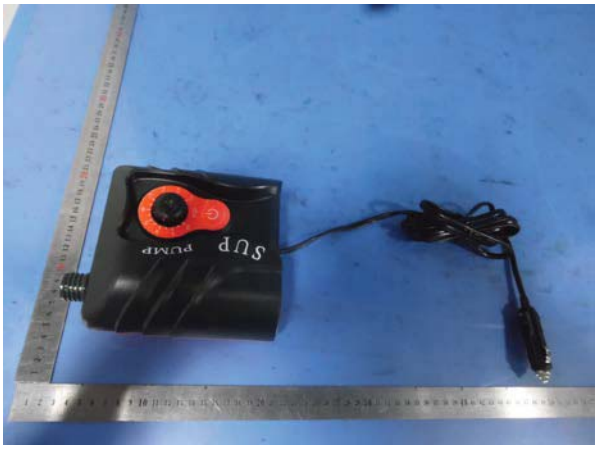
Prüfbericht-Nr.: *Test Report No.:*	16084872 005	**Auftrags-Nr.:** *Order No.:*	174096539	**Seite 1 von 17** *Page 1 of 17*
Kunden-Referenz-Nr.: *Client Reference No.:*	416594	**Auftragsdatum:** *Order date.:*	14.Dec.2018	
Auftraggeber: *Client:*	DONG GUAN HUA TAO METAL & PLASTIC PRODUCTS CO., LTD No.2, YanHe East Road, XiaBian Village, Chang'An Town, DongGuan, GuangDong P. R. China			
Prüfgegenstand: *Test item:*	Electric Air Pump			
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	HT-785			
Auftrags-Inhalt: *Order content:*	TUV Rheinland - EMC service			
Prüfgrundlage: *Test specification:*	EN 50498: 2010			

Wareneingangsdatum: *Date of receipt:*	16.Dec.2018
Prüfmuster-Nr.: *Test sample No.:*	A000848566-001
Prüfzeitraum: *Testing period:*	Refer to the test report
Ort der Prüfung: *Place of testing:*	Refer to section 2.1
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (Guangdong) Ltd.
Prüfergebnis*: *Test result*:*	Pass



geprüft von / *tested by:*

Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*
26 Jan.2019	Ken Liu/Project Engineer	

kontrolliert von / *reviewed by:*

Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*
28 Jan.2019	Amy Wang/TC	

Sonstiges / *Other:*

Zustand des Prüfgegenstandes bei Anlieferung: *Condition of the test item at delivery:*
Prüfmuster vollständig und unbeschädigt
Test item complete and undamaged

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhalt
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	1 = very good	2 = good	3 = satisfactory	4 = sufficient	5 = poor
	P(ass) = passed a.m. test specifications(s)		F(ail) = failed a.m. test specifications(s)	N/A = not applicable	N/T = not tested

/04

TEST SUMMARY

5.1.1 BROADBAND RADIATED DISTURBANCES FROM ESAS
RESULT: Pass

5.2.1 NARROWBAND ELECTROMAGNETIC EMISSIONS FROM ESAS
RESULT: Pass

5.3.1 CONDUCTED TRANSIENT DISTURBANCES
RESULT: Pass

6.2.1 CONDUCTED TRANSIENTS IMMUNITY
RESULT: Pass

CONTENTS

1. General Remarks

When applying the basic standards in this test report, please refer to the applied generic or product family standards for edition information:
For dated basic standards, only the edition cited applies. For undated basic standards, the latest edition (including any amendments) applies.

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix 1: Test Result.
Appendix 2: List of Test and Measurement Instruments.

2. Test Sites

2.1 Test Facilities

TÜV Rheinland (Guangdong) Ltd. EMC Laboratory

No.102, 1F of Southwest and No.205, 2F of West Warehouse Building, No.767 Tianyuan Road, Tianhe District, Guangzhou, Guangdong, P. R. China

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Refer to Appendix 2.

3. Modification Information

The previous certified models in report 16084872 001, make the modifications as Below,
Add 1 new sample HT-785 is Electric Air Pump used in vehicles.

According to the above information, all EMC tests were performed on **HT-785.**

Refer to the Technical Documentation for further information.

3.1 Product Function and Intended Use

Refer to Technical Documentation and user manual.

3.2 Ratings and System Details

Model	Rated Input	Rated Power	Protection Class
HT-785	DC 12V	110W	III
Ports: DC input			

Refer to the Technical Documentation for further information

3.3 Independent Operation Modes

The basic operation modes are:

A. On.

B. Off.

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Technical Documentation for further information.

3.5 Submitted Documents

Circuit Diagram
Rating Label
User Manual

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

Immunity: The equipment under test (EUT) was configured to have its highest possible susceptibility against the tested phenomena. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Refer to test set-up in chapter 5 and chapter 6.

4.3 Special Accessories and Auxiliary Equipment

None.

4.4 Countermeasures to achieve EMC Compliance

No additional measures were employed to achieve compliance.

5. Test Results EMISSION

5.1 Broadband emissions

5.1.1 Broadband radiated disturbances from ESAs

RESULT: **Pass**

Date of Testing	:	Refer to appendix 1
Test Procedure	:	EN 50498:2010, clause 7.1
Frequency Range	:	30-1000MHz
Kind of Test Site	:	3m semi-anechoic chamber
Limits	:	EN 50498:2010, clause 7.1, Table 1
Measurement Distance	:	1m

Test setup

Input Voltage	:	DC 13.5V
Operation Mode	:	A
Artificial Hand	:	N/A
Earthing	:	N/A
Temperature	:	Refer to appendix 1
Humidity	:	Refer to appendix 1
Air pressure	:	Refer to appendix 1

Test Result

Measurement uncertainty: 5.16dB (k=2, σ= 95%)

Disturbances other than those mentioned are small or not detectable.

For test results, please refer to the attached appendix 1.

5.2 Narrowband emissions

5.2.1 Narrowband electromagnetic emissions from ESAs

RESULT: **Pass**

Date of Testing	:	Refer to appendix 1
Test Procedure	:	EN 50498:2010, clause 7.2
Frequency Range	:	30 - 1000MHz
Kind of Test Site	:	3m semi-anechoic chamber
Limits	:	EN 50498:2010, clause 7.2, Table 2
Measurement Distance	:	1m

Test setup

Input Voltage	:	DC 13.5V
Operation Mode	:	A
Artificial Hand	:	N/A
Earthing	:	N/A
Temperature	:	Refer to appendix 1
Humidity	:	Refer to appendix 1
Air pressure	:	Refer to appendix 1

Test Result

Measurement uncertainty: 5.16dB (k=2, σ= 95%)

Disturbances other than those mentioned are small or not detectable.

For test results, please refer to the attached appendix 1.

5.3 Conducted Transient Emissions

5.3.1 Conducted transient disturbances

RESULT: **Pass**

Date of Testing : 02.Dec.2018
Test Procedure : EN 50498:2010, clause 7.3
Limits : EN 50498:2010, clause 7.3, Table 3

Test setup

Input Voltage : DC 13.5V
Operation Mode : A
Artificial Hand : N/A
Earthing : N/A
Temperature : 23°C
Humidity : 52%
Air pressure : 101kPA

Test Result

Table 2: ESA's Conducted Transient Emissions

Polarity of pulse amplitude	Limit: (Vehicles with 12V system)	Measured pulse amplitude value
Positive	+ 75	0V
Negative	-100	-21.6 V

6. Test Results IMMUNITY

6.1 General requirements

The tests of standard EN 50498:2010 were performed. According to EN 50498:2010, the appliance shall fulfill the requirements of:

Conducted transients Immunity **Refer to Clause 7.4 Table 4**

Classification of function status:

Functional status	Description
A	All functions of a device/system perform as designed during and after exposure to a disturbance.
B	All functions of a device/system perform as designed during exposure; however, one or more of them may go beyond the specified tolerance. All functions return automatically to within normal limits after exposure is removed. Memory functions shall remain criterion A.
C	One or more functions of a device/system do not perform as designed during exposure but returns automatically to normal operation after exposure is removed.
D	One or more functions of a device/system do not perform as designed during exposure and does not return to normal operation until exposure is removed and the device/system is reset by simple "operator/use" action.
E	One or more functions of a device/system do not perform as designed during and after exposure and cannot be returned to proper operation without repairing or replacing the device/system.

6.2 Continuous Disturbances

6.2.1 Conducted transients Immunity

RESULT: **Pass**

Date of testing : 02.Dec.2018
Test Specification : EN 50498:2010, clause 7.4, Table 4
Basic Standard : ISO 7637-2: 2004
Test pulses : Pulse 1, 2a, 2b, 3a, 3b, 4

Test setup

Input Voltage : DC 13.5V
Operation Mode : A
Earthing : N/A
Temperature : 23°C
Humidity : 52%
Air pressure : 100kPA

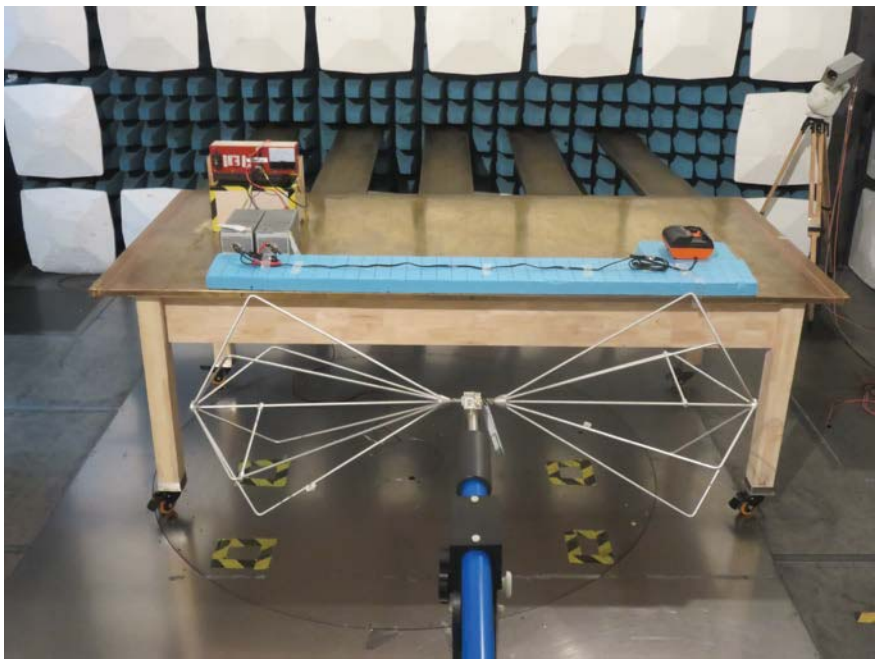
Table 3: test pulse and level in onboard systems

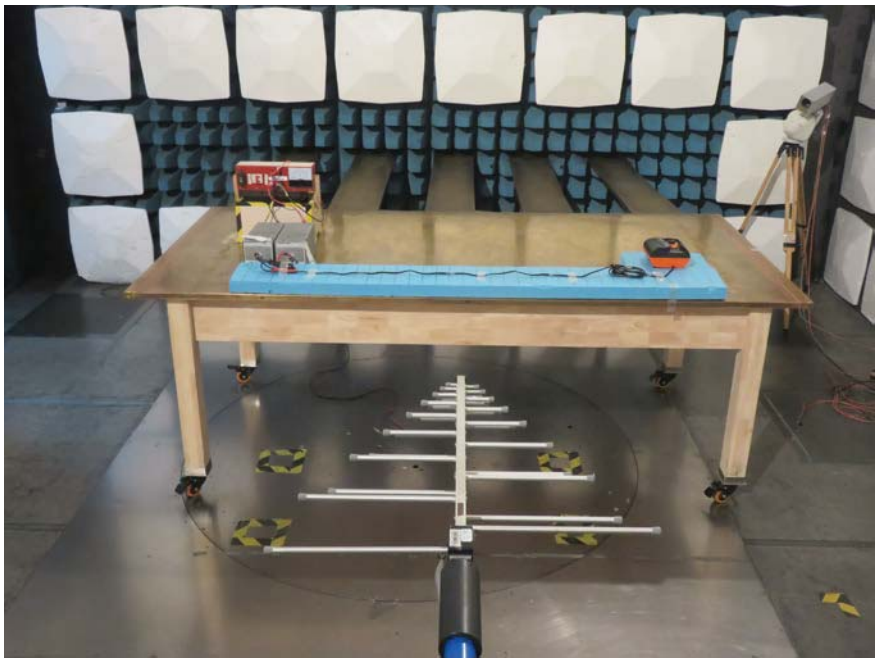
Test pulse	Test level 12V	Number of pulse / test time	Required minimum function status	Status of function true value	Result
				12V	
1	-75V	5000 pulses	D	D*	passed
2a	+37V	5000 pulses	D	A	passed
2b	+10V	10 pulses	D	D*	passed
3a	-112V	1 h	D	A	passed
3b	+75V	1 h	D	A	passed
4	-6V	1 pulse	D	D*	passed

Remark*: During the test of pulse 1, 2b, 4 the equipment under test stopped working. After testing, it can return to work normally automatically.

7. Photographs of the Test Set-Up

Photograph 1: Set-up for broadband and narrowband electromagnetic emissions from ESAs





Photograph 2: Set-up for Conducted Transient Emissions from ESAs

Photograph 3: Set-up for Conducted Transients Immunity

8. List of Tables

9. List of Photographs

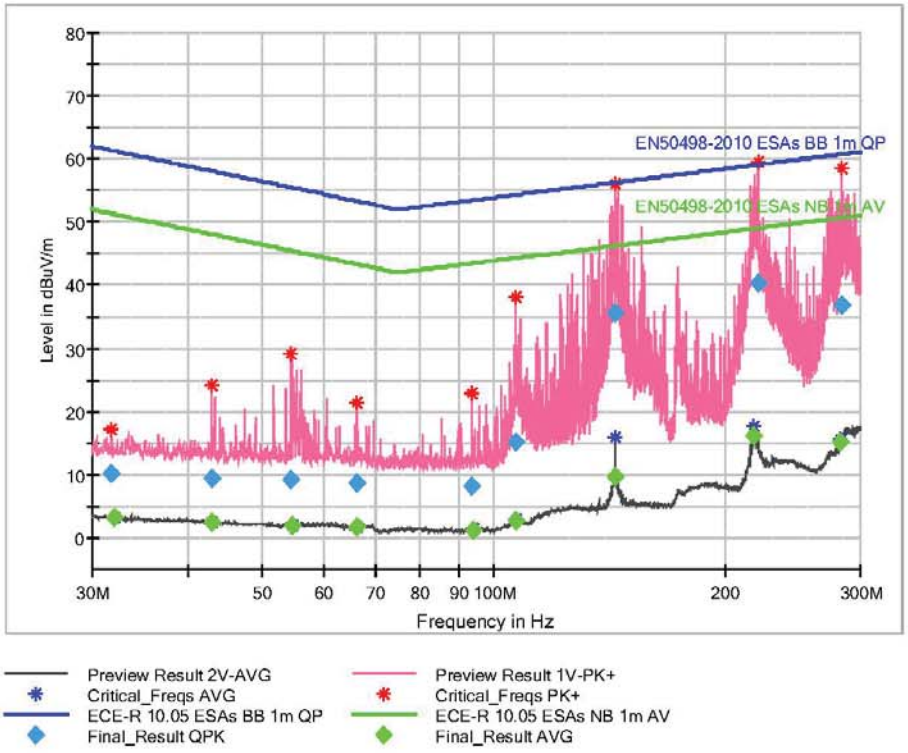
TUV Rheinland (Guangdong) Ltd. EMC Test Service Hotline: +86-20-28391188

EMC Test Record (Emission)

Common Information

Manufacturer:	Huatao
Test Item:	Electric air pump
Identification:	HT-785
Test Standard:	EN50498:2010
Test Detail:	Radiated Emission
Operation Mode:	on
Climate Condition:	23 degree, 45%, 101 kPa
Test Voltage/ Freq:	13.5V DC
Receipt No:	174097248
Report No:	
Result:	Pass
Comment:	Test distance is 1m, Vertical
Subrange 1	
Frequency Range:	30M-300MHz
Receiver:	TUV ESU 26
Transducer:	TUV VHBB9124

Full Spectrum



Tested by: fison chan
201812131

Reviewed by: Alex Li
201910106

TUV Rheinland (Guangdong) Ltd. EMC Test Service Hotline: +86-20-28391188

Final_Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
31.800000	10.15	---	61.36	51.21	1000.0	120.000	V	12.3
31.980000	---	3.15	51.30	48.15	1000.0	120.000	V	12.2
42.840000	---	2.45	48.11	45.66	1000.0	120.000	V	12.0
42.960000	9.43	---	58.08	48.65	1000.0	120.000	V	12.0
54.300000	9.23	---	55.53	46.29	1000.0	120.000	V	11.5
54.600000	---	2.04	45.47	43.43	1000.0	120.000	V	11.5
66.240000	---	1.70	43.36	41.65	1000.0	120.000	V	11.2
66.420000	8.80	---	53.33	44.53	1000.0	120.000	V	11.2
93.600000	8.33	---	53.46	45.12	1000.0	120.000	V	10.9
93.840000	---	1.35	43.47	42.12	1000.0	120.000	V	10.9
106.620000	15.24	---	54.31	39.07	1000.0	120.000	V	11.4
106.860000	---	2.61	44.33	41.71	1000.0	120.000	V	11.4
143.460000	35.52	---	56.26	20.75	1000.0	120.000	V	13.1
143.700000	---	9.61	46.27	36.67	1000.0	120.000	V	13.2
217.980000	---	16.17	49.01	32.84	1000.0	120.000	V	16.6
220.260000	40.37	---	59.08	18.71	1000.0	120.000	V	16.9
282.360000	---	15.13	50.71	35.58	1000.0	120.000	V	21.0
283.020000	36.94	---	60.73	23.79	1000.0	120.000	V	21.2

Tested by: fison chan
201812131

Reviewed by: Alex Li
201910106

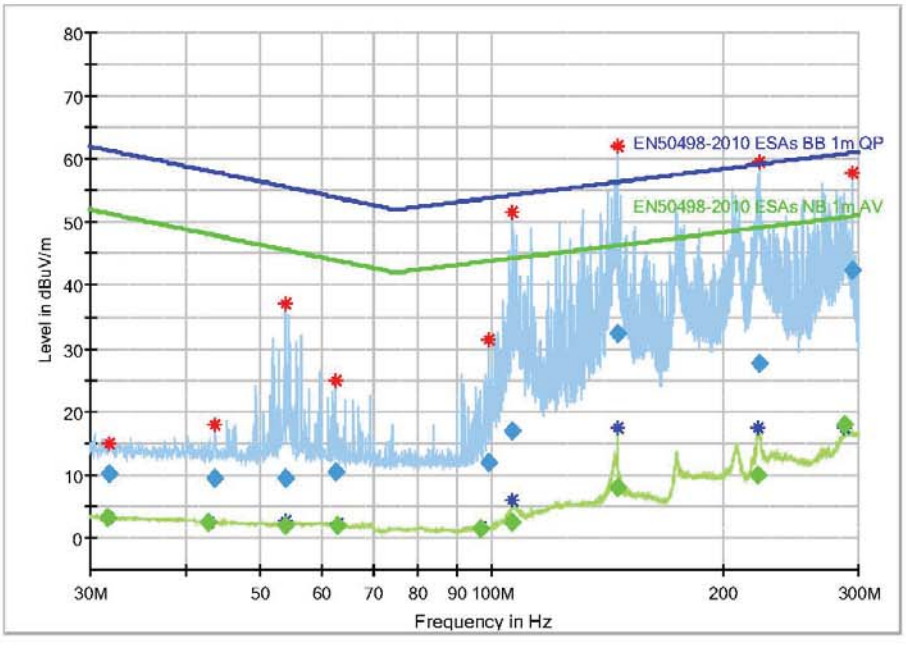
TUV Rheinland (Guangdong) Ltd. EMC Test Service Hotline: +86-20-28391188

EMC Test Record (Emission)

Common Information

Manufacturer:	Huatao
Test Item:	Electric air pump
Identification:	HT-785
Test Standard:	EN50498:2010
Test Detail:	Radiated Emission
Operation Mode:	on
Climate Condition:	23 degree, 45%, 101 kPa
Test Voltage/ Freq:	13.5V DC
Receipt No:	174097248
Report No:	
Result:	Pass
Comment:	Test distance is 1m, Horizontal
Subrange 1	
Frequency Range:	30M-300MHz
Receiver:	TUV ESU 26
Transducer:	TUV VHBB9124

Full Spectrum



Preview Result 2H-AVG
Critical_Freqs AVG
ECE-R 10.05 ESAs BB 1m QP
Final_Result QPK

Preview Result 1H-PK+
Critical_Freqs PK+
ECE-R 10.05 ESAs NB 1m AV
Final_Result AVG

Tested by: Fison Chan
201812131

Reviewed by: Alex Li
201910106

TUV Rheinland (Guangdong) Ltd. EMC Test Service Hotline: +86-20-28391188

Final_Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
31.620000	---	3.18	51.43	48.25	1000.0	120.000	H	12.3
31.680000	10.18	---	61.41	51.23	1000.0	120.000	H	12.3
42.660000	---	2.45	48.16	45.71	1000.0	120.000	H	12.0
43.620000	9.50	---	57.92	48.42	1000.0	120.000	H	12.0
53.760000	---	1.98	45.63	43.66	1000.0	120.000	H	11.4
53.760000	9.50	---	55.63	46.13	1000.0	120.000	H	11.4
62.520000	10.55	---	53.99	43.44	1000.0	120.000	H	11.3
62.940000	---	1.96	43.91	41.95	1000.0	120.000	H	11.2
96.540000	---	1.50	43.66	42.16	1000.0	120.000	H	10.8
99.120000	12.01	---	53.83	41.82	1000.0	120.000	H	10.6
106.380000	16.90	---	54.30	37.40	1000.0	120.000	H	11.4
106.380000	---	2.49	44.30	41.80	1000.0	120.000	H	11.4
145.740000	32.41	---	56.37	23.95	1000.0	120.000	H	13.2
145.740000	---	7.84	46.37	38.53	1000.0	120.000	H	13.2
221.340000	---	9.84	49.11	39.28	1000.0	120.000	H	17.1
223.140000	27.68	---	59.17	31.49	1000.0	120.000	H	17.4
288.000000	---	17.83	50.84	33.02	1000.0	120.000	H	22.6
293.820000	42.31	---	60.97	18.66	1000.0	120.000	H	23.7

Tested by: fison chan
201812131

Reviewed by: Alex Li 201910106

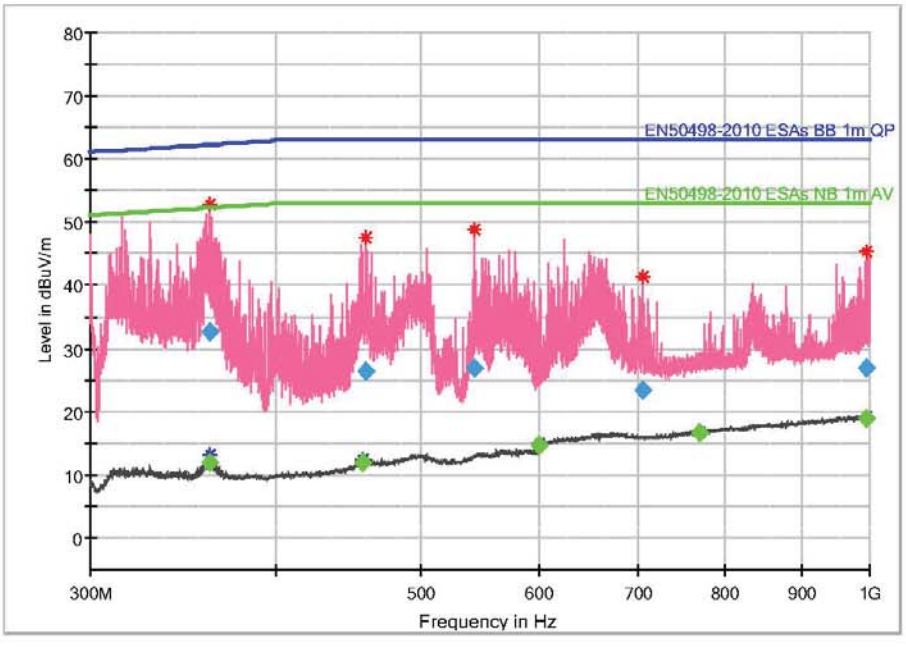
TUV Rheinland (Guangdong) Ltd. EMC Test Service Hotline: +86-20-28391188

EMC Test Record (Emission)

Common Information

Manufacturer:	Huatao
Test Item:	Electric air pump
Identification:	HT-785
Test Standard:	EN50498:2010
Test Detail:	Radiated Emission
Operation Mode:	on
Climate Condition:	23 degree, 45%, 101 kPa
Test Voltage/ Freq:	13.5V DC
Receipt No:	174097248
Report No:	
Result:	Pass
Comment:	Test distance is 1m, Vertical
Subrange 1	
Frequency Range:	300M-1GHz
Receiver:	TUV ESU 26
Transducer:	TUV VULP9118A

Full Spectrum



Tested by: Fison Chan
201812131

Reviewed by: Alex Li
201910106

TUV Rheinland (Guangdong) Ltd. EMC Test Service Hotline: +86-20-28391188

Final_Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
360.600000	---	11.93	52.32	40.39	1000.0	120.000	V	17.2
360.900000	32.75	---	62.32	29.57	1000.0	120.000	V	17.2
456.600000	---	12.06	53.00	40.94	1000.0	120.000	V	19.1
458.820000	26.51	---	63.00	36.49	1000.0	120.000	V	19.1
543.600000	26.98	---	63.00	36.02	1000.0	120.000	V	20.3
600.720000	---	14.70	53.00	38.30	1000.0	120.000	V	21.0
703.740000	23.49	---	63.00	39.51	1000.0	120.000	V	22.4
768.060000	---	16.81	53.00	36.19	1000.0	120.000	V	23.1
994.020000	26.98	---	63.00	36.02	1000.0	120.000	V	25.0
996.300000	---	18.98	53.00	34.02	1000.0	120.000	V	25.0

Tested by: Fison Chan 201812131

Reviewed by: Alex Li 201910106

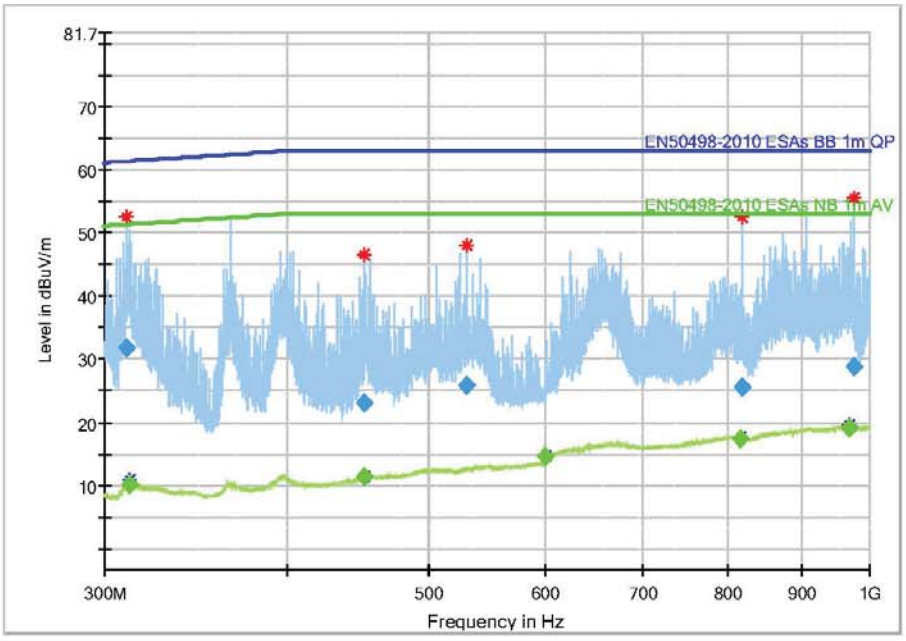
TUV Rheinland (Guangdong) Ltd. EMC Test Service Hotline: +86-20-28391188

EMC Test Record (Emission)

Common Information

Manufacturer:	Huatao
Test Item:	Electric air pump
Identification:	HT-785
Test Standard:	EN50498:2010
Test Detail:	Radiated Emission
Operation Mode:	on
Climate Condition:	23 degree, 45%, 101 kPa
Test Voltage/ Freq:	13.5V DC
Receipt No:	174097248
Report No:	
Result:	Pass
Comment:	Test distance is 1m, Horizontal
Subrange 1	
Frequency Range:	300M-1GHz
Receiver:	TUV ESU 26
Transducer:	TUV VULP9118A

Full Spectrum



Tested by: Fison Chan 201812131

Reviewed by: Alex Li 201910106

TUV Rheinland (Guangdong) Ltd. EMC Test Service Hotline: +86-20-28391188

Final_Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
310.740000	31.87	---	61.34	29.47	1000.0	120.000	H	16.3
311.820000	---	10.22	51.36	41.14	1000.0	120.000	H	16.4
451.500000	---	11.29	53.00	41.71	1000.0	120.000	H	19.0
452.040000	23.23	---	63.00	39.77	1000.0	120.000	H	19.0
530.220000	25.90	---	63.00	37.10	1000.0	120.000	H	19.8
600.300000	---	14.69	53.00	38.31	1000.0	120.000	H	21.0
817.080000	---	17.45	53.00	35.55	1000.0	120.000	H	23.8
818.340000	25.69	---	63.00	37.31	1000.0	120.000	H	23.8
967.440000	---	19.17	53.00	33.83	1000.0	120.000	H	25.0
976.200000	28.86	---	63.00	34.14	1000.0	120.000	H	25.0

Tested by: Fison Chan
201812131

Reviewed by: Alex Li 201910106

TÜV Rheinland (Guangdong) Ltd. EMC Laboratory

Radiated electromagnetic emissions

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESU26	100209	16.Mar.2019
Bi-conical Antenna	Schwarzbeck	VHBA9124 +BBA9106	511	16.Mar.2019
Log-Periodical Antenna	Schwarzbeck	VULP9118A	461	16.Mar.2019
Artificial Network	Rohde&Schwarz	ESH3-Z6	100290	16.Mar.2019
Artificial Network	Rohde&Schwarz	ESH3-Z6	100291	16.Mar.2019
CISPR 25 Chamber	Albatross Project	B83117-A1431-T161	22611	16.Mar.2019

Conducted Transients Emissions

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
Artificial Network	Schwarzbeck	NNBM8125	1717	16.Mar.2019
Electronic Switch	EMTEST	BS200N	V092710 4954	16.Mar.2019
Oscilloscope	Tektronix	DPO4054	B010438	16.Mar.2019
Voltage Probe	Tektronix	P5100	1.672	16.Mar.2019

Conducted Transients Immunity

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
Power Supply for Charging Battery	EMTEST	VDS 200N	V092710 4953	10.Dec.2019
Ultra Compact Simulator	EMTEST	UCS 200N	P170419 1643	10.Dec.2019