



EMC TEST REPORT

Report No: FCS202109033E01

Issued for

Applicant:	DONGGUAN RUN CHENG DA TECHNOLOGY CO., LTD.
Address:	2nd Floor, 2nd Floor, Building A1, TaiGu Yongsheng Technology Park, No. 9 Binhe West Road, Xia Ni Village, Qingxi Town, Dongguan City, Guangdong Province
Product Name:	DC BRUSHLESS FAN MOTOR
Brand Name:	N/A
Model Name:	RCD8025H12B (DC12V 0.20A 3200RPM)
Test Standard:	EN 55014-1:2017/A11:2020 EN 55014-2: 2015 EN 61000-3-2:2019 EN 61000-3-3:2013/A1:2019
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Series Model:

RC(D)2005(H)(12)(B); RC(D)2007(H)(12)(B); RC(D)2010(H)(12)(B)
RC(D)2015(H)(12)(B); RC(D)2020(H)(12)(B); RC(D)2507(H)(12)(B)
RC(D)2510(H)(12)(B); RC(D)2515(H)(12)(B); RC(D)2520(H)(12)(B)
RC(D)2525(H)(12)(B); RC(D)3005(H)(12)(B); RC(D)3007(H)(12)(B)
RC(D)3010(H)(12)(B); RC(D)3015(H)(12)(B); RC(D)3020(H)(12)(B)
RC(D)4007(H)(12)(B); RC(D)4010(H)(12)(B); RC(D)4012(H)(12)(B)
RC(D)4015(H)(12)(B); RC(D)4018(H)(12)(B); RC(D)4020(H)(12)(B)
RC(D)4025(H)(12)(B); RC(D)4028(H)(12)(B); RC(D)4030(H)(12)(B)
RC(D)4038(H)(12)(B); RC(D)4056(H)(12)(B); RC(D)4510(H)(12)(B)
RC(D)4512(H)(12)(B); RC(D)4515(H)(12)(B); RC(D)4520(H)(12)(B)
RC(D)5010(H)(12)(B); RC(D)5012(H)(12)(B); RC(D)5015(H)(12)(B)
RC(D)5020(H)(12)(B); RC(D)5025(H)(12)(B); RC(D)5038(H)(12)(B)
RC(D)6007(H)(12)(B); RC(D)6010(H)(12)(B); RC(D)6012(H)(12)(B)
RC(D)6015(H)(12)(B); RC(D)6020(H)(12)(B); RC(D)6025(H)(12)(B)
RC(D)6028(H)(12)(B); RC(D)6028(H)(12)(B); RC(D)6038(H)(12)(B)
RC(D)7010(H)(12)(B); RC(D)7012(H)(12)(B); RC(D)7015(H)(12)(B)
RC(D)7020(H)(12)(B); RC(D)7025(H)(12)(B); RC(D)7038(H)(12)(B)
RC(D)7515(H)(12)(B); RC(D)7520(H)(12)(B); RC(D)7530(H)(12)(B)
RC(D)8010(H)(12)(B); RC(D)8015(H)(12)(B); RC(D)8020(H)(12)(B)
RC(D)8025(H)(12)(B); RC(D)8038(H)(12)(B); RC(D)9210(H)(12)(B)
RC(D)9215(H)(12)(B); RC(D)9220(H)(12)(B); RC(D)9225(H)(12)(B)
RC(D)9238(H)(12)(B); RC(D)10010(H)(12)(B); RC(D)10020(H)(12)(B)
RC(D)10025(H)(12)(B); RC(D)10030(H)(12)(B); RC(D)10038(H)(12)(B)
RC(D)11010(H)(12)(B); RC(D)11020(H)(12)(B); RC(D)11025(H)(12)(B)
RC(D)11038(H)(12)(B); RC(D)12010(H)(12)(B); RC(D)12015(H)(12)(B)
RC(D)12020(H)(12)(B); RC(D)12025(H)(12)(B); RC(D)12028(H)(12)(B)
RC(D)12030(H)(12)(B); RC(D)12038(H)(12)(B); RC(D)12040(H)(12)(B)
RC(D)12050(H)(12)(B); RC(D)13020(H)(12)(B); RC(D)13025(H)(12)(B)
RC(D)13038(H)(12)(B); RC(D)13520(H)(12)(B); RC(D)13525(H)(12)(B)
RC(D)13538(H)(12)(B); RC(D)14010(H)(12)(B); RC(D)14020(H)(12)(B)
RC(D)14025(H)(12)(B); RC(D)14028(H)(12)(B); RC(D)14030(H)(12)(B)
RC(D)14038(H)(12)(B); RC(D)14050(H)(12)(B); RC(D)15020(H)(12)(B)
RC(D)15025(H)(12)(B); RC(D)15030(H)(12)(B); RC(D)15038(H)(12)(B)
RC(D)15050(H)(12)(B); RC(D)16020(H)(12)(B); RC(D)16030(H)(12)(B)
RC(D)16038(H)(12)(B); RC(D)16050(H)(12)(B); RC(D)16080(H)(12)(B)
RC(D)17020(H)(12)(B); RC(D)17030(H)(12)(B); RC(D)17038(H)(12)(B)
RC(D)17045(H)(12)(B); RC(D)17238(H)(12)(B); RC(D)17251(H)(12)(B)
RC(D)18030(H)(12)(B); RC(D)18038(H)(12)(B); RC(D)18050(H)(12)(B)
RC(D)18060(H)(12)(B); RC(D)20025(H)(12)(B); RC(D)20030(H)(12)(B)
RC(D)20038(H)(12)(B); RC(D)20045(H)(12)(B); RC(D)20050(H)(12)(B)
RC(D)20060(H)(12)(B); RC(D)22025(H)(12)(B); RC(D)22030(H)(12)(B)
RC(D)22038(H)(12)(B); RC(D)22050(H)(12)(B); RC(D)22060(H)(12)(B)
RC(D)25038(H)(12)(B); RC(D)25050(H)(12)(B); RC(D)25460(H)(12)(B)
RC(D)25450(H)(12)(B); RC(D)25060(H)(12)(B); RC(D)25489(H)(12)(B)

TEST RESULT CERTIFICATION

Applicant's Name.....: DONGGUAN RUN CHENG DA TECHNOLOGY CO., LTD.
Address.....: 2nd Floor, 2nd Floor, Building A1, TaiGu Yongsheng Technology
Park, No. 9 Binhe West Road, Xia Ni Village, Qingxi Town,
Dongguan City, Guangdong Province
Manufacture's Name.....: DONGGUAN RUN CHENG DA TECHNOLOGY CO., LTD.
Address.....: 2nd Floor, 2nd Floor, Building A1, TaiGu Yongsheng Technology
Park, No. 9 Binhe West Road, Xia Ni Village, Qingxi Town,
Dongguan City, Guangdong Province

Product Description

Product Name.....: DC BRUSHLESS FAN MOTOR
Brand Name: N/A
Model Name.....: RCD8025H12B (DC12V 0.20A 3200RPM)
Series Model.....: Refer to page 2
Test Standards.....: EN 55014-1:2017/A11:2020 EN 55014-2: 2015
EN 61000-3-2:2019 EN 61000-3-3:2013/A1:2019

This device described above has been tested by FCS, and the test results show that the equipment under test (EUT) is in compliance with the EMC Directive 2014/30/EU requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test.....:

Date (s) of performance of tests.: Sep 13. 2021 ~ Sep 18. 2021

Date of Issue.....: Sep 13. 2021

Pass

Testing Engineer : Scott Shen
(Scott Shen)

Technical Manager : Duke Qian
(Duke Qian)



Authorized Signatory : Kait Chen
(Kait Chen)

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**Revision History**

Rev.	Issue Date	Report No.	Effect Page	Contents
00	Sep 18. 2021	FCS202109033E01	ALL	Initial Issue

1. TEST SUMMARY

Test procedures according to the technical standards:

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
EN 55014-1:2017/A11:2020	Conducted Emissions From The AC Mains Power Ports	Class B	N/A	
	Conducted Emissions From Asymmetric Mode	Class B	N/A	
	Conducted Differential Voltage Emissions	Class B	N/A	
	Radiated Emissions	Class B	PASS	NOTE (1)
EN61000-3-2:2014	Harmonic Current Emission	Class A	N/A	NOTE (2)
EN61000-4-3:2006/A2:2010	Voltage Fluctuations & Flicker	-----	N/A	
EMC Immunity				
Section EN 55014-2: 2015	Test Item	Performance Criteria	Judgment	Remark
EN 61000-4-2:2009	Electrostatic Discharge	B	PASS	
EN 61000-4-3:2006/A2:2010	RF Electromagnetic Field	A	N/A	
EN 61000-4-4:2012	Fast Transients	B	N/A	
EN 61000-4-5:2014/A1:2017	Surges	B	N/A	
EN 61000-4-6:2014/AC:2015	Radio-frequency Common Mode / Conducted Susceptibility	A	N/A	
EN 61000-4-11:2020	Volt. Interruptions Volt. Dips	B / C / C	N/A	NOTE (3)

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

If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.

If the highest frequency of the internal sources of the EUT is between 500 MHz and 1GHz, the measurement shall only be made up to 5 GHz.

If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times of the highest frequency or 6 GHz, whichever is less.

(2) The power consumption of EUT is less than 75W and no Limits apply.

(3) Voltage Dip: 100% reduction – Performance Criteria B

Voltage Dip: 30% reduction – Performance Criteria C

Voltage Interruption: 100% Interruption – Performance Criteria C

(4) For client’s request and manual description, the test will not be executed.

(5) “N/A” denotes test is not applicable in this Test Report



1.1 TEST FACTORY

Company Name:	Flux Compliance Service Laboratory.
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan,

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95** %.

A. Conducted Measurement:

Test Site	Method	Measurement Frequency Range	U, (dB)	NOTE
FCSC01	ANSI	9KHz ~ 150KHz	3.18	
		150 KHz ~ 30MHz	2.70	

B. Radiated Measurement:

Test Site	Method	Measurement Frequency Range	U, (dB)	NOTE
FCSC02	ANSI	9KHz ~ 30MHz	2.50	
		30MHz ~ 200MHz	3.43	
		200MHz ~ 1000MHz	3.57	
		1GHz ~ 6 GHz	4.13	



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	DC BRUSHLESS FAN MOTOR
Brand Name	N/A
Model Name	RCD8025H12B (DC12V 0.20A 3200RPM)
Series Name	Refer to page 2
Product Differences	N/A
Power Supply	DC 3V-DC 60V
Hardware version number	V1.0
Software version number	V1.0

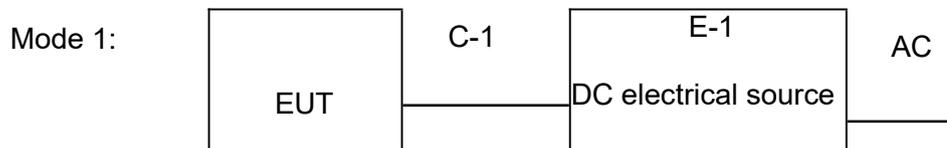
2.2 DESCRIPTION OF THE TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Test Mode	Description
Mode 1	Charging

Note: The test modes were carried out for all operation modes. Only worst case will be show in this report.

2.3 DESCRIPTION OF THE TEST SETUP



2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Accessories equipment

Mode 1:

Item	Equipment	Mfr/Brand	Model/Type No.
E-1			

Auxiliary equipment

Mode 2:

Item	Equipment	Mfr/Brand	Model/Type No.

Cable

Mode 1:

Item	Type	Shielded Type	Ferrite Core	Length
C-1				

Mode 2:

Item	Type	Shielded Type	Ferrite Core	Length

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” means “shielded” “with core”; “NO” means “unshielded” “without core”.

2.5 MEASUREMENT INSTRUMENTS LIST

2.5.1 CONDUCTED TEST SITE

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
EMI Test Receiver	R&S	ESCI	101427	2021.01.28	2022.01.27
LISN	R&S	ENV216	101242	2021.01.28	2022.01.27
LISN	ETS	3810/2NM	00023625	2021.01.28	2022.01.27
Absorbing Clamp	R&S	MDS-21	100668	2021.01.28	2022.01.27
Universal Radio Communication Tester	R&S	CMW500	117239	2021.01.28	2022.01.27
CE Cable	N/A	C01	N/A	2021.01.28	2022.01.27
Temperature & Humidity	Mieo	HH660	N/A	2021.01.28	2022.01.27
Testing Software	EZ-EMC(Ver.03A1 CE)				

2.5.2 RADIATED TEST SITE

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
EMI Test Receiver	R&S	ESCI	101427	2021.01.28	2022.01.27
Bi-log Antenna	TESEQ	CBL6111D	34678	2021.01.28	2022.01.27
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1343	2021.01.28	2022.01.27
Pre-amplifier(1G-18G)	SKET	LNPA-01018G-45	SK2018080901	2021.01.28	2022.01.27
Pre-amplifier(0.1M-3GHz)	EM	EM330	060665	2021.01.28	2022.01.27
Spectrum Analyzer	Agilent	N9020A	MY49100060	2021.01.28	2022.01.27
Universal Radio Communication Tester	R&S	CMW500	117239	2021.01.28	2022.01.27
RE Cable (9K-1G)	N/A	R01	N/A	2021.01.28	2022.01.27
RE Cable (1G-18G)	N/A	R02	N/A	2021.01.28	2022.01.27
Temperature & Humidity	Mieo	HH660	N/A	2021.01.28	2022.01.27
Testing Software	EZ-EMC(Ver. 03A1 RE)				

2.5.3 HARMONICS AND FLICKER

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
Harmonic Voltage & Flicker	LAPLACE	AC 2000A	311217	2021.01.28	2022.01.27
AC Power Source	MTONI	PHF-5010	631169	2021.01.28	2022.01.27
Universal Radio Communication Tester	R&S	CMW500	117239	2021.01.28	2022.01.27
Temperature & Humidity	Mieo	HH660	N/A	2021.01.28	2022.01.27

Testing Software	HA-PC Link Version 3.03
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2.5.4 ESD

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
Electrostatic Discharge Simulator	KZKUSUI	KES4021	LB003568	2021.01.28	2022.01.27
Universal Radio Communication Tester	R&S	CMW500	117239	2021.01.28	2022.01.27
Temperature & Humidity	N/A	WS1066	N/A	2021.01.28	2022.01.27

2.5.5 SURGE, EFT/BURST, VOLTAGE INTERRUPTION/DIPS

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
Surger Generator	HTEC	HCWG 10	152101	2021.01.28	2022.01.27
Surger Generator	HTEC	TC0MB4	152104	2021.01.28	2022.01.27
VOLTAGE DIPS & INTERRUPTIONS Generator	HTEC	HPFS 161P	143803	2021.01.28	2022.01.27
EFT/B Generator	HTEC	HEFT 51	143801	2021.01.28	2022.01.27
Universal Radio Communication Tester	R&S	CMW500	117239	2021.01.28	2022.01.27
Temperature & Humidity	Mieo	HH660	N/A	2021.01.28	2022.01.27

2.5.6 RS

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
Power Meter	Agilent	E4419B	QB4331226	2021.01.28	2022.01.27
Power Sensor	Hp	E9300A	US39210170	2021.01.28	2022.01.27
Power Sensor	Hp	E9300A	US39210476	2021.01.28	2022.01.27
Signal Generator	Agilent	N5181A	MY56144718	2021.01.28	2022.01.27
Power Amplifier	MICOTOP	MPA-80-1000-250	MPA1711489	2021.01.28	2022.01.27
Power Amplifier	MICOTOP	MPA-1000-3000-75	MPA1711488	2021.01.28	2022.01.27
Power Amplifier	MICOTOP	MPA-3000-6000-50	MPA1711490	2021.01.28	2022.01.27
RS Test Antenna (80-1GHz)	SCHWARZBECK	VULP 9118E	000999	2021.01.28	2022.01.27
RS Test Antenna (1G-10GHz)	SCHWARZBECK	STLP 9149	000648	2021.01.28	2022.01.27
Universal Radio Communication Tester	R&S	CMU200	109200	2021.01.28	2022.01.27

Universal Radio Communication Tester	R&S	CMW500	117239	2021.01.28	2022.01.27
Audio Analyzer	R&S	UPL	100689	2021.01.28	2022.01.27
Audio Breakthrough Shielding Box	SKET	SB_ABT/C35	N/A	2021.01.28	2022.01.27
Ear Simulator	SKET	AE_ABT/C35	N/A	2021.01.28	2022.01.27
Mouth Simulator	SKET	AM_ABT/C35	N/A	2021.01.28	2022.01.27
1KHz Standard Source	SKET	MSC_ABT/C35	N/A	2021.01.28	2022.01.27
Field Probe	Narda	EP601	611WX80261	2021.01.28	2022.01.27
Temperature & Humidity	Mieo	HH660	N/A	2021.01.28	2022.01.27
Testing Software	EMC-S V1.2.0.90				

2.5.7 INJECTION CURRENT

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
CS	SCHLODER	CDG-6000-25	126A1280/2014	2021.01.28	2022.01.27
CDN	SCHLODER	CDN-M2+3	A2210275/2014	2021.01.28	2022.01.27
EM Clamp	SCHLODER	EMCL-20	132A1283	2021.01.28	2022.01.27
Attenuator	Nemtest	ATT-6DB-100	A100W224	2021.01.28	2022.01.27
Universal Radio Communication Tester	R&S	CMW500	117239	2021.01.28	2022.01.27
Universal Radio Communication Tester	R&S	CMU200	109200	2021.01.28	2022.01.27
Audio Analyzer	R&S	UPL	100689	2021.01.28	2022.01.27
Audio Breakthrough Shielding Box	SKET	SB_ABT/C35	N/A	2021.01.28	2022.01.27
Ear Simulator	SKET	AE_ABT/C35	N/A	2021.01.28	2022.01.27
Mouth Simulator	SKET	AM_ABT/C35	N/A	2021.01.28	2022.01.27
1KHz Standard Source	SKET	MSC_ABT/C35	N/A	2021.01.28	2022.01.27
Temperature & Humidity	Mieo	HH660	N/A	2021.01.28	2022.01.27

2.5.8 PFMF

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
MF Generator	HTEC	HMFG-COMB	143903	2021.01.28	2022.01.27
Magnetic Field Coil	HTEC	HCOIL 100	143808	2021.01.28	2022.01.27
Universal Radio Communication Tester	R&S	CMW500	117239	2021.01.28	2022.01.27
Temperature & Humidity	Mieo	HH660	N/A	2021.01.28	2022.01.27

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 REQUIREMENTS FOR CONDUCTED EMISSIONS FROM THE AC MAINS POWER PORTS OF THE CLASS A EQUIPMENT

FREQUENCY (MHz)	Coupling device	Detector type / bandwidth	Class A limits dB(μ V)
0.15 - 0.5	AMN	Quasi Peak / 9 kHz	79
0.50 - 30			63
0.15 - 0.5	AMN	Average / 9 kHz	66
0.50 - 30			60

3.1.2 REQUIREMENTS FOR CONDUCTED EMISSIONS FROM THE AC MAINS POWER PORTS OF THE CLASS B EQUIPMENT

FREQUENCY (MHz)	Coupling device	Detector type / bandwidth	Class B limits dB(μ V)
0.15 - 0.5	AMN	Quasi Peak / 9 kHz	66 - 56*
0.50 - 5			56
5 - 30			60
0.15 - 0.5	AMN	Average / 9 kHz	56 - 46*
0.50 - 5			46
5 - 30			50

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

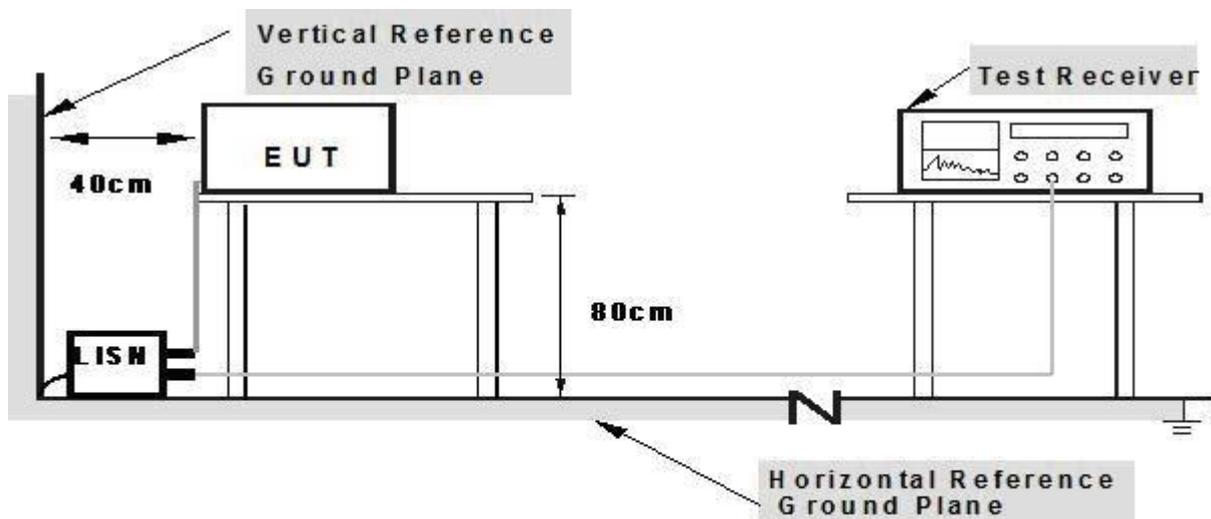
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.3 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.4 TEST SETUP



Note: 1. Support units were connected to second LISN.

2. Both of LISN s (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the following during the testing.



3.1.6 TEST RESULTS

Temperature:	25.3°C	Relative Humidity:	62%
Phase:	N/A	Test Mode:	N/A
Test Voltage:	N/A		

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF THE RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	Distance (m)	Detector type/ bandwidth	Class A	Class B
			dBuV/m	dBuV/m
30 - 230	3	Quasi peak/ 120 kHz	50	40
230 - 1000	3	Quasi peak/ 120 kHz	57	47
1000 - 3000	3	Peak /1 MHz	76	70
3000 - 6000	3	Peak /1 MHz	80	74
1000 - 3000	3	AV/1 MHz	56	50
3000 - 6000	3	AV/1 MHz	60	54

Notes:

- (1) The tighter limit applies at the band edges.
- (2) Emission level (dBuV/m) = 20log Emission level (uV/m).

3.2.3 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.2.4 TEST SETUP

(A) Radiated Emission Test Set-Up Frequency Below 1 GHz

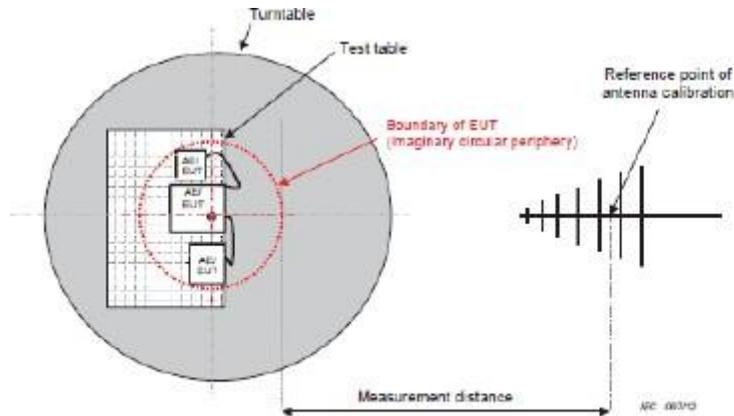


Figure C.1 – Measurement distance

(B) Radiated Emission Test Set-Up Frequency Above 1GHz

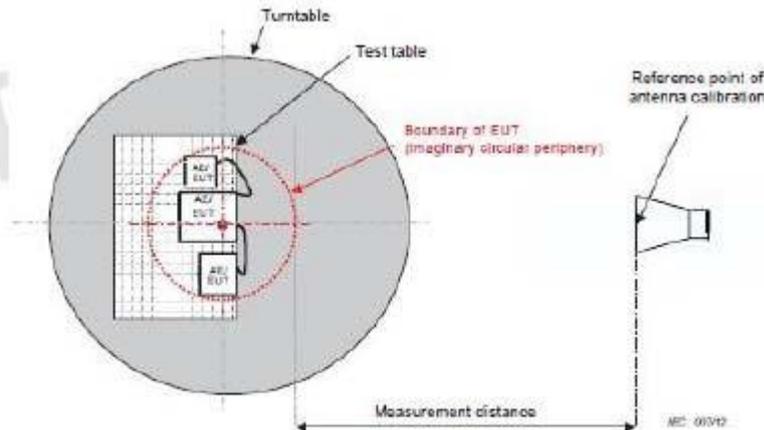


Figure C.1 – Measurement distance

3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the following during the testing.

3.2.6 TEST RESULTS

Temperature:	24.4°C	Relative Humidity:	51%
Phase:	Horizontal	Test Mode:	Mode 1
Test Voltage:	DC 12V		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	109.7960	34.41	-6.66	27.75	40.00	-12.25	QP
2	141.8262	35.92	-11.00	24.92	40.00	-15.08	QP
3	204.2377	42.58	-6.15	36.43	40.00	-3.57	QP
4	263.8190	47.26	-5.59	41.67	47.00	-5.33	QP
5	337.2155	46.53	-3.55	42.98	47.00	-4.02	QP
6	389.3549	39.43	-3.38	36.05	47.00	-10.95	QP

Remark:

- 1 .All readings are Quasi-Peak.
- 2.Margin = Result (Result =Reading + Factor)–Limit
- 3.Factor= Cable Loss +Antenna Factor-Amplifier Gain





Temperature:	24.4°C	Relative Humidity:	51%
Phase:	Vertical	Test Mode:	Mode 1
Test Voltage:	DC 12V		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	108.6470	50.01	-16.76	33.25	40.00	-6.75	QP
2	205.6751	45.60	-16.15	29.45	40.00	-10.55	QP
3	268.4853	49.29	-15.43	33.86	47.00	-13.14	QP
4	302.4812	50.72	-14.33	36.39	47.00	-10.61	QP
5	351.7079	47.10	-13.27	33.83	47.00	-13.17	QP
6	385.2805	46.11	-13.37	32.74	47.00	-14.26	QP

Remark:

1. All readings are Quasi-Peak.
2. Margin = Result (Result =Reading + Factor)–Limit
3. Factor= Cable Loss +Antenna Factor–Amplifier Gain



4. EMC IMMUNITY TEST

4.1 STANDARD COMPLIANCE/SERVIRITY LEVEL/CRITERIA

Tests Standard No.	TEST SPECIFICATION	Test Mode Test Ports	Perform. Criteria
1. ESD IEC/EN 61000-4-2	8KV air discharge 4KV contact discharge	Direct Mode	B
	4KV HCP discharge 4KV VCP discharge	Indirect Mode	B
2. RS IEC/EN 61000-4-3	80 MHz - 1000 MHz, 1800MHz, 2600MHz, 3500MHz, 50 00MHz, 1000Hz, 80%, AM modulated	Enclosure	A

4.2 GENERAL PERFORMANCE CRITERIA

According to **EN 55014** standard, the general performance criteria as following:

<p>Criterion A</p>	<p>The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>
<p>Criterion B</p>	<p>During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.</p> <p>After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.</p> <p>If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>
<p>Criterion C</p>	<p>Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed.</p> <p>Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.</p>

4.2.1 GENERAL PERFORMANCE CRITERIA TEST SETUP

The EUT tested system was configured as the statements of **2.3** Unless otherwise a special operating condition is specified in the following during the testing.

4.3 ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD)

4.3.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Required Performance:	B
Discharge Voltage:	Air Discharge: 2KV/4KV/8KV (Direct) Contact Discharge: 2KV/4KV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: min. 20 times at each test point Contact Discharge: min. 200 times in total 20 times at each test point
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

4.3.2 TEST PROCEDURE

The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manners:

- a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation
The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.

The time interval between two successive single discharges was at least 1 second.

The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.

Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.

Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.

Vertical Coupling Plane (VCP):

The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the Discharge Electrode touching the coupling plane.

The four faces of the EUT will be performed with electrostatic discharge.

Horizontal Coupling Plane (HCP):

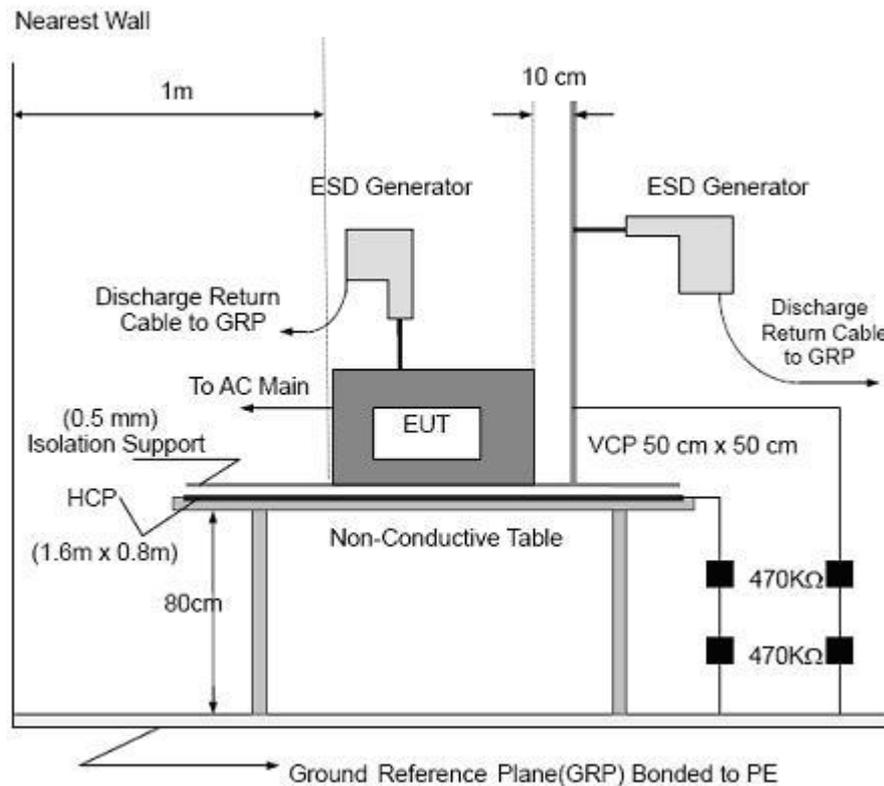
The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane.

The four faces of the EUT will be performed with electrostatic discharge.

- b. Air discharges at insulation surfaces of the EUT.

It was at least ten single discharges with positive and negative at the same selected point.

4.3.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940kΩ total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC /EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of 0.8-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC/EN 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1 meter thickness. The GRP was consisted of a sheet of aluminum that is at least 0.25mm thick, and extended at least 0.5 meters from the EUT on all sides.

4.3.4 TEST RESULTS

Temperature:	23.9°C	Relative Humidity:	56%
Pressure:	1020.1hPa	Test Voltage:	DC 12V
Test Mode:	Mode1		

Discharge Level	Polarity	Test Points	Contact Discharge	Air Discharge	Criterion	Test Result
4	+/-	VCP/HCP	NOTE	N/A	A	PASS
2,4	+/-	Air Discharged	Note	N/A	A	PASS
2,4,8	+/-	Contact Discharged	N/A	NOTE	A	PASS

Note: The EUT function was correct during the test.
 Air Discharged
 Contact Discharged

4.4 RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY TEST (RS)

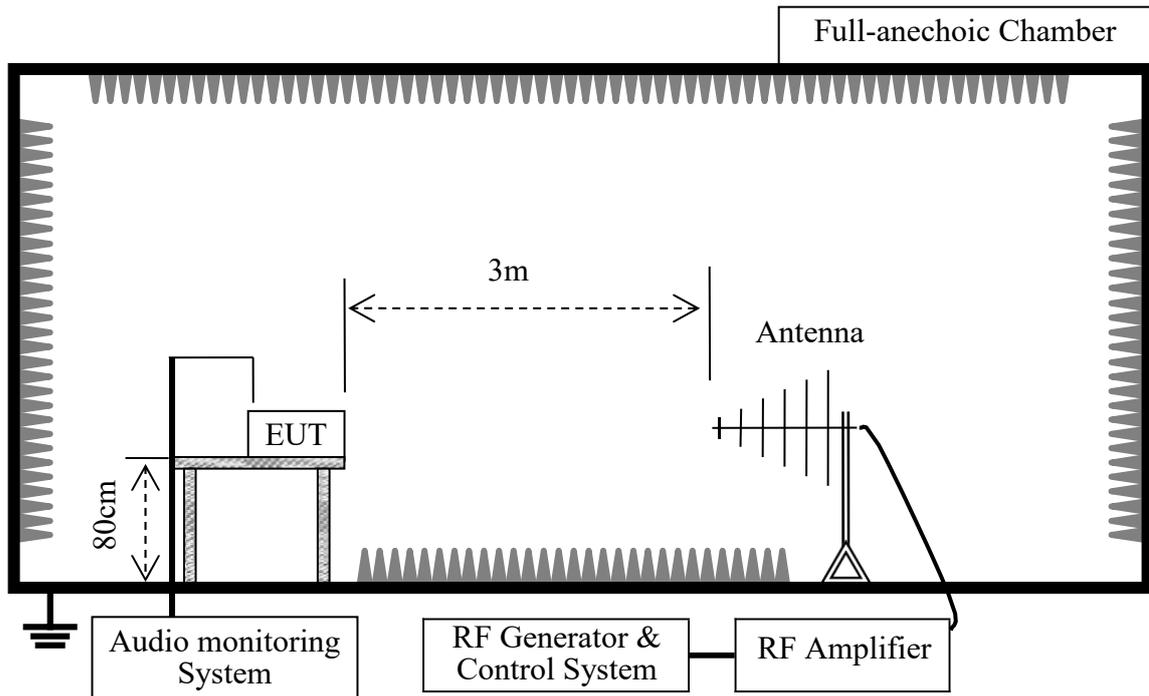
4.4.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-3
Required Performance:	A
Frequency Range:	80 MHz - 1000 MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Dwell Time:	1.5×10^{-3} decade/s

4.4.2 TEST PROCEDURE

- a. The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.
- b. The frequency range is swept from 80 MHz to 1000 MHz, 1800 MHz, 2600 MHz, 3500 MHz, 5000 MHz, with the signal 80% amplitude modulated with a 1kHz sine-wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s, where the frequency range is swept incrementally, the step size was 1% of preceding frequency value.
- c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- e. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

4.4.3 TEST SETUP



Note:

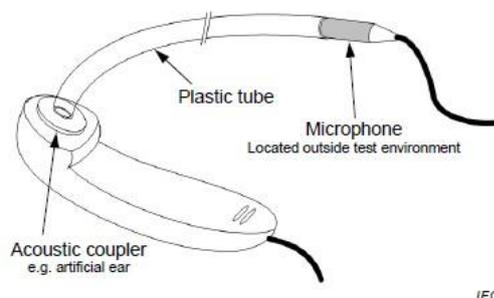
TABLE-TOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

For Audio output function use below setting



NOTE 1 The microphone is connected via the cable to a suitable amplifier.

NOTE 2 This setup is suitable for radiated immunity testing. See G.6.3

Figure G.5 – Example test setup for on-ear acoustic measurements, microphone located away from earpiece transducer

4.4.4 TEST RESULTS

Temperature:	23.9°C	Relative Humidity:	54%
Test Voltage:	N/A	Test Mode:	N/A

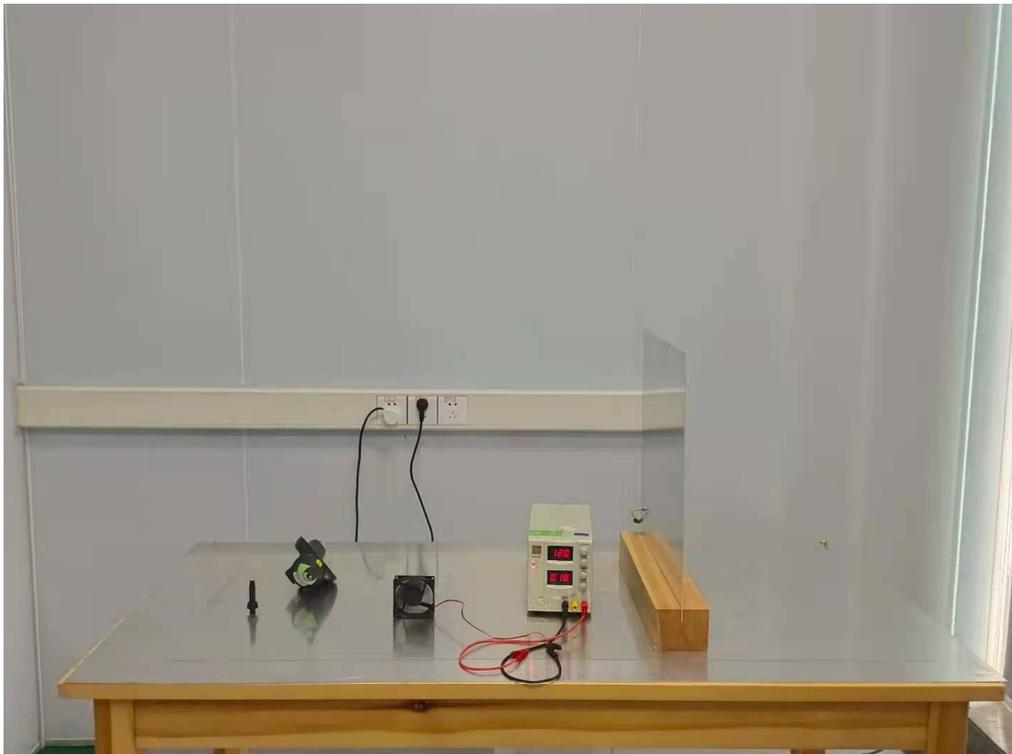
Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Perform. Criteria	Results	Judgment
80MHz - 1000MHz	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	A	A	N/A
			Rear			
			Left			
			Right			
1800MHz	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	A	A	N/A
			Rear			
			Left			
			Right			
2600MHz	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	A	A	N/A
			Rear			
			Left			
			Right			
3500MHz	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	A	A	N/A
			Rear			
			Left			
			Right			
5000MHz	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	A	A	N/A
			Rear			
			Left			
			Right			

APPENDIX 1- TEST SETUP

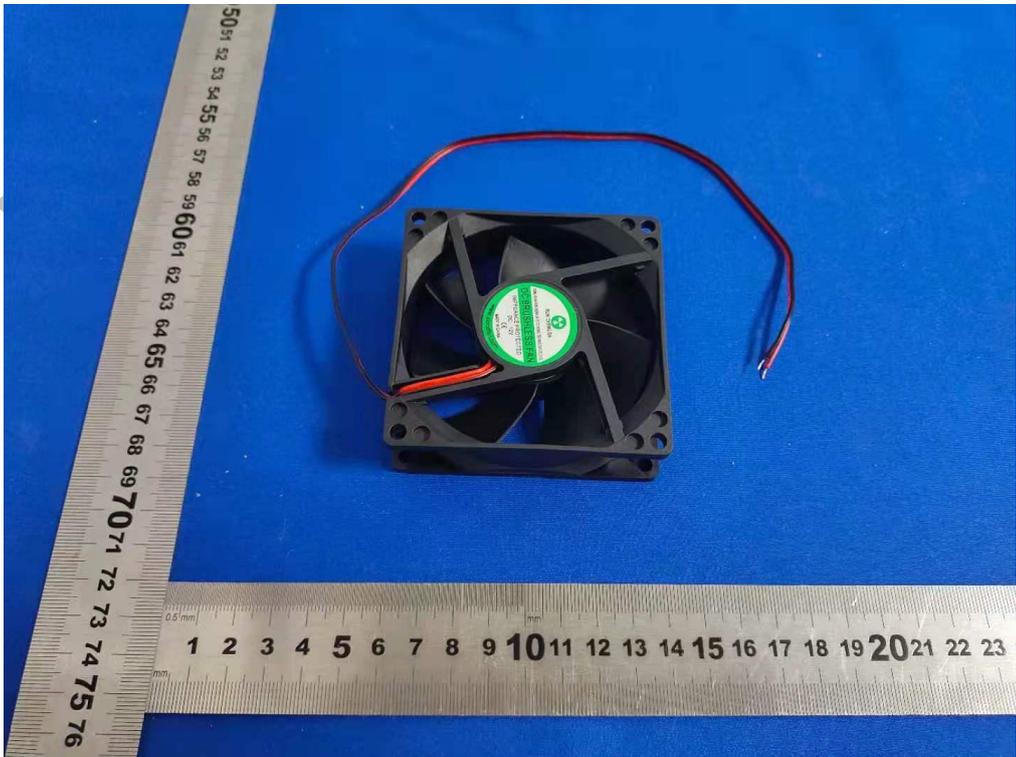
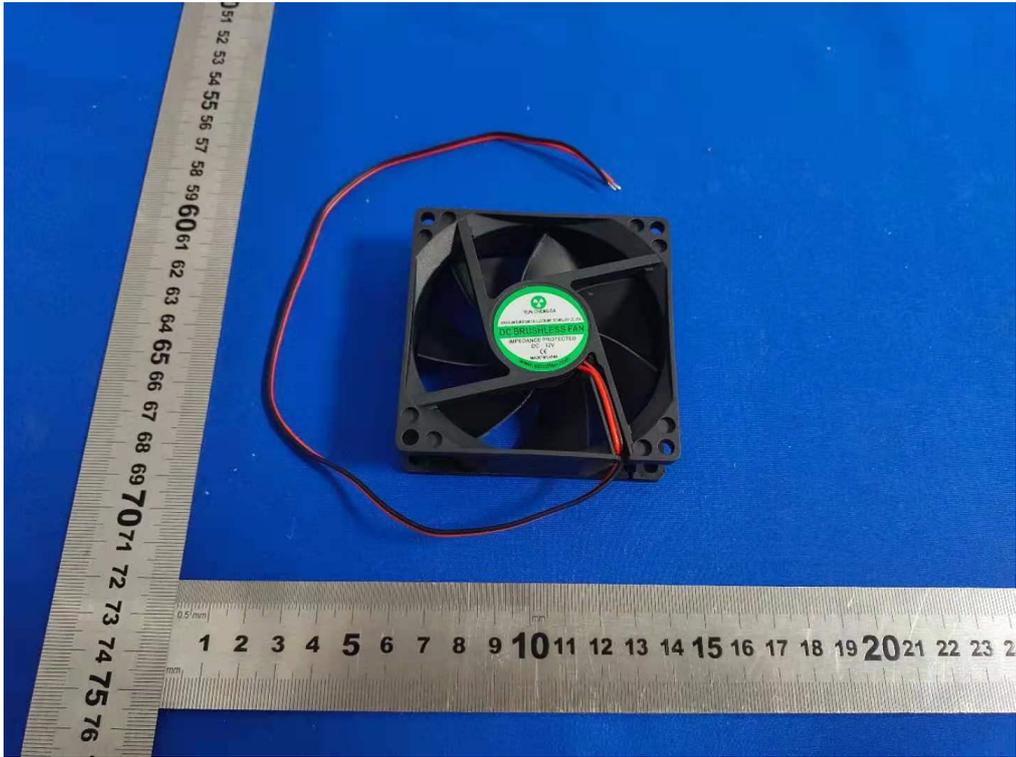
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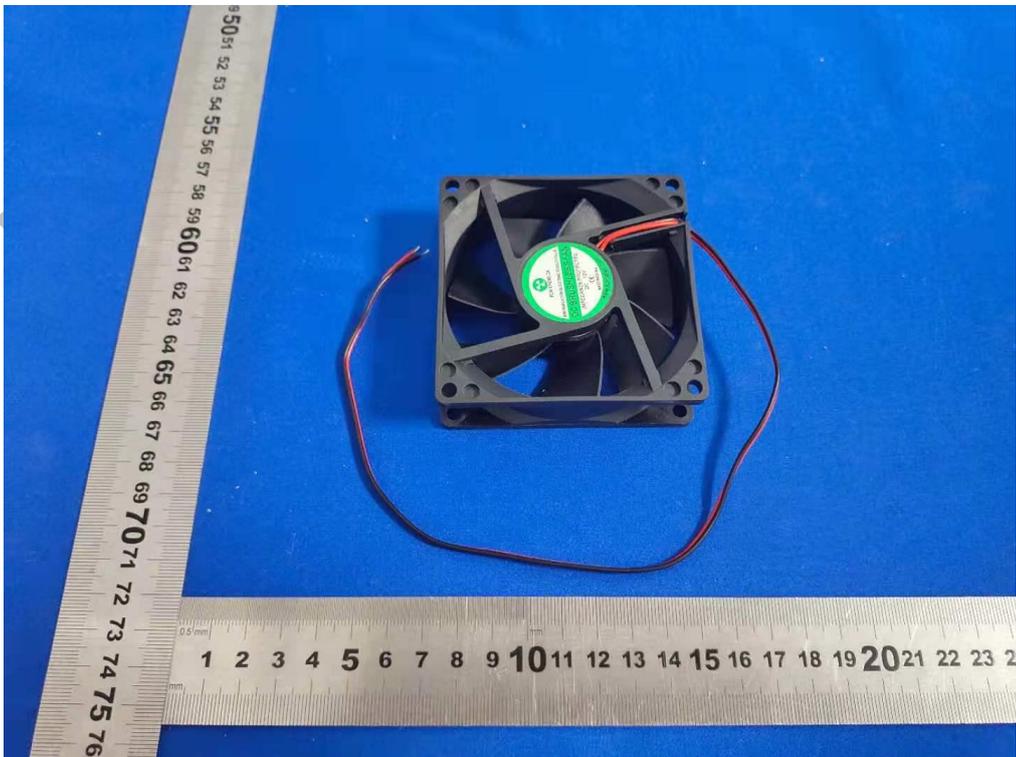
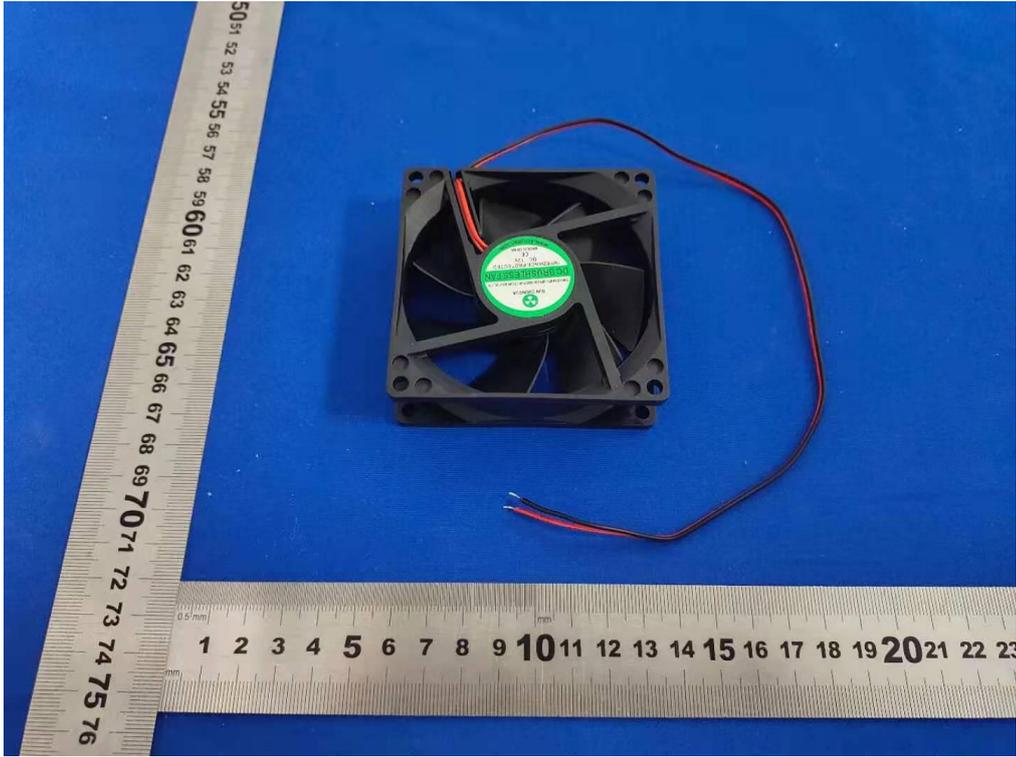


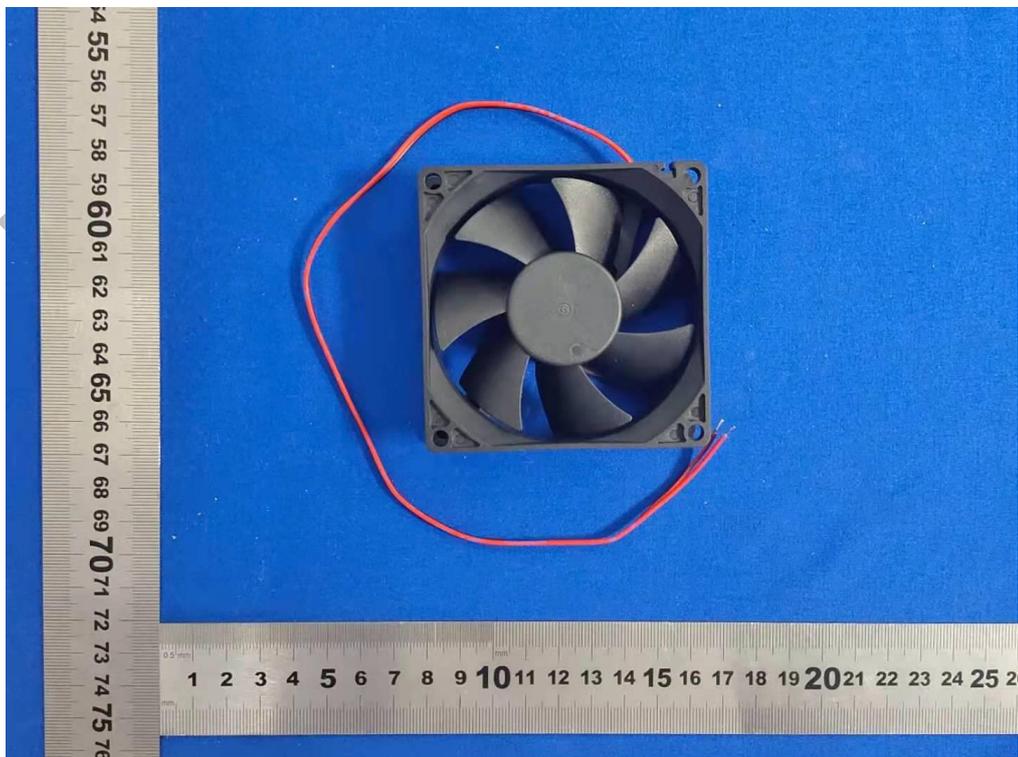
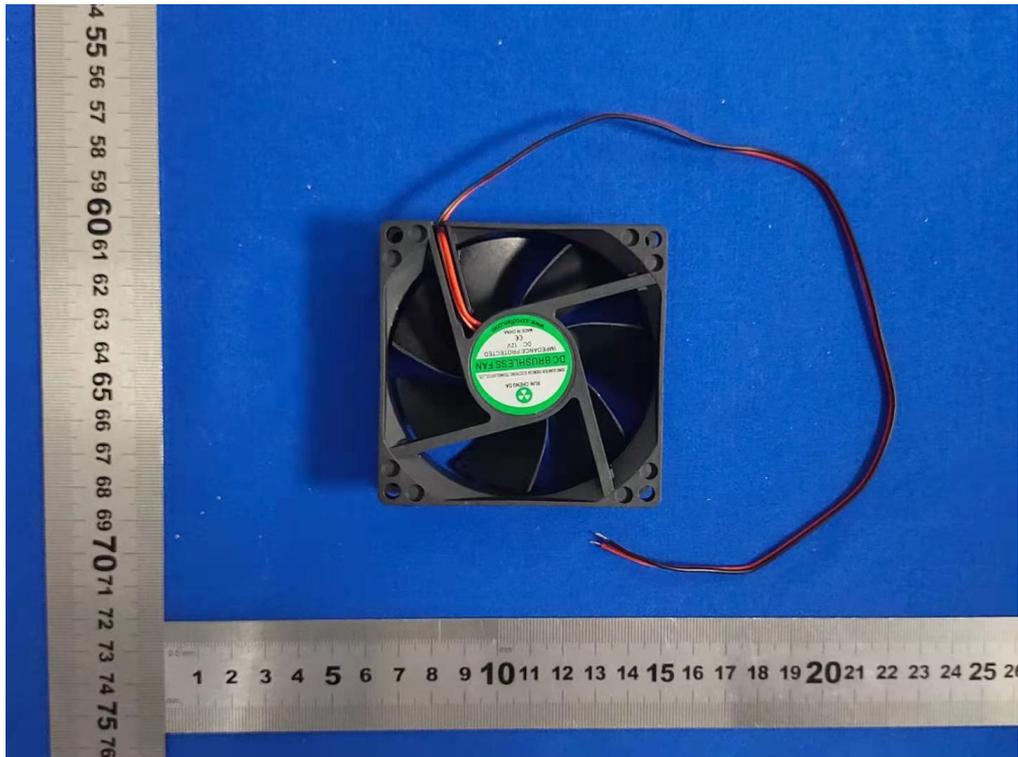
ESD



EUT PHOTO







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