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EMC TEST REPORT

On Model Name: DL-P40 Computer Control System
Model Number: Release 3.0 Hardware and Software
Brand Name: Dorman Long Technology Ltd.
Trade Mark: DLT

Prepared for Dorman Long Engineering Technology Consultant (Shanghai) Co., Ltd.

According to
EN 61326-1: 2006
Electrical equipment for measurement, control and laboratory use - EMC requirements
Part 1: General requirements (IEC 61326-1: 2005)

Test Report #:	*DOR-0907-8294-CE*
Prepared by:	*Chris Huang*
Reviewed by:	*Harry Zhao*
QC Manager:	*Paul Chen*

Test Report Released By: Paul J. Chen _____ *2009, August 4*

Paul Chen *Date*

Test Location

Tests performed in a Certified ANSI Semi-Anechoic Chamber and Shielded Room performed testing.

Test Site Location #1: *ECMG Worldwide Certification Solution, Inc. (China)*

Building 2, 1298 Lian Xi Road, Pu Dong New Area, Shanghai, P.R. China 201204

Tel: *86-21-51909300*
Fax: *86-21-51909333*
FCC Registration Number: *172634*

Test Site Location#2: *Shanghai Institute of Quality Inspection and Technicl Research No.627, Yongjia Road, Shanghai, PRC.*
Tel: *86-21-62335275*
Fax: *86-21-64317195*
CNAS Certificate Number*: L0128*

Accreditation Bodies

The report is prepared by ECMG Worldwide Certification Solution, Inc., which is a fully accredited Test Laboratory for ITE, ISM, MIL-STD and Telecommunications Products.

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Administrative Data

Test Sample : DL-P40 Computer Control System

Model Number : Release 3.0 Hardware and Software

Brand Name : Dorman Long Technology Ltd.

Trade Mark : DLT

Serial Number : Engineering Sample

Date Tested : 2009, July 27th and 28th

Applicant : Dorman Long Engineering Technology Consultant (Shanghai) Co., Ltd.
19D, Yujia Building, 1336 Huashan Road, 200052, P.R.China

Telephone : 86-21-62110500

Fax : 86-21-62110523

Manufacturer : Dorman Long Engineering Technology Consultant (Shanghai) Co., Ltd.
19D, Yujia Building, 1336 Huashan Road 200052, P.R.China

EUT Description

Dorman Long Engineering Technology Consultant (Shanghai) Co., Ltd. model tested Release 3.0 Hardware and Software (referred to as the EUT in this report) is a Heavy Lift Controller.

The control unit contains 1 power pack node and 1~2 jack node and connected by CAN B. The control units are connected by CAN A.

Test Summary

The Electromagnetic Compatibility requirements on model Release 3.0 Hardware and Software for this test are stated below. All results listed in this report relate exclusively to this above-mentioned model as the Equipment under Test. This report confers no approval or endorsement upon any other component, host or subsystem used in the test set-up.

Emission Tests				
Specifications	***Description***	***Test Results***	***Test Point***	***Remark***
CISPR 11: Edition 4.1:2006, Group 1, Class B	*Conducted Emission*	*Passed by 13.51 dB of QP* *Passed by 8.60 dB of AVE*	*DC Input Port*	*Attachment 1*
CISPR 11: Edition 4.1:2006, Group 1, Class B	*Radiated Emission*	*Passed by 8.45 dB of QP*	*Enclosure*	*Attachment 2*
IEC 61000-3-2 Edition 3.0: 2005	*Power Harmonics Emission*	*The EUT is DC Powered, test is not applicable*		
IEC 61000-3-3, Edition 1.1: 2002	*Voltage Fluctuation/Flicker*			

Continue on to next page…

Immunity Test Requirements for equipment intended for use in industrial locations				
Specifications	***Description***	***Test Results***	***Test Point***	***Remark***
IEC 61000-4-2, Edition 2.0 (2008)	*Electrostatic Discharge*	*Passed Level 3, Air* *Passed Level 2, Contact* *Air 8kV / Contact 4kV*	*Enclosure*	*Meets Performance Criteria B* *Attachment 3*
IEC 61000-4-3: Edition 3.1 (2008)	*RF Immunity*	*Passed Level 2* *10V/m (80MHz-1000MHz),* *3V/m (1.4GHz-2GHz),* *1V/m(2.0GHz-2.7GHz)*	*Enclosure*	*Meets Performance Criteria A* *Attachment 4*
IEC 61000-4-4: Edition 2.0 (2007)	*EFT/Bursts Immunity*	*Passed Level 3* *DC Power line: 2kV* *I/O Line: 1kV*	*DC Input Port* *I/O Port*	*Meets Performance Criteria B* *Attachment 5*
IEC 61000-4-5: Edition 2.0 (2005)	*Surge Immunity*	*Passed Level 2, Differential mode* *DC Power Line: Line - Line 1kV* *Passed Level 3, Common mode DC Power Line: Line - Ground 2kV* *Passed Level 2, Common mode* *I/O Line: Line – Ground 1kV*	*DC Input Port* *I/O Port*	*Meets Performance Criteria B* *Attachment 6*
IEC 61000-4-6: Edition 3.0 (2008)	*Conducted Immunity*	*Passed Level 2* *DC Power Line: 3V* *0.15MHz-80MHz* *I/O Line: 3V* *0.15MHz-80MHz*	*DC Input Port* *I/O Port*	*Meets Performance Criteria A* *Attachment 7*
IEC 61000-4-8: Edition 1.1 (2001)	*Power Frequency Magnetic Field Immunity*	*30A/m*	*Enclosure*	*Meets Performance Criteria A* *Attachment 8*
IEC 61000-4-11: Edition 2.0 (2004)	*Voltage Dips & Short Interruption*	*The EUT is DC Powered, test is not applicable*		

Performance Criteria

As described in EN61326-1: 2006

Performance Criteria 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 of 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.*

Performance Criteria 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 of 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.*

Performance Criteria C: *Temporary loss of function is allowed, provided the function the function is self-recoverable or can be restored by the operation of controls.*

Test Mode Justification

The EUT is powered by 24V power or 24V DC battery. The EUT runs in communicating mode during the test.

EUT Exercise Software

The EUT run the software that is named by "Release 3.0 Hardware and Software" during the test.

Equipment Modification

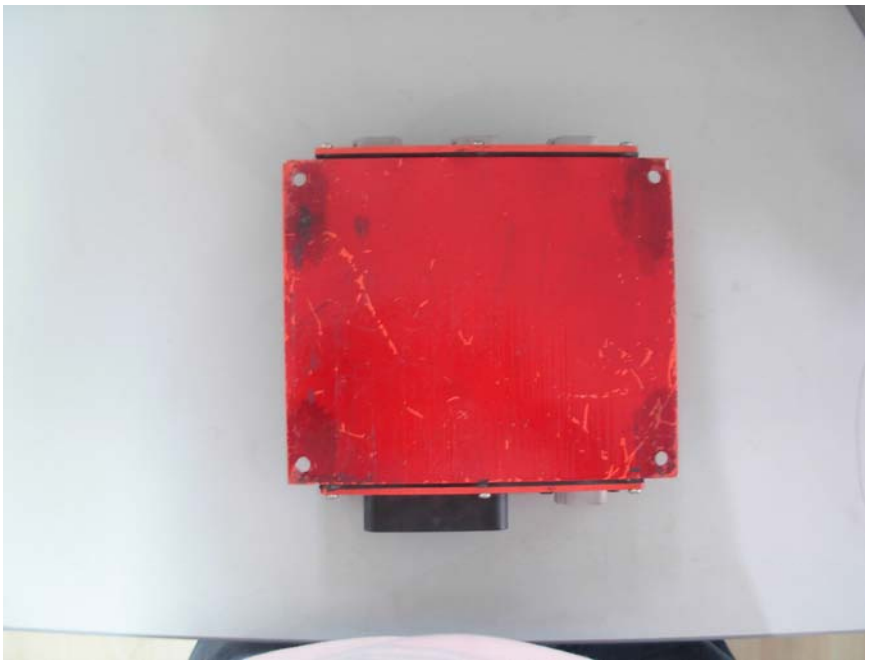
Any modifications installed previous to testing by Dorman Long Engineering Technology Consultant (Shanghai) Co., Ltd. will be incorporated in each production model sold or leased in Europe.

There were no modifications installed by ECMG Worldwide Certification Solution, Inc. (China) test personnel.

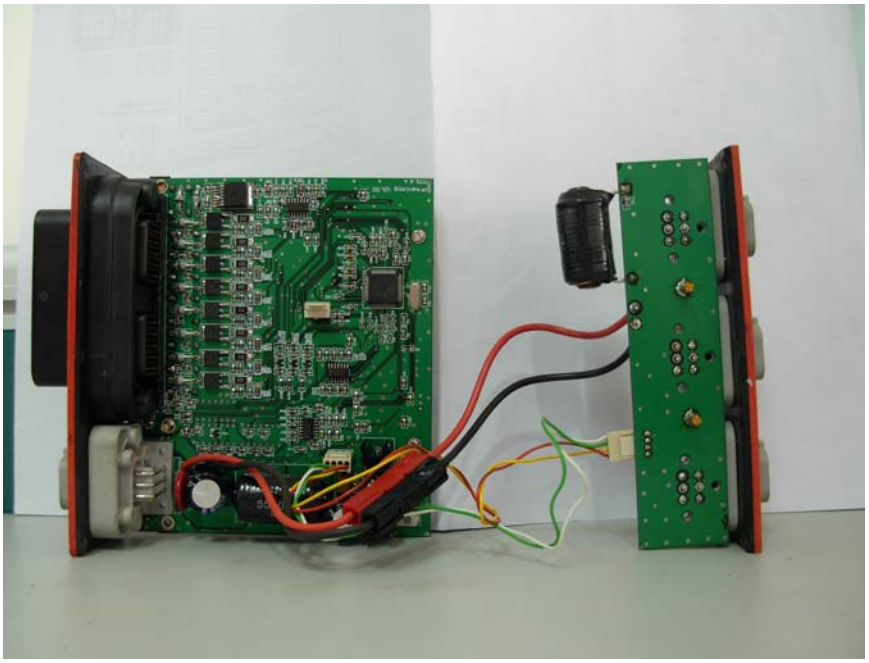
EUT Sample Photos - Release 3.0 Hardware and Software

For Power Pack Node

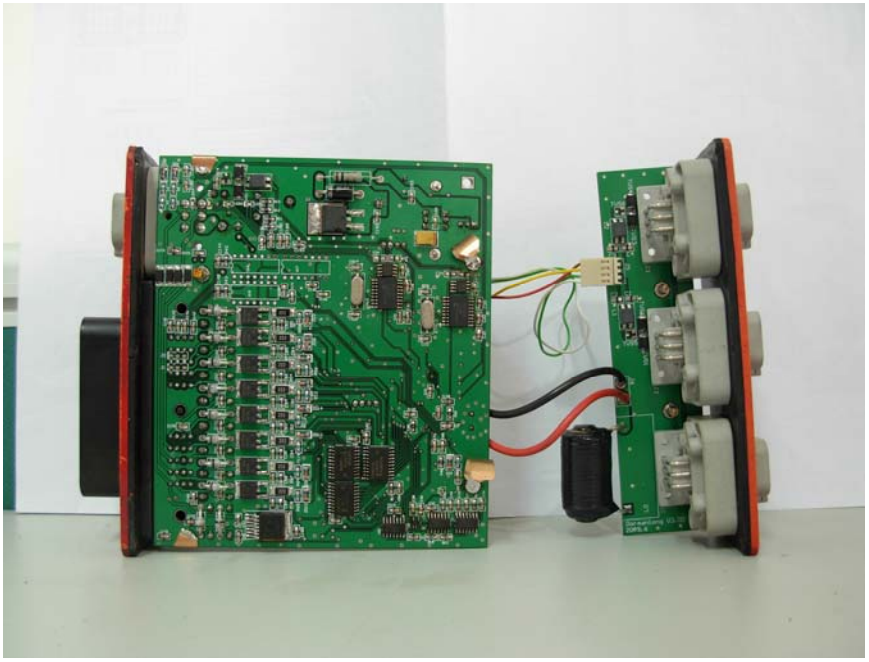
Front view



Back View



Main Board Front View

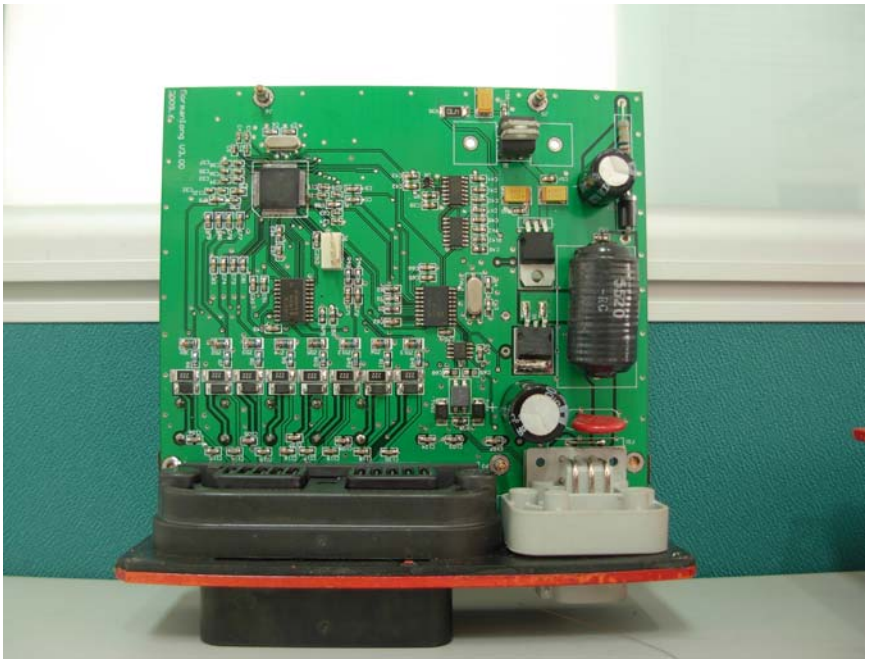


Main Board Rear View

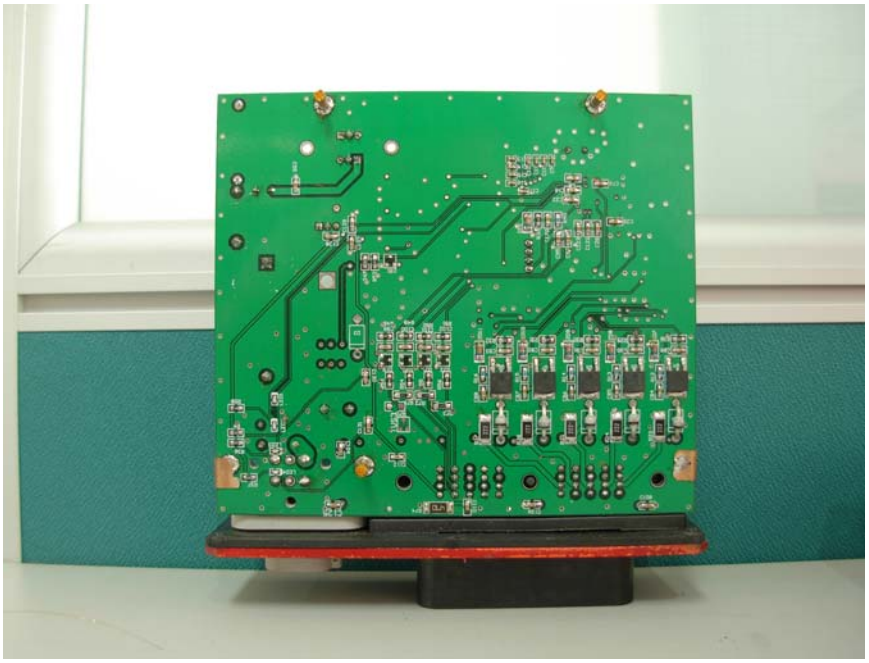
For Jack Node

Front view

Back View



Main Board Front View



Main Board Rear View

CAN A Signal Line View

CAN B Signal Line View

Test System Details

EUT	
Model Number:	Release 3.0 Hardware and Software
Trade Mark:	Dorman Long Technology Ltd.
Input Voltage:	DC 24V
Serial Number:	Engineering Sample
Description:	DL-P40 Computer Control System
Manufacturer:	Dorman Long Engineering Technology Consultant (Shanghai) Co., Ltd.

EUT Power Supply

Model : S-100-24

Input Voltage : 200~240V AC 0.8A

Output Voltage : DC 24V 4.5A

Manufacturer : Meanwell

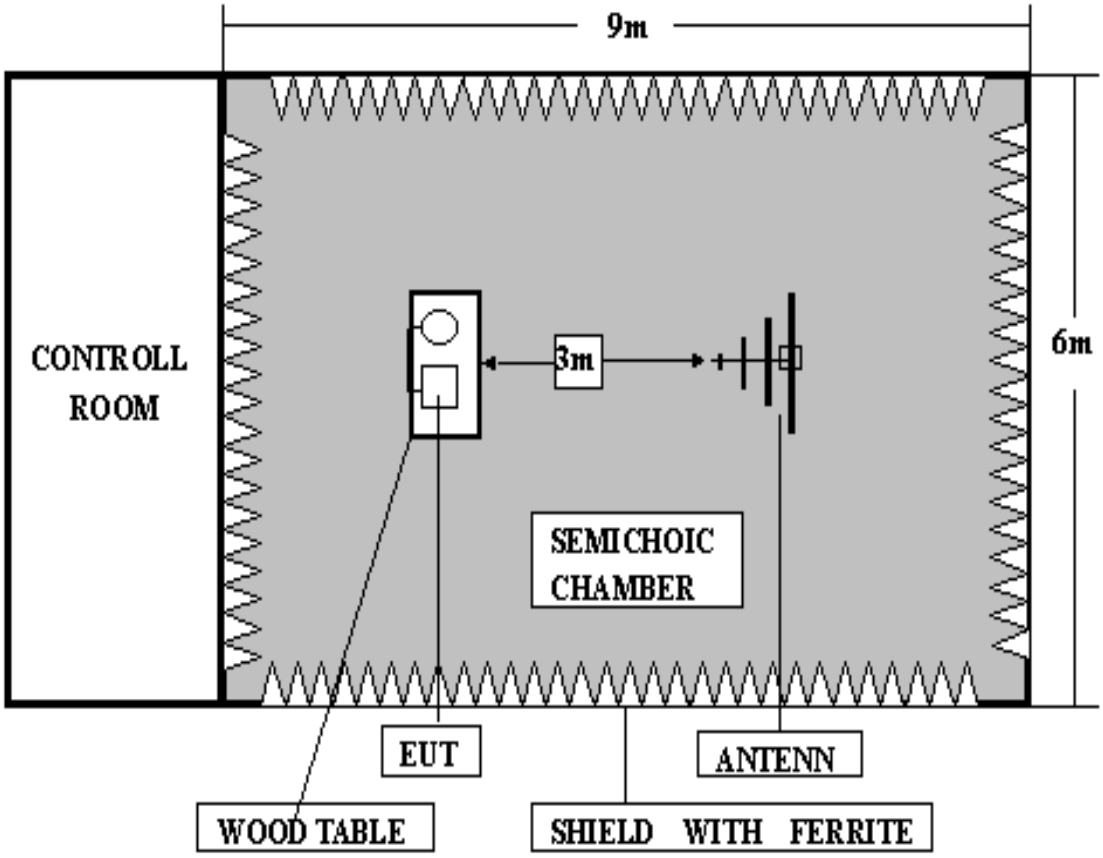
Support Equipment

Description	Model Number	Serial Number	Manufacturer	Power Cable Description (Meters)
Notebook	LATITUDE D630	8K8GB2X	DELL	1.8m
USB to CAN Converter	USB-to-CAN compact	1.01.0087.10200	IXXAT	N/A

Cable Description

Name	From	To	Length	Shielded (Y/N)	Ferrite Loaded (Y/N)
CAN A	PP Node	PC	30m	Y	Y (*5)
CAN B	PP Node	Jack Node	30m	Y	N

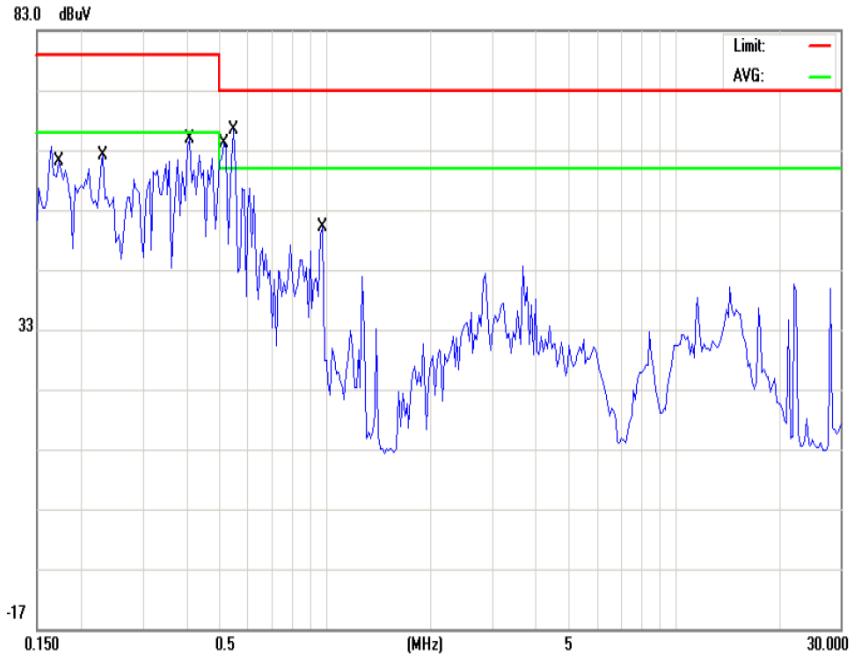
Configuration of Tested System



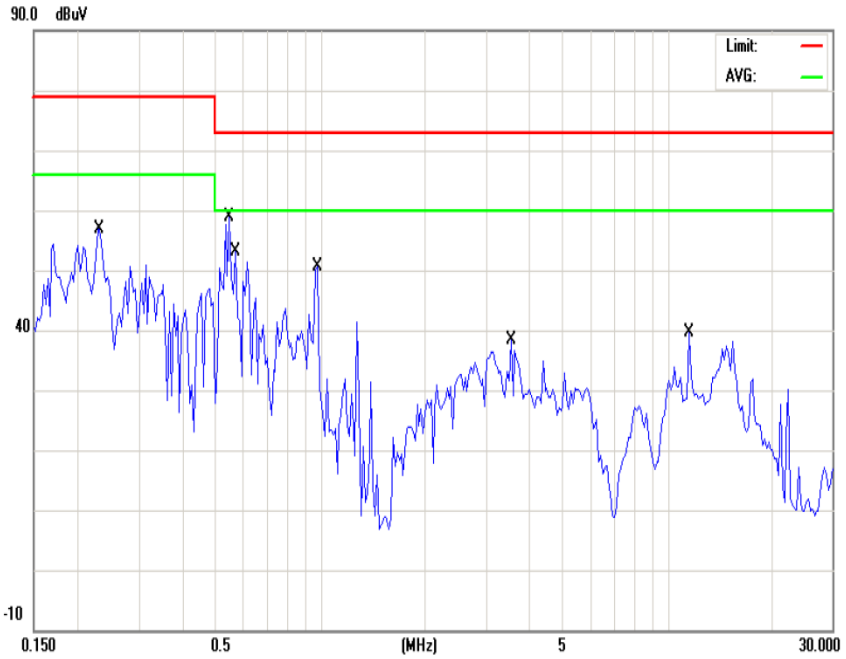
ATTACHMENT 1 - CONDUCTED EMISSION TEST RESULTS

CLIENT:	Dorman Long Engineering Technology Consultant (Shanghai) Co., Ltd.	**TEST STANDARD:**	EN 61326-1: 2006
MODEL NUMBER:	Release 3.0 Hardware and Software	**PRODUCT:**	DL-P40 Computer Control System
SERIAL NO.:	Engineering Sample	**EUT DESIGNATION:**	Control Equipment
TEMPERATURE:	22°C	**HUMIDITY:**	56%RH
ATM PRESSURE:	101.1 kPa	**GROUNDING:**	Grounding
TESTED BY:	Edison Li	**DATE OF TEST:**	2009, July 27

TEST REFERENCE:	CISPR 11 Edition 4.1:2006 Group 1 Class A
TEST PROCEDURE:	The EUT is set up according to the guideline of CISPR 11 Edition 4.1:2006 for conducted emissions. The measurement is using a LISN line on each line and an EMI receiver peak scan is made at the frequency measurement range. The three highest significant peaks are then marked, and these signals are then quasi-peaked and averaged. The frequency range investigated is from 150kHz to 30MHz.
TESTED RANGE:	150kHz to 30MHz
TEST VOLTAGE:	24V DC
RESULTS:	The EUT meets the requirements of test reference for Conducted Emissions on line L by 13.51 dB of Quasi-Peak detector and by 8.60 dB of Average Detector. The test results relate only to the equipment under test provided by client.
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Worldwide Certification Solution, Inc. (China) test personnel.
M. UNCERTAINTY:	Freq. $\pm$ 2x10^{-7} x Center Freq., Amp $\pm$ 2.6 dB



Line L Conducted Emission Graph



Line N Conducted Emission Graph

Line L (Hot Lead)								
Signal	**Frequency (MHz)**	**Corrected QP Level (dBuV)**	**Limits QP (dBuV)**	**Margin QP (dB)**	**Frequency (MHz)**	**Corrected AVE Level (dBuV)**	**Limits AVE (dBuV)**	**Margin AVE (dB)**
1	0.1694	57.88	79.00	-21.12	0.1694	43.42	66.00	-22.58
2	0.2336	59.71	79.00	-19.29	0.2336	53.65	66.00	-12.35
3	0.4160	64.89	79.00	-14.11	0.4160	57.40	66.00	-8.60
4	0.5109	59.35	73.00	-13.65	0.5109	38.05	60.00	-21.95
5	0.5417	59.49	73.00	-13.51	0.5417	48.88	60.00	-11.12
6	0.9911	53.96	73.00	-19.04	0.9911	50.92	60.00	-9.08
Line N (Hot Lead)								
Signal	**Frequency (MHz)**	**Corrected QP Level (dBuV)**	**Limits QP (dBuV)**	**Margin QP (dB)**	**Frequency (MHz)**	**Corrected AVE Level (dBuV)**	**Limits AVE (dBuV)**	**Margin AVE (dB)**
1	0.2357	55.33	79.00	-23.67	0.2357	49.17	66.00	-16.83
2	0.5500	50.93	73.00	-22.07	0.5500	41.02	60.00	-18.98
3	0.5645	55.46	73.00	-17.54	0.5645	29.56	60.00	-30.44
4	0.9910	51.91	73.00	-21.09	0.9910	49.05	60.00	-10.95
5	3.5560	39.39	73.00	-33.61	3.5560	26.60	60.00	-33.40
6	11.6800	36.26	73.00	-36.74	11.6800	32.91	60.00	-27.09

Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due
EMI Receiver	HP	85462A	3704A00349	11/29/07	11/28/09
AMN	R&S	ESH3-Z5	844249/018	12/04/07	12/03/09
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

SIGNED BY: _____ **REVIEWED BY:** _____

ENGINEER **SENIOR ENGINEER**

EUT Model: Release 3.0 Hardware and Software

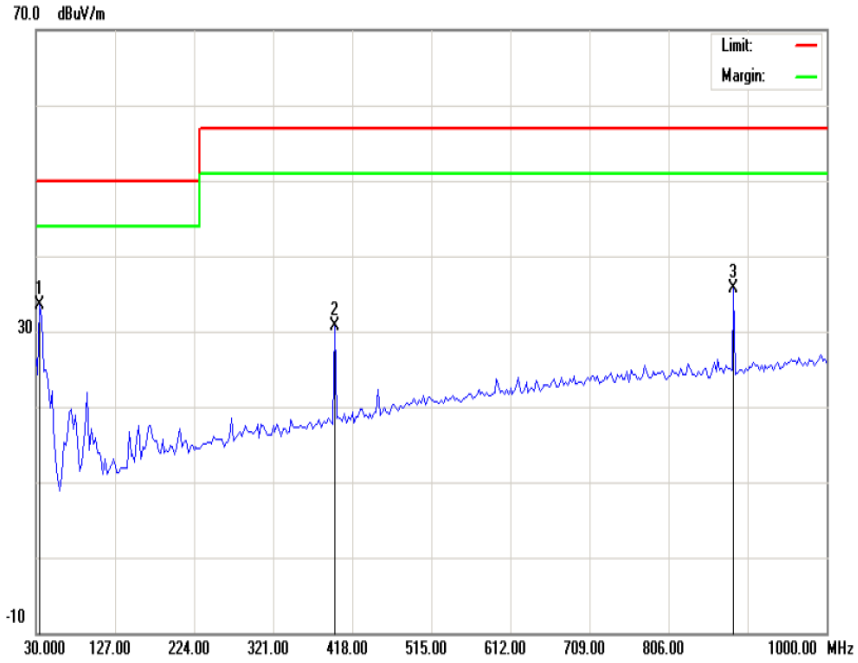
Conducted Emission Test Set-up Front View

Conducted Emission Test Set-up Side View

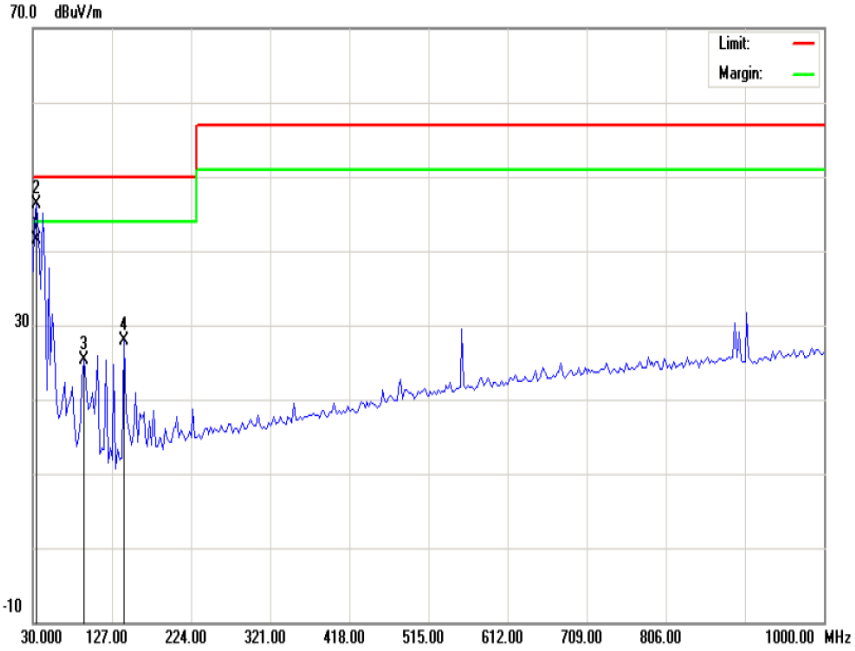
ATTACHMENT 2 - RADIATED EMISSION TEST RESULTS

CLIENT:	Dorman Long Engineering Technology Consultant (Shanghai) Co., Ltd.	**TEST STANDARD:**	EN 61326-1: 2006
MODEL NUMBER:	Release 3.0 Hardware and Software	**PRODUCT:**	DL-P40 Computer Control System
SERIAL NO.:	Engineering Sample	**EUT DESIGNATION:**	Control Equipment
TEMPERATURE:	22°C	**HUMIDITY:**	56%RH
ATM PRESSURE:	101.1 kPa	**GROUNDING:**	Grounding
TESTED BY:	Edison Li	**DATE OF TEST:**	2009, July 27

TEST REFERENCE:	CISPR 11 Edition 4.1:2006 Group 1 Class A
TEST PROCEDURE:	The EUT is set up according to the guidelines of CISPR 11 Edition 4.1:2006 for radiated emissions. An EMI receiver peak scan is made at the frequency measurement range (pre-scan) in an Anechoic chamber. Signal discrimination is then performed and the significant quasi-peaked is then measured. The frequency investigated is from 30MHz to 1GHz. The following data lists the significant emission frequencies, measured levels, correction factors (including cable and antenna correction factors), and the corrected readings against the limits. Explanation of the Correction Factor is given as follows: FS= RA + AF + CF - AG Where: FS = Field Strength RA = Receiver Amplitude AF = Antenna Factor CF = Cable Attenuation Factor AG = Amplifier Gain
TESTED RANGE:	30MHz to 1,000MHz
TEST VOLTAGE:	24V DC
RESULTS:	The EUT meets the unrestricted distribution requirements of test reference for Radiated Emissions on vertical polarization by 8.45 dB at 34.6500 MHz The test results relate only to the equipment under test provided by client.
CHANGES OR MODIFICATIONS:	There were some modifications installed by ECMG Worldwide Certification Solution, Inc. (China) test personnel.
M. UNCERTAINTY:	Freq. $\pm$ 2x10^{-7} x Center Freq., Amp $\pm$ 2.6 dB



Horizontal Radiated Emission Plot (Peak, Max Hold Mode)



Vertical Radiated Emission Plot (Peak, Max Hold Mode)

Horizontal							
Signal	**Frequency (MHz)**	**Corrected Factor (dB)**	**Corrected QP Level dB(uV/m)**	**3 Meter Limits dB(uV/m)**	**Margin (dB)**	**Angle of Turner (degree)**	**Height of Tower (cm)**
1	34.8500	16.89	33.59	50.00	-16.41	105	105
2	396.1750	17.61	30.74	57.00	-26.26	175	148
3	886.0250	24.96	35.71	57.00	-21.29	164	139
Vertical							
Signal	**Frequency (MHz)**	**Corrected Factor (dB)**	**Corrected QP Level dB(uV/m)**	**3 Meter Limits dB(uV/m)**	**Margin (dB)**	**Angle of Turner (degree)**	**Height of Tower (cm)**
1	34.6500	17.02	41.55	50.00	-8.45	188	112
2	93.0499	8.89	25.40	50.00	-24.60	149	100
3	141.5500	11.62	27.92	50.00	-22.08	203	100

Test Equipment	**Manufacturer**	**Model**	**Serial No.**	**Last Cal.**	**Cal. Due Date**
Test Receiver	HP	85462A	3704A00349	11/29/07	11/28/09
Bilog Antenna	Sunol	JB5	A110503	03/28/08	03/27/10
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated and traceable to the National Institute of Standards and Technology (NIST).					

SIGNED BY: _____ **REVIEWED BY:** _____

ENGINEER **SENIOR ENGINEER**

EUT Model: Release 3.0 Hardware and Software

Radiated Emission Test Set-up Front View

Radiated Emission Test Set-up Back View

ATTACHMENT 3 - ESD IMMUNITY TEST

CLIENT:	Dorman Long Engineering Technology Consultant (Shanghai) Co., Ltd.	**TEST STANDARD:**	EN 61326-1: 2006
MODEL NUMBER:	Release 3.0 Hardware and Software	**PRODUCT:**	DL-P40 Computer Control System
SERIAL NO.:	Engineering Sample	**EUT DESIGNATION:**	Control Equipment
TEMPERATURE:	22°C	**HUMIDITY:**	56%RH
ATM PRESSURE:	101.1 kPa	**GROUNDING:**	Grounding
TESTED BY:	Edison Li	**DATE OF TEST:**	2009, July 27

TEST REFERENCE:	IEC 61000-4-2, Edition 2.0 (2008)
TEST PROCEDURE:	The EUT was set up according to the guidelines of IEC 61000-4-2 for tabletop equipment. A calibrated ESD gun was then used to test a predetermined set of points of the EUT as described below. **Air Discharge:** The ESD was applied to all normally accessible points of the EUT. The test was performed as follows: - Single discharges; - ±8kV at Air Discharge (for nonconductive parts); - All severity levels were tested stepped up to the maximum required level; - At least 10 discharges each (positives and negatives); - Intervals of at least 1 second between successive discharges. **Direct Contact Discharge:** The discharges were applied to all conductive surfaces, to the horizontal coupling plane and on a vertical coupling metal plate of 50 cm x 50 cm at front, left and right of the EUT. (At 0.1 m from EUT) The test was performed as follows: - Single discharges; - ±4kV at Contact Discharge (for conductive parts); - All severity levels were tested stepped up to the maximum required level; - At least 10 discharges each (positives and negatives); - Intervals of at least 1 second between successive discharges.

Continue on to next page…

TEST VOLTAGE:	24V DC
RESULTS:	The EUT meets the requirements of IEC 61000-4-2 for Electrostatic Discharge ±4KV at Contact Discharge and ±4kV at Air Discharge. No performance degradation detected during this test.
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Worldwide Certification Solution, Inc. (China) test personnel.
M. UNCERTAINTY:	Discharge: Current: ± 10% (first peak), ESD Voltage: ± 5% of reading ± 0.2kV

AIR DISCHARGE TEST LEVELS:

	LEVEL 1				LEVEL 2				LEVEL 3				LEVEL 4					
	1 kV		2 kV		3 kV		4kV		6 kV		8 kV		10 kV		12 kV		15 kV	
			-	+			-	+			-	+						
TO EUT:																		
FRONT			X	X			X	X										
BACK			X	X			X	X										
SIDE			X	X			X	X										

DIRECT CONTACT DISCHARGE TEST LEVELS:

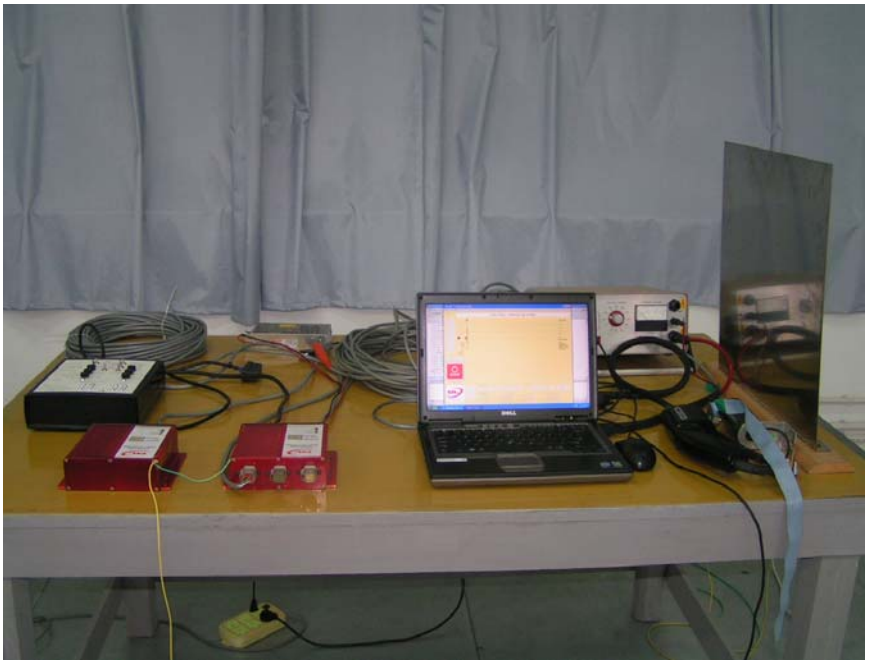
	LEVEL 1				LEVEL 2				LEVEL 3				LEVEL 4			
	1 kV		2 kV		3 kV		4 kV		5 kV		6 kV		7 kV		8 kV	
			-	+			-	+								
TO EUT:																
FRONT			X	X			X	X								
BACK			X	X			X	X								
SIDE																
THRU HCP:																
FRONT			X	X			X	X								
BACK			X	X			X	X								
LEFT			X	X			X	X								
RIGHT			X	X			X	X								
THRU VCP:																
FRONT			X	X			X	X								
BACK			X	X			X	X								
LEFT			X	X			X	X								
RIGHT			X	X			X	X								

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due Date
Electrostatic Discharge	Haefely	PSD25B	083706-23	12/04/07	12/03/09
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

SIGNED BY: _____ **REVIEWED BY:** _____

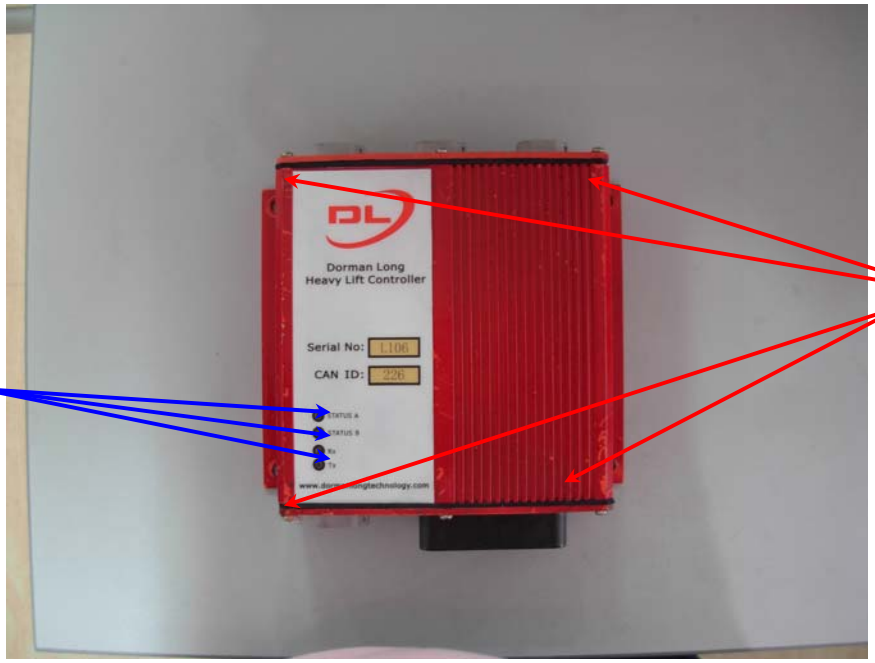
ENGINEER **SENIOR ENGINERR**

EUT Model: Release 3.0 Hardware and Software

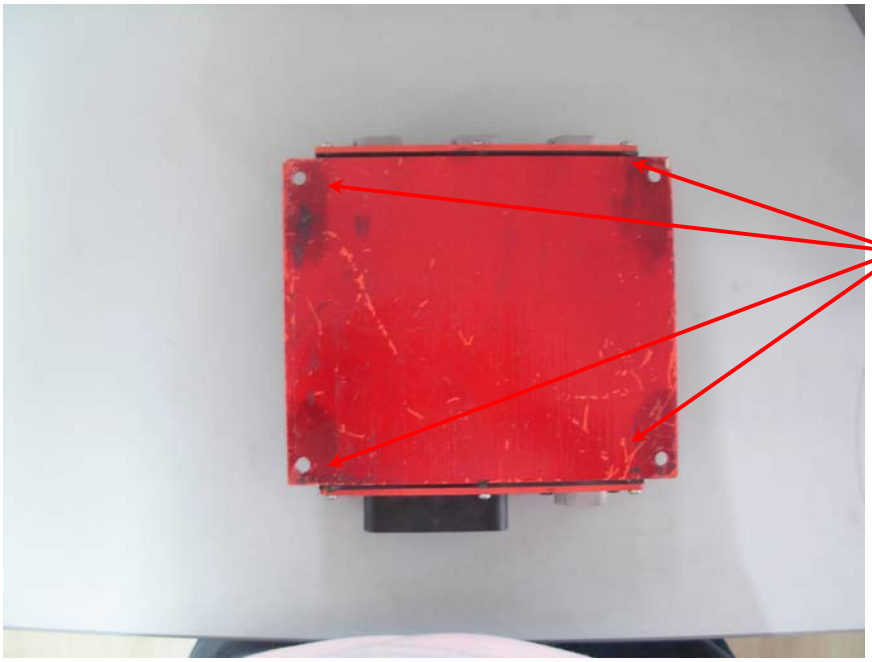


Electrostatic Discharge Test Set-up

For Power Pack Node



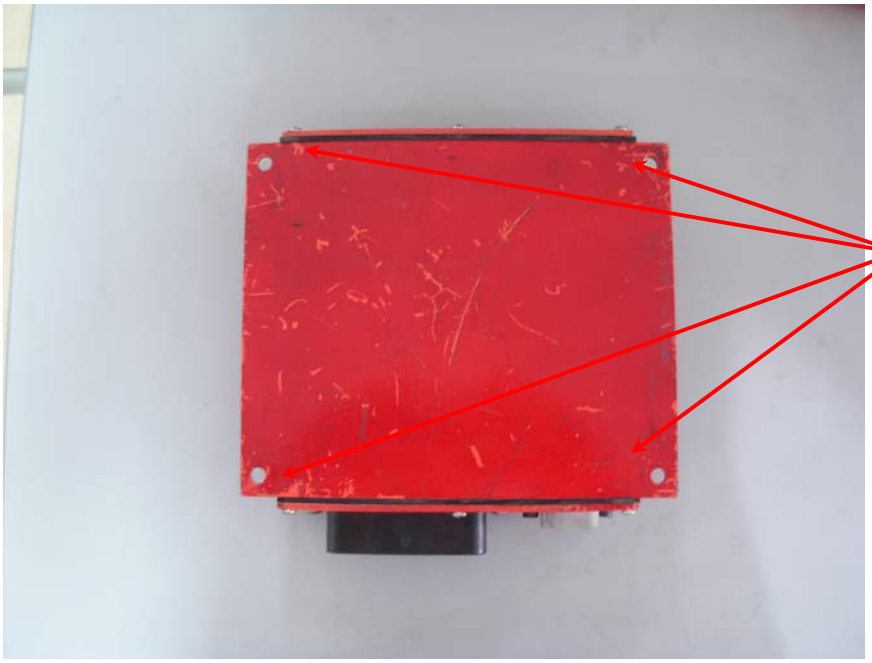
Contact and Air Discharge Test Points - Front View



Contact Discharge Test Points - Rear View

For Jack Node

Contact and Air Discharge Test Points - Front View



Contact Discharge Test Points - Rear View

ATTACHMENT 4 - RADIATED SUSCEPTIBILITY IMMUNITY TEST

CLIENT:	Dorman Long Engineering Technology Consultant (Shanghai) Co., Ltd.	**TEST STANDARD:**	EN 61326-1: 2006
MODEL NUMBER:	Release 3.0 Hardware and Software	**PRODUCT:**	DL-P40 Computer Control System
SERIAL NO.:	Engineering Sample	**EUT DESIGNATION:**	Control Equipment
TEMPERATURE:	22°C	**HUMIDITY:**	56%RH
ATM PRESSURE:	101.1 kPa	**GROUNDING:**	Grounding
TESTED BY:	Chen Yegang	**DATE OF TEST:**	2009, July 28

TEST REFERENCE:	IEC 61000-4-3: Edition 3.1 (2008)
TEST PROCEDURE:	The EUT was set up according to the guidelines of IEC 61000-4-3 for tabletop equipment. Four sides of the EUT were subjected successively to horizontal and vertical electric fields as described below. - frequency range was from 80 MHz - 2700 MHz; - 80 % amplitude modulated with a 1 kHz sine-wave; - with a minimum 10V/m intensity at 3 meters for 80MHHz – 1GHz, 3V/m intensity at 1 meter for 1.4GHz – 2GHz, 1V/m intensity at 1 meter for 2.0GHz – 2.7GHz; - step size of 1% of fundamental of linear interpolation between points; - Dwell time set to 4 sec.; - With 1 meter of the I/O cables and P/S cable exposed to the field if possible.
TEST VOLTAGE:	24V DC
RESULTS:	The EUT meets the requirements of IEC 61000-4-3 for Radiated Susceptibility requirement. No performance degradation detected during this test.
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Worldwide Certification Solution, Inc. (China) test personnel.
M. UNCERTAINTY:	Freq.: ± 2 parts in 10^6, Amp. ± 4.0dB

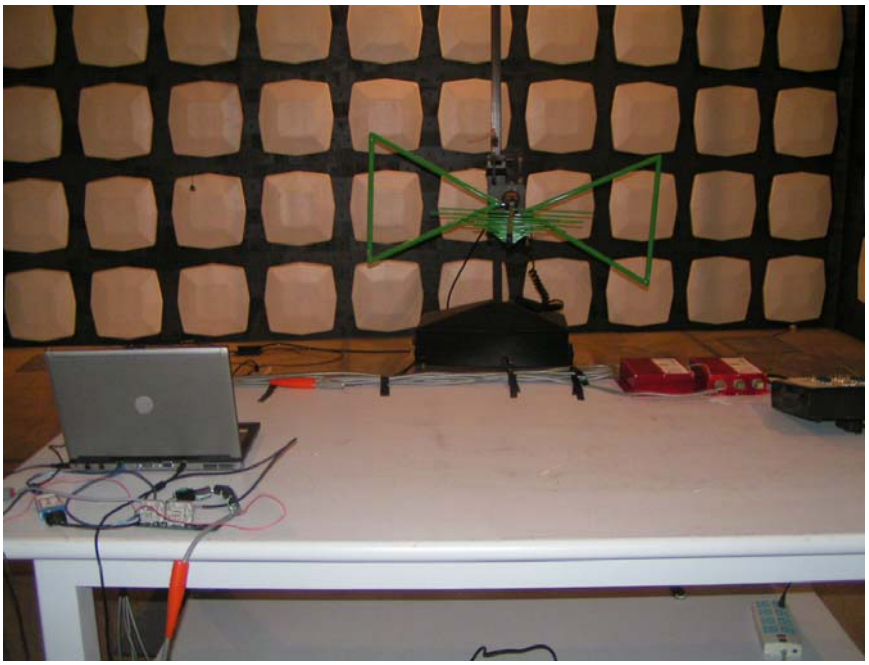
Test No.#	Frequency [MHz]	Test level [V/m]	Amplitude Modulated	Pass/Fail	Performance criterion
1	80MHz~1000MHz	10 V/m	80%AM (1kHz)	Pass	A
2	1400MHz~2000MHz	3V/m	80%AM (1kHz)	Pass	A
3	2000MHz~2700MHz	1V/m	80%AM (1kHz)	Pass	A

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due Date
Signal Generator	IFN	2023B	DZ-C-A1-04-21-0	03/02/09	01/03/10
Power Amplifier	Shaffner	CBA9426	DZ-A-A1-52-09-0	07/15/08	07/14/10
Log-Periodic Antenna	Shaffner	CBL6112B	DZ-C-A1-2705-27	07/17/07	07/16/10
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

SIGNED BY: _____ **REVIEWED BY:** _____

ENGINEER **SENIOR ENGINEER**

EUT Model: Release 3.0 Hardware and Software



Radiated Susceptibility Test Set-up View

ATTACHMENT 5- EFT IMMUNITY TEST

CLIENT:	Dorman Long Engineering Technology Consultant (Shanghai) Co., Ltd.	**TEST STANDARD:**	EN 61326-1: 2006
MODEL NUMBER:	Release 3.0 Hardware and Software	**PRODUCT:**	DL-P40 Computer Control System
SERIAL NO.:	Engineering Sample	**EUT DESIGNATION:**	Control Equipment
TEMPERATURE:	22°C	**HUMIDITY:**	56%RH
ATM PRESSURE:	101.1 kPa	**GROUNDING:**	Grounding
TESTED BY:	Chen Yegang	**DATE OF TEST:**	2009, July 28

TEST REFERENCE:	IEC 61000-4-4: Edition 2.0 (2007)
TEST PROCEDURE:	The EUT was set up according to the guidelines of IEC 61000-4-4 for tabletop equipment. The AC power supply line of the EUT was then coupled through a "Capacitive Coupler" using a waveform described in standard of a Fast Transient (EFT) generator. Burst signals described below were then introduced into the individual power lines and its combinations. The EUT was then monitored and evaluated for results. The burst are specified as follows: - 5 kHz burst rate, 5ns rise-time, and 50ns hold-time; - 3 Hz burst repetition rate; - Test levels from 0.5kV to 2.0 kV (positive and negative bursts); - Dwell time set to 120 sec.
TEST VOLTAGE:	24V DC
RESULTS:	The EUT meets the requirements of IEC 61000-4-4 for Electrical Fast Transient/Burst to ±2.0kV for DC Power Supply line and at ±1kV for I/O line. No performance degradation detected during this test.
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Worldwide Certification Solution, Inc. (China) test personnel.
M. UNCERTAINTY:	Voltage: ± 2% Pulse Duration ± 0.2%

For DC Power Line

Test Levels (kV)							
Inject Line	+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	Result
DC-mains (+&-)	A	A	A	A	A	A	PASS

**Performance criterion B*

For CAN A Line

Test Levels (kV)							
Inject Line	+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	Result
(L)	A	A	A	A	N/A	N/A	PASS

**Performance criterion B*

For CAN B Line

Test Levels (kV)							
Inject Line	+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	Result
(L)	A	A	A	A	N/A	N/A	PASS

**Performance criterion B*

Test Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Cal Due
Fast Transient/ Burst Generator	Schaffner	NSG2025	DZ-A-A1-52-12-0	07/14/08	07/13/10
Coupling Clamp	Schaffner	CDN126	DZ-A-A1-52-12-1	07/14/08	07/13/10
Shielding Room	---	JPH	DZ-A-A1-73-008	06/13/07	06/12/12
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated and traceable to the National Institute of Standards and Technology (NIST).					

SIGNED BY: Chen ye gang _____ **REVIEWED BY:** Hang Zhao _____

ENGINEER **SENIOR ENGINEER**

EUT Model: Release 3.0 Hardware and Software

Electrical Fast Transient/Burst Test Set-up

ATTACHMENT 6 - SURGE IMMUNITY TEST

CLIENT:	Dorman Long Engineering Technology Consultant (Shanghai) Co., Ltd.	**TEST STANDARD:**	EN 61326-1: 2006
MODEL NUMBER:	Release 3.0 Hardware and Software	**PRODUCT:**	DL-P40 Computer Control System
SERIAL NO.:	Engineering Sample	**EUT DESIGNATION:**	Control Equipment
TEMPERATURE:	22°C	**HUMIDITY:**	56%RH
ATM PRESSURE:	101.1 kPa	**GROUNDING:**	Grounding
TESTED BY:	Edison Li	**DATE OF TEST:**	2009, July 27

TEST REFERENCE:	IEC 61000-4-5: Edition 2.0 (2005)
TEST PROCEDURE:	The EUT was set up according to the guidelines of IEC 61000-4-5 for tabletop equipment. The AC power cord of the EUT was then plugged into a surge generator. Power surges described below were then introduced to differential line mode and common line mode. The EUT was then monitored and evaluated for results. The surge pulses are specifies as follows: - 1.2μs rise-time, 50μs hold-time; - 5 positive and negative pulsed per combination; - Pulse rate at one per minute; - Test levels from 0.5kV to 1.0kV for differential mode and from 0.5kV to 2.0kV for common mode
TEST VOLTAGE:	24V DC
RESULTS:	The EUT meets the requirements of IEC 61000-4-5 for Surge Immunity at ±1kV differential mode and ±2kV common mode for power line and at ±1kV for I/O line. No performance degradation detected during this test.
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Worldwide Certification Solution, Inc. (China) test personnel.
M. UNCERTAINTY	Source Impedance: ± 0.25Ω; Amp.: ± 20%

For DC Power Line

Test Levels (kV)						
Test Points	+0.5	-0.5	+1.0	-1.0	+2.0	-2.0
DC Main (+ -- -) Differential Mode	A	A	A	A	N/A	N/A
DC Main (+&- -- Ground) Common Mode	A	A	A	A	A	A

Performance criterion B

For CAN A Line

Test Levels (kV)						
Test Points	+0.5	-0.5	+1.0	-1.0	+2.0	-2.0
I/O Line(Shielding -- Ground) Common Mode	A	A	A	A	N/A	N/A

Performance criterion B

For CAN B Line

Test Levels (kV)						
Test Points	+0.5	-0.5	+1.0	-1.0	+2.0	-2.0
I/O Line(Shielding -- Ground) Common Mode	A	A	A	A	N/A	N/A

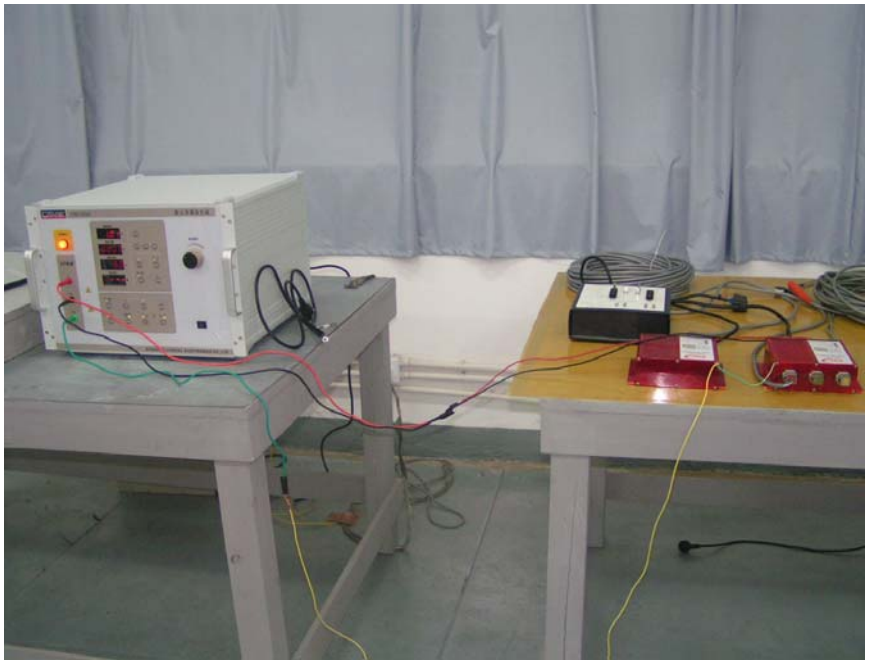
Performance criterion B

Test Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Cal Due
Surge Tester	LIONCEL	LSG-506A	001	05/13/09	05/12/10
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated and traceable to the National Institute of Standards and Technology (NIST).					

SIGNED BY: _____ **REVIEWED BY:** _____

ENGINEER **SENIOR ENGINEER**

EUT Model: Release 3.0 Hardware and Software



Surge Test Set-up

ATTACHMENT 7 - CONDUCTED IMMUNITY TEST

CLIENT:	Dorman Long Engineering Technology Consultant (Shanghai) Co., Ltd.	**TEST STANDARD:**	EN 61326-1: 2006
MODEL NUMBER:	Release 3.0 Hardware and Software	**PRODUCT:**	DL-P40 Computer Control System
SERIAL NO.:	Engineering Sample	**EUT DESIGNATION:**	Control Equipment
TEMPERATURE:	22°C	**HUMIDITY:**	56%RH
ATM PRESSURE:	101.1 kPa	**GROUNDING:**	Grounding
TESTED BY:	Chen Yegang	**DATE OF TEST:**	2009, July 28

TEST REFERENCE:	IEC 61000-4-6: Edition 3.0 (2008)
TEST PROCEDURE:	The EUT was set up according to the guidelines of IEC 61000-4-6 for tabletop equipment. A current injection clamp was then used to inductively couple the stimulus as described below into the power cable. The EUT was then monitored and evaluated for results. - Frequency range from 0.15 to 80MHz; - Step size of 1% of fundamental of linear interpolation between points; - Voltage level of minimum 3 Volts (rms) before adding modulation; - 80% amplitude modulated with a 1kHz sine-wave - Dwell time set to 4 sec.
TEST VOLTAGE:	24V DC
RESULTS:	The EUT meets the requirements of IEC 61000-4-6 for Conducted Immunity at 3 V(rms) with 1kHz sine-wave amplitude modulation for DC power line and I/o line. No performance degradation detected during this test.
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Worldwide Certification Solution, Inc. (China) test personnel.
M. UNCERTAINTY:	Freq.: ± 12Hz; Amp.: ± 1.5dB

For DC Power Line

Test No.#	Frequency [MHz]	Test level [V]	Amplitude Modulated	Pass/Fail	Performance criterion
1	150kHz~80MHz	3 V	80%AM (1kHz)	Pass	A

For CAN A Line

Test No.#	Frequency [MHz]	Test level [V]	Amplitude Modulated	Pass/Fail	Performance criterion
1	150kHz~80MHz	3 V	80%AM (1kHz)	Pass	A

For CAN B Line

Test No.#	Frequency [MHz]	Test level [V]	Amplitude Modulated	Pass/Fail	Performance criterion
1	150kHz~80MHz	3 V	80%AM (1kHz)	Pass	A

Test Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Cal Due
RF Generator	Schaffner	NSG2070	DZ-A-A1-52-11-0	07/14/08	07/13/10
EM Clamp	Schaffner	KEMZ801	DZ-A-A1-52-11-1	07/14/08	07/13/10
Shielding Room	---	JPH	DZ-A-A1-73-008	06/13/07	06/12/12
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated and traceable to the National Institute of Standards and Technology (NIST).					

SIGNED BY: Chen ye gang _____ **REVIEWED BY:** Hang Zhao _____

ENGINEER **SENIOR ENGINEER**

EUT Model: Release 3.0 Hardware and Software

Conducted Immunity Test Set-up

ATTACHMENT 8 - POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST

CLIENT:	Dorman Long Engineering Technology Consultant (Shanghai) Co., Ltd.	**TEST STANDARD:**	EN 61326-1: 2006
MODEL NUMBER:	Release 3.0 Hardware and Software	**PRODUCT:**	DL-P40 Computer Control System
SERIAL NO.:	Engineering Sample	**EUT DESIGNATION:**	Control Equipment
TEMPERATURE:	22°C	**HUMIDITY:**	56%RH
ATM PRESSURE:	101.1 kPa	**GROUNDING:**	Grounding
TESTED BY:	Chen Yegang	**DATE OF TEST:**	2009, July 28

TEST REFERENCE:	IEC 61000-4-8: Edition 1.1 (2001)
TEST PROCEDURE:	The EUT was set up according to the guidelines of IEC 61000-4-8 for tabletop equipment. For tabletop equipment, a calibrated 1 square meter magnetic loop was used to test the EUT in its x, y, and z-axis. A current generator was used to provide power to the magnetic loop and generate the required magnetic field level. The EUT was centered in the loop and then monitored and evaluated for results. For the tabletop or equipment larger than the loop, the "proximity method" of testing was adopted to accomplish the test. The loop was moved as close as possible to the most probable susceptible areas of the EUT. The EUT was then monitored and evaluated for results The magnetic field are specified as follows: - Test levels of 30A/m, 50Hz - Dwell time set to 10 minutes.
TEST VOLTAGE:	DC 24V
RESULTS:	The EUT meets the requirements of IEC 61000-4-8 for Power Frequency Magnetic Field Test at 30A/m, 50Hz. No performance degradation detected during this test.
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Worldwide Certification Solution, Inc (China) test personnel.
M. UNCERTAINTY:	Voltage: ± 0.5% + 0.3V; Freq.: 0.01% + 0.01Hz

Orientation	Field	Performance Criterion	Result
X	30 A/m, 50Hz	A	Pass
Y	30 A/m, 50Hz	A	Pass
Z	30 A/m, 50Hz	A	Pass

Test Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Cal Due
Power Supply	Schaffner	NSG1007	DZ-A-A2-32-04-1	03/05/09	03/04/11
Power Frequency Generator	Schaffner	INA2141	DZ-A-A2-32-04-0	03/05/09	03/04/11
Power Frequency Coil	Schaffner	INA702	DZ-A-A2-32-04-2	03/05/09	03/04/11
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated and traceable to the National Institute of Standards and Technology (NIST).					

SIGNED BY: Chen ye gang _____ **REVIEWED BY:** Hang Zhao _____

ENGINEER **SENIOR ENGINEER**

EUT Model: Release 3.0 Hardware and Software

Power Frequency Magnetic Field Test Set-up