Shenzhen Huatongwei International Inspection Co., Ltd.
Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
Phone:86-755-26748019 Fax:86-755-26748089 http://www.szhtw.com.cn

TEST REPORT

IEC 60601-1-2: 2007

Medical electrical equipment - Part 1-2: General requirements for basic safety and essential performance - Collateral standard: Electromagnetic compatibility - Requirements and tests

Report Reference No. ..... :	**TRE11120111**	**R/C: 81181**
Compiled by (printed name+signature) ..... :	Belial	Belial .....
Supervised by (printed name+signature) ..... :	Jony Yu	Jony Yu .....
Approved by (printed name+signature) ..... :	Tony Jiang	Tony Jiang .....
Date of issue ..... :	Dec. 30, 2011	
Testing Laboratory Name ..... :	**Shenzhen Huatongwei International Inspection Co., Ltd.**	
Address ..... :	Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China	
Testing location/ procedure ..... :	Full application of Harmonised standards ☒ Partial application of Harmonised standards ☐ Other standard testing methods ☐	
Applicant's name ..... :	**Foshan YaYou Medical Equipment Co., Ltd.**	
Address ..... :	NO.2 Building, No.1 Huafu Bei Road, Zhangcha Street, Chancheng District, Foshan City, Guangdong Province, China	
Test specification: Standard ..... :	**IEC 60601-1-2: 2007**	
Non-standard test method…….. :	/	
Test Report Form No ..... :	HTWEMCCE_1B	
TRF Originator ..... :	Shenzhen Huatongwei International Inspection Co., Ltd.	
Master TRF ..... :	Dated 2014-06	

Test item description ..... :	Complete Dental Unit
Trade Mark ..... :	YAYODENT
Manufacturer ..... :	Foshan YaYou Medical Equipment Co., Ltd.
Model/Type reference ..... :	A8000-IA
Listed models ..... :	A8000-ⅠB, A8000-Ⅱ, A6800, A6600, A5000, A3600, A3000, A1000, A880, A800
Ratings ..... :	230Va.c. 50/60Hz 1200VA
Result ..... :	**Positive**

Report version information

Revised date: 2015-05-05 Clause 2.3 /3

EMC -- T E S T R E P O R T

Test Report No. :	**TRE11120111**	Dec. 30, 2011 Date of issue

Equipment under Test	:	Complete Dental Unit
Model /Type	:	A8000-IA
Listed Models	:	A8000-ⅠB, A8000-Ⅱ, A6800, A6600, A5000, A3600, A3000, A1000, A880, A800
Applicant	:	Foshan YaYou Medical Equipment Co., Ltd.
Address	:	NO.2 Building, No.1 Huafu Bei Road, Zhangcha Street, Chancheng District, Foshan City, Guangdong Province, China
Manufacturer	:	Foshan YaYou Medical Equipment Co., Ltd.
Address	:	NO.2 Building, No.1 Huafu Bei Road, Zhangcha Street, Chancheng District, Foshan City, Guangdong Province, China

Test Result according to the standards on page 4:	**Positive**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1. TEST STANDARDS

The tests were performed according to following standards:

IEC 60601-1-2: 2007 Medical electrical equipment - Part 1-2: General requirements for basic safety and essential performance - Collateral standard: Electromagnetic compatibility - Requirements and tests.

Remark: This EUT is ranged to the Group 1 Class B apparatus according to the standard of CISPR 11: 2010 clause 5.2

2 . SUMMARY

2.1. General Remarks:

Date of receipt of test sample : Dec. 17, 2011

Testing commenced on : Dec. 18, 2011

Testing concluded on : Dec. 27, 2011

2.2. Equipment Under Test

Power supply system utilised

Power supply voltage : ■ 230V / 50 Hz o 115V / 60Hz
o 12 V DC o 24 V DC
o Other (specified in blank below)

/

2.3. Short description of the Equipment under Test (EUT)

Change applicant and manufacturer's name and address, change product models on the basic of the original test Report.

Serial number: prototype

2.4. EUT operation mode:

The equipment under test was operated during the measurement under the following conditions:

Test program (customer specific)

Emissions tests……..: According to IEC 60601-1-2, searching for the highest disturbance.
Immunity tests ……..: According to IEC 60601-1-2, searching for the highest susceptivity.
Harmonics current……. : According to IEC 61000-3-2, searching for the highest disturbance.
Voltage fluctuation……. : According to IEC 61000-3-3, searching for the highest disturbance.

2.5. EUT configuration:

The following peripheral devices and interface cables were connected during the measurement:

■ - supplied by the manufacturer

o - supplied by the lab

■ AC power cord for EUT	Length(m) :	1.4
	Shield :	Unshielded
	Detachable :	Detachable
■ Foot pedal Cable	Length(m) :	1.6
	Shield :	Shielded
	Detachable :	Detachable
■ Control Cable	Length(m) :	0.8
	Shield :	Shielded
	Detachable :	Undetachable

2.6. Compliance criteria

Under the test conditions specified in 6.2.1.10 of IEC 60601-1-2: 2007, the equipment of system shall be able to provide the essential performance and remain safe. The following degradations associated with essential performance and safety shall not be allowed:

- component failures;
- changes in programmable parameters;
- reset to factory defaults (manufacturer's presets);
- change of operating mode;
- false alarms;
- cessation or interruption of any intended operation, even if accompanied by an alarm;
- initiation of any unintended operation, including unintended or uncontrolled motion, even if accompanied by an alarm
- error of a displayed numerical value sufficiently large to affect diagnosis or treatment;
- noise on a waveform in which the noise would interfere with diagnosis, treatment or monitoring;
- artifact or distortion in an image in which the artifact would interfere with diagnosis, treatment or monitoring;
- failure of automatic diagnosis or treatment equipment and systems to diagnose or treat, even if accompanied by an alarm.

For equipment and systems with multiple functions, the criteria apply to each function, parameter and channel.
The equipment or system may exhibit degradation of performance (e.g. deviation from manufacturer's specifications) that does not affect essential performance or safety.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen Huatongwei International Inspection Co., Ltd.
Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
Tel: 86-755-26748019 Fax: 86-755-26748089

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: February 28, 2015. Valid time is until February 27, 2018.

A2LA-Lab Cert. No. 2243.01

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until Sept 30, 2015.

FCC-Registration No.: 662850&317478

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 662850, Renewal date Jul. 01, 2012, valid time is until Jun. 01, 2015. Registration 317478, Renewal date Jul. 18, 2014, valid time is until Jul. 18, 2017.

IC-Registration No.: 5377A&5377B

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Dec. 31, 2013, valid time is until Dec. 31, 2016.
Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377B on Dec.03, 2014, valid time is until Dec.03, 2017.

ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

VCCI

The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.:R-2484. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 29, 2015.

Radiated disturbance above 1GHz measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 24, 2013. Valid time is until Dec. 23, 2016.

Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 19, 2015.

Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-1837. Date of Registration: May 07, 2013. Valid time is until May 06, 2016.

DNV

Shenzhen Huatongwei International Inspection Co., Ltd. has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-ups according to relevant parts of ISO/IEC Guide 17025 (2005), in accordance with the requirements of the DNV Laboratory Quality Manual towards subcontractors. Valid time is until Aug. 24, 2016.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	22-25 ° C
Humidity:	40-54 %
Atmospheric pressure:	950-1050mbar

3.4. Test Description

Emission Measurement		
Radiated Emission	IEC 60601-1-2: 2007 ISO 80601-2-61: 2011 Clause 202 CISPR 11: 2010	PASS
Conducted Disturbance (0.15-30MHz)	IEC 60601-1-2: 2007 ISO 80601-2-61: 2011 Clause 202 CISPR 11: 2010	PASS
Harmonic Current	IEC 60601-1-2: 2007 IEC 61000-3-2: 2014	PASS
Voltage Fluctuation and Flicker	IEC 60601-1-2: 2007 IEC 61000-3-3: 2013	PASS
Immunity Measurement		
Electrostatic Discharge	IEC 60601-1-2: 2007 ISO 80601-2-61: 2011 Clause 202 IEC 61000-4-2: 2008	PASS
RF Field Strength Susceptibility (80~2500MHz)	IEC 60601-1-2: 2007 ISO 80601-2-61: 2011 Clause 202 IEC 61000-4-3: 2010	PASS
Electrical Fast Transient/Burst Test	IEC 60601-1-2: 2007 ISO 80601-2-61: 2011 Clause 202 IEC 61000-4-4: 2012	PASS
Surge Test	IEC 60601-1-2: 2007 ISO 80601-2-61: 2011 Clause 202 IEC 61000-4-5: 2014	PASS
Conducted Susceptibility Test	IEC 60601-1-2: 2007 ISO 80601-2-61: 2011 Clause 202 IEC 61000-4-6: 2013	PASS
Power Frequency Magnetic Field Susceptibility Test	IEC 60601-1-2: 2007 ISO 80601-2-61: 2011 Clause 202 IEC 61000-4-8: 2009	PASS
Voltage Dips and Interruptions Test	IEC 60601-1-2: 2007 ISO 80601-2-61: 2011 Clause 202 IEC 61000-4-11: 2004	PASS

Note: “N/A” means “not applicable”.
The measurement uncertainty is not included in the test result.

IEC 60601-1-2: 2007			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
5	**IDENTIFICATION, MARKING AND DOCUMENTS**		PASS
5.1	**Marking on the outside of ME EQUIPMENT OR ME EQUIPMENT parts**		N/A
5.1.1	RF equipment marked with symbol IEC 60417-5140		N/A
5.1.2	Equipment for which the connector testing exemption is used marked with symbol IEC 60417-5134		N/A
5.1.3	Equipment specified for use only in shielded location has appropriate marking		N/A
5.2	**ACCOMPANYING DOCUMENTS**		PASS
5.2.1	Instructions for use		PASS
5.2.1.1	All equipment and systems:		PASS
a)	A statements that medical electrical equipment needs special precautions regarding EMC and needs to be installed according to EMC information	Please refer to User manual	PASS
b)	A statement that RF communications equipment can effect medical electrical equipment	Please refer to User manual	PASS
5.2.1.2	Equipment for which the connector testing exemption is used:		N/A
a)	A reproduction of the ESD warning symbol (IEC 60417-5134)		N/A
b)	A warning that pins of connectors marked with the warning symbol shall not be touched and connections shall not be made without special precautions		N/A
c)	A specification of precautionary procedures		N/A
d)	A recommendation that all staff receive explanation and training in ESD procedures		N/A
e)	A specification of the minimum contents of ESD precautions procedure training		N/A
5.2.1.3	For equipment and systems without a manual sensitivity adjustment and for which the manufacturer specifies a minimum amplitude or signal:		PASS
a)	The minimum amplitude or value of signal	Please refer to User manual	PASS
b)	A warning that operation of the equipment below that value may cause incorrect results	Please refer to User manual	PASS
5.2.1.4	Requirements applicable to TYPE A PROFESSIONAL SYSTEMS		N/A
5.2.2	Technical description		PASS
5.2.2.1	All equipment and systems:		PASS
a)	List of cables and accessories	Please refer to User manual	PASS
b)	A warning that other cables and accessories may affect EMC performance	Please refer to User manual	PASS
c)	Table 1, modified as appropriate	Please refer to User manual	PASS
d)	A warning regarding stacking and location close to other equipment	Please refer to User manual	PASS
e)	A justification for each immunity compliance level below 60601 test level		N/A
f)	Table 2, completed as appropriate		PASS
g)	The performance of the ME EQUIPMENT or ME SYSTEM that was determined to be ESSENTIAL PERFORMANCE.	Please refer to User manual	PASS
5.2.2.2	Equipment not specified for use only in shielded location		PASS
	Table 3 and Table 5 shall be used for LIFE-SUPPORTING , Table 4 and Table 6 shall be used are not LIFE-SUPPORTING , selected and completed as appropriate	Please refer to User manual	PASS

a)	ME EQUIPMENT or ME SYSTEM shall be replaced with the MODEL OR TYPE REFERENCE of the ME EQUIPMENT or SYSTEM	Please refer to User manual	PASS
b)	Table 3or Table 4,as applicable shall be filled in with the IMMUNITY COMPLIMENT LEVEL in accordance with the requirements of 5.2.2 and 6.2	Please refer to User manual	PASS
c)	The expressions of Table 3 Table 4 and Table 5 Table 6,as applicable, shall be calculated,the results substituted in place of the COMPLIANCE LEVELS for IEC61000-4-6and IEC61000-4-3 test	Please refer to User manual	PASS
d)	Table 5 and Table 6,as applicable,shall be completed by calculating the distance corresponding to each entry in columns 2 through 5 in Table 5 or in columns 2 through 4 in Table 6	Please refer to User manual	PASS
e)	If,according to 6.2 or the scope of the EMC basic standard not apply to,the corresponding entries shall state “not applicable”	Please refer to User manual	PASS
5.2.2.3	Equipment specified for use only in shielded location		N/A
a)	A warning that equipment should be used only in the specified type of shielded location		N/A
b)	Tables modified if disturbance allowance according in 6.1.1.1 d) is used		N/A
c)	A specification of allowed emission of other equipment located within the shielded location		N/A
d)	Table 7 shall be used for LIFE-SUPPORTING, Table 8 shall be used are not LIFE-SUPPORTING		N/A
5.2.2.4	Equipment that intentionally apply RF energy		N/A
5.2.2.5	Equipment that intentionally receive RF energy		N/A
5.2.2.6	Equipment that includes RF transmitters		N/A
5.2.2.7	Requirements of cables and accessories	Please refer to User manual	PASS
5.2.2.8	Requirements applicable to large permanently installed equipment and systems		N/A
5.2.2.9	Requirements applicable to equipment that has no essential performance		N/A
5.2.2.10	Requirements applicable to TYPE A PROFESSIONAL SYSTEMS		N/A
6	**ELECTROMAGNETIC COMPATIBILITY**	(see appended table)	

3.5. tatement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.65dB	(1)
Conducted Disturbance	0.15~30MHz	3.35dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6. Equipments Used during the Test

Radiated Emission						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Ultra-Broadband Antenna	R&S	HL562	100015	11/8/2014	11/7/2017
2	Emi Test Receiver	R&S	ESI 26	100009	11/1/2014	10/31/2015
3	Pre-Amplifer	CD	PAP-0102	12004	11/1/2014	10/31/2015
4	Turntable	ETS	2088	2149	N/A	N/A
5	Antenna Mast	ETS	2075	2346	N/A	N/A
6	Test Software	R&S	ES-K1	/	N/A	N/A

Conducted Disturbance						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	EMI Test Receiver	R&S	ESCS30	100038	11/1/2014	10/31/2015
2	Artificial Mains	R&S	ESH3-Z5	100049	11/1/2014	10/31/2015
3	Pulse Limiter	R&S	ESH3-Z2	100449	11/1/2014	10/31/2015
4	Test Software	R&S	ES-K1	/	N/A	N/A

Harmonic Current						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Purified Power Source	CALIFORNIA INSTRUMENTS	HFS500	54513	11/1/2014	10/31/2015
2	Harmonic And Flicker Analyzer	EM TEST	DPA500N	V1106108797	11/1/2014	10/31/2015
3	Test Software	EM TEST	DPA	/	NA	NA

Voltage Fluctuation and Flicker						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Purified Power Source	CALIFORNIA INSTRUMENTS	HFS500	54513	11/1/2014	10/31/2015
2	Harmonic And Flicker Analyzer	EM TEST	DPA500N	V1106108797	11/1/2014	10/31/2015
3	Test Software	EM TEST	DPA	/	NA	NA

Electrostatic Discharge						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	ESD Simulator	EM TEST	DITO	0301-04	11/19/2014	11/18/2015

RF Field Strength Susceptibility						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Signal Generator	IFR	2032	203002/100	11/1/2014	10/31/2015
2	Amplifier	AR	150W1000	301584	11/1/2014	10/31/2015
3	Dual Directional Coupler	AR	DC6080	301508	11/1/2014	10/31/2015
4	Power Head	AR	PH2000	301193	11/1/2014	10/31/2015
5	Power Meter	AR	PM2002	302799	11/1/2014	10/31/2015
6	Transmit Antenna	AR	AT1080	28570	11/1/2014	10/31/2015
7	Power Amplifier	AR	25S1G4A	0325511	11/1/2014	10/31/2015
8	Dual Directional Coupler	AR	DC7144A	0325100	11/1/2014	10/31/2015
9	Microwave Horn Antenna	AR	AT4002A	0324848	11/1/2014	10/31/2015
10	Test Software	AR	SW1004	/	NA	NA

Electrical Fast Transient/Burst						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Electrical Fast Transient/Burst Generator	EM TEST	UCS500N5E	P1305111135	11/1/2014	10/31/2015
2	Test Software	EM TEST	ISM IEC	/	NA	NA

Surge						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Surge Generator	EM TEST	VCS500N10T	P1318118309	11/1/2014	10/31/2015
2	Coupling Network	EM TEST	CNV501S4.1	P1413132874	11/1/2014	10/31/2015
3	Test Software	EM TEST	IEC	/	NA	NA

Conducted Susceptibility						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Signal Generator	IFR	2023A	202304/060	11/1/2014	10/31/2015
2	Amplifier	AR	75A250	302205	11/1/2014	10/31/2015
3	Dual Directional Coupler	AR	DC2600	302389	11/1/2014	10/31/2015
4	6db Attenuator	EMTEST	ATT6/75	0010230A	11/1/2014	10/31/2015
5	CDN	EMTEST	CDN M3/32A	510010320023	11/1/2014	10/31/2015
6	Test Software	AR	SW1004	/	NA	NA

Power Frequency Magnetic Field Susceptibility						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Ultra Compact Simulator	EM TEST	UCS500M6	202304/060	11/1/2014	10/31/2015
2	Motor Driven Voltage Transformer	EM TEST	MV2616	302205	11/1/2014	10/31/2015
3	Current Transformer	EM TEST	MC2630	302389	11/1/2014	10/31/2015
4	Magnetic Coil	EM TEST	MS100	0010230A	11/1/2014	10/31/2015
5	Test Software	EM TEST	ISM IEC	/	NA	NA

Voltage Dips and Interruptions						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Purified Power Source	CALIFORNIA INSTRUMENTS	HFS500	54513	11/1/2014	10/31/2015
2	Test Software	EM TEST	DPA	/	NA	NA

4. TEST CONDITIONS AND RESULTS

4.1. Radiated Emission

For test instruments and accessories used see section 3.6.

4.1.1. Description of the test location

Test location: Shielded room No. 4

4.1.2. Limits of disturbance (Class B)

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dBμV/m)
30 ~ 230	3	40
230 ~ 1000	3	47

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

4.1.3. Description of the test set-up

4.1.3.1. Operating Condition

The EUT is turned on during the test, and the maximum emanating results are recorded.

4.1.3.2. Test Configuration and Procedure

EUT is tested in Semi-Anechoic Chamber. EUT is placed on a nonmetal table above a grounded turntable. The turntable can rotate 360 degrees to determine the azimuth of the maximum emission level. EUT is set 3 meters away from the center of receiving antenna. The antenna can move up and down from 1 to 4 meter to find out the maximum emission level. Both horizontal and vertical polarizations of the antenna are set on the test.

4.1.3.3. Photos of the test set-up

Old

New

4.1.4. Test result

The requirements are **Fulfilled**

Band Width: 120kHz

Frequency Range: 30MHz to 1000MHz

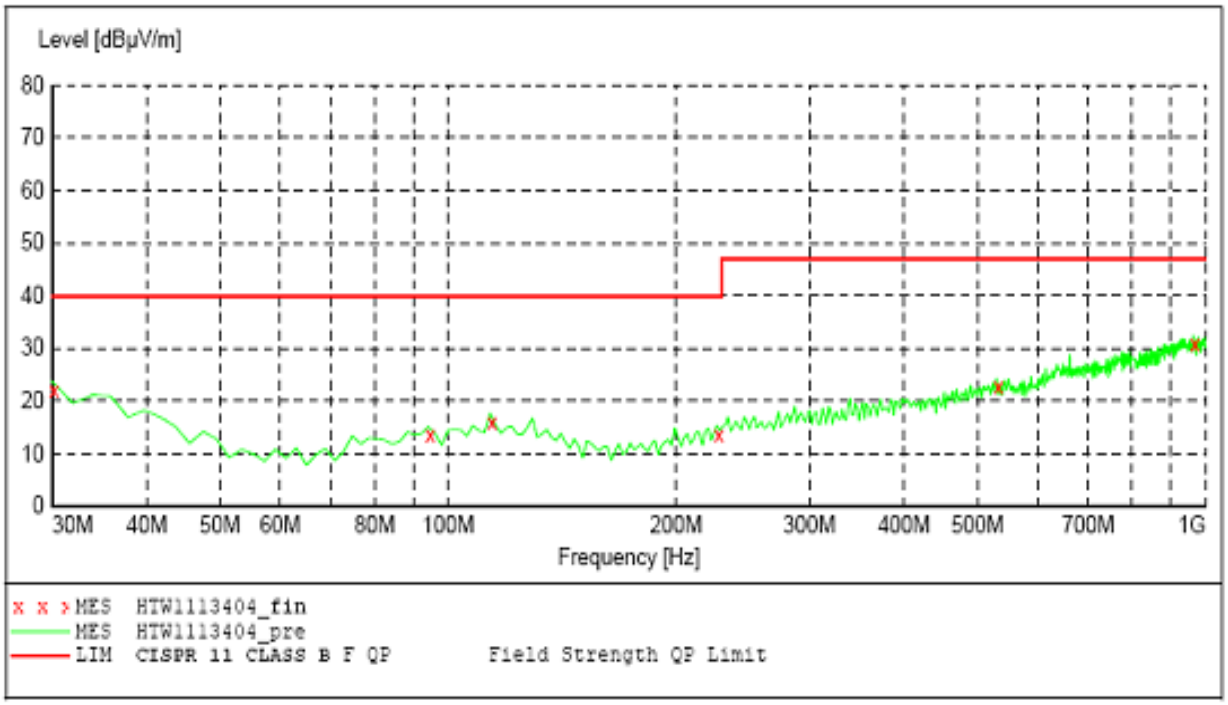
Remarks: The limits are kept. For detailed results, please see the following page(s).

Margin=limit-level

Level=read values+transducer

Transducer=antenna factor+pre-amplifier factor+cable loss

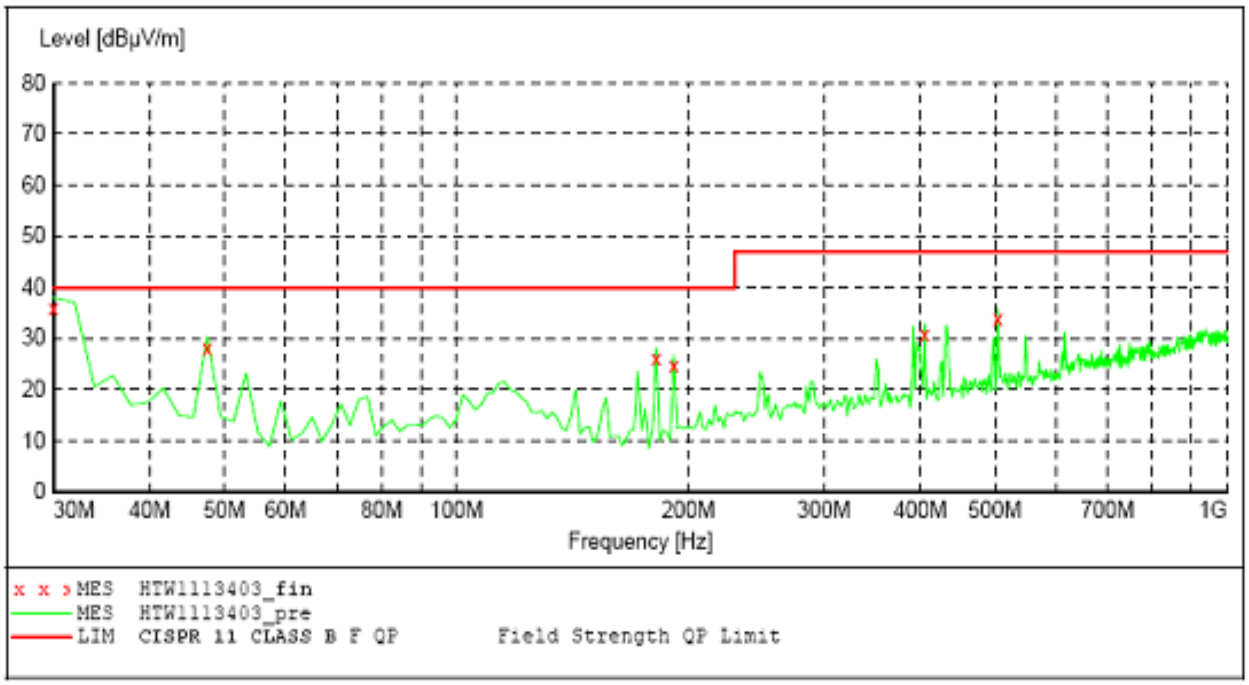
Old



MEASUREMENT RESULT: "HTW1113404_fin"

11/13/2009 9:02AM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarizatio
30.000000	21.70	-4.7	40.0	18.3	QP	100.0	65.00	HORIZONTAL
94.150000	13.10	-13.9	40.0	26.9	QP	100.0	196.00	HORIZONTAL
113.590000	15.60	-13.0	40.0	24.4	QP	100.0	229.00	HORIZONTAL
226.330000	13.30	-13.6	40.0	26.7	QP	300.0	0.00	HORIZONTAL
529.580000	22.30	-5.8	47.0	24.7	QP	300.0	207.00	HORIZONTAL
963.070000	30.50	2.7	47.0	16.5	QP	100.0	276.00	HORIZONTAL

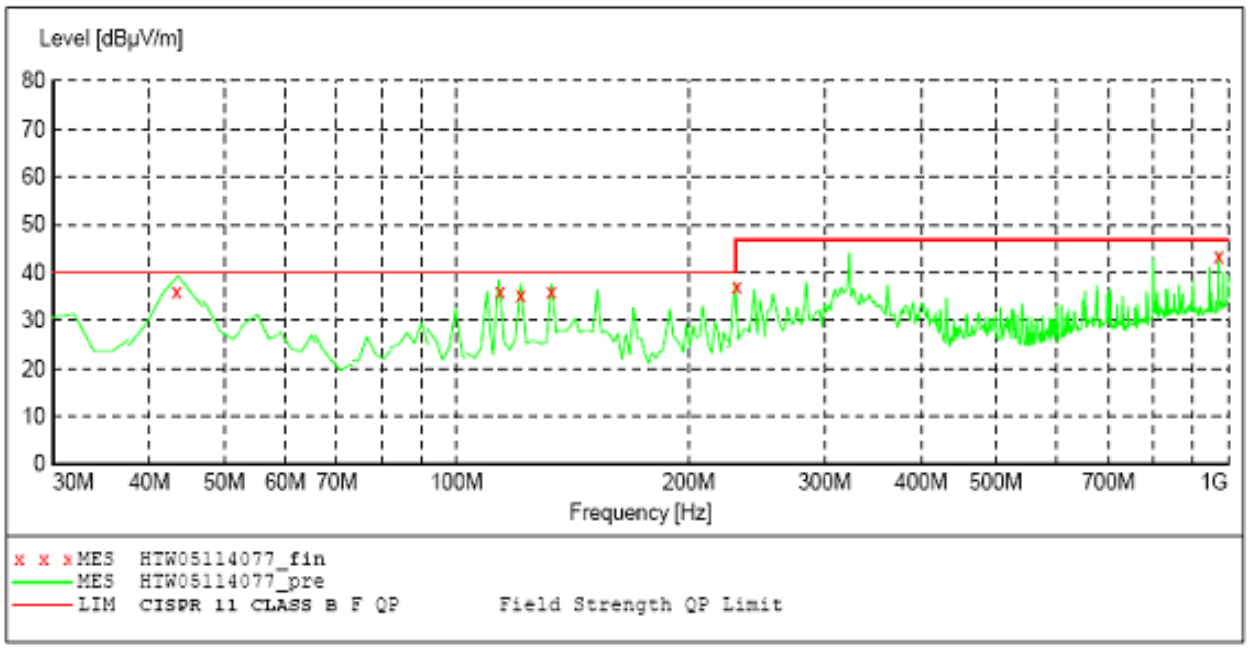


MEASUREMENT RESULT: "HTW1113403_fin"

11/13/2009 8:40AM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarizatio
30.000000	36.00	-4.7	40.0	4.0	QP	100.0	229.00	VERTICAL
47.490000	28.30	-14.6	40.0	11.7	QP	100.0	324.00	VERTICAL
181.620000	26.10	-16.6	40.0	13.9	QP	100.0	236.00	VERTICAL
191.340000	24.70	-16.0	40.0	15.3	QP	100.0	330.00	VERTICAL
405.170000	30.80	-8.6	47.0	16.2	QP	100.0	229.00	VERTICAL
504.310000	33.80	-6.5	47.0	13.2	QP	100.0	56.00	VERTICAL

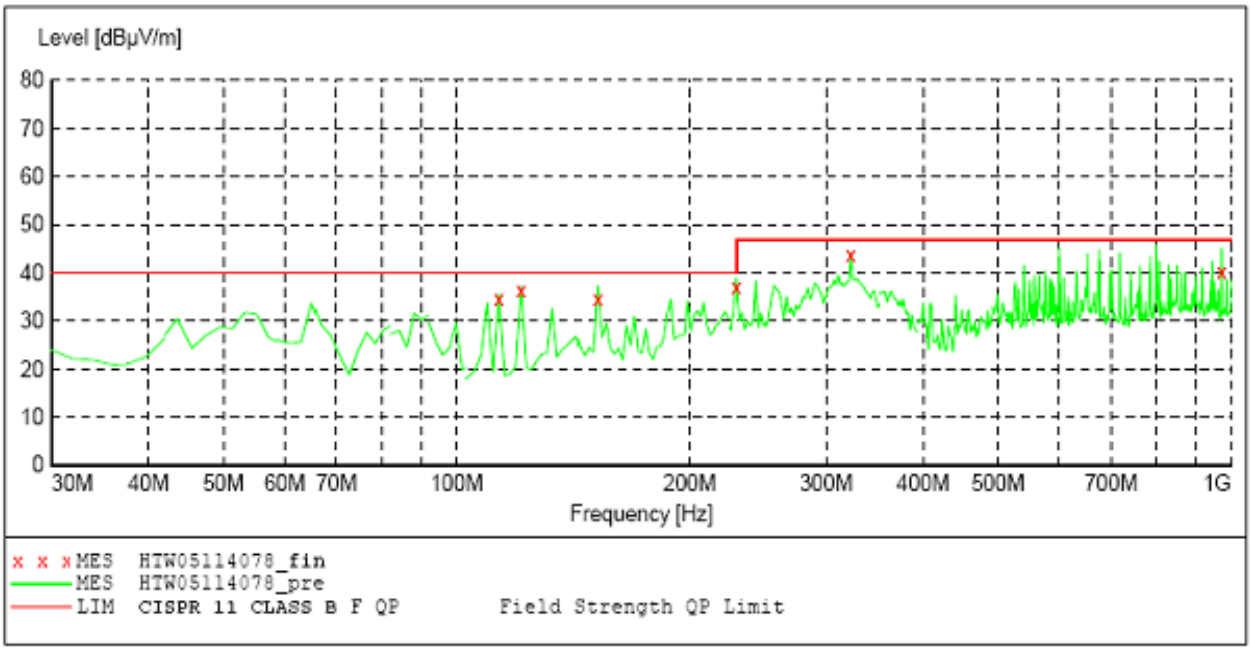
New



MEASUREMENT RESULT: "HTW05114077_fin"

5/11/2013 5:37PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
43.580000	36.90	-11.1	40.0	3.1	QP	300.0	102.00	VERTICAL
113.420000	37.00	-17.2	40.0	3.0	QP	300.0	116.00	VERTICAL
121.180000	36.50	-22.4	40.0	3.5	QP	300.0	0.00	VERTICAL
136.420000	36.20	-18.1	40.0	3.8	QP	300.0	31.00	VERTICAL
229.820000	37.00	-17.9	40.0	3.0	QP	300.0	167.00	VERTICAL
969.820000	36.80	-18.0	40.0	3.2	QP	300.0	354.00	VERTICAL



MEASUREMENT RESULT: "HTW05114078_fin"

5/11/2013 5:49PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
113.420000	35.20	-18.1	40.0	4.8	QP	100.0	68.00	HORIZONTAL
121.180000	36.90	-17.9	40.0	3.1	QP	100.0	42.00	HORIZONTAL
152.220000	35.50	-21.1	40.0	4.8	QP	100.0	280.00	HORIZONTAL
229.820000	35.90	-18.0	40.0	4.1	QP	100.0	300.00	HORIZONTAL
322.940000	43.40	-14.6	47.0	3.6	QP	100.0	261.00	HORIZONTAL
972.840000	39.90	-3.8	47.0	7.1	QP	100.0	21.00	HORIZONTAL

4.2. Conducted disturbance

For test instruments and accessories used see section 3.6.

4.2.1. Description of the test location

Test location: Shielded room No. 3

4.2.2. Limits of disturbance

Limit of conducted disturbance at the mains ports(Class B)

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150～0.500	66~56	56~46
0.5000~5.000	56	46
5.000~30.000	60	50

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

4.2.3. Description of the test set-up

4.2.3.1. Operating Condition

The EUT is turned on during the test, and the maximum emanating results are recorded.

4.2.3.2. Test Configuration and Procedure

EUT is placed on the grounded reference plane. Connect the power line of the EUT to the LISN which is connected to receiver by coaxial line, then disturbance of the neutral line and live line can be detected by the receiver.

4.2.3.3. Photo of the test set-up

Old

New

4.2.4. Test result

The requirements are **Fulfilled**

Band Width: 9kHz

Frequency Range: 150kHz to 30MHz

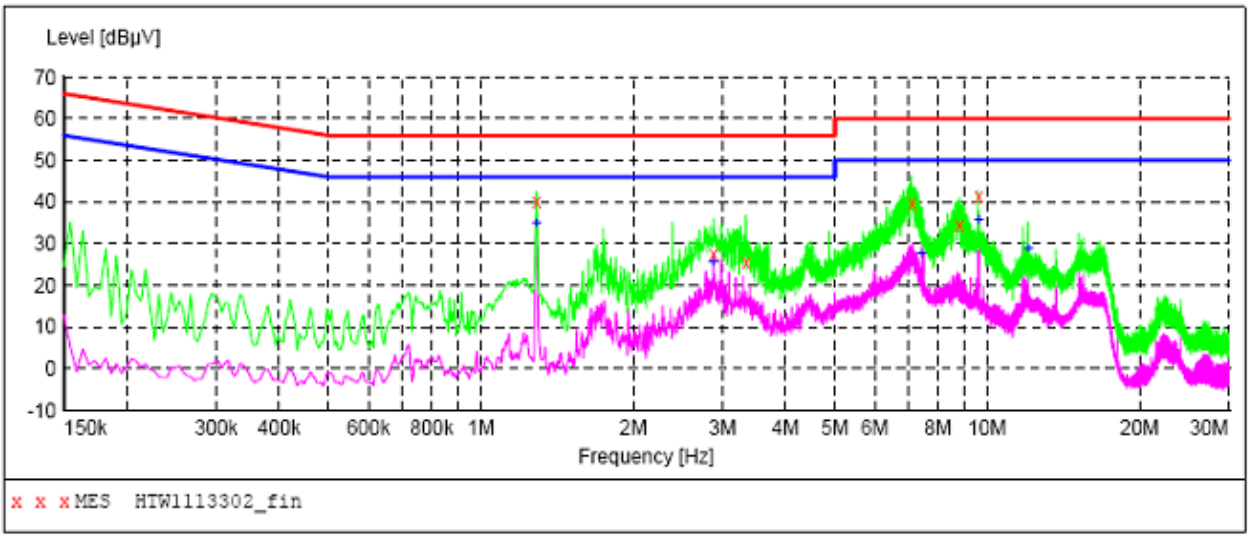
Remarks: The limits are kept. For detailed results, please see the following page(s).

Margin=limit-level

Level=read values+transducer

Transducer=insertion loss of LISN+cable loss+insertion loss of pulse limiter

Old



MEASUREMENT RESULT: "HTW1113302_fin"

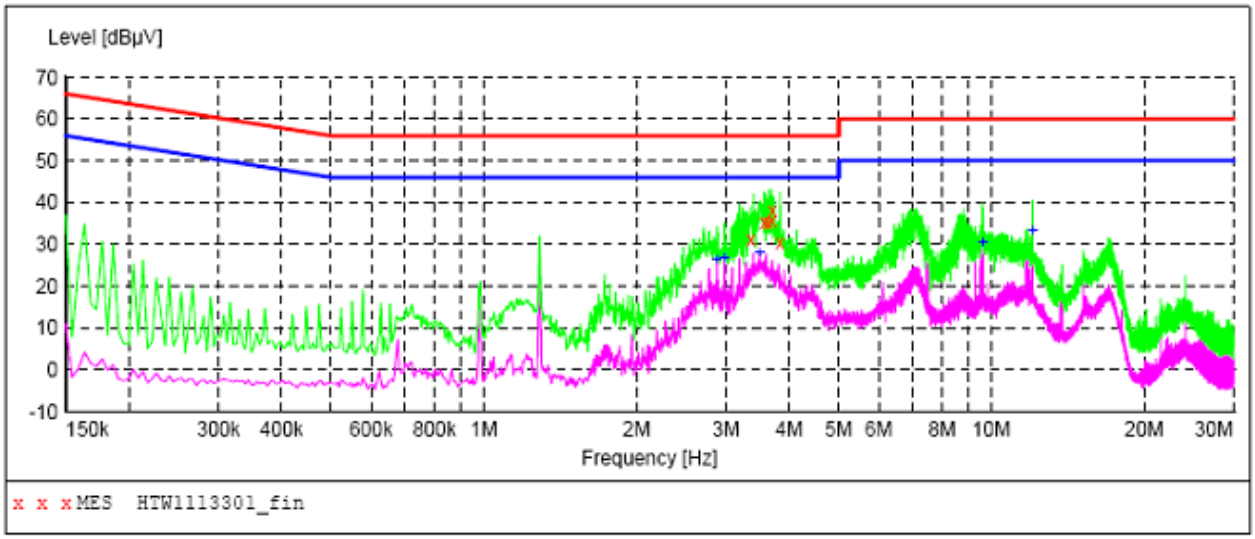
11/13/2009 8:51AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
1.288500	40.10	10.3	56	15.9	QP	L1	GND
2.886000	27.40	10.4	56	28.6	QP	L1	GND
3.345000	25.50	10.4	56	30.5	QP	L1	GND
7.116000	39.90	10.4	60	20.1	QP	L1	GND
8.821500	34.50	10.6	60	25.5	QP	L1	GND
9.622500	41.50	10.6	60	18.5	QP	L1	GND

MEASUREMENT RESULT: "HTW1113302_fin2"

11/13/2009 8:51AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
1.288500	34.90	10.3	46	11.1	AV	L1	GND
2.877000	25.50	10.4	46	20.5	AV	L1	GND
7.435500	27.50	10.5	50	22.5	AV	L1	GND
9.622500	35.80	10.6	50	14.2	AV	L1	GND
12.070500	28.90	10.6	50	21.1	AV	L1	GND



MEASUREMENT RESULT: "HTW1113301_fin"

11/13/2009 8:48AM

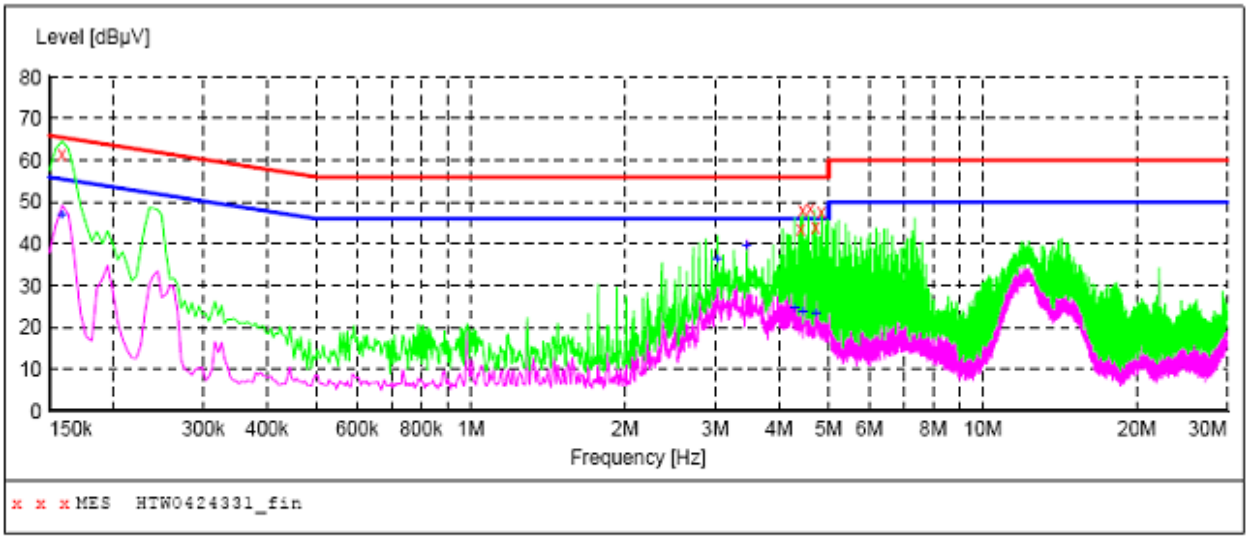
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
3.363000	31.30	10.4	56	24.7	QP	N	GND
3.570000	35.20	10.4	56	20.8	QP	N	GND
3.633000	35.40	10.4	56	20.6	QP	N	GND
3.700500	35.80	10.4	56	20.2	QP	N	GND
3.709500	38.10	10.4	56	17.9	QP	N	GND
3.835500	30.60	10.4	56	25.4	QP	N	GND

MEASUREMENT RESULT: "HTW1113301_fin2"

11/13/2009 8:48AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
2.881500	26.30	10.4	46	19.7	AV	N	GND
2.985000	26.70	10.4	46	19.3	AV	N	GND
3.498000	27.90	10.4	46	18.1	AV	N	GND
9.622500	30.50	10.6	50	19.5	AV	N	GND
12.070500	33.10	10.6	50	16.9	AV	N	GND

New



MEASUREMENT RESULT: "HTW0424331_fin"

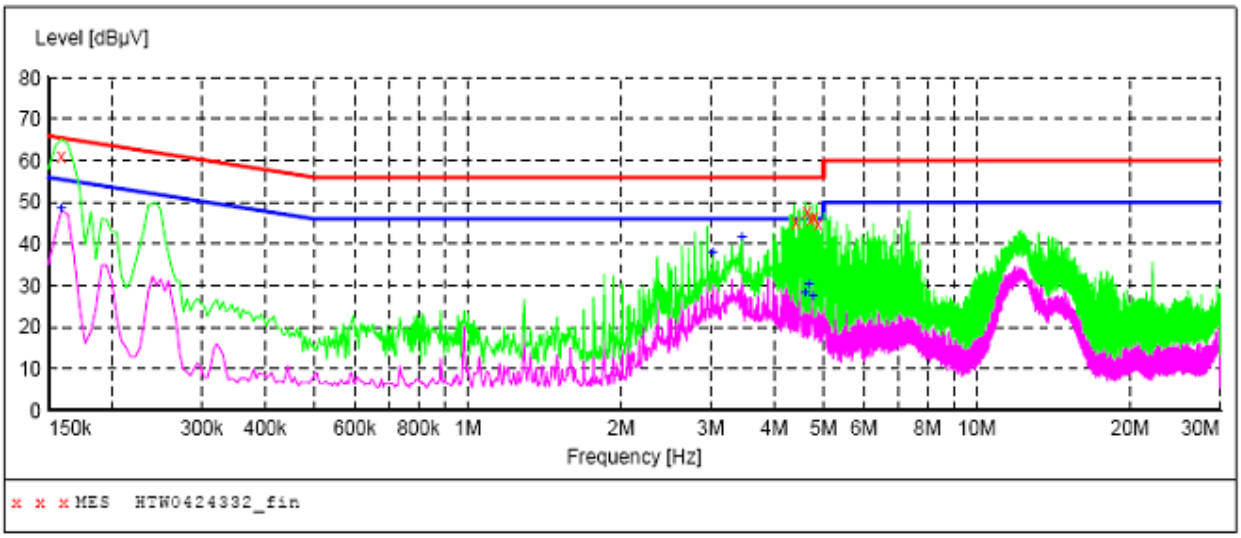
4/24/2013 5:02PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.159000	62.80	10.2	66	3.2	QP	L1	GND
4.402500	45.10	10.2	56	10.9	QP	L1	GND
4.443000	49.60	10.2	56	6.4	QP	L1	GND
4.600500	50.00	10.2	56	6.0	QP	L1	GND
4.717500	45.50	10.2	56	10.5	QP	L1	GND
4.839000	49.00	10.2	56	7.0	QP	L1	GND

MEASUREMENT RESULT: "HTW0424331_fin2"

4/24/2013 2:11PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.159000	48.30	10.2	56	7.2	AV	L1	GND
3.025500	37.70	10.2	46	8.3	AV	L1	GND
3.457500	40.90	10.2	46	5.1	AV	L1	GND
4.290000	25.70	10.2	46	20.3	AV	L1	GND
4.447500	25.20	10.2	46	20.8	AV	L1	GND
4.722000	24.70	10.2	46	21.3	AV	L1	GND



MEASUREMENT RESULT: "HTW0424332_fin"

4/24/2013 5:04PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.159000	62.20	10.2	66	3.8	QP	N	GND
4.407000	45.20	10.2	56	10.8	QP	N	GND
4.641000	47.70	10.2	56	8.3	QP	N	GND
4.717500	46.10	10.2	56	9.9	QP	N	GND
4.798500	46.30	10.2	56	9.7	QP	N	GND
4.875000	44.70	10.2	56	11.3	QP	N	GND

MEASUREMENT RESULT: "HTW0424332_fin2"

4/24/2013 5:04PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.159000	48.40	10.2	56	7.1	AV	N	GND
3.025500	37.80	10.2	46	8.2	AV	N	GND
3.457500	41.60	10.2	46	4.4	AV	N	GND
4.605000	28.20	10.2	46	17.8	AV	N	GND
4.677000	30.10	10.2	46	15.9	AV	N	GND
4.762500	27.30	10.2	46	18.7	AV	N	GND

4.3. Harmonic current

For test instruments and accessories used see section 3.6.

4.3.1. Description of the test location

Test location: Shielded room No. 2

4.3.2. Limits of harmonic current

Test configuration and procedure see clause 7.1 of standard IEC 61000-3-2: 2014.

4.3.3. Description of the test set-up

4.3.3.1. Operating Condition

The EUT is turned on during the test, and the results of the maximum emanation are recorded.

4.3.3.2. Photo of the test set-up

4.3.4. Test result

The requirements are **Fulfilled**

Remarks: The limits are kept. For detailed results, please see the following page(s).

Test Report of HTW

Standard used:	IEC 61000-3-2 Ed.3 Quasi-stationary
	Equipment class A <= 150% of the limit
Observation time:	150s
Windows width:	10 periods – (IEC 61000-4-7: 2009)
Customer:	Foshan YaYou Medical Equipment Co., Ltd.
Mains supply voltage:	AC 230V/50Hz
E. U. T.:	Complete dental unit
	M/N: A8000-IA
Date of test:	11:03 22.Sep 2009
Tester:	Nada

Test Result	
E. U. T.:	PASS
Power Source:	PASS

E. U. T. Result

Check harmonics 2..40 [exception odd 21..39]:

Harmonic(s) > 150%:	
Order (n):	None
Harmonic(s) with average > 100%:	
Order (n):	None

Check odd harmonics 21..39:

All Partial Odd Harmonics below partial limits.	
Harmonic(s) > 150%:	
Order (n):	None
Harmonic(s) with average > 150%:	
Order (n):	None

Power Source Result

First dataset out of limit:	
DS (time):	None
Harmonic(s) out of limit:	
Order (n):	None

Average harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	98.957E-3			
2	2.357E-3	0.218	1.08	PASS
3	41.063E-3	1.785	2.30	PASS
4	1.875E-3	0.436	430.00E-3	PASS
5	28.491E-3	2.499	1.14	PASS
6	1.203E-3	0.401	300.00E-3	PASS
7	23.658E-3	3.073	770.00E-3	PASS
8	788.046E-6	0.343	230.00E-3	PASS
9	7.552E-3	1.888	400.00E-3	PASS
10	461.385E-6	0.251	184.00E-3	PASS
11	3.995E-3	1.210	330.00E-3	PASS
12	457.608E-6	0.298	153.33E-3	PASS
13	7.725E-3	3.678	210.00E-3	PASS
14	417.235E-6	0.317	131.43E-3	PASS
15	9.421E-3	6.281	150.00E-3	PASS
16	358.603E-6	0.312	115.00E-3	PASS
17	9.190E-3	6.944	132.35E-3	PASS
18	421.296E-6	0.412	102.22E-3	PASS
19	8.418E-3	7.108	118.42E-3	PASS
20	328.852E-6	0.357	92.00E-3	PASS
21	6.253E-3	3.891	160.71E-3	PASS
22	346.364E-6	0.414	83.64E-3	PASS
23	4.432E-3	3.020	146.74E-3	PASS
24	315.263E-6	0.411	76.66E-3	PASS
25	3.849E-3	2.851	135.00E-3	PASS
26	287.436E-6	0.406	70.77E-3	PASS
27	3.961E-3	3.169	124.99E-3	PASS
28	293.072E-6	0.446	65.71E-3	PASS
29	3.900E-3	3.351	116.39E-3	PASS
30	313.874E-6	0.512	61.33E-3	PASS
31	3.599E-3	3.306	108.87E-3	PASS
32	293.304E-6	0.510	57.50E-3	PASS
33	3.459E-3	3.382	102.27E-3	PASS
34	281.766E-6	0.521	54.12E-3	PASS
35	3.453E-3	3.580	96.44E-3	PASS
36	290.054E-6	0.568	51.11E-3	PASS
37	3.272E-3	3.587	91.21E-3	PASS
38	313.540E-6	0.648	48.42E-3	PASS
39	3.034E-3	3.506	86.53E-3	PASS
40	299.282E-6	0.651	46.00E-3	PASS

Maximum harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	272.691E-3			
2	20.836E-3	1.286	1.62	PASS
3	165.073E-3	4.785	3.45	PASS
4	8.092E-3	1.255	645.00E-3	PASS
5	93.585E-3	5.473	1.71	PASS
6	7.532E-3	1.674	450.00E-3	PASS
7	53.958E-3	4.672	1.15	PASS
8	4.201E-3	1.218	345.00E-3	PASS
9	21.850E-3	3.642	600.00E-3	PASS
10	2.936E-3	1.064	276.00E-3	PASS
11	17.761E-3	3.588	495.00E-3	PASS
12	2.527E-3	1.099	229.99E-3	PASS
13	19.958E-3	6.336	315.00E-3	PASS
14	1.596E-3	0.810	197.15E-3	PASS
15	13.180E-3	5.858	225.00E-3	PASS
16	1.541E-3	0.894	172.50E-3	PASS
17	9.428E-3	4.749	198.52E-3	PASS
18	1.464E-3	0.955	153.33E-3	PASS
19	9.613E-3	5.412	177.63E-3	PASS
20	976.813E-6	0.708	138.00E-3	PASS
21	7.811E-3	4.860	160.71E-3	PASS
22	954.260E-6	0.761	125.46E-3	PASS
23	5.703E-3	3.886	146.74E-3	PASS
24	896.038E-6	0.779	114.99E-3	PASS
25	5.313E-3	3.936	135.00E-3	PASS
26	755.728E-6	0.712	106.16E-3	PASS
27	4.380E-3	3.504	124.99E-3	PASS
28	749.101E-6	0.760	98.57E-3	PASS
29	4.070E-3	3.497	116.39E-3	PASS
30	692.906E-6	0.753	92.00E-3	PASS
31	3.719E-3	3.416	108.87E-3	PASS
32	650.054E-6	0.754	86.25E-3	PASS
33	3.689E-3	3.607	102.27E-3	PASS
34	643.529E-6	0.793	81.18E-3	PASS
35	3.596E-3	3.729	96.44E-3	PASS
36	592.405E-6	0.773	76.66E-3	PASS
37	3.381E-3	3.707	91.21E-3	PASS
38	587.885E-6	0.809	72.63E-3	PASS
39	3.334E-3	3.852	86.53E-3	PASS
40	570.530E-6	0.827	69.00E-3	PASS

Maximum harmonic voltage results

Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	229.99	99.994		
2	155.14E-3	0.067	0.2	PASS
3	422.33E-3	0.184	0.9	PASS
4	49.22E-3	0.021	0.2	PASS
5	20.18E-3	0.009	0.4	PASS
6	46.20E-3	0.020	0.2	PASS
7	39.55E-3	0.017	0.3	PASS
8	27.05E-3	0.012	0.2	PASS
9	24.44E-3	0.011	0.2	PASS
10	21.26E-3	0.009	0.2	PASS
11	18.17E-3	0.008	0.1	PASS
12	14.09E-3	0.006	0.1	PASS
13	25.20E-3	0.011	0.1	PASS
14	13.31E-3	0.006	0.1	PASS
15	12.46E-3	0.005	0.1	PASS
16	19.67E-3	0.009	0.1	PASS
17	20.79E-3	0.009	0.1	PASS
18	17.31E-3	0.008	0.1	PASS
19	16.21E-3	0.007	0.1	PASS
20	15.81E-3	0.007	0.1	PASS
21	13.13E-3	0.006	0.1	PASS
22	15.17E-3	0.007	0.1	PASS
23	13.12E-3	0.006	0.1	PASS
24	12.58E-3	0.005	0.1	PASS
25	12.10E-3	0.005	0.1	PASS
26	12.17E-3	0.005	0.1	PASS
27	12.08E-3	0.005	0.1	PASS
28	13.28E-3	0.006	0.1	PASS
29	14.87E-3	0.006	0.1	PASS
30	12.47E-3	0.005	0.1	PASS
31	9.44E-3	0.004	0.1	PASS
32	11.10E-3	0.005	0.1	PASS
33	13.61E-3	0.006	0.1	PASS
34	10.82E-3	0.005	0.1	PASS
35	17.26E-3	0.008	0.1	PASS
36	8.32E-3	0.004	0.1	PASS
37	7.15E-3	0.003	0.1	PASS
38	7.98E-3	0.003	0.1	PASS
39	14.17E-3	0.006	0.1	PASS
40	14.21E-3	0.006	0.1	PASS

4.4. Voltage Fluctuation and Flicker

For test instruments and accessories used see section 3.6.

4.4.1. Description of the test location

Test location: Shielded room No. 2

4.4.2. Limits of voltage fluctuation and flicker

Test configuration and procedure see clause 5 of standard IEC 61000-3-3: 2013.

4.4.3. Description of the test set-up

4.4.3.1. Operating Condition

The EUT is turned on during the test, and the results of the maximum emanation are recorded.

4.4.3.2. Photo of the test set-up

4.4.4. Test result

The requirements are **Fulfilled**

Remarks: The limits are kept. For detailed results, please see the following page(s).

Test Report of HTW

Standard used:	IEC 60601-1-2: 2007 IEC 61000-3-3: 2013
Short time (Pst):	10 mins
Observation time:	120 mins (12 Flicker measurement)
Customer:	Foshan YaYou Medical Equipment Co., Ltd.
Flickermeter:	AC 230V/ 50Hz
Ambient Temperature:	23℃
Humidity:	51%
Barometric Pressure:	1017mbar
E. U. T.:	Complete dental unit M/N: A8000-IA
Date of test:	11:08 22.Sep 2009
Tester:	Nada

Test Result	PASS

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.222	4.00	PASS
dt [s]	0.000	0.50	PASS

Detail Flicker data

Flicker measurement 1	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.222	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 2	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.064	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 3	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.069	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 4	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.064	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 5	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.066	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 6	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.067	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 7	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.061	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 8	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.065	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 9	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.064	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 10	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.066	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 11	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.065	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 12	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.064	4.00	PASS
dt [s]	0.000	0.50	PASS

4.5. Electrostatic discharge

For test instruments and accessories used see section 3.6.

4.5.1. Description of the test location and date

Test location: Shielded room No. 1

Date of test: May 13, 2013

Operator: Jony

4.5.2. Severity levels of electrostatic discharge

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1	2	2
2	4	4
3	6	8
4	8	15
X	Special	Special

Note: equipment and systems shall comply with the requirements of 6.2.2 of IEC 60601-1-2: 2007 at immunity test levels of ± 2KV, ± 4KV and ±8KV for air discharge and ± 2KV, ± 4KV and ± 6KV for contact discharge.

4.5.3. Description of the test set-up

4.5.3.1. Operating Condition

The EUT is turned on during the test, and the results of the maximum susceptive results are recorded.

4.5.3.2. Test Configuration and Procedure:

Air Discharge:

－This test is done on a non-conductive surfaces. The round discharge tip of the Electrostatic Discharge simulator shall be approached as fast as possible then to touch the EUT. After each discharge, the simulator shall be removed from the EUT. The simulator is then re-triggered for a new single discharge and repeated 25 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

Contact Discharge:

－All the procedure shall be same as air discharge, except using the acute discharge tip. The top end of the Electrostatic Discharge simulator is touch the EUT all the time when the simulator is re-triggered for a new single discharge and repeated 10 times for each pre-selected test point.

Indirect Discharge:

－The vertical coupling plane(VCP) is placed 0.1m away from EUT. The top end of Electrostatic Discharge simulator should aim at the center of one border of the VCP for at least 10 times discharge.

－The top end of Electrostatic Discharge simulator should place at the point 0.1m away from EUT on the horizontal coupling plane(HCP). At least 10 times discharge should be done for every pre-selected point around EUT.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.5.3.3. Photo of the test set-up

Old

New

4.5.4. Test specification:

Contact discharge voltage:	■ 2 kV	■ 4 kV	■ 6 kV
Number of discharges:	■ 10	□ 25	
Air discharge voltage:	■ 2 kV	■ 4 kV	■ 8 kV
Number of discharges:	□ 10	■ 25	
Type of discharge:	Direct discharge	■ Air discharge ■ Contact discharge	
	Indirect discharge	■ Contact discharge	
Polarity:	■ Positive	■ Negative	
Discharge location:	■ see photo documentation of the test set-up		
	■ all external locations accessible by hand		
	□ horizontal coupling plane (HCP)		
	■ vertical coupling plane (VCP)		

4.5.5. Test result

No degradation of function. Comply with IEC 60601-1-2: 2007.

4.6. Radiated, radio-frequency, electromagnetic field

For test instruments and accessories used see section 3.6.

4.6.1. Description of the test location and date

Test location: Shielded room No. 4

Date of test: Nov. 24, 2009

Operator: Nada

4.6.2. Severity levels of radiated, radio-frequency, electromagnetic field

Level	Field Strength (V/m)
1.	1
2.	3
3.	10
X	Special

Note: equipment and systems shall comply with the requirements of 6.2.3 of IEC 60601-1-2: 2007 at immunity test levels of 3V/m.

4.6.3. Description of the test set-up

4.6.3.1. Operating Condition

The EUT is turned on during the test, and the results of the maximum susceptive results are recorded.

4.6.3.2. Test Procedure

EUT and its auxiliary instrument are placed on a turntable above ground. Transmitting antenna mounted on an antenna mast is set 3 meter away from the EUT. During the test, each of the four sides of EUT will face the transmitting antenna with the turntable cycled. Both horizontal and vertical polarization of the antenna are set on test and measured individually.

In order to judge the performance of the EUT, a set of monitor system is used.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.6.3.3. Photo of the test set-up

4.6.4. Test specification:

Frequency range:	■ 80 MHz to 2500 MHz
Field strength:	■ 3 V/m
EUT - antenna separation:	■ 3 m
Modulation:	■ AM: 80 % ■ sinusoidal 1kHz
Frequency step:	■ 1 % with 1s dwell time
Antenna polarisation:	■ horizontal ■ vertical

4.6.5. Test result

No degradation of function. Comply with IEC 60601-1-2: 2007.

4.7. Electrical fast transients / Burst

For test instruments and accessories used see section 3.6.

4.7.1. Description of the test location and date

Test location: Shielded room No. 1

Date of test: May 13, 2013

Operator: Jony

4.7.2. Severity levels of electrical fast transients / Burst

Open circuit output test voltage and repetition rate of the impulses		
Level	On power port, PE	
	V peak(KV)	Repetition Frequency (kHz)
1.	0.5	5 or 100
2.	1	5 or 100
3.	2	5 or 100
4.	4	5 or 100
X	Special	Special

Note: equipment and systems shall comply with the requirements of 6.2.4 of IEC 60601-1-2: 2007 at immunity test levels of ± 2KV for a.c. power lines.

4.7.3. Description of the test set-up

4.7.3.1. Operating Condition

The EUT is turned on during the test, and the results of the maximum susceptive results are recorded.

4.7.3.2. Test Requirements

EUT and its simulators shall be placed above the ground reference plane which is a minimum 1m*1m with minimum 0.65mm thickness. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

4.7.3.3. Test Configuration and Procedure

For AC power input ports:

EUT is connected to coupling/decoupling network which couples the EFT signal to power input lines. During the test, both positive and negative polarities of the test voltage should be applied and the duration of the test can't be less than 1mins.

The EUT is unnecessary to test on these signal / control lines.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.7.3.4. Photo of the test set-up

Old

New

4.7.4. Test specification:

Coupling network: ■ 0.5 kV ■ 1 kV ■ 2 kV

Coupling clamp: □ 0.5 kV □ 1 kV

Burst frequency: ■ 5.0 kHz

Coupling duration: ■ 60 s

Polarity: ■ positive ■ negative

4.7.5. Coupling points

Cable description: AC power line : L, N, PE, L-N, L-PE, N-PE, L-N-PE

Screening: o screened ■ unscreened
Status: ■ detachable o undetachable
Signal transmission: ■ analogue o digital
Length: ■ 1.4 m

4.7.6. Test result

No degradation of function. Comply with IEC 60601-1-2: 2007.

4.8. Surge

For test instruments and accessories used see section 3.6.

4.8.1. Description of the test location and date

Test location: Test location No. 1

Date of test: Nov. 24, 2009

Operator: Nada

4.8.2. Severity levels of surge

Level	Test Voltage (KV)
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

Note: equipment and systems shall comply with the requirements of 6.2.5 of IEC 60601-1-2: 2007 at immunity test levels of ± 0.5KV, ± 1KV and ± 2KV for a.c. power line(s) to earth and ± 0.5KV and ± 1KV for a.c. power line(s) to line(s).

4.8.3. Description of the test set-up

4.8.3.1. Operating Condition

The EUT is turned on during the test, and the results of the maximum susceptive results are recorded.

4.8.3.2. Test Configuration and Procedure

In this test, the 1.2/50us& 8/20us surge generator must be used for AC power ports. The voltage for line to earth coupling mode is twice of that for line to line. At least 5 positive and 5 negative (polarity) surge signal with a maximum 1/min repetition rate are injected to AC power lines from 3 different phase angles (0°, 90°, 180°, 270°) during the test.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.8.3.3. Photo of the test set-up

4.8.4. Test specification:

Pulse amplitude-Power line sym.: Source impedance: 2 Ω + 18µF	■ 0.5 kV	■ 1 kV	□ 2 kV	□ 4 kV
Pulse amplitude-Power line unsym: Source impedance: 12 Ω + 9µF	■ 0.5 kV	■ 1 kV	■ 2 kV	□ 4 kV
Number of surges:	■ 5 Surges/Phase angle			
Phase angle:	■ 0 °	■ 90 °	■ 180 °	■ 270 °
Repetition rate:	■ 60 s			
Polarity:	■ positive		■ negative	

4.8.5. Coupling points

Cable description: AC power line: L-N, L-PE, N-PE

Screening:	o screened	■ unscreened
Status:	■ detachable	o undetachable
Signal transmission:	■ analogue	o digital
Length:	■ 1.4 m	

4.8.6. Test result

No degradation of function. Comply with IEC 60601-1-2: 2007.

4.9. Conducted disturbances induced by radio-frequency fields

For test instruments and accessories used see section 3.6.

4.9.1. Description of the test location and date

Test location: Shielded room No. 2

Date of test: May 13, 2013

Operator: Jony

4.9.2. Severity levels of conducted disturbances induced by radio-frequency fields discharge

Level	Field Strength （V）
1.	1
2.	3
3.	10
X	Special

Note: equipment and systems shall comply with the requirements of 6.2.6 of IEC 60601-1-2: 2007 at immunity test levels of 0.5Vrms over the frequency range beginning at the start frequency and extending to 80 MHz.

4.9.3. Description of the test set-up

4.9.3.1. Operating Condition

The EUT is turned on during the test, and the results of the maximum susceptive results are recorded.

4.9.3.2. Test Configuration and Procedure

For AC power input lines:

—EUT is placed on an insulating support above a ground reference plane. It must be 0.3m away the CDN (coupling and decoupling network) of which the bottom is made of metallic material and placed directly on the ground plane. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible). The disturbance signal amplified by amplifier is injected to EUT through CDN.

For Signal Line and Control Line:

—EUT is placed on an insulating support above a ground reference plane. The EM clamp is directly placed on the ground reference plane with its metallic bottom contacting the plane. Cables between EUT and auxiliary equipment are put through the EM clamp. The disturbance signal amplified by amplifier is injected to EUT through EM clamp.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.9.3.3. Photo of the test set-up

Old

New

4.9.4. Test specification:

Frequency range: ■ 0.15 MHz to 80 MHz

Test voltage : ■ 3 V

Modulation: ■ AM: 80 %
■ sinusoidal 1kHz

Frequency step: ■ 1 % with 3 s dwell time

4.9.5. Coupling points

Cable description : AC power line, Signal line

Screening:	o screened	■ unscreened
Status:	■ detachable	o undetachable
Signal transmission:	■ analogue	o digital
Length:	■ 1.4 m	

4.9.6. Test result

No degradation of function comply with IEC 60601-1-2: 2007.

4.10. Magnetic Field Immunity

For test instruments and accessories used see section 3.6.

4.10.1. Description of the test location and date

Test location: Shielded room No. 1

Date of test: May 13, 2013

Operator: Jony

4.10.2. Severity levels of magnetic field immunity

Level	Magnetic Field Strength (A/m)
1	1
2	3
3	10
4	30
5	100
X.	Special

Note: equipment and systems shall comply with the requirements of 6.2.8 of IEC 60601-1-2: 2007 at immunity test levels of 3A /m.

4.10.3. Description of the test set-up

4.10.3.1. Operating Condition

The EUT is turned on during the test, and the results of the maximum susceptive results are recorded.

4.10.3.2. Test Configuration and Procedure:

EUT is placed on an insulating support of 0.1m high above a table of 0.8m high. There is a minimum 1m*1m ground metallic plane put on this table. EUT is put in the center of the magnetic coil then three orientations of the magnetic coil, X, Y and Z, shall be rotated in order to expose the EUT to the difference polarization magnetic field.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.10.3.3. Photo of the test set-up

New

4.10.4. Test specification:

Test frequency:	■ 50 Hz	■ 60 Hz	
Continuous field:	■ 3 A/m		
Test duration:	■ 5 mins		
Antenna factor:	0.917 A/m		
Axis:	■ x-axis	■ y-axis	■ z-axis

4.10.5. Test result

No degradation of function. Comply with IEC 60601-1-2: 2007.

4.11. Voltage Dips and Interruptions

For test instruments and accessories used see section 3.6.

4.11.1. Description of the test location and date

Test location: Test location No. 1

Date of test: Nov. 24, 2009

Operator: Nada

4.11.2. Severity levels of voltage dips and interruptions

Test Level for Voltage Dips		
Test Level (%Ut)	**Voltage Dip And Short Interruptions (%Ut)**	**Duration (In Period)**
<5	>95	0.5
40	60	5
70	30	25

Test Level for Voltage Interruption		
Test Level (%Ut)	**Voltage Dip And Short Interruptions (%Ut)**	**Duration (In Period)**
<5	>95	250

4.11.3. Description of the test set-up

4.11.3.1. Operating Condition

The EUT is turned on during the test, and the results of the maximum susceptive results are recorded.

4.11.3.2. Test Configuration and Procedure

EUT is connected to the simulator according to the test photo. When conducting this test ,the power supply shall be set at the minimum and maximum rated input voltages and test voltage changes shall be step changes and start at the phase angle of 0° and 180° .

4.11.3.3. Photo of the test set-up

4.11.4. Test specification:

Nominal Mains Voltage (V_N):	■ 230 V AC		
Number of voltage fluctuations:	■ 3		
Level of reduction(dip) / duration:	■ 100 % / 10ms	■ 60 % / 100ms	■ 30 % / 500ms
Nominal Mains Voltage (V_N):	■ 230 V AC		
Number of Interruptions:	■ 3		
Duration of the Interruption:	■ 5000 ms		

4.11.5. Test result

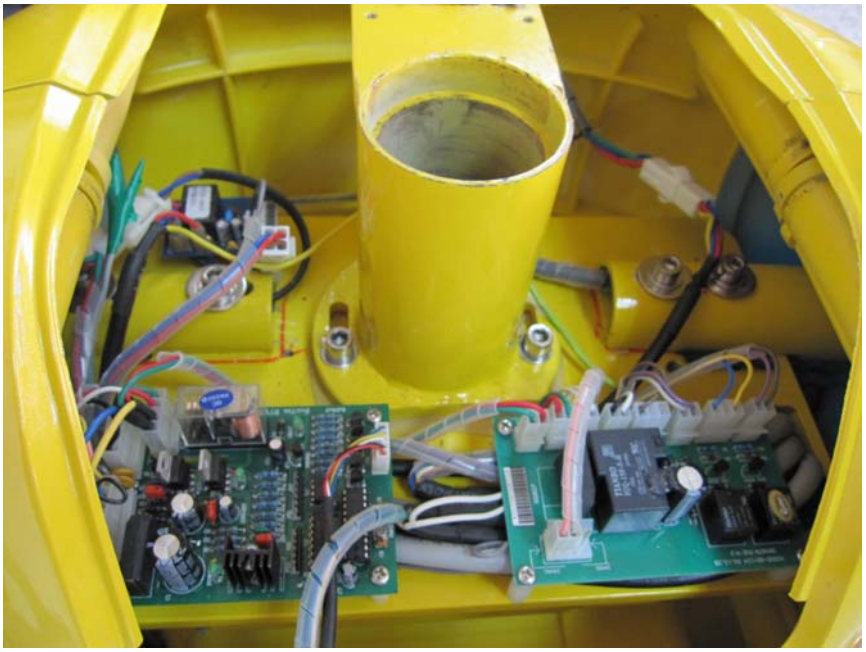
No degradation of function. Comply with IEC 60601-1-2: 2007.

5. External and Internal Photos of the EUT

5.1. External photos of the EUT

New

5.2. Internal photos of the EUT

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33/39 r/min FREE
VDE
40010359
ZHAOQING QINGLONG ELECTRICAL


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I/P:230VAC 50/60HZ Red Red
O/P:0V-24V(7.5A) Blu Blu 6
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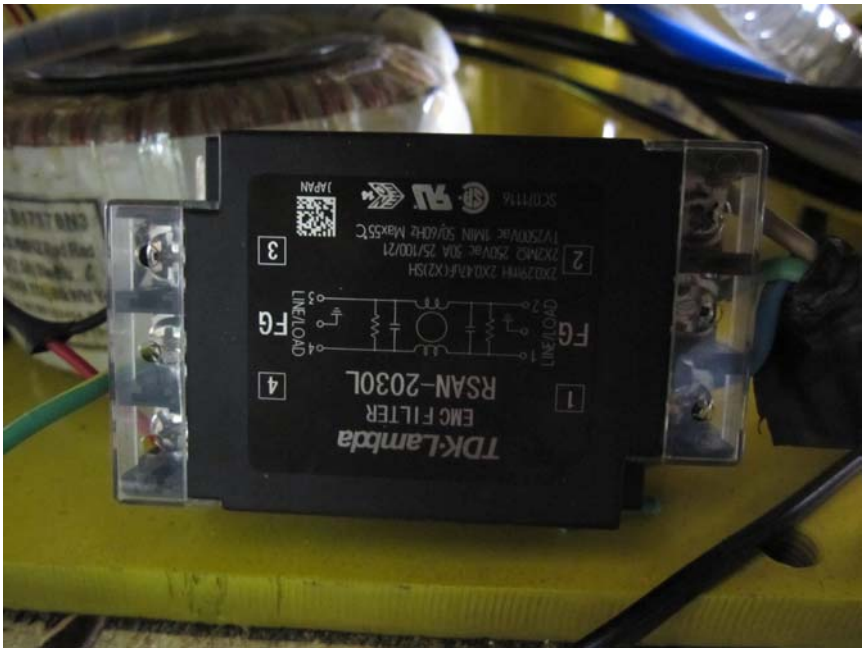
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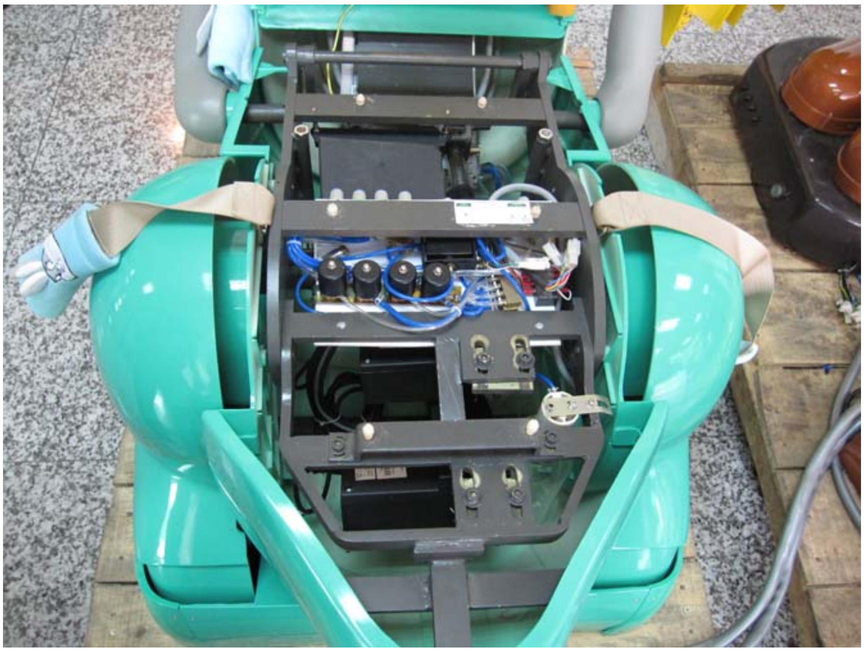


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产品型号：
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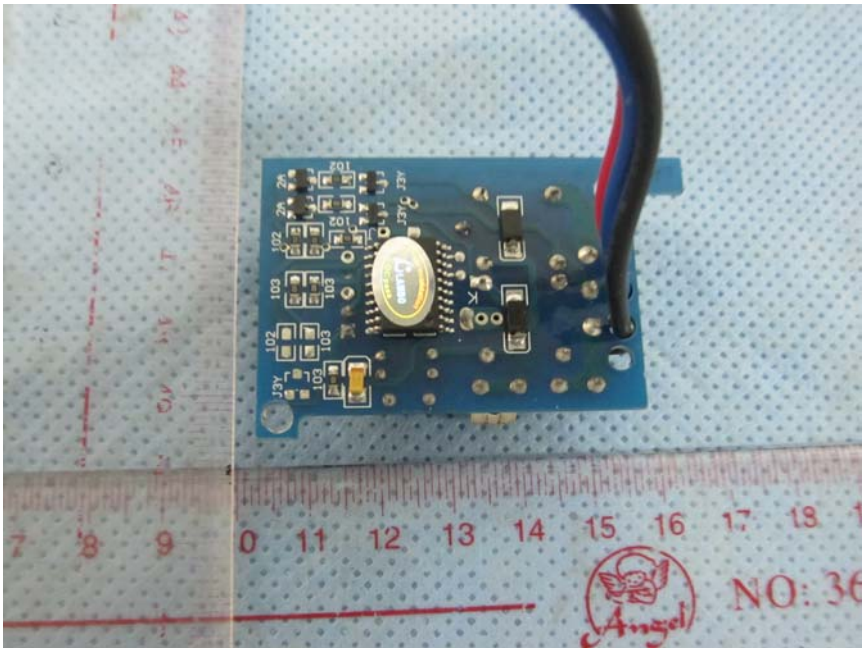
2009050437 6D
产品合格证
PL-8000N
检3
合格


Runyes
RYCB CONTROL BOX
MADE BY RUNYES
Type:RYCB
Vin:220VAC,+10%,50Hz
Iin:Max.1.0A
Uout:24VDC,Max.130VA
Op. :Int.10%,Max.6min.in 1 hour
CAUTION:Not to be opened by unauthorized personnel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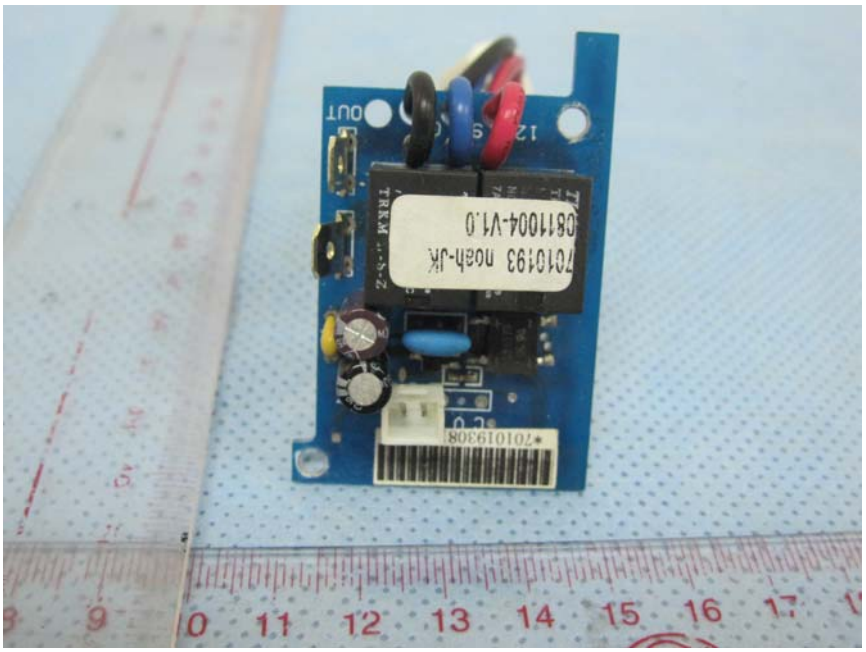
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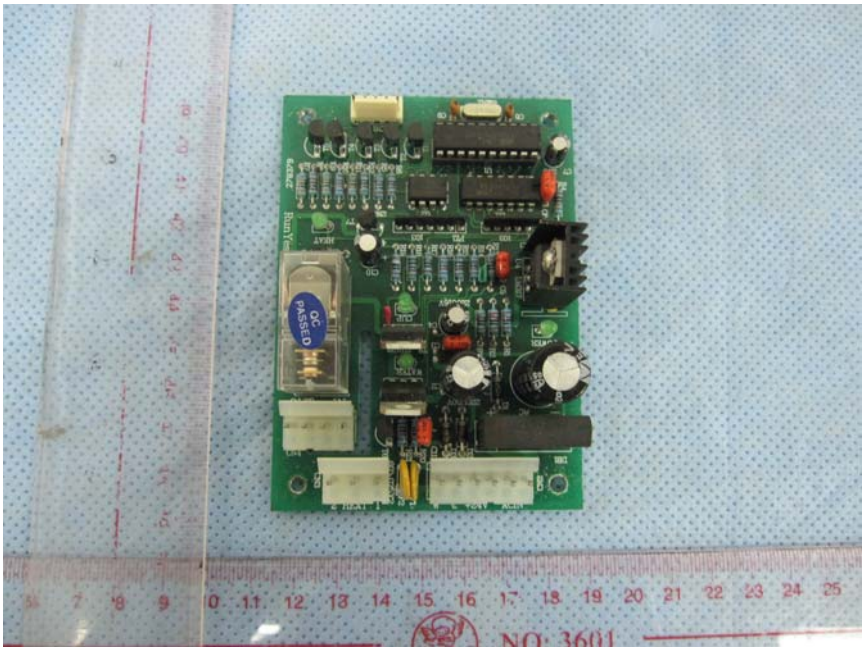
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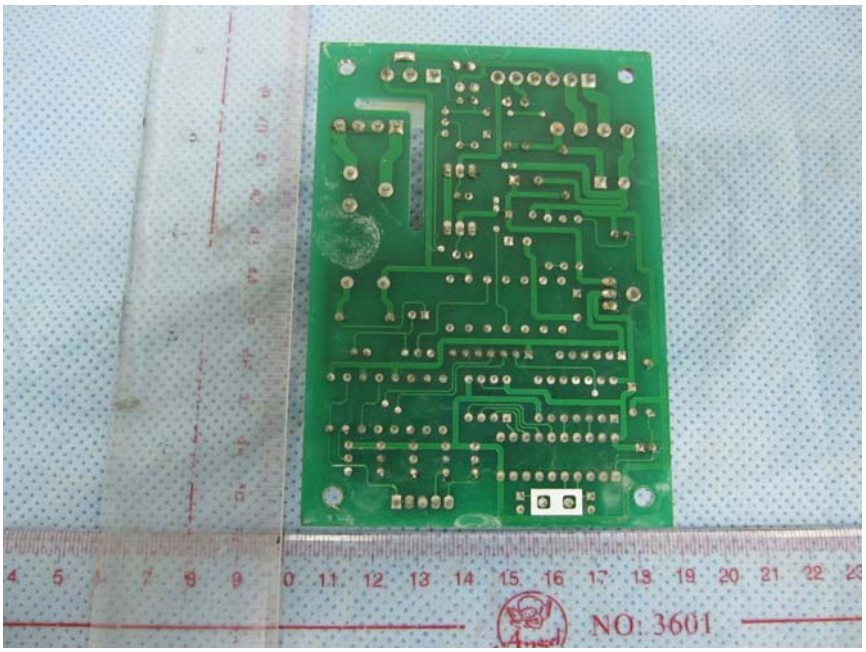
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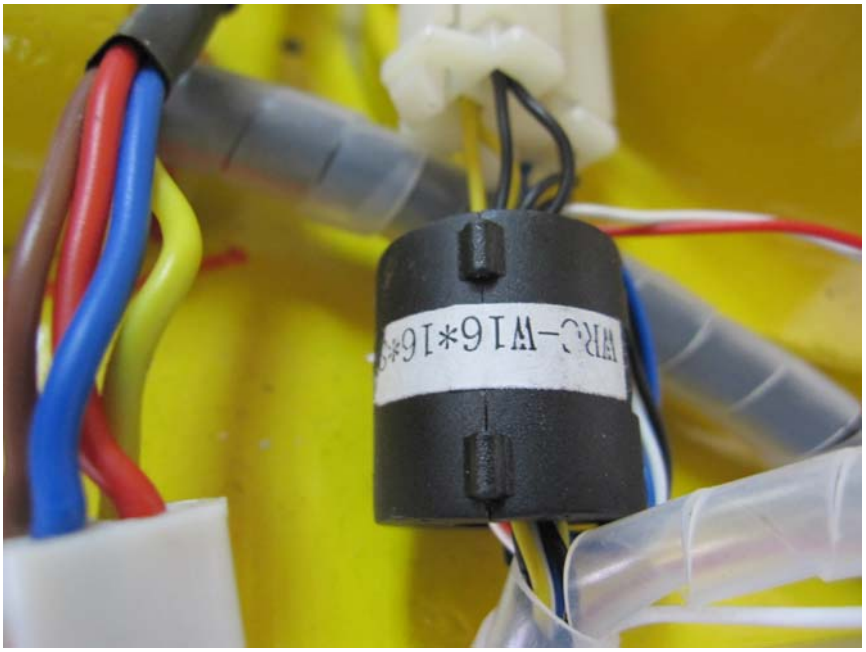


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RS807
吸开关
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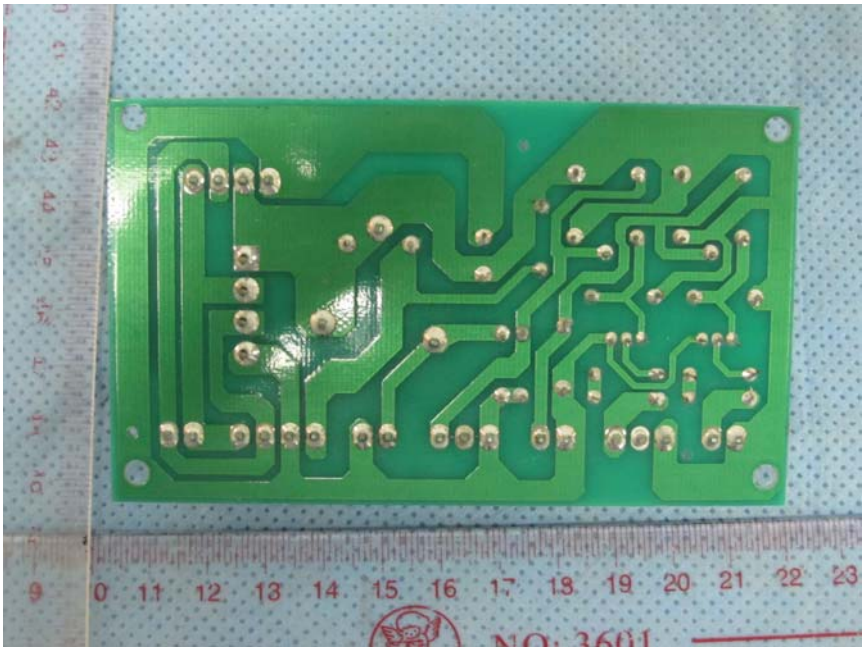

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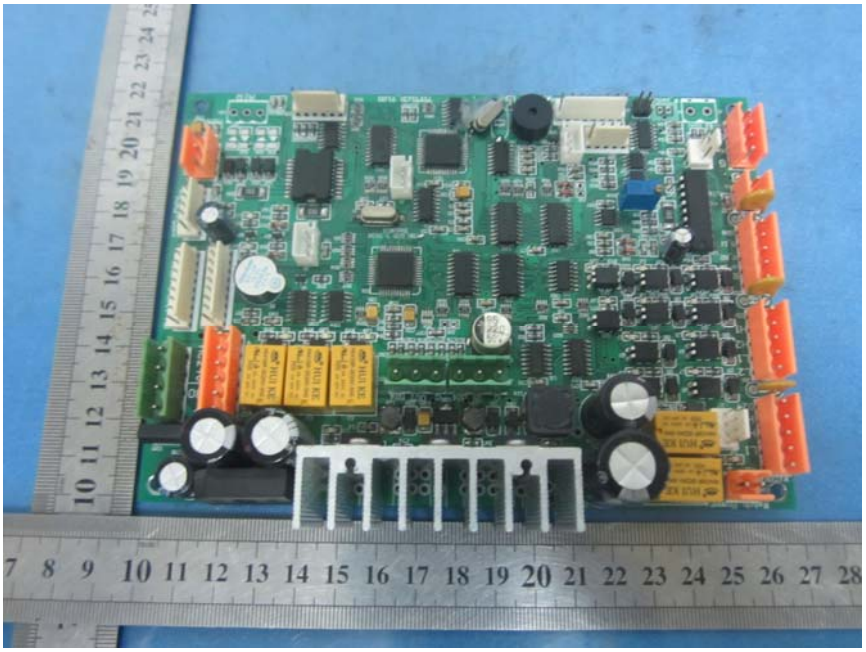

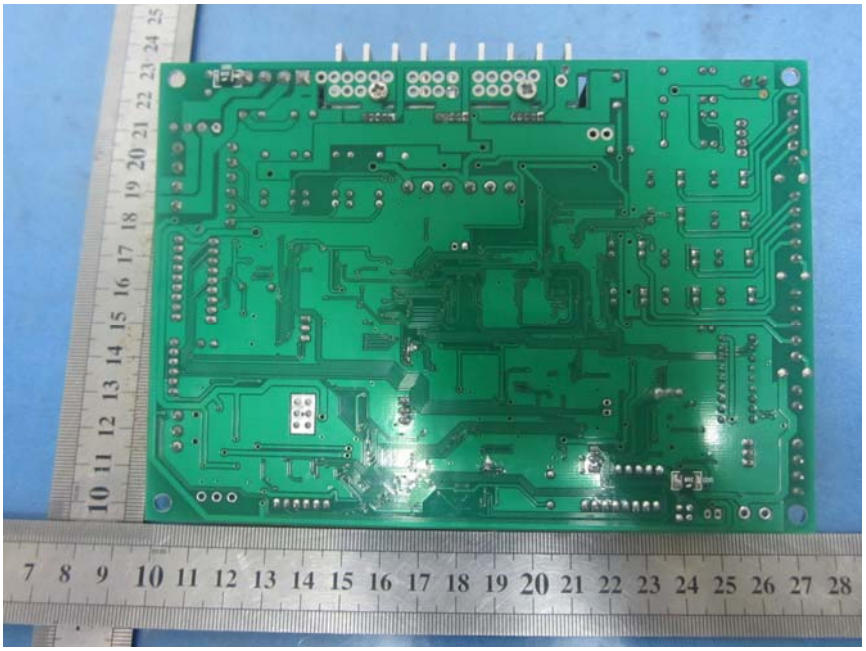

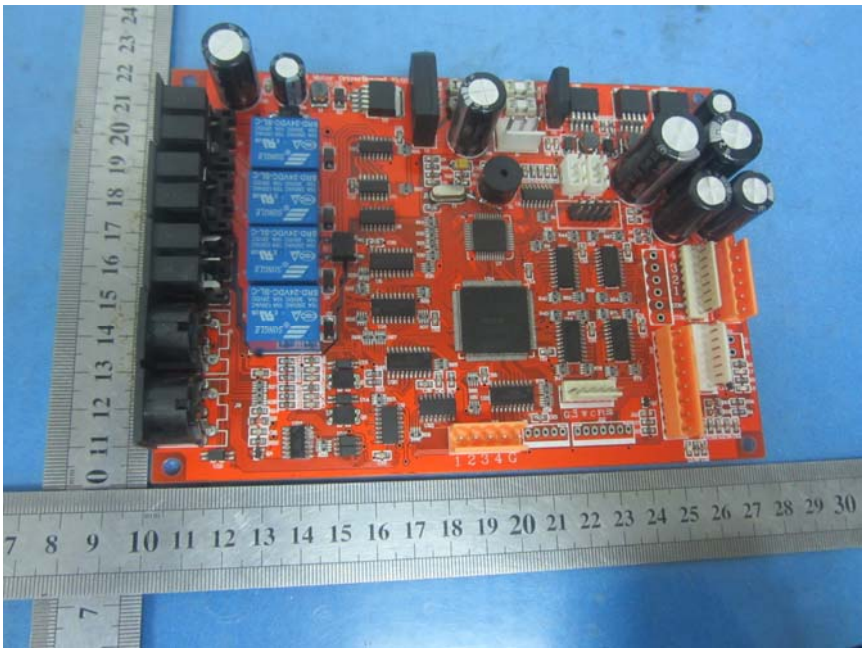

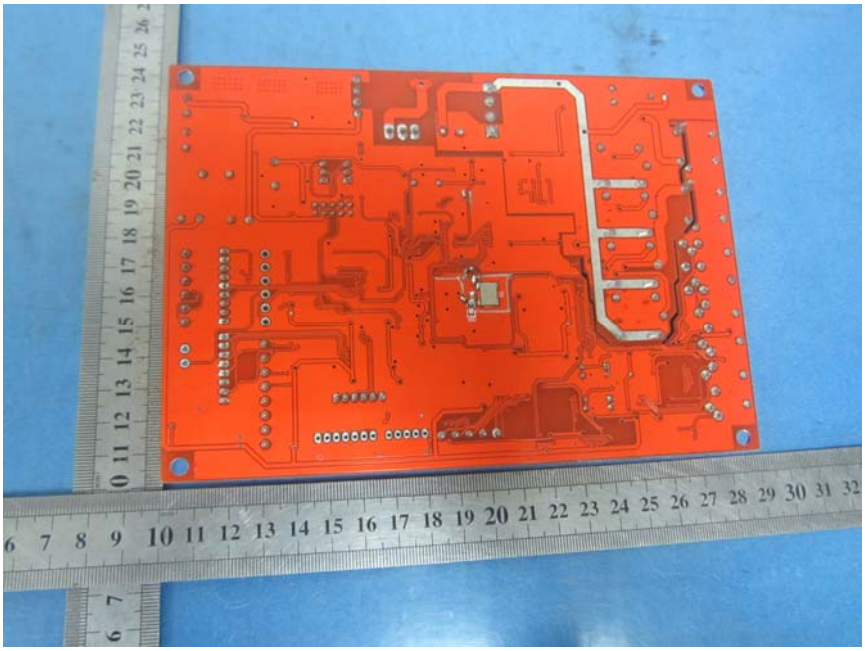


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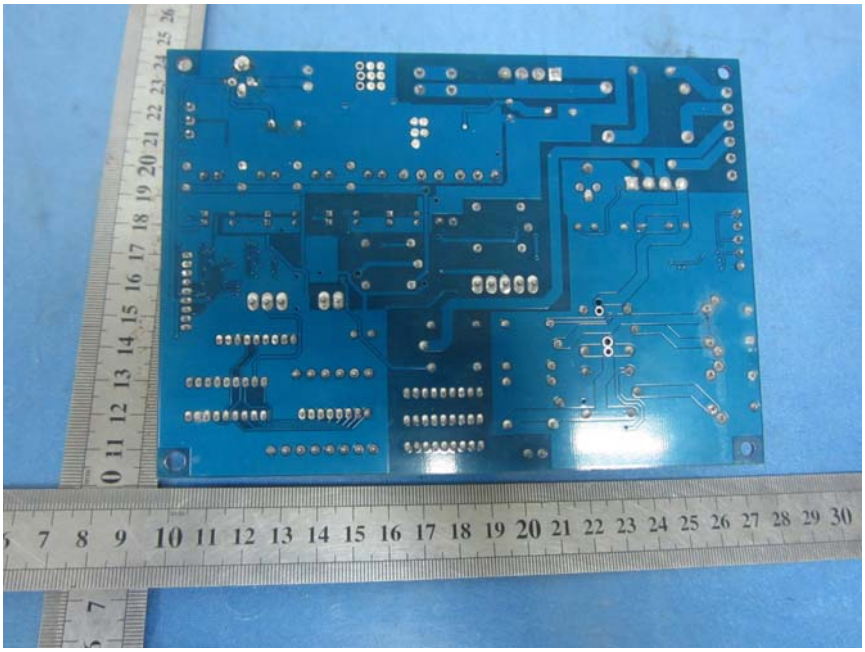

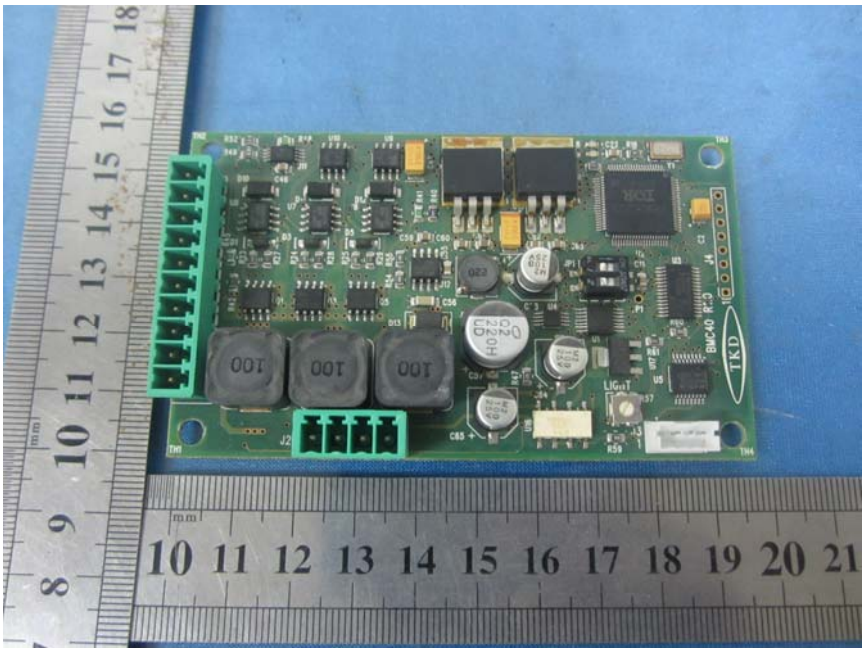
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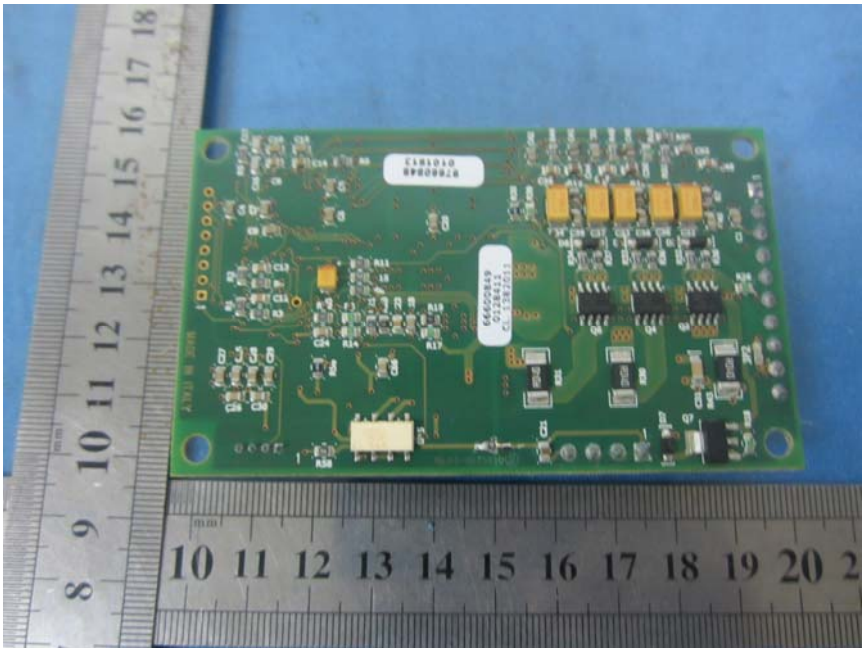

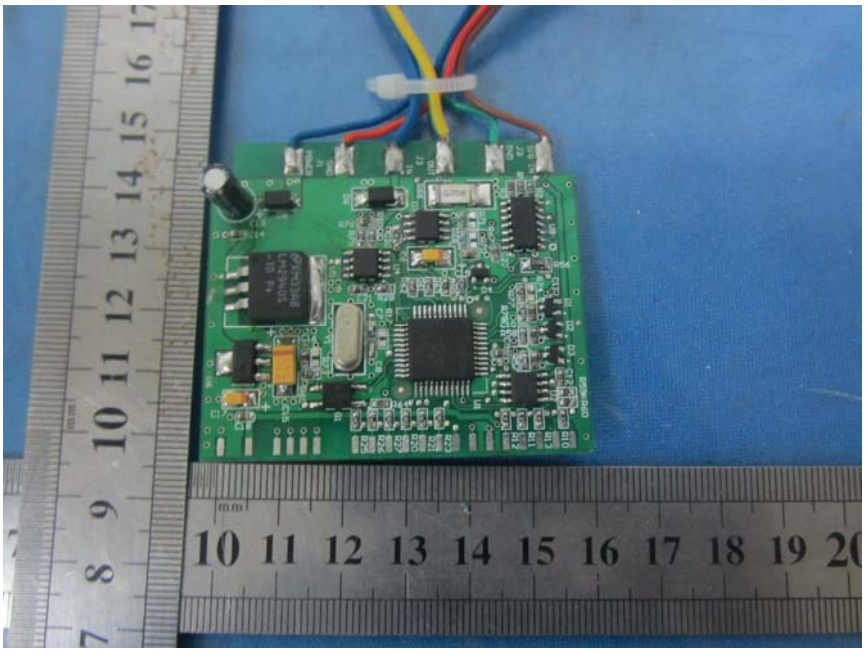

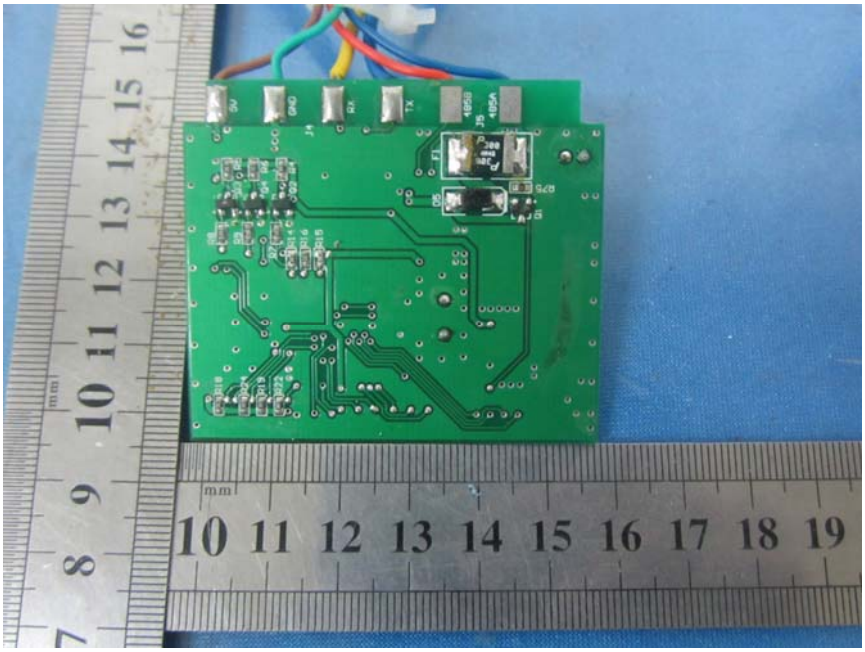

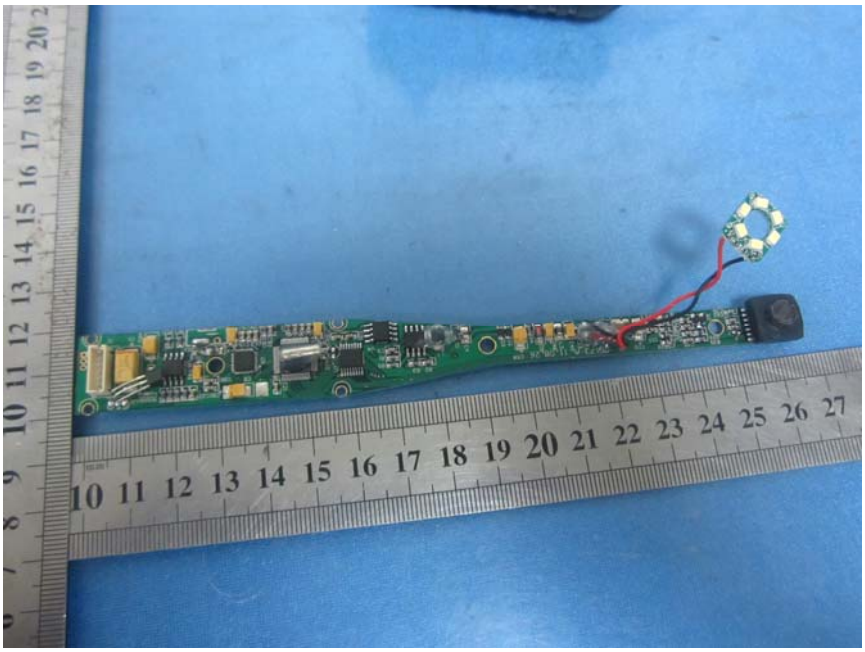

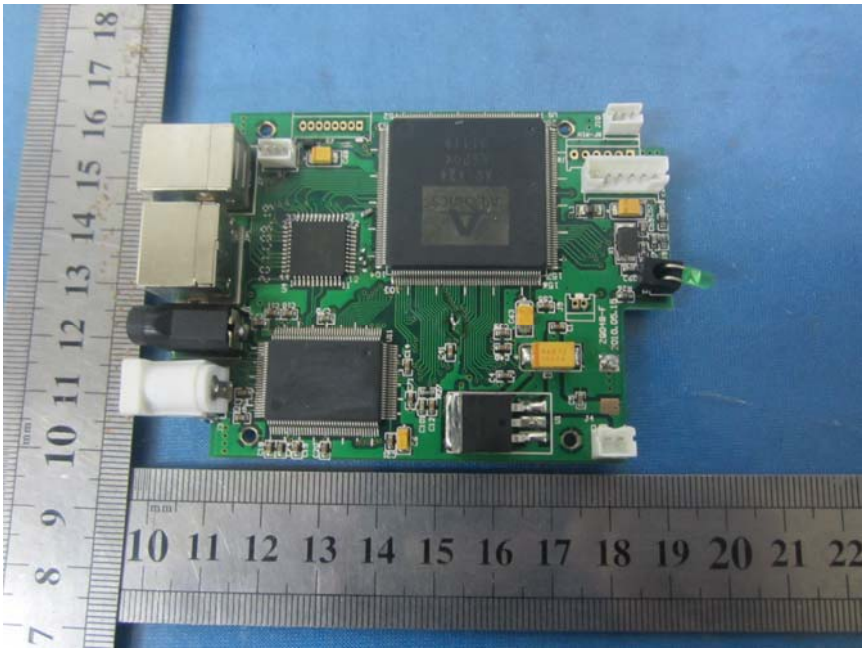

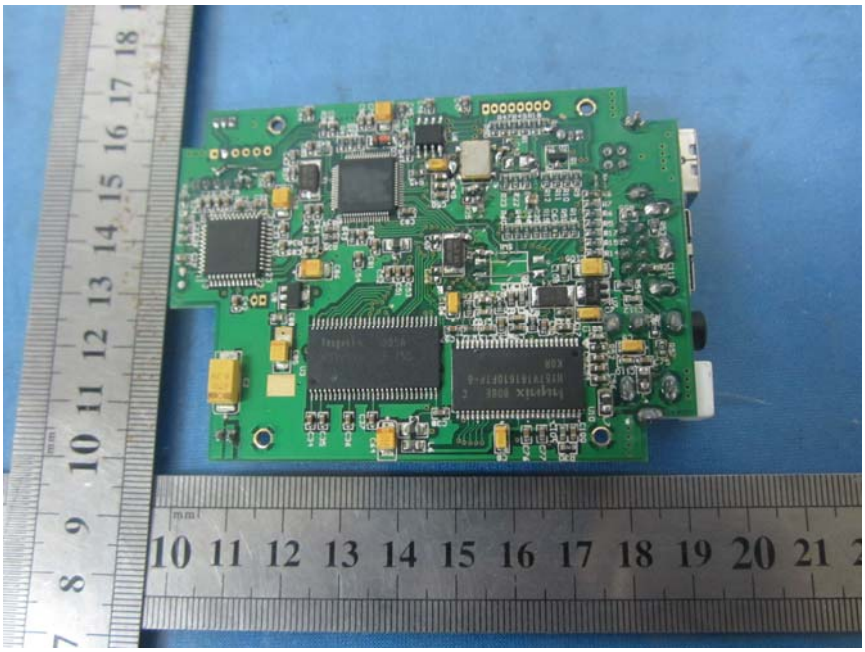

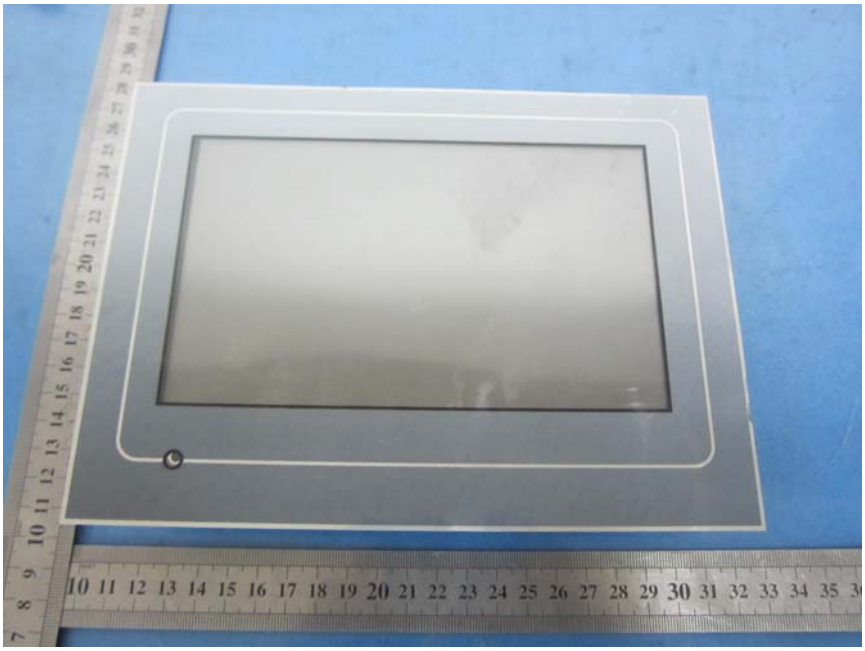

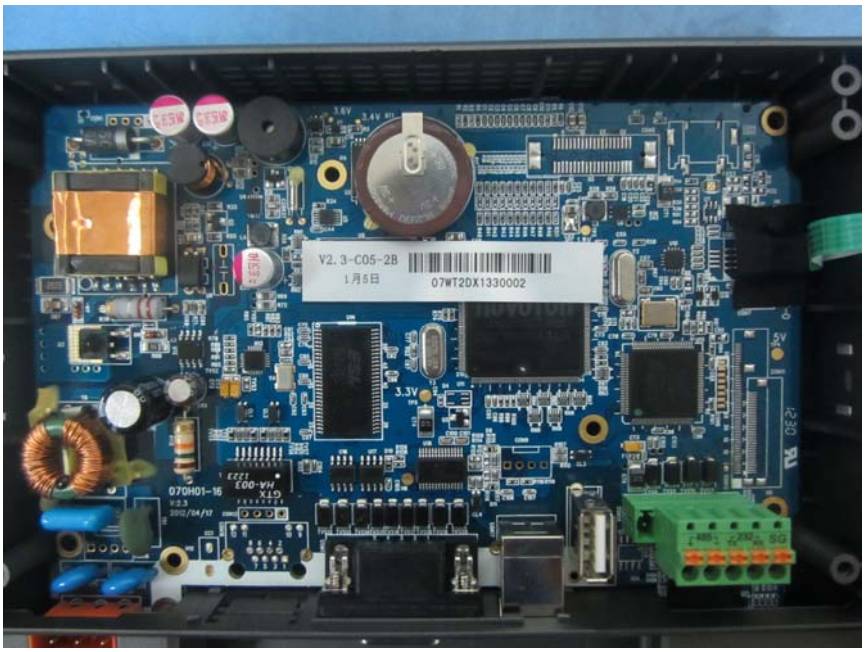

..... End of Report.....

Annex of Report

Manufacturer’s Declaration of the EUT
(altogether 5 pages)

Guidance and manufacturer´s declaration – electromagnetic emission – for all EQUIPMENT AND SYSTEMS

Row			
1	Guidance and manufacturer´s declaration – electromagnetic emission		
2	The A8000-IA Complete Dental Unit is intended for use in the electromagnetic environment specified below. The customer or the user of A8000-IA Complete Dental Unit should assure that it is used in such an environment.		
3	Emissions test	Compliance	Electromagnetic environment - guidance
4	RF emissions CISPR 11	Group 1	The A8000-IA Complete Dental Unit uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
5	RF emissions CISPR 11	Class B	The A8000-IA Complete Dental Unit is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
6	Harmonic emissions IEC 61000-3-2	Class A	
7	Voltage fluctuations / flicker emissions IEC 61000-3-3	Complies	

Guidance and manufacturer's declaration – electromagnetic immunity – for all EQUIPMENT and SYSTEMS

Guidance and manufacturer´s declaration – electromagnetic immunity			
The A8000-IA Complete Dental Unit is intended for use in the electromagnetic environment specified below. The customer or the user of the A8000-IA Complete Dental Unit should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment - guidance**
Electrostatic discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrostatic transient / burst IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	± 2 kV for power supply lines ± 1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	± 1 kV differential mode ± 2 kV common mode	± 1 kV differential mode ± 2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	< 5 % U_T (>95 % dip in U_T) for 0.5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles < 5 % U_T (>95 % dip in U_T) for 5 sec	< 5 % U_T (>95 % dip in U_T) for 0.5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles < 5 % U_T (>95 % dip in U_T) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the A8000-IA Complete Dental Unit requires continued operation during power mains interruptions, it is recommended that the A8000-IA Complete Dental Unit be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	N/A	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE	U_T is the a. c. mains voltage prior to application of the test level.		

Guidance and manufacturer´s declaration – electromagnetic immunity – for EQUIPMENT and SYSTEM that are not LIFE-SUPPORTING

Guidance and manufacturer´s declaration – electromagnetic immunity

The A8000-IA Complete Dental Unit is intended for use in the electromagnetic environment specified below. The customer or the user of the A8000-IA Complete Dental Unit should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
			Portable and mobile RF communications equipment should be used no closer to any part of the A8000-IA Complete Dental Unit, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance**
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 V	$d = [\frac{3.5}{V_1}]\sqrt{P}$
			$d = [\frac{3.5}{E_1}]\sqrt{P}$ 80 MHz to 800 MHz
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	$d = [\frac{7}{E_1}]\sqrt{P}$ 800 MHz to 2.5 GHz where *p* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and *d* is the recommended separation distance in metres (m).[b] Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range.[b] Interference may occur in the vicinity of equipment marked with the following symbol:

NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic is affected by absorption and reflection from structures, objects and people.

[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the A8000-IA Complete Dental Unit is used exceeds the applicable RF compliance level above, the A8000-IA Complete Dental Unit should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the A8000-IA Complete Dental Unit.

[b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3V/m.

Recommended separation distances between portable and mobile RF communications equipment and the EQUIPMENT or SYSTEM - for EQUIPMENT and SYSTEMS that are not LIFE-SUPPORTING

Recommended separation distances between portable and mobile RF communications equipment and the A8000-IA Complete Dental Unit

The A8000-IA Complete Dental Unit is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the A8000-IA Complete Dental Unit can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the A8000-IA Complete Dental Unit as recommended below, according to the maximum output power of the communications equipment

Rated maximum output of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz $d = [\frac{3.5}{V_1}]\sqrt{P}$	80 MHz to 800 MHz $d = [\frac{3.5}{E_1}]\sqrt{P}$	800 MHz to 2.5 GHz $d = [\frac{7}{E_1}]\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above the recommended separation distance d in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.