and Average measurement

	Frequency (MHz)	Value read	Factor (dB)	Real value	Limit	Over Limit	Over Margin	Detector	Comments
1	0.150000	25.31	9.87	35.18	79.00	-43.82	-37.82	Peak	Pre-scan
2	0.150048	17.52	9.87	27.39	79.00	-51.61	-45.61	QP	Final Measure
3	0.150048	-0.82	9.87	9.05	66.00	-56.95	-50.95	AV	Final Measure
4	0.238291	7.38	10.30	17.68	79.00	-61.32	-55.32	QP	Final Measure
5	0.238291	3.62	10.30	13.92	66.00	-52.08	-46.08	AV	Final Measure
6	2.707652	10.17	10.26	20.43	73.00	-52.57	-46.57	QP	Final Measure
7	2.707652	4.89	10.26	15.15	60.00	-44.85	-38.85	AV	Final Measure
8	3.767935	14.95	10.30	25.25	73.00	-47.75	-41.75	QP	Final Measure
9	3.767935	8.96	10.30	19.26	60.00	-40.74	-34.74	AV	Final Measure
10	5.090100	19.56	10.33	29.89	73.00	-43.11	-37.11	QP	Final Measure
11	5.090100	14.34	10.33	24.67	60.00	-35.33	-29.33	AV	Final Measure
12	7.789432	8.42	10.50	18.92	73.00	-54.08	-48.08	QP	Final Measure
13	7.789432	1.06	10.50	11.56	60.00	-48.44	-42.44	AV	Final Measure
14	9.615186	12.46	10.58	23.04	73.00	-49.96	-43.96	QP	Final Measure
15	9.615186	6.91	10.58	17.49	60.00	-42.51	-36.51	AV	Final Measure
16	22.371249	5.82	11.07	16.89	73.00	-56.11	-50.11	QP	Final Measure
17	22.371249	0.20	11.07	11.27	60.00	-48.73	-42.73	AV	Final Measure
18	0.407219	9.74	10.72	20.46	79.00	-58.54	-52.54	QP	Final Measure
19	0.407219	5.18	10.72	15.90	66.00	-50.10	-44.10	AV	Final Measure



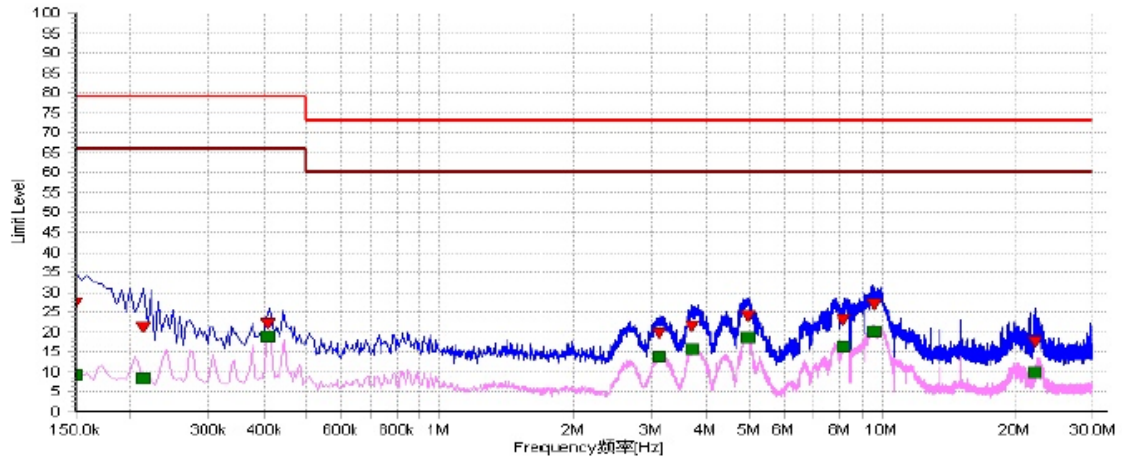
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For model CLS-F130HW/ZR1B

Live Line 1

Peak Scan:



Quasi-peak and Average measurement

	Frequency (MHz)	Value read	Factor (dB)	Real value	Limit	Over Limit	Over Margin	Detector	Comments
1	0.150240	17.48	9.87	27.35	79.00	-51.65	-45.65	QP	Final Measure
2	0.150240	-0.58	9.87	9.29	66.00	-56.71	-50.71	AV	Final Measure
3	0.213554	11.04	10.20	21.24	79.00	-57.76	-51.76	QP	Final Measure
4	0.213554	-1.99	10.20	8.21	66.00	-57.79	-51.79	AV	Final Measure
5	0.408304	11.42	10.72	22.14	79.00	-56.86	-50.86	QP	Final Measure
6	0.408304	8.26	10.72	18.98	66.00	-47.02	-41.02	AV	Final Measure
7	3.126230	9.23	10.28	19.51	73.00	-53.49	-47.49	QP	Final Measure
8	3.126230	3.62	10.28	13.90	60.00	-46.10	-40.10	AV	Final Measure
9	3.702882	11.25	10.29	21.54	73.00	-51.46	-45.46	QP	Final Measure
10	3.702882	5.61	10.29	15.90	60.00	-44.10	-38.10	AV	Final Measure
11	4.962789	13.71	10.33	24.04	73.00	-48.96	-42.96	QP	Final Measure
12	4.962789	8.23	10.33	18.56	60.00	-41.44	-35.44	AV	Final Measure
13	8.159459	12.70	10.51	23.21	73.00	-49.79	-43.79	QP	Final Measure
14	8.159459	5.73	10.51	16.24	60.00	-43.76	-37.76	AV	Final Measure
15	9.570973	16.30	10.57	26.87	73.00	-46.13	-40.13	QP	Final Measure
16	9.570973	9.67	10.57	20.24	60.00	-39.76	-33.76	AV	Final Measure
17	22.178401	6.52	11.06	17.58	73.00	-55.42	-49.42	QP	Final Measure
18	22.178401	-1.07	11.06	9.99	60.00	-50.01	-44.01	AV	Final Measure



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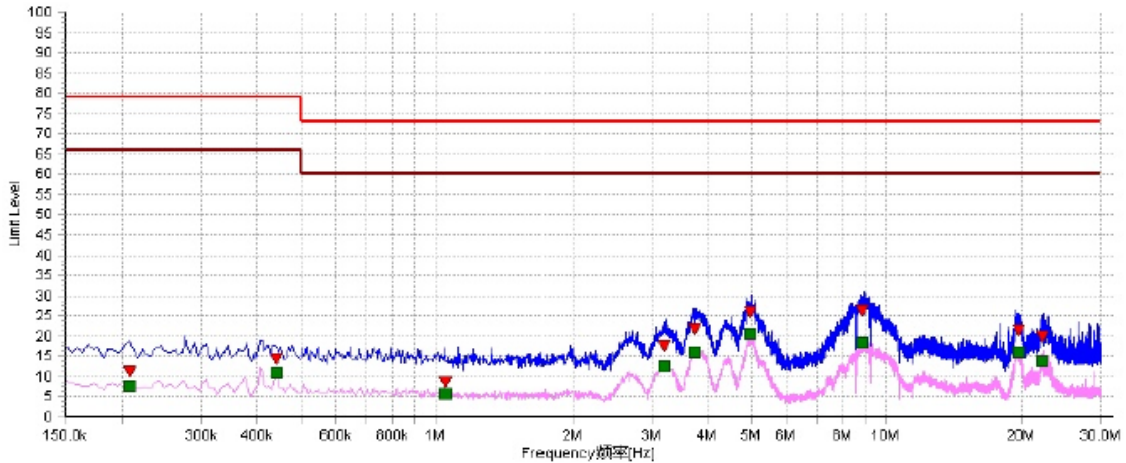
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Live Line 2

Peak Scan:



Quasi-peak and Average measurement

	Frequency (MHz)	Value read	Factor (dB)	Real value	Limit	Over Limit	Over Margin	Detector	Comments
1	0.207983	1.07	10.17	11.24	79.00	-67.76	-61.76	QP	Final Measure
2	0.207983	-2.38	10.17	7.79	66.00	-58.21	-52.21	AV	Final Measure
3	0.441767	3.65	10.77	14.42	79.00	-64.58	-58.58	QP	Final Measure
4	0.441767	0.05	10.77	10.82	66.00	-55.18	-49.18	AV	Final Measure
5	1.048804	-1.32	10.16	8.84	73.00	-64.16	-58.16	QP	Final Measure
6	1.048804	-4.37	10.16	5.79	60.00	-54.21	-48.21	AV	Final Measure
7	3.210311	7.35	10.28	17.63	73.00	-55.37	-49.37	QP	Final Measure
8	3.210311	2.16	10.28	12.44	60.00	-47.56	-41.56	AV	Final Measure
9	4.970594	15.58	10.33	25.91	73.00	-47.09	-41.09	QP	Final Measure
10	4.970594	10.14	10.33	20.47	60.00	-39.53	-33.53	AV	Final Measure
11	3.744444	11.66	10.30	21.96	73.00	-51.04	-45.04	QP	Final Measure
12	3.744444	5.75	10.30	16.05	60.00	-43.95	-37.95	AV	Final Measure
13	8.858493	15.94	10.54	26.48	73.00	-46.52	-40.52	QP	Final Measure
14	8.858493	7.93	10.54	18.47	60.00	-41.53	-35.53	AV	Final Measure
15	19.678620	10.69	10.95	21.64	73.00	-51.36	-45.36	QP	Final Measure
16	19.678620	5.08	10.95	16.03	60.00	-43.97	-37.97	AV	Final Measure
17	22.314680	8.96	11.07	20.03	73.00	-52.97	-46.97	QP	Final Measure
18	22.314680	2.85	11.07	13.92	60.00	-46.08	-40.08	AV	Final Measure

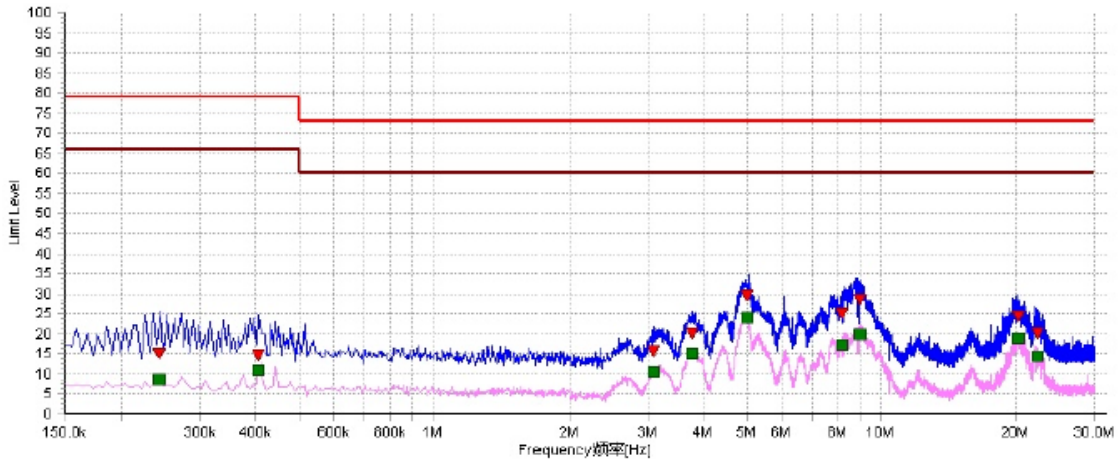


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Live Line 3

Peak Scan:



Quasi-peak and Average measurement

	Frequency (MHz)	Value read	Factor (dB)	Real value	Limit	Over Limit	Over Margin	Detector	Comments
1	0.404793	4.12	10.71	14.83	79.00	-64.17	-58.17	QP	Final Measure
2	0.404793	0.30	10.71	11.01	66.00	-54.99	-48.99	AV	Final Measure
3	0.242612	4.83	10.32	15.15	79.00	-63.85	-57.85	QP	Final Measure
4	0.242612	-1.56	10.32	8.76	66.00	-57.24	-51.24	AV	Final Measure
5	3.100423	5.59	10.28	15.87	73.00	-57.13	-51.13	QP	Final Measure
6	3.100423	0.41	10.28	10.69	60.00	-49.31	-43.31	AV	Final Measure
7	3.770086	10.04	10.30	20.34	73.00	-52.66	-46.66	QP	Final Measure
8	3.770086	4.76	10.30	15.06	60.00	-44.94	-38.94	AV	Final Measure
9	5.009753	19.22	10.33	29.55	73.00	-43.45	-37.45	QP	Final Measure
10	5.009753	13.79	10.33	24.12	60.00	-35.88	-29.88	AV	Final Measure
11	8.196828	14.63	10.51	25.14	73.00	-47.86	-41.86	QP	Final Measure
12	8.196828	6.90	10.51	17.41	60.00	-42.59	-36.59	AV	Final Measure
13	8.965815	17.95	10.55	28.50	73.00	-44.50	-38.50	QP	Final Measure
14	8.965815	9.49	10.55	20.04	60.00	-39.96	-33.96	AV	Final Measure
15	20.325290	13.51	10.98	24.49	73.00	-48.51	-42.51	QP	Final Measure
16	20.325290	7.94	10.98	18.92	60.00	-41.08	-35.08	AV	Final Measure
17	22.443908	9.34	11.07	20.41	73.00	-52.59	-46.59	QP	Final Measure
18	22.443908	3.31	11.07	14.38	60.00	-45.62	-39.62	AV	Final Measure

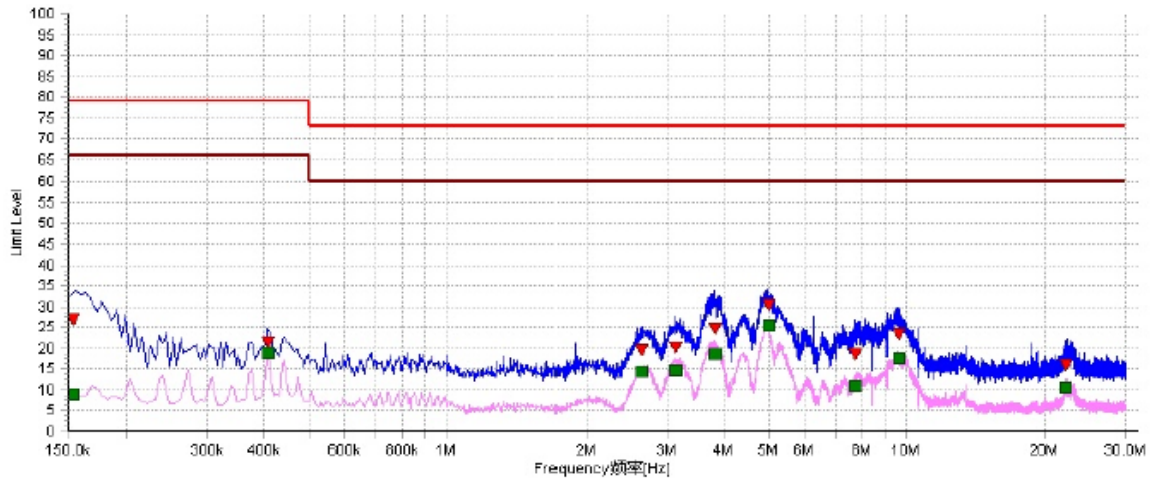


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Line: Neutral Line

Peak Scan:



Quasi-peak and Average measurement

	Frequency (MHz)	Value read	Factor (dB)	Real value	Limit	Over Limit	Over Margin	Detector	Comments
1	0.153660	17.03	9.89	26.92	79.00	-52.08	-46.08	QP	Final Measure
2	0.153660	-0.97	9.89	8.92	66.00	-57.08	-51.08	AV	Final Measure
3	0.407199	10.72	10.72	21.44	79.00	-57.56	-51.56	QP	Final Measure
4	0.407199	8.26	10.72	18.98	66.00	-47.02	-41.02	AV	Final Measure
5	2.636600	9.22	10.26	19.48	73.00	-53.52	-47.52	QP	Final Measure
6	2.636600	4.06	10.26	14.32	60.00	-45.68	-39.68	AV	Final Measure
7	3.134753	10.13	10.28	20.41	73.00	-52.59	-46.59	QP	Final Measure
8	3.134753	4.54	10.28	14.82	60.00	-45.18	-39.18	AV	Final Measure
9	3.812199	14.52	10.30	24.82	73.00	-48.18	-42.18	QP	Final Measure
10	3.812199	8.29	10.30	18.59	60.00	-41.41	-35.41	AV	Final Measure
11	5.026452	20.09	10.33	30.42	73.00	-42.58	-36.58	QP	Final Measure
12	5.026452	15.02	10.33	25.35	60.00	-34.65	-28.65	AV	Final Measure
13	9.612745	12.86	10.58	23.44	73.00	-49.56	-43.56	QP	Final Measure
14	9.612745	7.10	10.58	17.68	60.00	-42.32	-36.32	AV	Final Measure
15	22.242069	5.10	11.06	16.16	73.00	-56.84	-50.84	QP	Final Measure
16	22.242069	-0.32	11.06	10.74	60.00	-49.26	-43.26	AV	Final Measure
17	7.740983	8.07	10.49	18.56	73.00	-54.44	-48.44	QP	Final Measure
18	7.740983	0.57	10.49	11.06	60.00	-48.94	-42.94	AV	Final Measure



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7.2 Conducted Emissions on Telecommunication ports, 150 kHz to 30 MHz

Test Requirement: EN 61000-6-4
Frequency Range: 150 kHz to 30 MHz
Test Date: N/A: See Remark Below

Remark:

There is no need for Conducted Emission at telecommunication port test to be performed on this product in accordance with EN 61000-6-4:2007+A1:2011 because there is no telecommunication port in the product.



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7.3 Discontinuous Interference 150kHz to 30MHz

Test Requirement: EN 61000-6-4
Test Method: CISPR14-1
Test Date: N/A: See Remark Below
Frequency Range: 150kHz to 30MHz
Limit: As per clause 4.2.3.1 of CISPR14-1
Remark:

“4.2.3.1 Individual switching operations

The disturbance from individual switching operations, caused directly or indirectly, manually or by similar activities on a switch or a control which is included in an appliance or otherwise to be used for:

- a) the purpose of mains connection or disconnection only;
- b) the purpose of programme selection only;
- c) the control of energy or speed by switching between a limited number of fixed positions;
- d) the changing of the manual setting of a continuously adjustable control such as a variable speed device for water extraction or electronic thermostats, is to be disregarded for the purpose of testing the appliance for compliance with the limits of radio disturbance set out in this standard.

Examples of switches included in this subclause are the on/off switches for apparatus (including foot activated), for instance the switch for an electric typewriter, manual switches for heat and air flow control in fan heaters and hair dryers, as well as the indirectly operated switch in a cupboard, wardrobe or refrigerator, and sensor-operated switches, etc. Switches which usually will be repeatedly operated are not included in this subclause, e.g. for sewing machines, calculating machines, soldering equipment, etc. (see 7.2.3. and 7.3.2.4.c).

Also the disturbance caused by the operation of any switching device or control which is included in an appliance for the purpose of mains disconnection for safety only, is to be disregarded for the purpose of testing the appliance for compliance with the limits of radio disturbance as described in this standard.”

There is no need for Discontinuous Interference test to be performed on this product in accordance with table 2 of EN 61000-6-4:2007+A1:2011 :Impulse noise (clicks) which occur less than five times per minute is not considered



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7.4 Radiated Emissions, 30MHz to 1GHz

Test Requirement: EN 61000-6-4
Test Method: CISPR 16-2-3
Test Voltage: AC 380V 50Hz
Test Date: 2017-11-10
Frequency Range: 30MHz to 1GHz
Measurement Distance: 3m
Detector: Peak for pre-scan
Quasi-Peak or final measurement(120 kHz resolution bandwidth)
Class / Limit:

Frequency range MHz	Quasi-peak limits dB (μV/m)
30 to 230	50
230 to 1 000	57
At transitional frequencies the lower limit applies.	

7.4.1 E.U.T. Operation

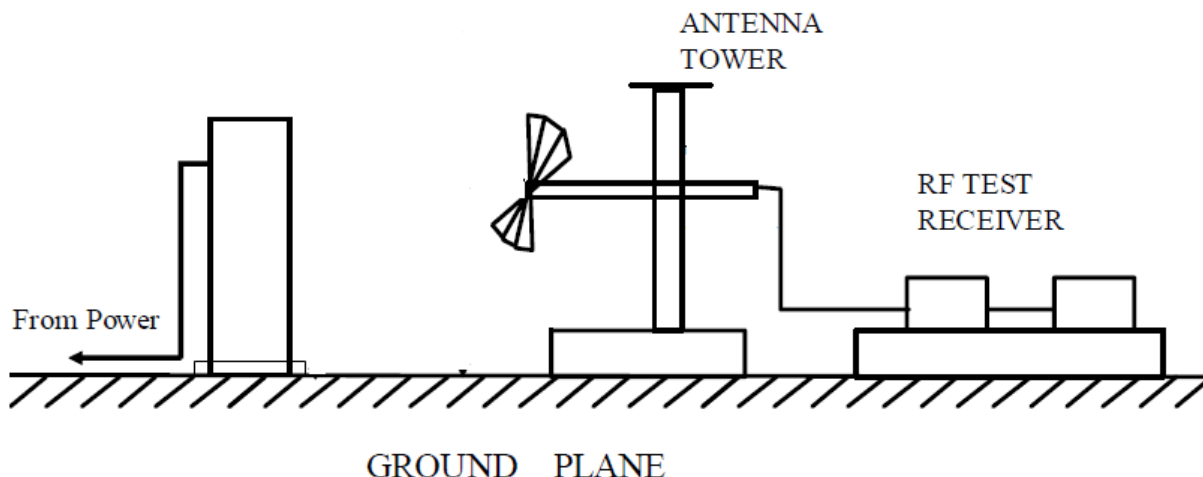
Pre-test the EUT in cooling mode and heating mode to find the worst case.
Test the EUT in cooling mode as the worst case was found.



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7.4.2 Test Setup and Procedure



1. The radiated emissions test was conducted in a suitable open area..
2. Broadband antenna was used for the frequency range from 30MHz to 1GHz
3. The EUT input terminal was connected to nominal power supply and nominal Battery. The EUT output terminal was connected to physical load box. The mains cables were draped to the ground reference plane. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. Perform a vertical CNE scan and compare the results with those in the on-site calibration file.
5. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT.
6. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the Antenna should turn at 0, 90, 180, and 270 degree, and the antenna was at a fixed height in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.



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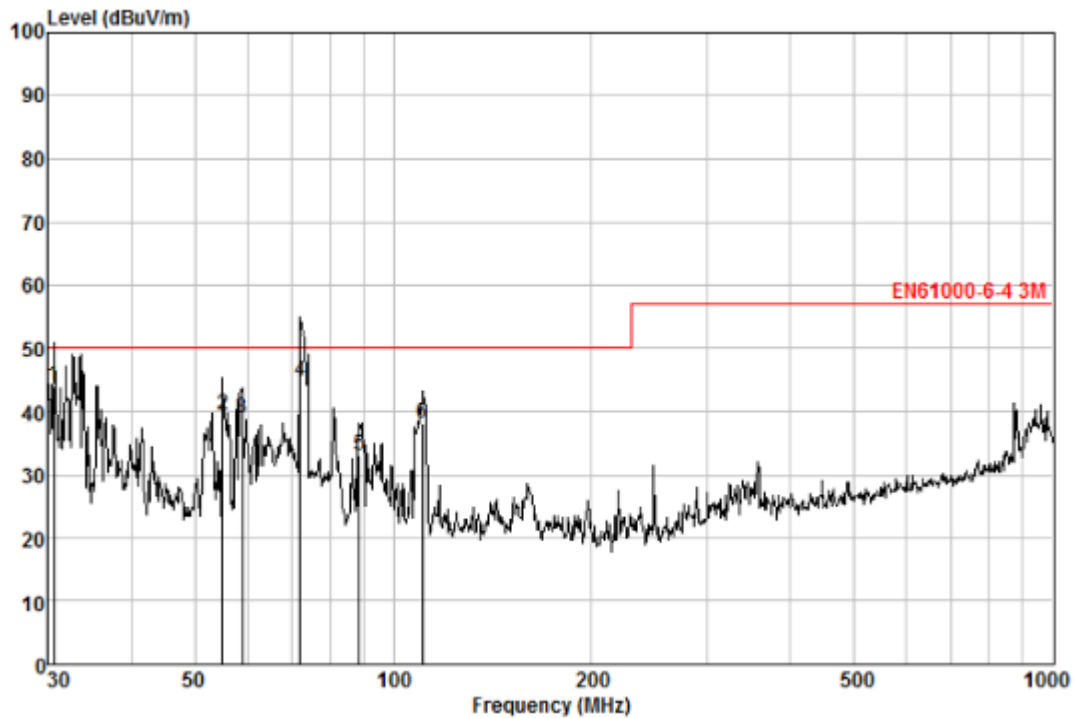
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7.4.3 Measurement Data

For model CLS-F65HW/ZR1B

Vertical:

Peak scan



Quasi-peak measurement

Freq	Read	Antenna	Cable	Preamp	Limit	Over	
MHz	Level	Factor	Loss	Factor	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
30.531	61.89	12.21	0.03	30.14	43.99	50.00	-6.01 QP
55.221	59.40	12.54	0.12	32.70	39.36	50.00	-10.64 QP
59.025	58.85	12.25	0.21	32.45	38.86	50.00	-11.14 QP
72.338	66.07	10.40	0.14	31.70	44.91	50.00	-5.09 QP
88.652	56.22	7.67	0.24	30.94	33.19	50.00	-16.81 QP
110.569	57.63	10.74	0.25	30.47	38.15	50.00	-11.85 QP

Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor.



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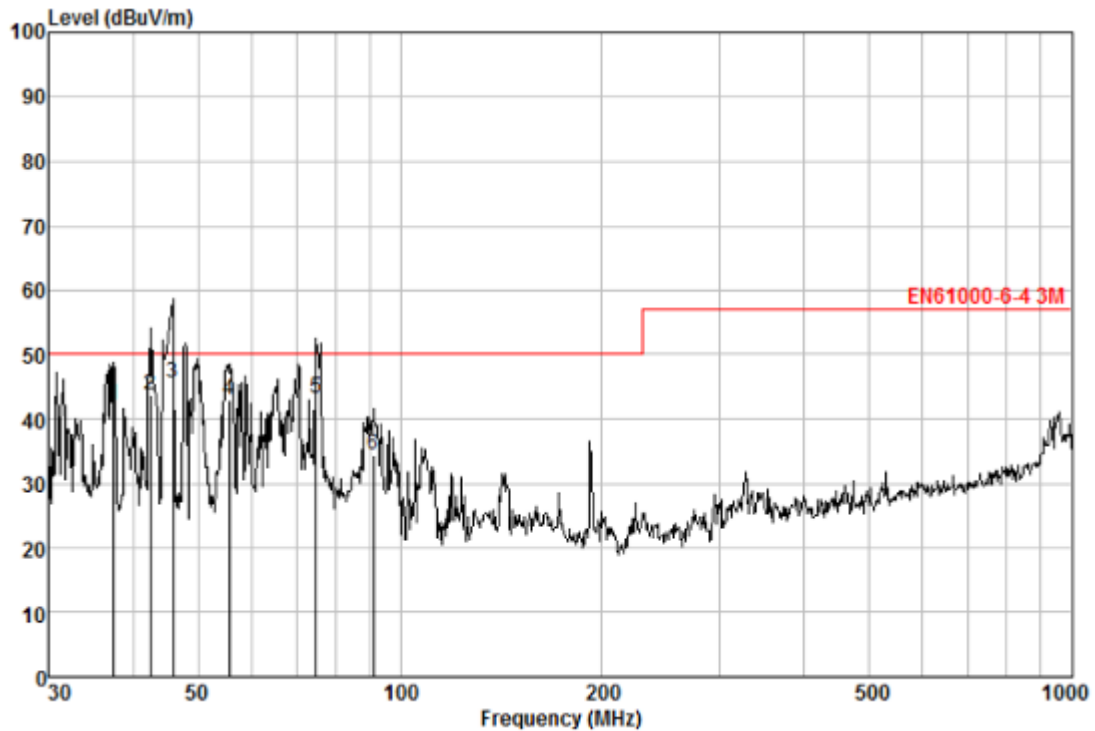
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Horizontal:

Peak scan



Quasi-peak measurement

Freq	Read	Antenna	Cable	Preamp	Level	Limit	Over	Remark
MHz	Level	Factor	Loss	Factor	Level	Line	Limit	
	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
37.416	62.47	12.54	0.18	32.97	42.22	50.00	-7.78	QP
42.451	64.60	12.67	0.18	33.68	43.77	50.00	-6.23	QP
45.855	65.94	12.87	0.12	33.39	45.54	50.00	-4.46	QP
55.609	63.04	12.49	0.12	32.68	42.97	50.00	-7.03	QP
74.919	64.93	9.65	0.17	31.57	43.18	50.00	-6.82	QP
91.175	57.27	7.79	0.23	30.84	34.45	50.00	-15.55	QP

Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor.



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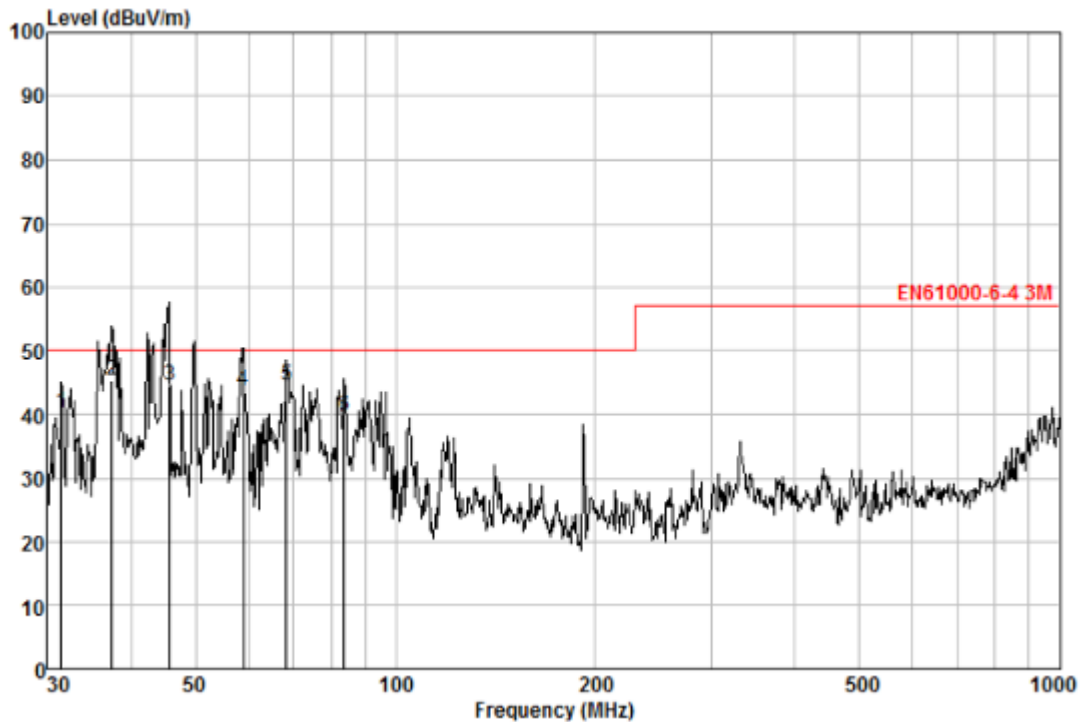
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Horizontal:

Peak scan



Quasi-peak measurement

Freq	Read	Antenna	Cable	Preamp	Limit	Over	
MHz	Level	Factor	Loss	Factor	Level	Line	Limit Remark
	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
31.399	58.59	12.24	0.05	30.53	40.35	50.00	-9.65 QP
37.416	65.70	12.54	0.18	32.97	45.45	50.00	-4.55 QP
45.695	64.91	12.87	0.12	33.40	44.50	50.00	-5.50 QP
59.025	63.75	12.25	0.21	32.45	43.76	50.00	-6.24 QP
68.631	65.28	10.92	0.14	31.89	44.45	50.00	-5.55 QP
83.816	62.43	8.17	0.22	31.15	39.67	50.00	-10.33 QP

Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor.



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7.5 Radiated Emissions above 1 GHz

Test Requirement: EN 61000-6-4

Frequency Range: 1 GHz to 6 GHz

Measurement Distance: 3 m

Test Date: N/A: See Remark Below

Remark:

There is no need for Radiated Emissions (above 1G) test to be performed on this product in accordance with EN 61000-6-4:2007+A1:2011, because the highest internal source is less than 108 MHz

For further details, please refer to note C in table 1 of EN61000-6-4 which states:

If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz.



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8 Immunity Test Results

8.1 Performance Criteria Description in Clause 4 of EN 61000-6-2

Criterion A:	The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.
Criterion B:	The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.
Criterion C:	Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.



8.2 ESD

Test Requirement:	EN 61000-6-2
Test Method:	EN 61000-4-2
Criterion Required:	B
Test Voltage:	AC 380V 50Hz
Test Date:	2017-11-10
Discharge Impedance:	330 Ω / 150 pF
Discharge Voltage:	Air Discharge: 8 kV
	Contact Discharge: 4 kV
	VCP: 4 kV
Polarity:	Positive & Negative
Number of Discharge:	Minimum 10 times at each test point
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

8.2.1 E.U.T. Operation

Operating Environment:

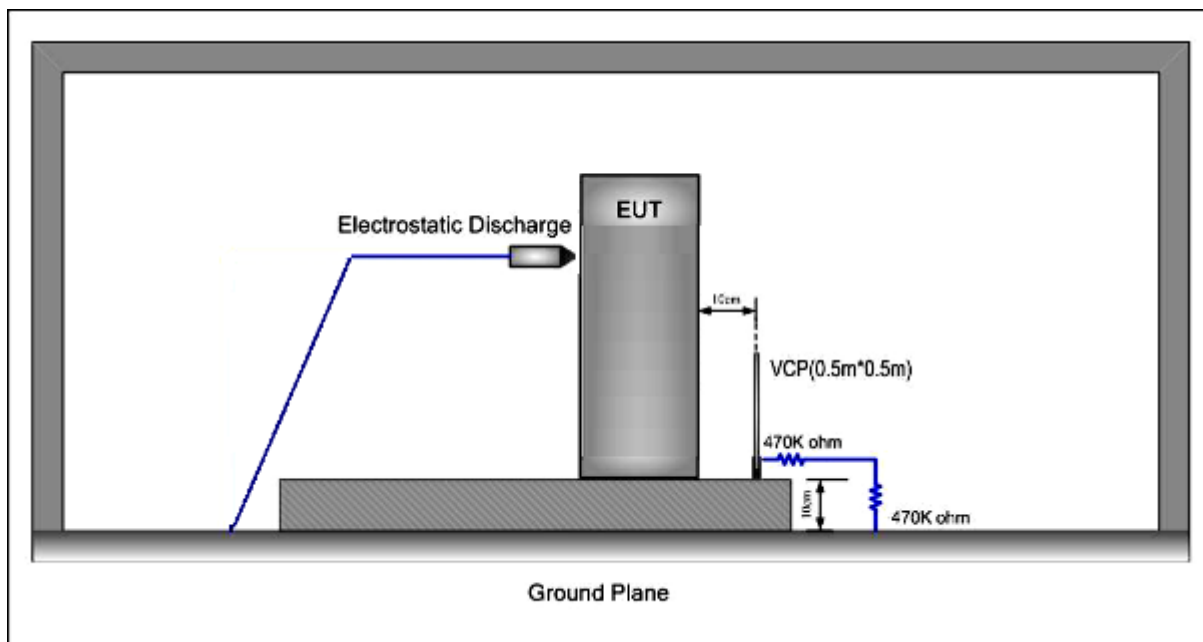
Temperature: 23 $^{\circ}\text{C}$

Humidity: 54 %RH

Atmospheric Pressure: 1010 mbar

EUT Operation: Test the EUT in cooling mode, heating mode and idle mode.

8.2.2 Test Setup and Procedure



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1. Contact discharges to the conductive surfaces and to coupling planes:

The EUT was exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points (a minimum of 50 discharges at each point). One of the test points was subjected to at least 50 indirect discharges (contact) to the centre of the front edge of the horizontal coupling plane. The remaining three test points shall each receive at least 50 direct contact discharges.

If no direct contact test points were available, then at least 200 indirect discharges were applied in the indirect mode. Tests were performed at a maximum repetition rate of one discharge per second.

Air discharge at slots and apertures, and insulating surfaces:

On those parts of the EUT where it was not possible to perform contact discharge testing, the equipment was investigated to identify user accessible points where breakdown may occur. This investigation was restricted to those areas normally handled by the user. A minimum of 10 single air discharges were applied to the selected test point for each such area.

The application of electrostatic discharges to the contacts of open connectors was not required by this standard.

2. The EUT was put on a 0.8m high wooden table for table-top equipment or 0.1m high for floor standing equipment standing on the ground reference plane (GRP).
3. A horizontal coupling plane(HCP) 1.6m by 0.8m in size was placed on the table, and the EUT with its cables were isolated from the HCP by an insulating support thick than 0.5mm. The VCP 0.5m by 0.5m in size while HCP were constructed from the same material type and thickness as that of the GRP, and connected to the GRP via a 470kΩ resistor at each end. The distance between EUT and any of the other metallic surfaces except the GRP, HCP and VCP was greater than 1m.
4. During the contact discharges, the tip of the discharge electrode was touched the EUT before the discharge switch is operated. During the air discharges, the round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT.
5. After each discharge, the ESD generator was removed from the EUT, the generator was then retriggered for a new single discharge. For ungrounded product, a discharge cable with two resistances was used after each discharge to remove remnant electrostatic voltage. 10 times of each polarity single discharge were applied to VCP and HCP if any.



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8.2.3 Test Results

Direct Application Test Results

- Observations: Test Point:
1. All insulated enclosure & seams.
 2. All accessible metal parts of the enclosure.

Direct Application		Test Results		
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge
8	+/-	1	N/A	A
4	+/-	2	A	N/A

Indirect Application Test Results

- Observations: Test Point:
1. All sides.

Indirect Application		Test Results		
Discharge Level (Kv)	Polarity (+/-)	Test Point	Horizontal Coupling	Vertical Coupling
4	+/-	1	N/A	A

Results:

A: No degradation in the performance of the EUT was observed.

N/A: Not applicable (floor mounted EUT or not requested by Standard).



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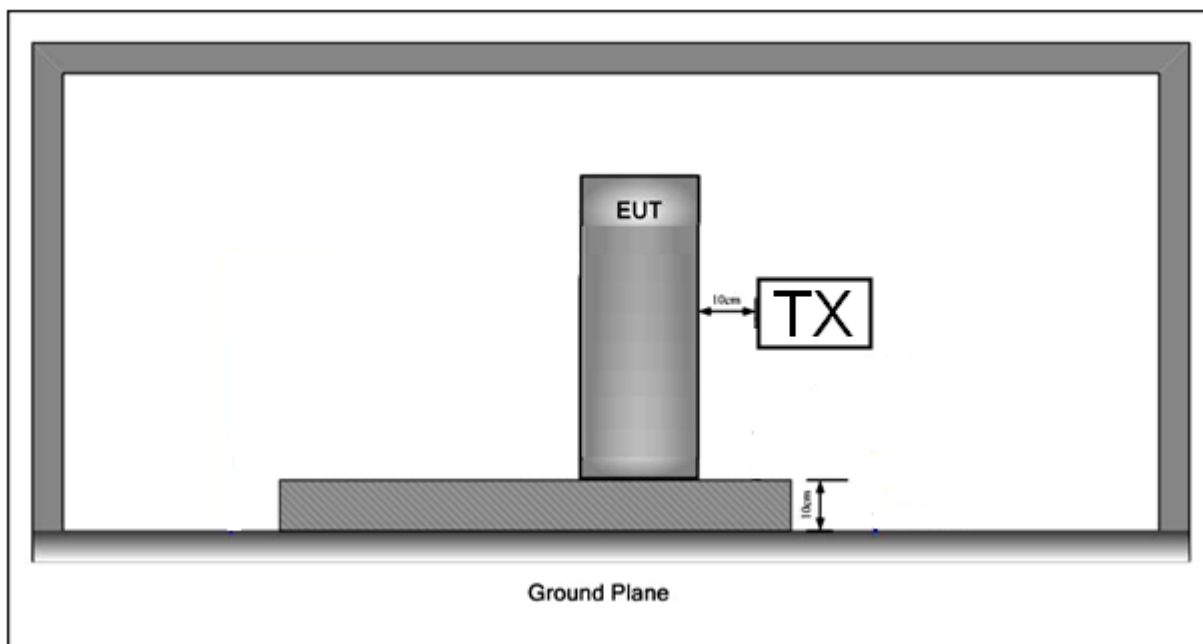
8.3 Radiated Immunity

Test Requirement:	EN 61000-6-2
Test Method:	EN 61000-4-3
Criterion Required:	A
Test Voltage:	AC 380V 50Hz
Test Date:	2017-11-10
Frequency Range:	80MHz to 1GHz, 1.4GHz to 2.7GHz
Antenna Polarization:	Horizontal & Vertical
Test level:	10V/m, 3V/m & 1V/m on enclosure
Modulation:	80% 1kHz Amplitude Modulated

8.3.1 E.U.T. Operation

Test the EUT in cooling mode, heating mode and idle mode.

8.3.2 Test Setup and Procedure



As on-site testing was hard to avoid affecting other devices, after discussing with the manufacturer, the actual radio transmitters were applied for the EUT interference at 10cm position. The Interference frequency was shown as below:

27MHz, 49MHz, 433MHz, 446MHz, 863 to 865 MHz radio microphones, GSM mobile phone, 2.4GHz transmitter and so on. For more details, please refer to the figure in 9.4 of this report.



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1. Ensure that transmitter batteries are fully charged, and perform a functional check on the transmitter.
2. The EUT was placed on an open test site. For table-top equipment, the EUT was placed on a table 0.8m high. For arrangement of floor-standing equipment, the EUT was mounted on a non-conductive support 0.1m above the supporting plane. For human body-mounted equipment, the EUT may be tested in the same manner as table top items.
3. At a distance of 0.1 metres from the EUT, and with the radio transmitter vertical, press the work button.
4. Repeat step 3 with the radio transmitter horizontally.
5. The EUT was initially placed with one face coincident with the calibration plane. The EUT face being illuminated was contained within the UFA (Uniform Field Area), and the test normally was performed facing each side of the EUT.
6. Record any EUT malfunctions, interrupts, resets or failures.

8.3.3 Test Results

Transmitter Frequency	Distance	EUT Face	Result / Observations
27MHz Controller	0.1 m	Five Faces	A
49MHz Controller	0.1 m	Five Faces	A
433MHz Controller	0.1 m	Five Faces	A
446MHz Controller	0.1 m	Five Faces	A
863 to 865 MHz radio microphones	0.1 m	Five Faces	A
GSM mobile phone	0.1 m	Five Faces	A
2.4GHz transmitter	0.1 m	Five Faces	A

Remarks:

Five Faces: Front, Rear, Left, Right, Top

Front: the front of the EUT faces to Radio transmitter(refer to Radiated Immunity test setup photo)

A: No degradation in the performance of the E.U.T. was observed.

The EUT is presumed to meet the Radiated Immunity requirements of Standard.



8.4 Electrical Fast Transients (EFT)

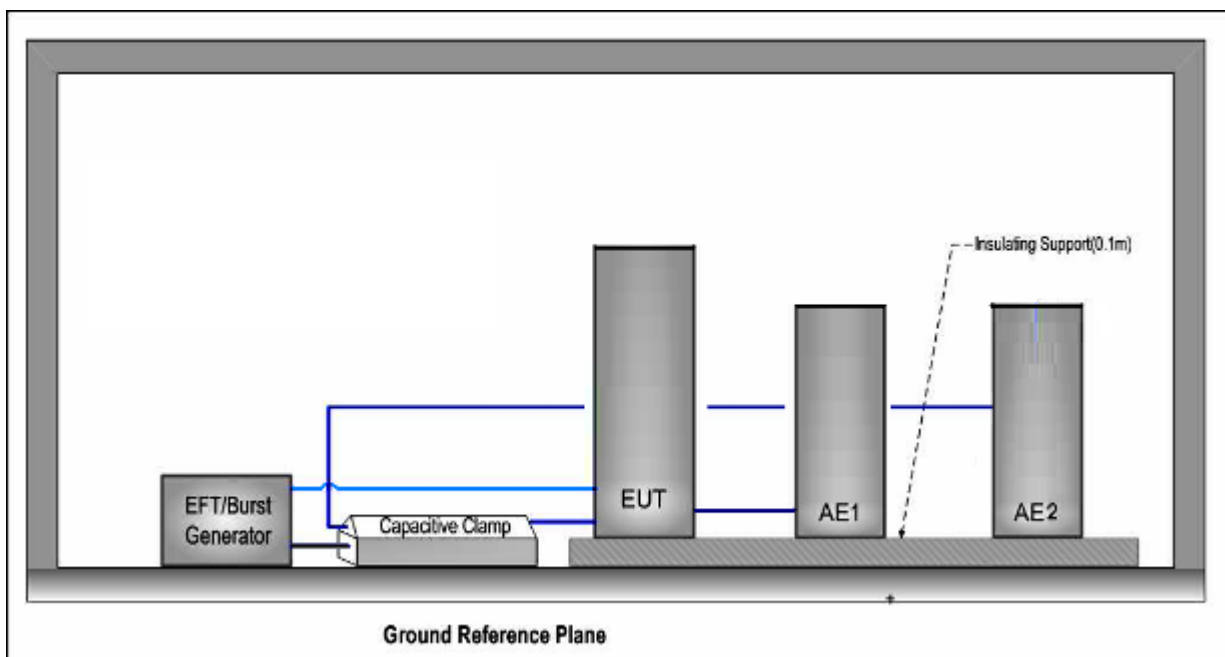
Test Requirement:	EN 61000-6-2
Test Method:	EN 61000-4-4
Criterion Required:	B
Test Voltage:	AC 380V 50Hz
Test Date:	2017-11-10
Test Level:	2.0 kV on AC
Polarity:	Positive & Negative
Repetition Frequency:	5kHz
Burst Duration:	300ms
Test Duration:	2 minute per level & polarity

8.4.1 E.U.T. Operation

Test the EUT in cooling mode, heating mode and idle mode.

8.4.2 Test Setup and Procedure

For AC port:





1. The EUT was placed on a ground reference plane(GRP) insulated by an insulating support 0.1 m thick and the EUT was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP.
2. The GRP shall project beyond the EUT and the clamp by at least 0.1m on all sides. The distance between the EUT and any other of the metallic surface except the GRP was greater than 0.5m. All cables to the EUT were placed on the insulation support 0.1m above GRP. Cables not subject to EFT were routed as far as possible from cable under test to minimize the coupling between the cables.
3. The length of signal and power cable between the EUT and EFT generator was 0.5m. If the cable is a non-detachable supply cable more than 0.5m, the excess length of this cable shall be folded to avoid a flat coil and situated at a distance of 0.1m above the GRP.
4. The EUT was conducted the below specified level voltage test for line to neutral or line to neutral to earth(for clamp coupling is for the signal line), 120 seconds duration.
5. If the equipment contains identical ports, only one was tested; multi-conductor cables, such as a 50-pair telecommunication cable, were tested as a single cable. Cables did not be split or divided into groups of conductors for this test; interface ports, which were intended by the manufacturer to be connected to data cables not longer than 3 m, did not be tested.
6. Due to large the current of EUT, a capacitive clamp was applied to couple the EFT signal to the AC, DC input terminal and AC output terminal of EUT.

8.4.3 Test Results

Lead under Test	Level (\pm kV)	Coupling Direct/Clamp	EUT operating mode	Observations (Performance Criterion)
Live+ Neutral+ Earth (EUT)	2.0	Clamp	All modes	(A)

Remark:

A: No degradation in the performance of the E.U.T. was observed.

The EUT does meet the Electrical Fast Transients requirements of Standard.



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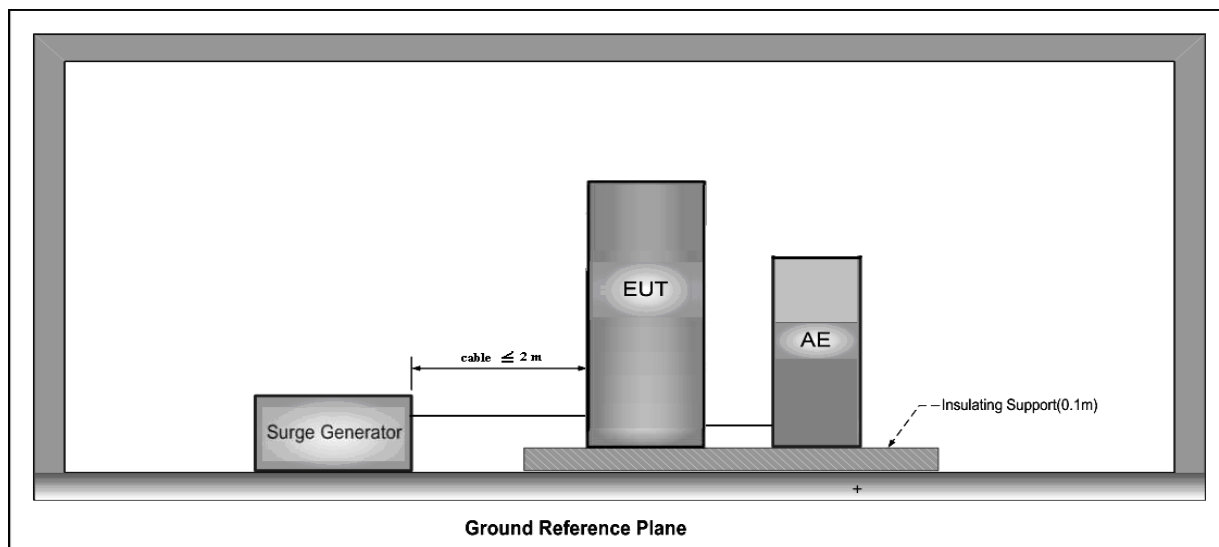
8.5 Surge Immunity on AC

Test Requirement:	EN 61000-6-2
Test Method:	EN 61000-4-5
Criterion Required:	B
Test Voltage:	AC 380V 50Hz
Test Date:	2017-11-10
Test Level:	± 1.0 kV Live to Neutral, ± 2.0 kV Line to Earth
Polarity:	Positive & Negative
Generator source impedance:	2Ω
Trigger Mode:	Internal
No. of surges:	5 positive, 5 negative at 0°, 90°, 180°, 270°.

8.5.1 E.U.T. Operation

Test the EUT in cooling mode, heating mode and idle mode.

8.5.2 Test Setup and Procedure



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1. The EUT was placed on a ground reference plane (GRP) insulated by an insulating support 0.1 m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP.
2. The 1,2/50 μ s surge was to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks were required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines and to provide sufficient decoupling impedance to the surge wave so that the specified wave may be applied on the lines under test.
3. The power cord between the EUT and the coupling/decoupling network was not exceeding 2 m in length. The interconnection line between the EUT and the coupling/ decoupling network shall not exceed 2 m in length.
4. The EUT was conducted 0.5kV and 1kV test voltage for live to neutral and line to neutral and conducted 0.5kV, 1kV and 2kV test voltage for line to earth and neutral to earth, five positive pulses and five negative pulses each at 0°, 90°, 180° and 270° for a.c. power ports and five positive pulses and five negative surge pulses for d.c. power ports. The test levels were applied on the EUT with a 2 Ω generator source impedance for power supply terminals and 40 Ω output impedance for interconnection lines. The tests were done at repetition rate one per minute.
5. Due to the large current of EUT, after discussing with the manufacturer, one live Line and Earth line (or Neutral line) were connected to the generator. Then these two lines were back to the EUT from generator. The surge signal was coupled to the two lines directly. The same method was applied to AC, DC input and AC output.



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8.5.3 Test Results

Pulse No	Line-Line	Coupling	Level (kV)	Surge Interval	Phase (deg)	Observation (Performance Criterion)
1-5	L-N	18uF	+1	60s	0°	(A)
6-10	L-N	18uF	-1	60s	0°	(A)
11-15	L-N	18uF	+1	60s	90°	(A)
16-20	L-N	18uF	-1	60s	90°	(A)
21-25	L-N	18uF	+1	60s	180°	(A)
26-30	L-N	18uF	-1	60s	180°	(A)
31-35	L-N	18uF	+1	60s	270°	(A)
36-40	L-N	18uF	-1	60s	270°	(A)
41-45	L-PE	9uF	+2	60s	0°	(A)
46-50	L-PE	9uF	-2	60s	0°	(A)
51-55	L-PE	9uF	+2	60s	90°	(A)
56-60	L-PE	9uF	-2	60s	90°	(A)
61-65	L-PE	9uF	+2	60s	180°	(A)
66-70	L-PE	9uF	-2	60s	180°	(A)
71-75	L-PE	9uF	+2	60s	270°	(A)
76-80	L-PE	9uF	-2	60s	270°	(A)
41-45	N-PE	9uF	+2	60s	0°	(A)
46-50	N-PE	9uF	-2	60s	0°	(A)
51-55	N-PE	9uF	+2	60s	90°	(A)
56-60	N-PE	9uF	-2	60s	90°	(A)
61-65	N-PE	9uF	+2	60s	180°	(A)
66-70	N-PE	9uF	-2	60s	180°	(A)
71-75	N-PE	9uF	+2	60s	270°	(A)
76-80	N-PE	9uF	-2	60s	270°	(A)

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The test results of three Live line are the same.

A: No degradation in the performance of the E.U.T. was observed.

The EUT does meet the Surge immunity on AC requirements of Standard.



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8.6 Surge immunity on telecommunication port

Test Requirement: EN 61000-6-2
Criterion Required: B
Test Date: N/A: See Remark Below

Remark:

There is no need for surge immunity on telecommunication port test to be performed on this product in accordance with EN 61000-6-2:2005 because there is no telecommunication port in the product or the normal functioning cannot be achieved because of the impact of the CDN on the EUT, no test shall be required.



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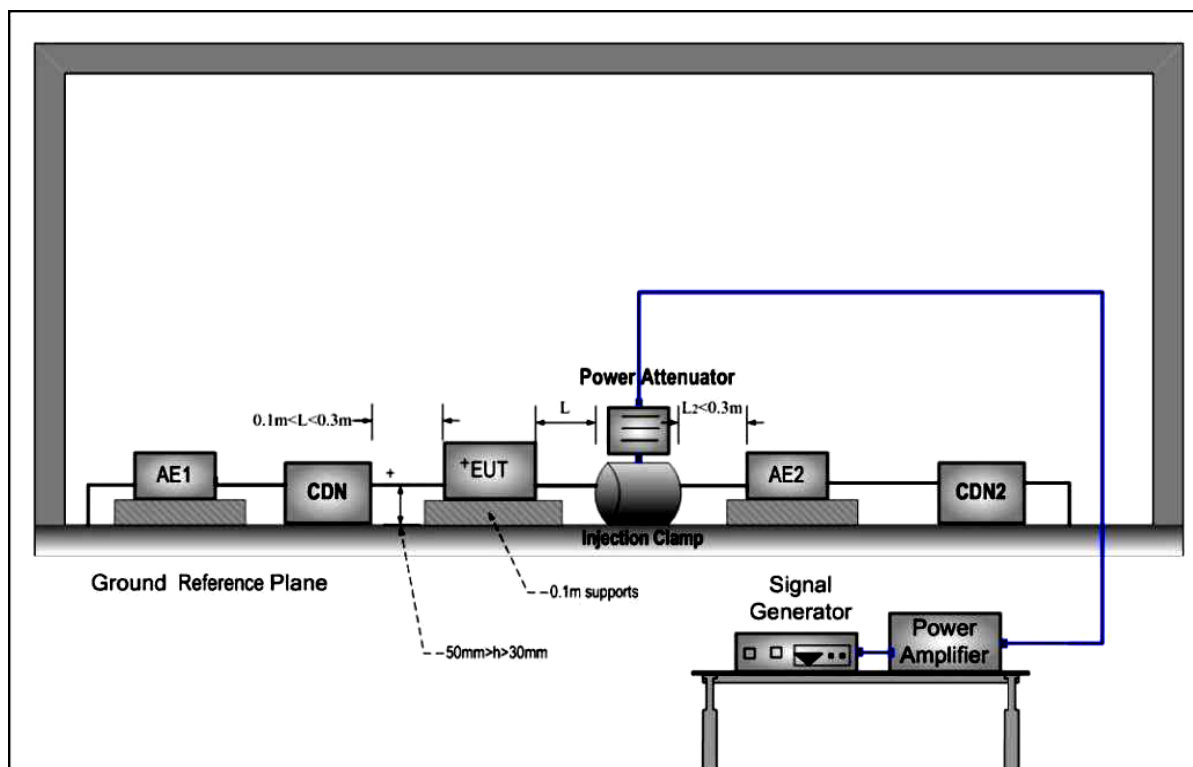
8.7 Conducted Immunity 0.15 MHz to 80 MHz

Test Requirement:	EN 61000-6-2
Test Method:	EN 61000-4-6
Criterion Required:	A
Test Voltage:	AC 380V 50Hz
Test Date:	2017-11-10
Frequency Range:	0.15MHz to 80MHz
Test level:	10V r.m.s on AC Ports (unmodulated emf into 150 Ω) 10V r.m.s on Signal Ports (unmodulated emf into 150 Ω)
Modulation:	80%, 1kHz Amplitude Modulation

8.7.1 E.U.T. Operation

Test the EUT in cooling mode, heating mode and idle mode.

8.7.2 Test Setup and Procedure



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1. The EUT was placed on an insulating support of 0.1m height above a ground reference Plane, arranged and connected to satisfy its functional requirement. All cables exiting the EUT was supported at a height of at least 30 mm above the ground reference plane.
2. The coupling and decoupling devices were required, they were located between 0.1m and 0.3m from the EUT. This distance was to be measured horizontally from the projection of the EUT on to the ground reference plane to the coupling and decoupling device.
3. Each AE, used with clamp injection, shall be placed on an insulating support 0.1m above the ground reference plane. A decoupling network shall be installed on each cable between the EUT and AE except the cable under test. All cables connected to each AE, other than those being connected to the EUT, shall be provided with decoupling networks. The decoupling networks connected to each AE (except those on cables between the EUT and AE) shall be applied no further than 0.3m from the AE. The cable(s) between the AE and the decoupling network (s) or in between the AE and the injection clamp shall not be bundled nor wrapped and shall be kept between 30 mm and 50 mm above the ground reference plane.
4. The frequency range was swept from 150 kHz to 230 MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or to change coupling devices as necessary. Where the frequency was swept incrementally, the step size do not exceed 1% of the preceding frequency value. The dwell time of the amplitude modulated carrier at each frequency was not less than the time necessary for the EUT to be exercised and to respond, and was not less than 0.5 s.



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8.7.3 Test Results

Frequency	Line	Test Level	Modulation	Step Size	Observation (Performance Criterion)
150 kHz to 80 MHz	3 Wires AC Supply Cable (EUT)	10V r.m.s	80%, 1 kHz Amp. Mod.	1%	(A)

Remarks:

A: No degradation in the performance of the E.U.T. was observed.

The EUT does meet the Conducted Immunity requirements of Standard.



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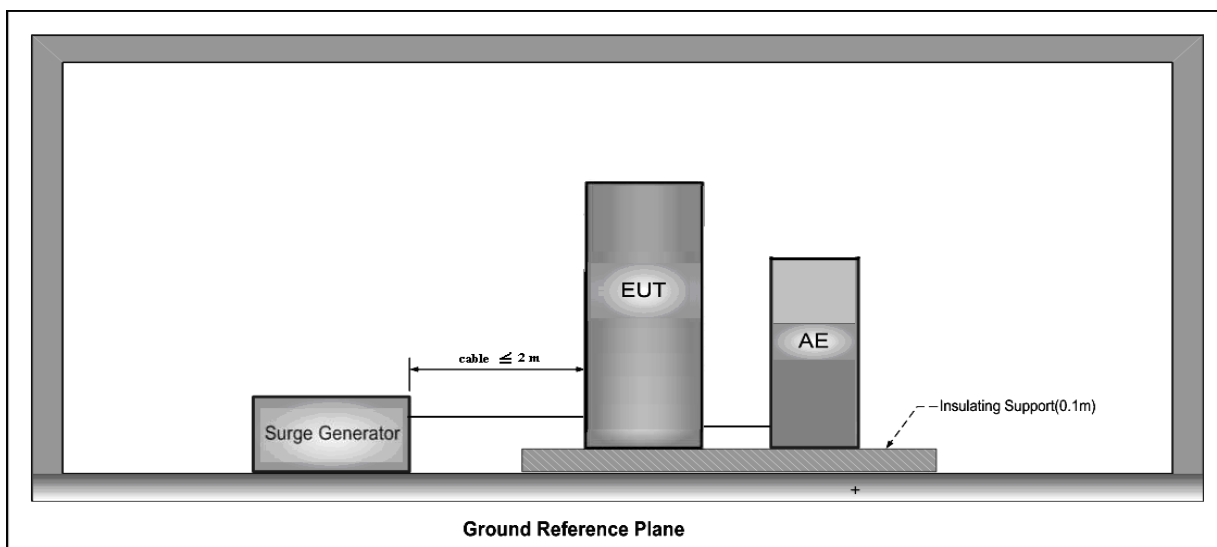
8.8 Voltage Dips and Interruptions

Test Requirement:	EN 61000-6-2
Test Method:	EN 61000-4-11
Criterion Required:	0%VD,1.0 periods: B; 0%VD,250 periods: C 40%VD,10 periods:C ;70%VD,25 periods:C
Test Voltage:	AC 380V 50Hz
Test Date:	2017-11-10
Test Level:	0% of U_T (Supply Voltage) for 1.0 Periods 0% of U_T (Supply Voltage) for 250 Periods 40 % of U_T (Supply Voltage) for 10 Periods 70 % of U_T (Supply Voltage) for 25 Periods
No. of Dips / Interruptions:	3 per Level

8.8.1 E.U.T. Operation

Test the EUT in cooling mode, heating mode and idle mode.

8.8.2 Test Setup and Procedure



1. The EUT was placed on a ground reference plane (GRP) insulated by an insulating support 0.1m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP.
2. The test was performed with the EUT connected to the test generator with the shortest power supply cable as specified by the EUT manufacturer.
3. The EUT was tested for each selected combination of test level and duration with a sequence of three dips /interruptions with intervals of 10 s minimum. Each representative mode of operation was tested.



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4. For EUT with more than one power cord, each power cord was tested individually.



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8.8.3 Test Results

U_T = AC 380V 50Hz

Test Level % U_T	Phase	Duration of drop out in Periods	No of drop out	Time between drop out	Observations (Performance Criterion)
0	0°	1.0	3	10 s	(A)
0	0°	250	3	10 s	(C)
40	0°	10	3	10 s	(A)
70	0°	25	3	10 s	(A)

Remark:

U_T = the nominal supply voltage

A: No degradation in the performance of the EUT was observed.

C: The EUT stopped working during test; it could be recovered by operator after test.

The EUT does meet the Voltage Dips and Interruptions requirements of Standard.



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9 Photographs

9.1 Conducted Emissions on Mains Terminals Test Setup

For model CLS-F65HW/ZR1B



For model CLS-F130HW/ZR1B



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9.2 Radiated Emissions, 30MHz to 1GHz Test Setup

For model CLS-F65HW/ZR1B



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For model CLS-F130HW/ZR1B



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9.3 ESD Test Setup

For model CLS-F65HW/ZR1B



For model CLS-F130HW/ZR1B



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9.4 Radiated Immunity Test Setup

For model CLS-F65HW/ZR1B



For model CLS-F130HW/ZR1B



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9.5 EFT, Surge Immunity, Voltage Dips and Interruptions on AC

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9.6 Conducted Immunity on AC Test Setup

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9.7 EUT Constructional Details

Below photos were supplied by Applicant.

Other internal photos were not shown in this report as per the Applicant request.

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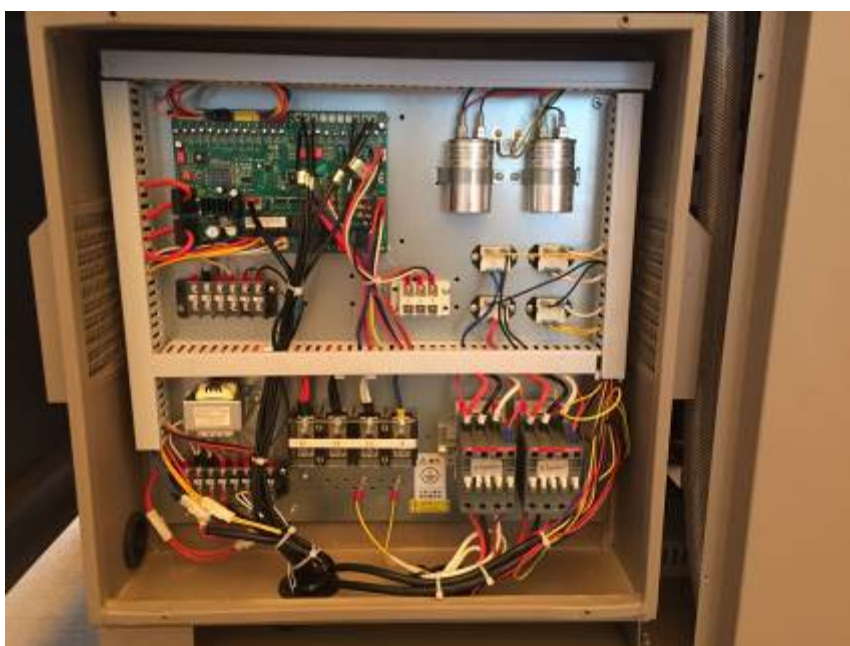


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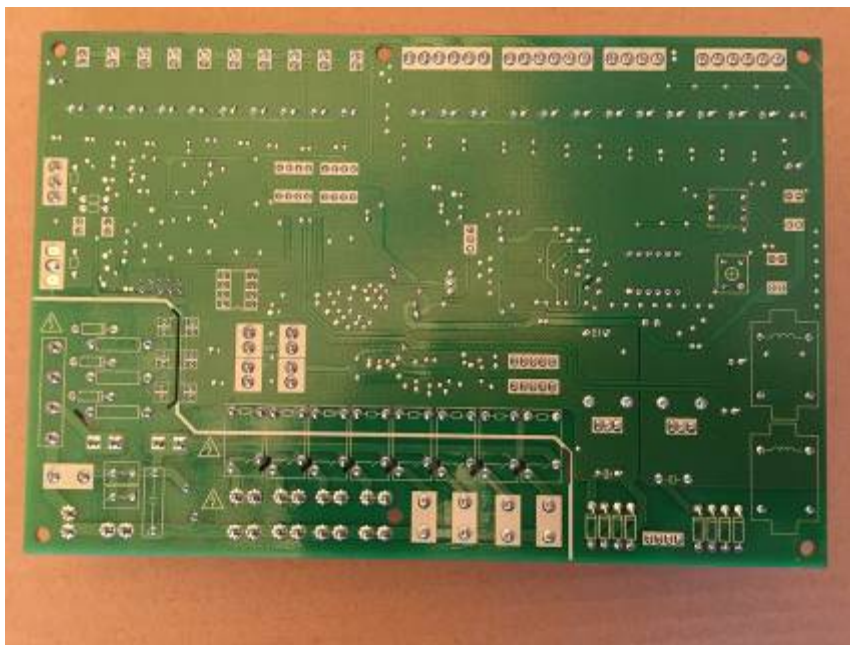


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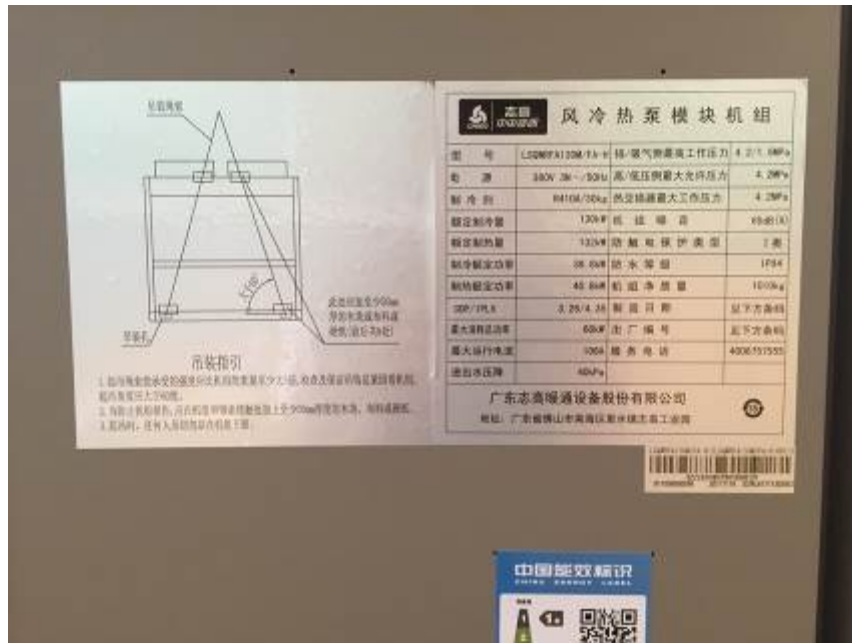


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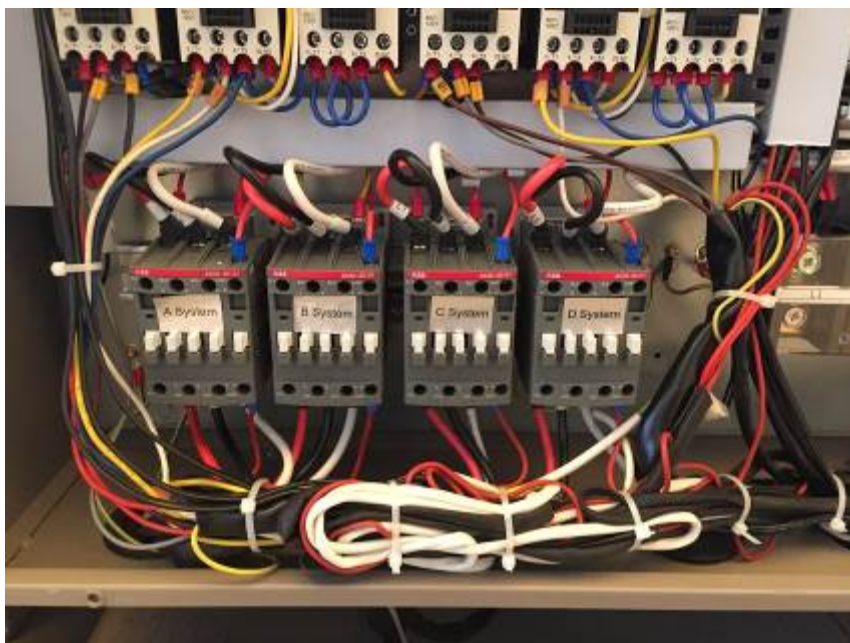
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--End of Report--

