Shenzhen Centre Quality Accreditation Technology Co., Ltd.

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Report No.: CQASZ160601319E-01
Report Version: V01

MEASUREMENT REPORT
FCC Report

Applicant:	Shenzhen Yuejiang Technology Co., Ltd
Address of Applicant:	Bldg C2, 18/F, Nanshan iPark, No. 1001 Xueyuan Avenue, Nanshan District, Shenzhen, China
Manufacturer:	Shenzhen Yuejiang Technology Co., Ltd
Address of Manufacturer:	Bldg C2, 18/F, Nanshan iPark, No. 1001 Xueyuan Avenue, Nanshan District, Shenzhen, China
Equipment Under Test (EUT):	
Product:	Dobot arm
Model No.:	Dobot 2.0
Brand Name:	N/A
FCC ID:	2AHI4-DOBOT-200
Standards:	47 CFR Part 15B
Date of Test:	2016-06-25 to 2016-07-07
Date of Issue:	2016-07-07
Test Result :	**PASS***

Reviewed By: _____
(Aaron Ma)

Approved By: _____
(Owen Zhou)

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

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ160601319E-01	Rev.01	Initial report	2016-07-07

2 Test Summary

Test Item	Test Requirement	Test method	Result
Radiated Emission	47 CFR Part 15B	ANSI C63.4 (2014)	PASS
Conducted Emission (150KHz to 30MHz)	47 CFR Part 15B	ANSI C63.4 (2014)	PASS

3 Contents

4 General Information

4.1 Client Information

Applicant:	Shenzhen Yuejiang Technology Co., Ltd
Address of Applicant:	Bldg C2, 18/F, Nanshan iPark, No. 1001 Xueyuan Avenue, Nanshan District, Shenzhen, China
Manufacturer:	Shenzhen Yuejiang Technology Co., Ltd
Address of Manufacturer:	Bldg C2, 18/F, Nanshan iPark, No. 1001 Xueyuan Avenue, Nanshan District, Shenzhen, China

4.2 General Description of EUT

Product Name:	Dobot arm	
Model No.:	Dobot 2.0	
Trade Mark:	N/A	
Hardware Version:	V2.0.0	
Software Version:	V2.0.0	
Highest Operating Frequency (without wireless module):	269MHz	
Sample Type:	Mobile production	
Power Supply:	AC/DC Adapter:	Input: AC100-240V 50/60Hz Output: DC12V 5A
	EUT Power Supply:	DC12V
Test Voltage:	AC120V 60Hz	

4.3 Test Environment

Operating Environment:	
Temperature:	24.0 °C
Humidity:	52 % RH
Atmospheric Pressure:	1008 mbar

4.4 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.
PC	Lenovo	Lenovo ideapad 100-14IBY
AC/DC Adapter	DS	GMY-1260W-5F
AC/DC Adapter	Lenovo	PA-1450-55LN

4.5 Test Location

All tests were performed at:

Shenzhen CTL Testing Technology Co., Ltd., Shenzhen EMC Laboratory,

1/F.-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, Guangdong, China

4.6 Statement 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 CTL Testing Technology 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 CTL laboratory is reported:

Test	Range	Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	1~12.75GHz	4.32dB	(1)
Radiated Emission	12.75GHz-25GHz	4.68dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

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

4.7 Test Facility

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

FCC – Registration No.: 970318

Shenzhen CTL Testing Technology Co., Ltd. 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 970318

4.8 Deviation from Standards

None.

4.9 Abnormalities from Standard Conditions

None.

4.10 Other Information Requested by the Customer

None.

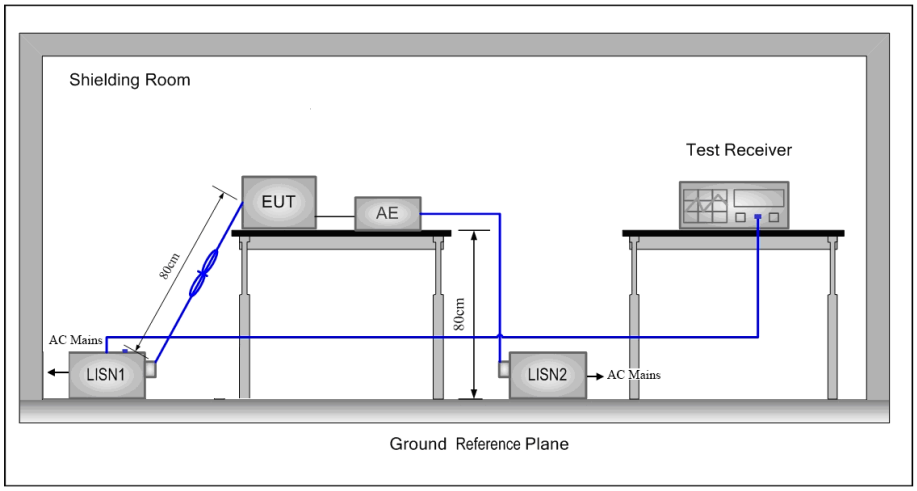
4.11 Equipment List

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Due Date
1	Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2017/06/01
2	EMI Test Receiver	ROHDE & SCHWARZ	ESCI3	103710	2017/06/01
3	Spectrum Analyzer	Agilent	E4407B	MY45108355	2017/05/20
4	Controller	EM Electronics	Controller EM 1000	N/A	2017/05/20
5	Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2017/05/18
6	Spectrum Analyzer	R&S	FSU	MY41440676	2017/05/18
7	LISN	R&S	ENV216	101316	2017/06/01
8	LISN	SCHWARZBECK	NSLK8127	8127687	2017/06/01
9	Microwave Preamplifier	HP	8349B	3155A00882	2017/05/18
10	Preamplifier	HP	8447D	3113A07663	2017/05/18
11	Transient Limiter	Com-Power	LIT-153	532226	2017/06/01
12	Temperature/Humidity Meter	Gangxing	CTH-608	02	2017/05/19
13	Climate Chamber	ESPEC	EL-10KA	A20120523	2017/05/19
14	RF Cable(0-1GHz)	HUBER+SUHNER	RG174	N/A	2017/05/19
15	RF Cable(1-25GHz)	HUBER+SUHNER	RG214	N/A	2017/05/19

5 Test results and Measurement Data

5.1 Conducted Emissions

<table>
<tr><td>Test Requirement:</td><td>47 CFR Part 15B</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.4: 2014</td></tr>
<tr><td>Test Frequency Range:</td><td>150kHz to 30MHz</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr>
<tr><th>Quasi-peak</th><th>Average</th></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
* Decreases with the logarithm of the frequency.
</td></tr>
<tr><td>Test Procedure:</td><td>1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.</td></tr>
</table>

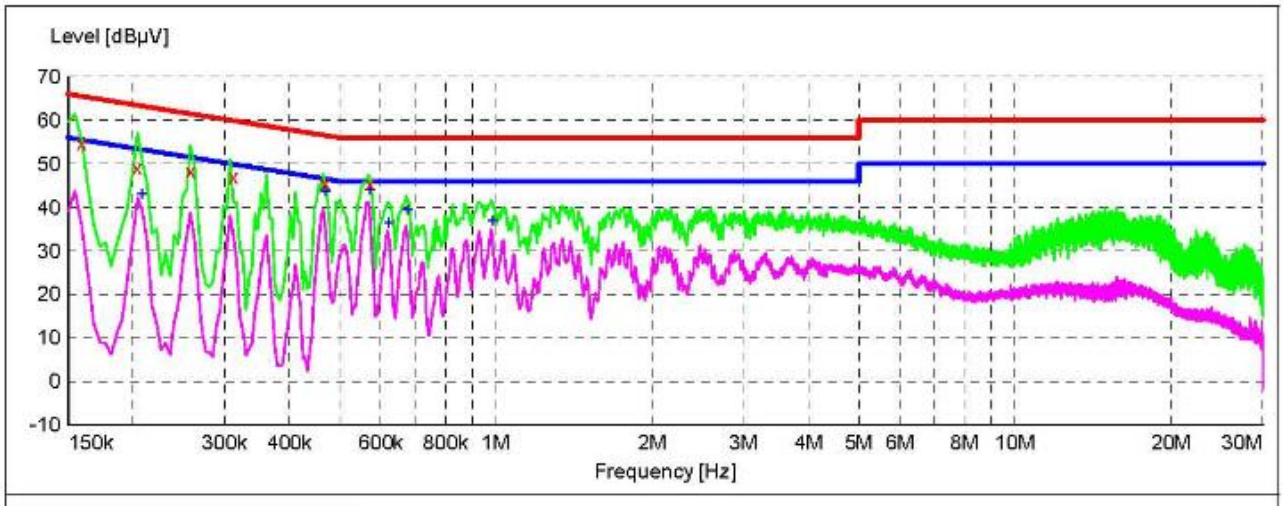
Test setup:	
Instruments Used:	Refer to section 4.10 for details
Test Mode:	On Mode: Exchange data with PC
Test Voltage	120V/60Hz
Test Results:	Pass

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

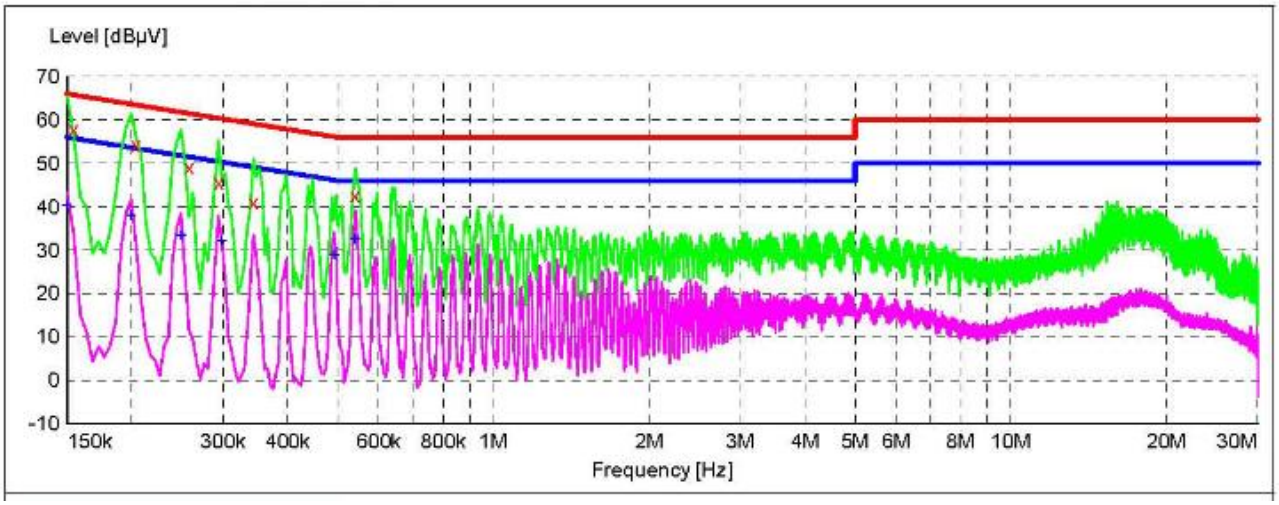
Live Line:



Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.159000	54.80	10.1	66	10.7	QP	L1	GND
0.204000	49.00	10.1	63	14.4	QP	L1	GND
0.258000	48.40	10.0	62	13.1	QP	L1	GND
0.312000	46.90	10.0	60	13.0	QP	L1	GND
0.469500	45.60	10.0	57	10.9	QP	L1	GND
0.573000	45.30	10.0	56	10.7	QP	L1	GND

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.208500	43.10	10.1	53	10.2	AV	L1	GND
0.469500	43.70	10.0	47	2.8	AV	L1	GND
0.573000	44.00	10.0	46	2.0	AV	L1	GND
0.622500	36.40	10.0	46	9.6	AV	L1	GND
0.676500	39.40	10.0	46	6.6	AV	L1	GND
0.987000	36.90	10.0	46	9.1	AV	L1	GND

Neutral Line:



Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.154500	57.90	10.1	66	7.9	QP	N	GND
0.204000	54.20	10.1	63	9.2	QP	N	GND
0.258000	49.00	10.0	62	12.5	QP	N	GND
0.294000	45.60	10.0	60	14.8	QP	N	GND
0.343500	41.10	10.0	59	18.0	QP	N	GND
0.541500	42.60	10.0	56	13.4	QP	N	GND

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	40.30	10.1	56	15.7	AV	N	GND
0.199500	38.10	10.1	54	15.5	AV	N	GND
0.249000	33.60	10.0	52	18.2	AV	N	GND
0.298500	32.10	10.0	50	18.2	AV	N	GND
0.492000	29.00	10.0	46	17.1	AV	N	GND
0.541500	32.60	10.0	46	13.4	AV	N	GND

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT,

2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

5.2 Radiated Emission

<table>
<tr><td>Test Requirement:</td><td>47 CFR Part 15B</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.4: 2014</td></tr>
<tr><td>Test Site:</td><td>Measurement Distance: 3m (Semi-Anechoic Chamber)</td></tr>
<tr><td>Receiver Setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr>
<tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr>
<tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr>
<tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr>
<tr><td>74.0</td><td>Peak Value</td></tr>
</table>
Note:
<table>
<tr><td>Highest frequency generated or used in the device or on which the device operates or tunes (MHz)</td><td>Upper frequency of measurement Range (MHz)</td></tr>
<tr><td>Below 1.705</td><td>30</td></tr>
<tr><td>1.705 to 108</td><td>1000</td></tr>
<tr><td>108 to 500</td><td>2000</td></tr>
<tr><td>500 to 1000</td><td>5000</td></tr>
<tr><td>Above 1000</td><td>5th harmonic of the highest frequency or 40GHz, whichever is lower</td></tr>
</table>
</td></tr>
<tr><td>Test Procedure:</td><td>a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
2) Above 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
Note: For the radiated emission test above 1GHz:
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The</td></tr>
</table>

	measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. b. The antenna height is varied from one meter to four 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. c. 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. d. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. e. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test Setup:	

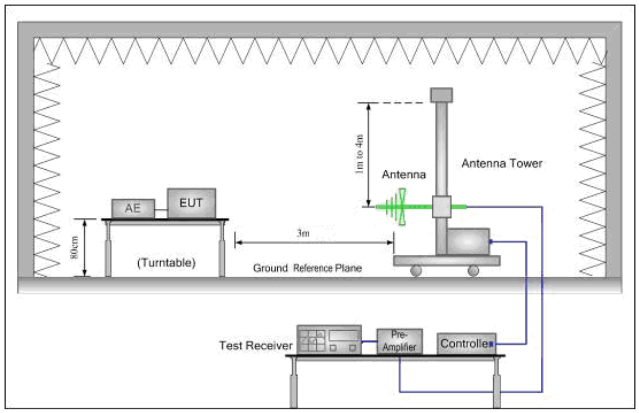


Figure 1. 30MHz to 1GHz

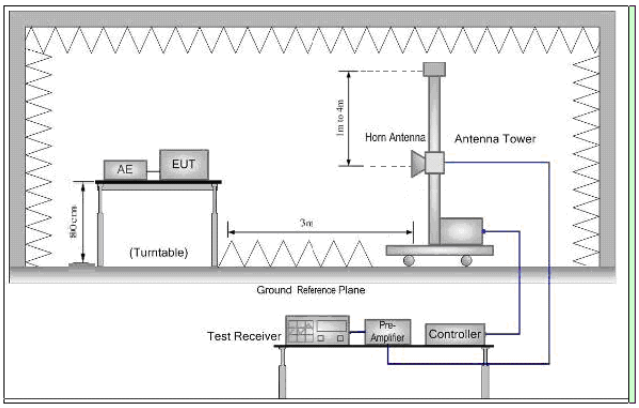
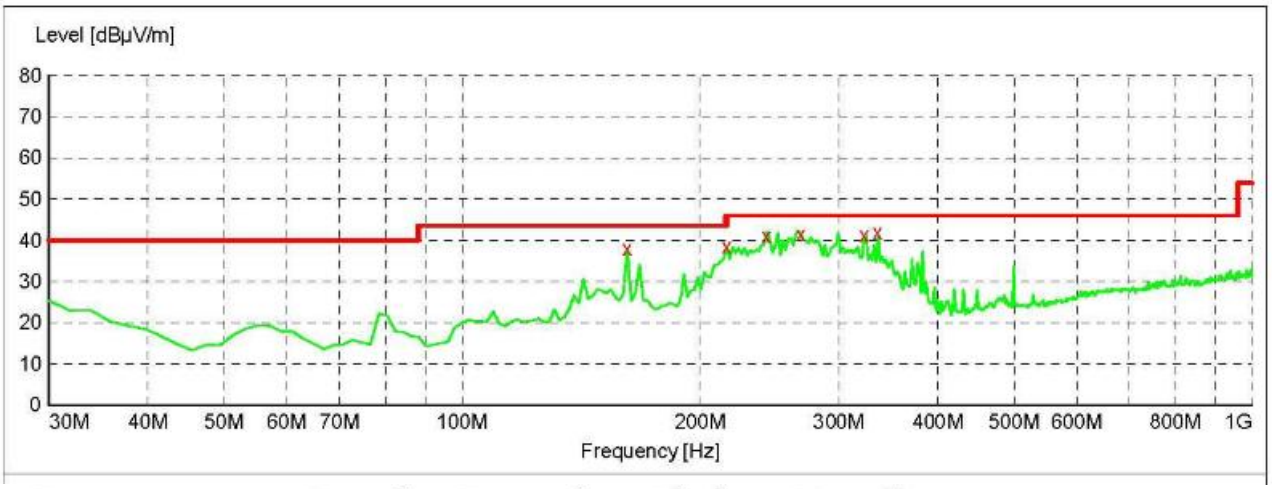


Figure 2. Above 1 GHz

Instruments Used:	Refer to section 4.10 for details
Test Mode:	On mode: Exchange data with PC
Test Results:	Pass

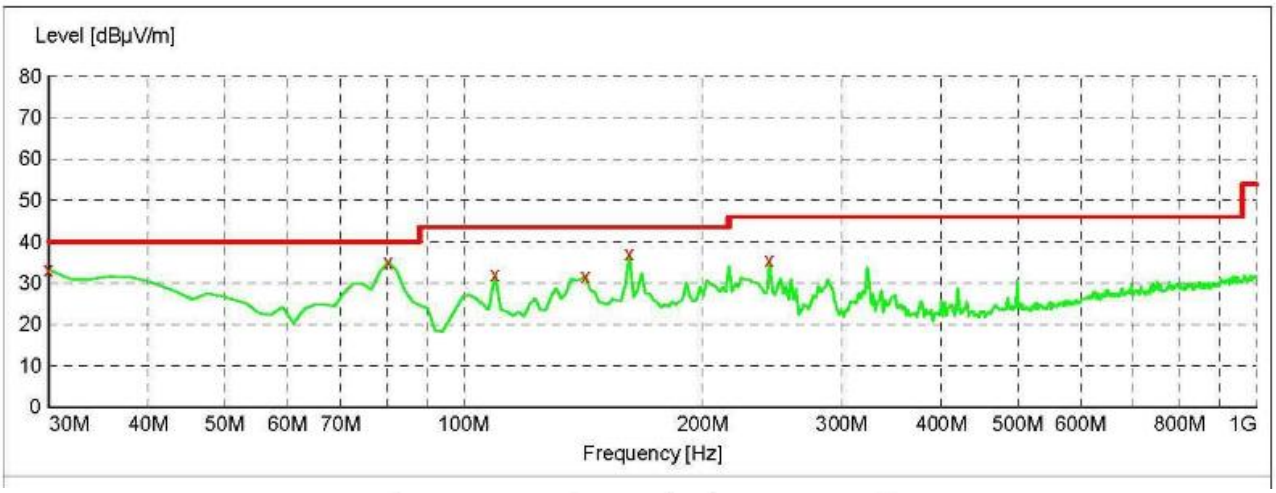
Peak value: 30MHz~1GHz

Horizontal



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB
161.920000	38.00	13.9	43.5	5.5
216.240000	38.50	14.2	46.0	7.5
243.400000	41.00	14.1	46.0	5.0
268.620000	41.50	15.2	46.0	4.5
322.940000	41.20	16.0	46.0	4.8
336.520000	42.00	16.5	46.0	4.0

Vertical



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB
30.000000	33.20	21.1	40.0	6.8
80.440000	35.10	8.8	40.0	4.9
109.540000	32.00	13.7	43.5	11.5
142.520000	31.70	14.5	43.5	11.8
161.920000	37.10	13.9	43.5	6.4
243.400000	35.50	14.1	46.0	10.5

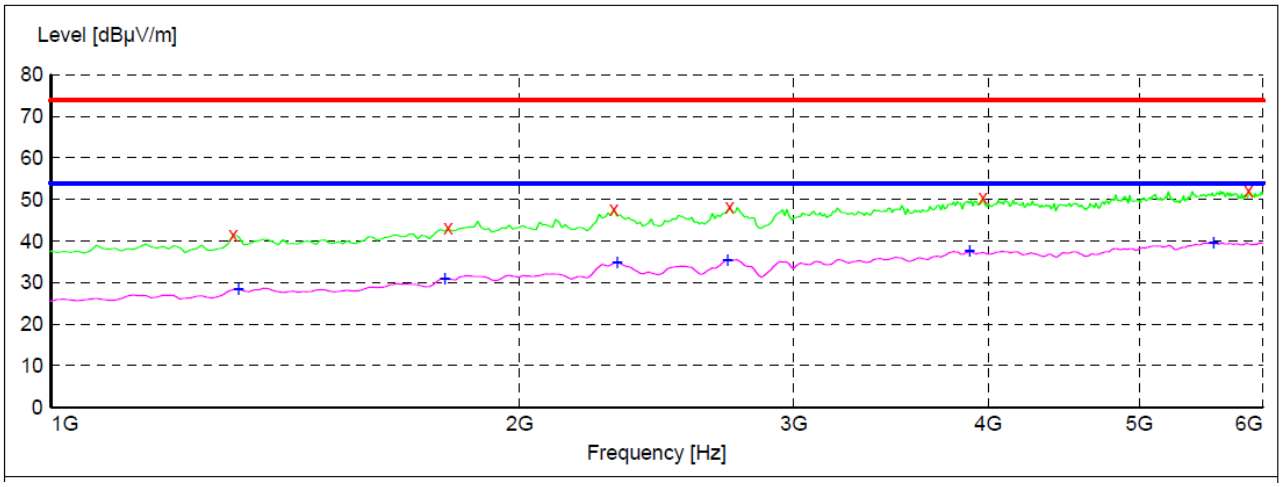
Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

Above 1GHz:

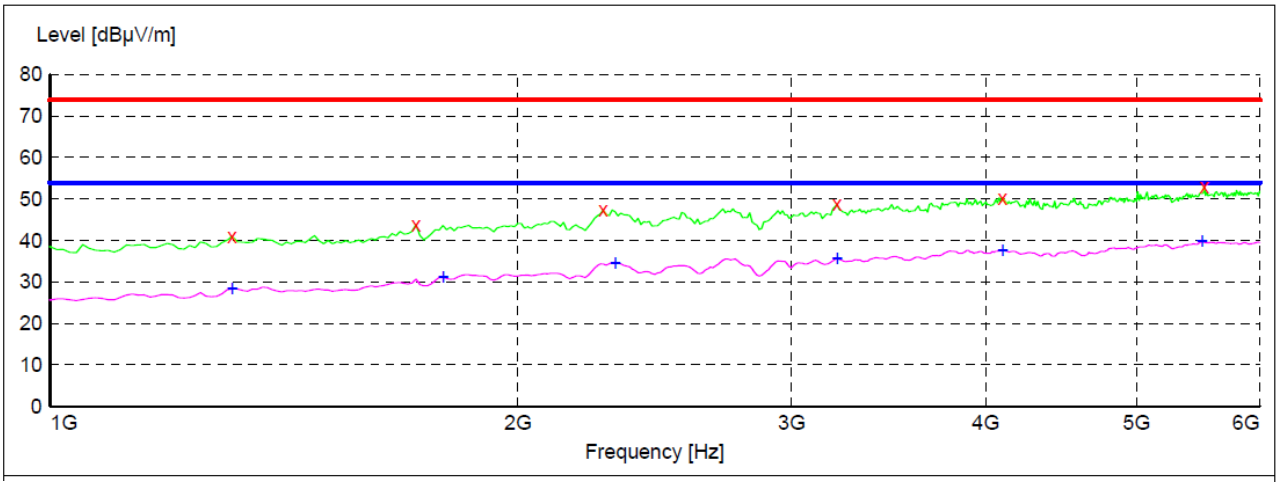
Horizontal



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.
1310.000000	41.50	-7.2	73.9	32.4	-PK-
1800.000000	43.10	-3.9	73.9	30.8	-PK-
2300.000000	47.70	-1.1	73.9	26.2	-PK-
2730.000000	48.20	-0.7	73.9	25.7	-PK-
3970.000000	50.50	4.8	73.9	23.4	-PK-
5880.000000	52.30	7.3	73.9	21.6	-PK-

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.
1320.000000	28.40	-7.2	53.9	25.5	-AV-
1790.000000	31.00	-4.0	53.9	22.9	-AV-
2310.000000	34.80	-1.1	53.9	19.1	-AV-
2720.000000	35.50	-0.7	53.9	18.4	-AV-
3890.000000	37.60	4.7	53.9	16.3	-AV-
5580.000000	39.60	7.3	53.9	14.3	-AV-

Vertical



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.
1310.000000	41.00	-7.2	73.9	32.9	-PK-
1720.000000	43.80	-4.7	73.9	30.1	-PK-
2270.000000	47.40	-1.5	73.9	26.5	-PK-
3210.000000	48.80	1.8	73.9	25.1	-PK-
4100.000000	50.30	4.5	73.9	23.6	-PK-
5530.000000	53.10	7.3	73.9	20.8	-PK-

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.
1310.000000	28.30	-7.2	53.9	25.6	-AV-
1790.000000	31.10	-4.0	53.9	22.8	-AV-
2310.000000	34.70	-1.1	53.9	19.2	-AV-
3210.000000	35.80	1.8	53.9	18.1	-AV-
4100.000000	37.60	4.5	53.9	16.3	-AV-
5510.000000	39.80	7.3	53.9	14.1	-AV-

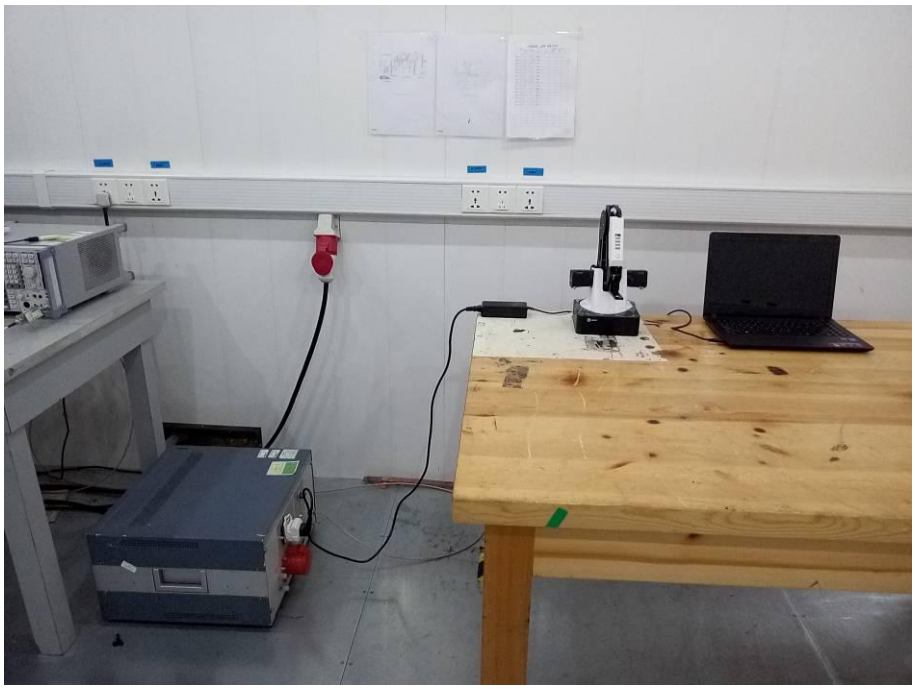
Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

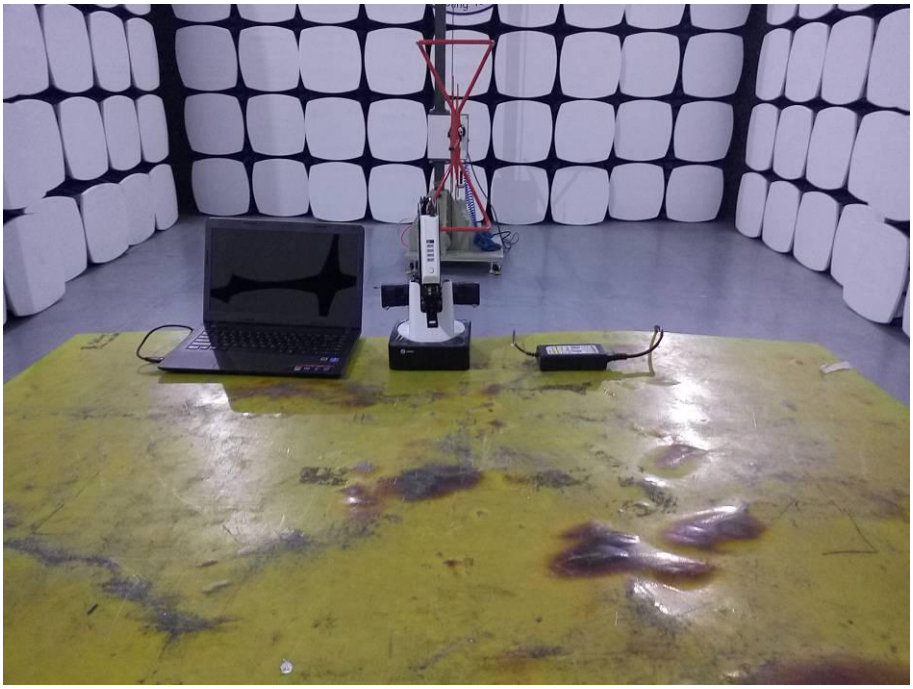
6 Photographs - EUT Test Setup

6.1 Conducted Emission

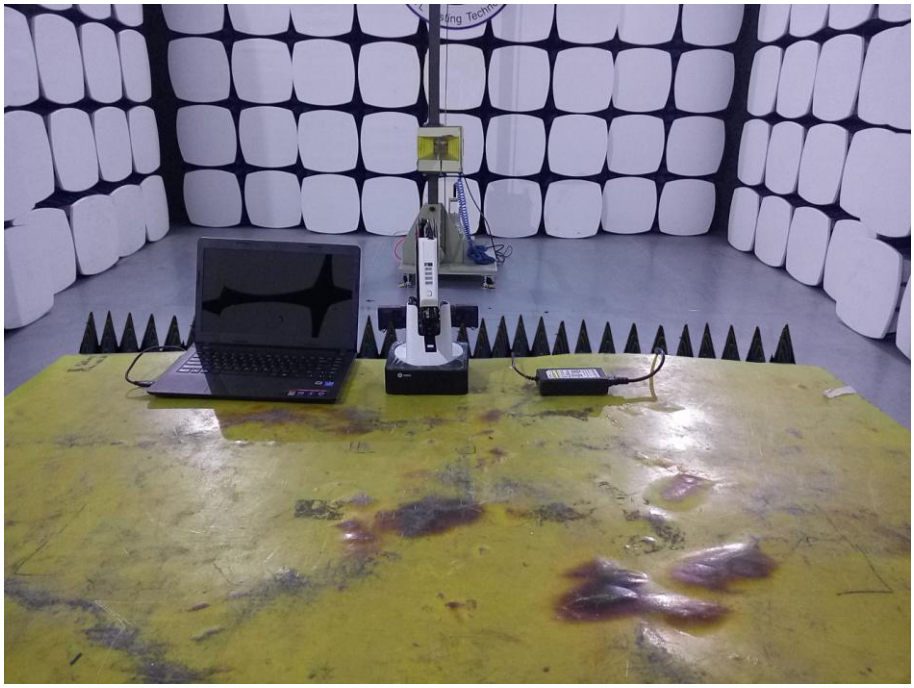


6.2 Radiated Emission

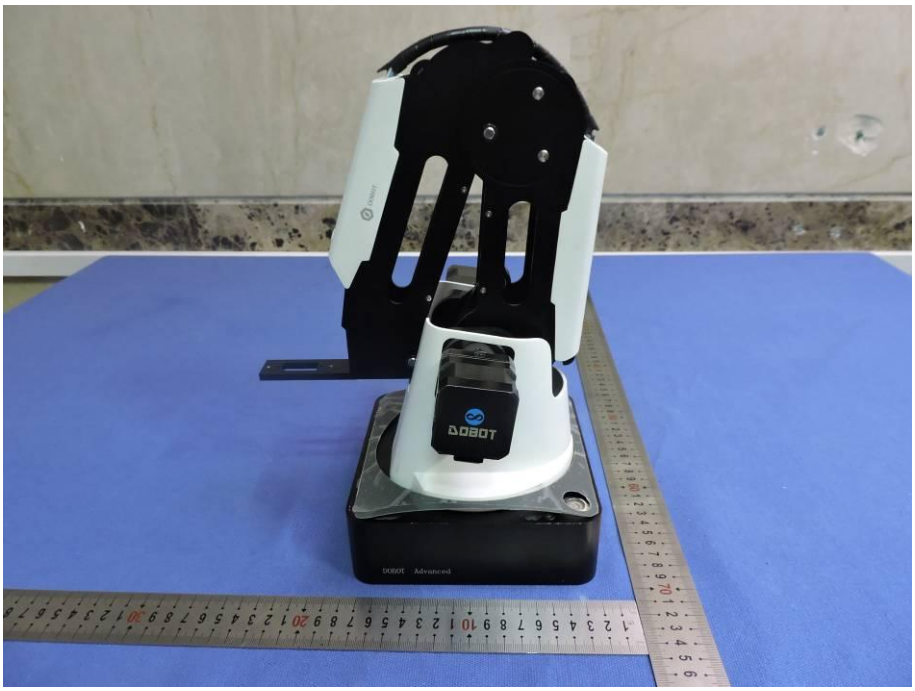
30MHz~1GHz:

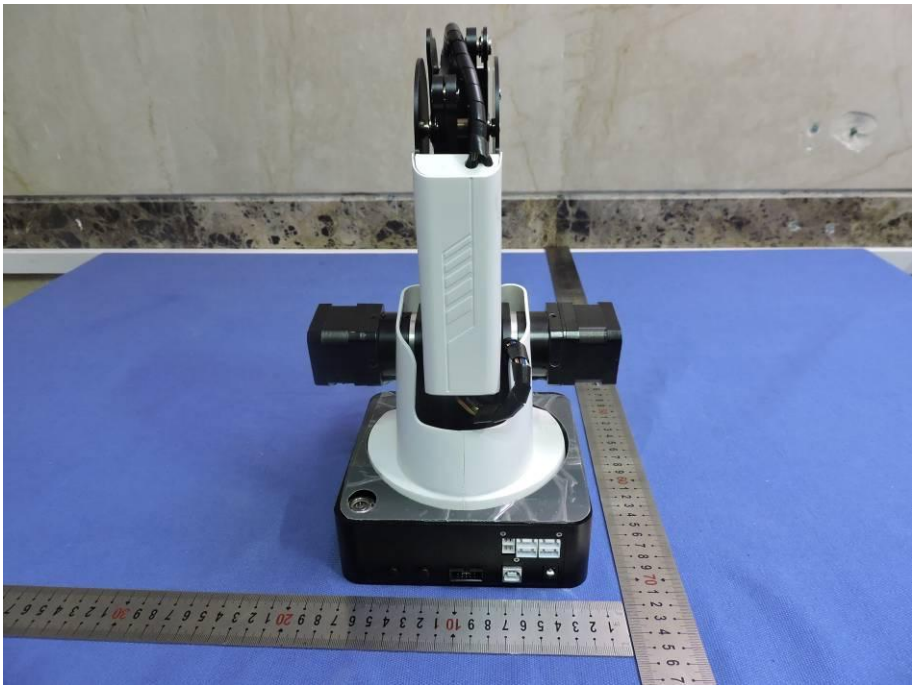


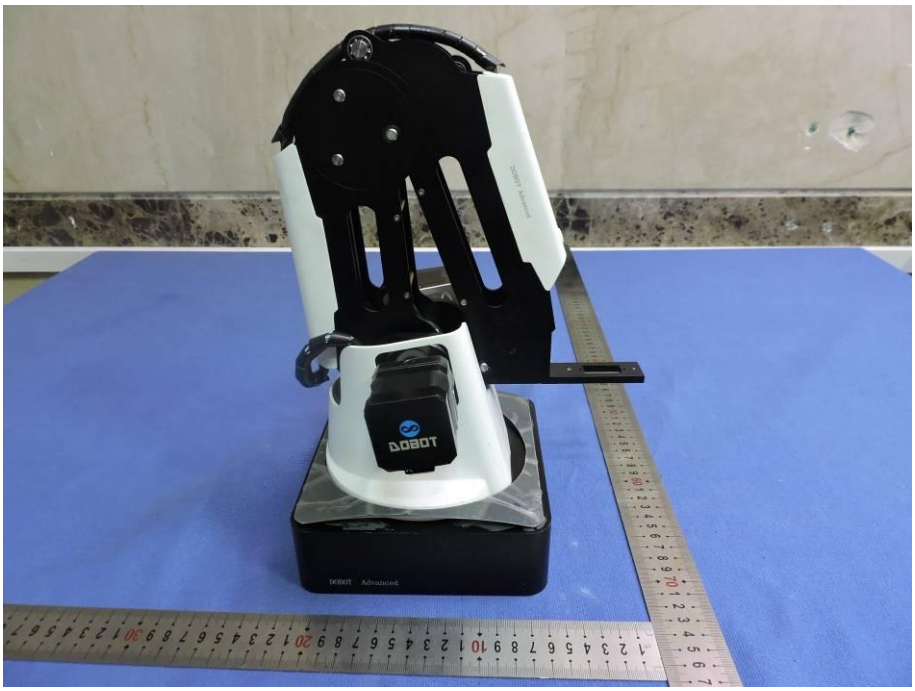
Above 1GHz

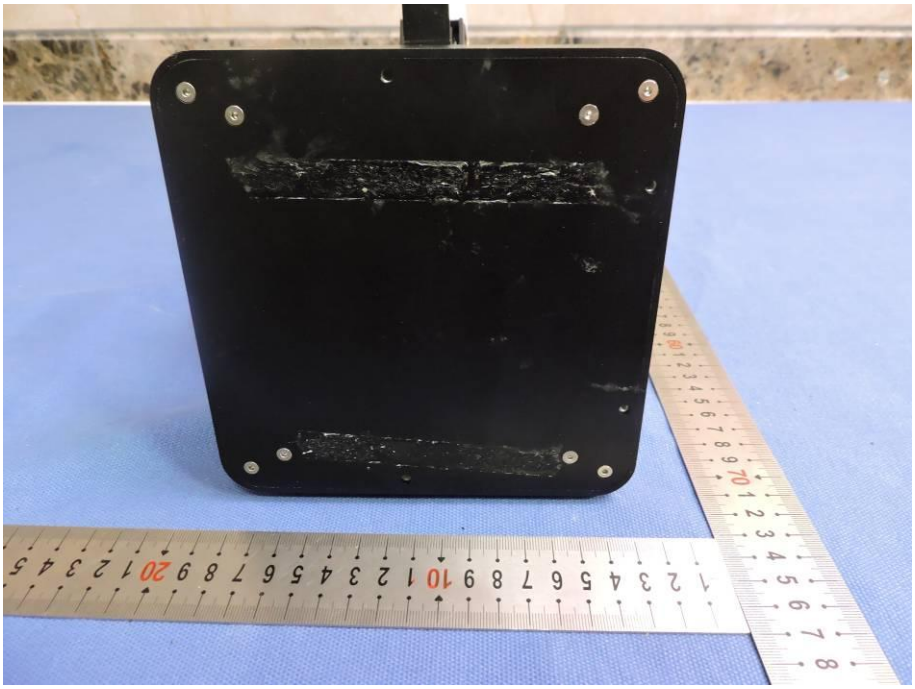


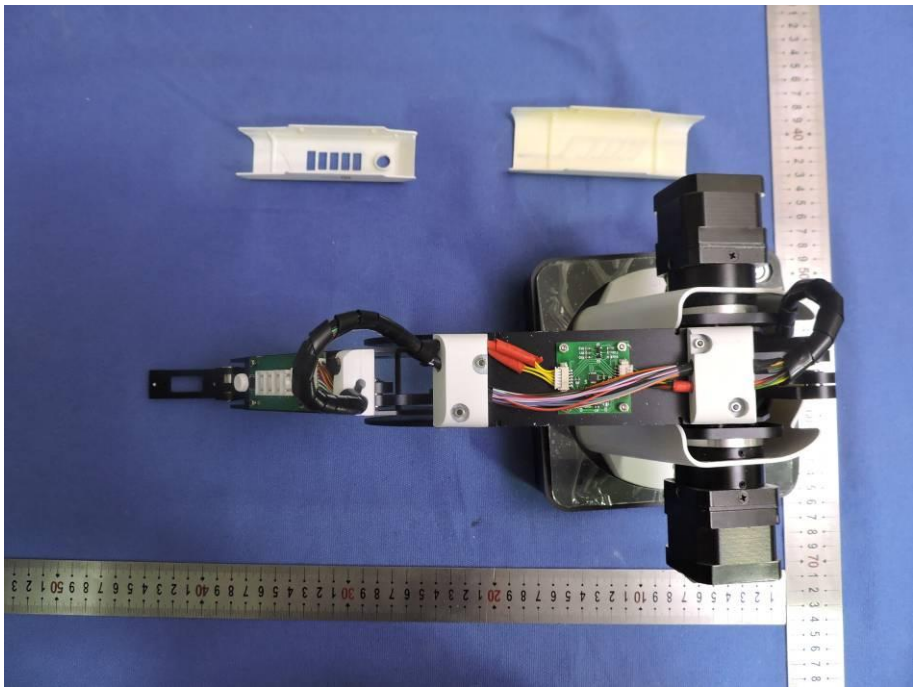
7 Photographs of EUT Constructional Details

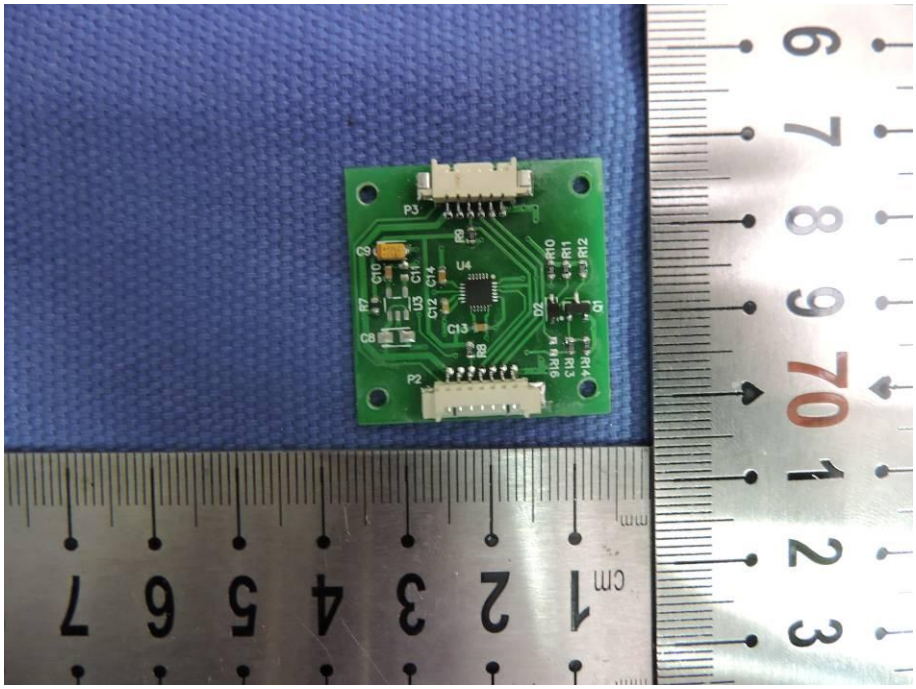

DOBOT
DOBOT Advanced




DOBOT






P3
P2
U4
U3
U5
C9
C10
C11
C12
C13
C14
C8
R7
R8
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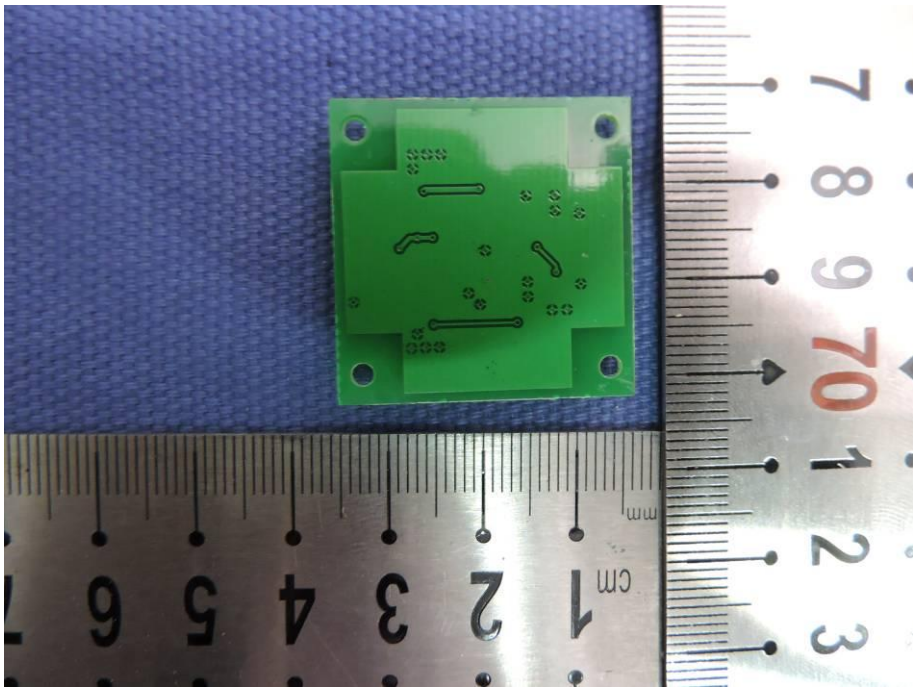
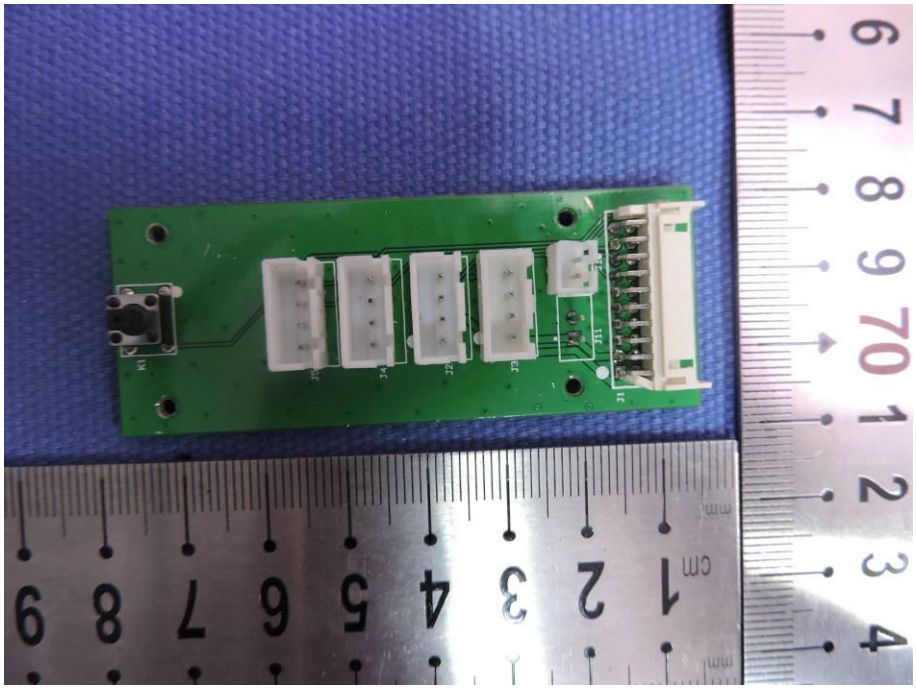
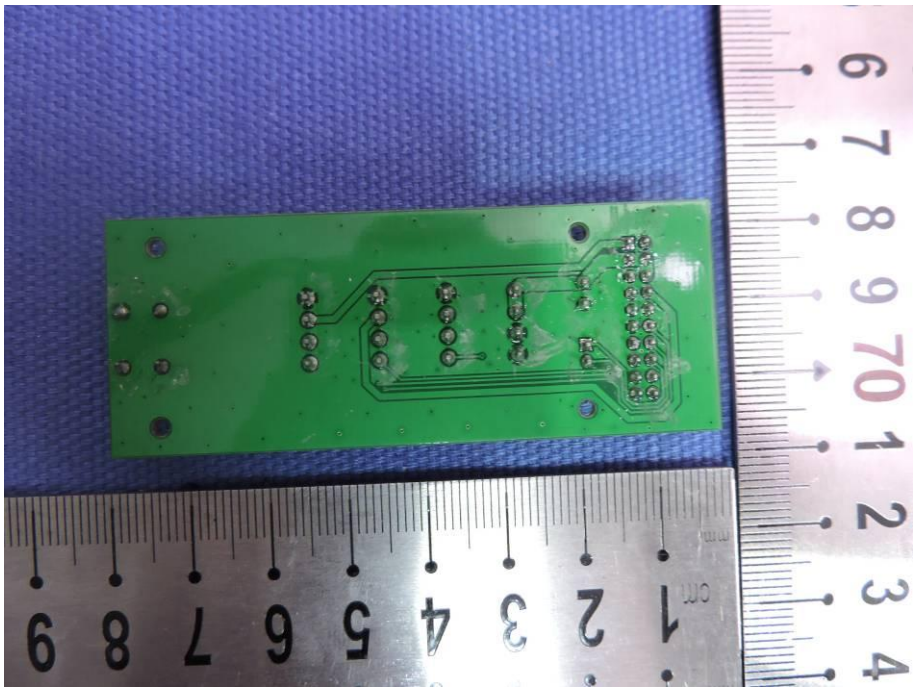
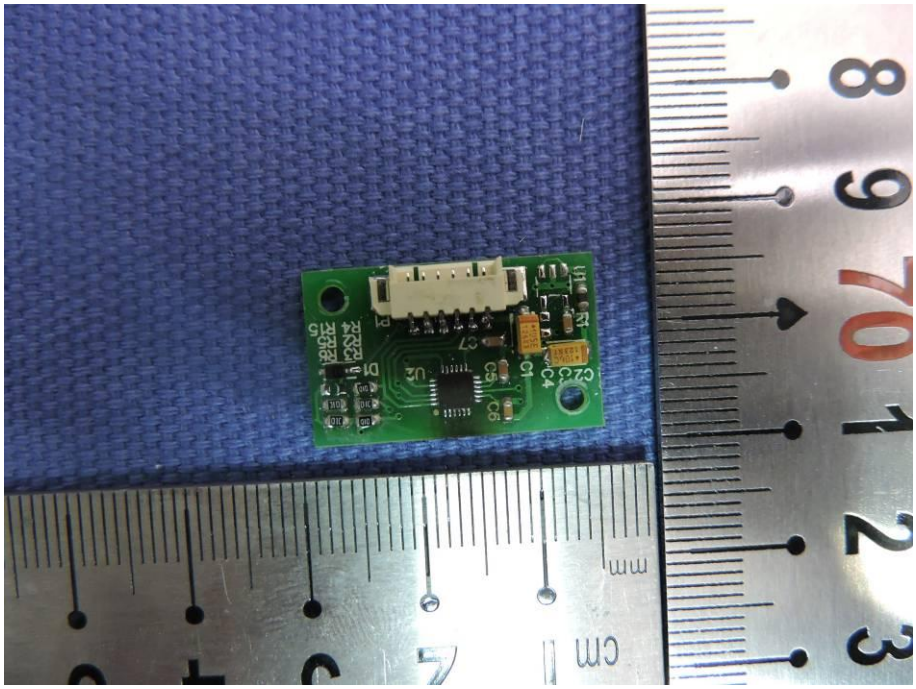
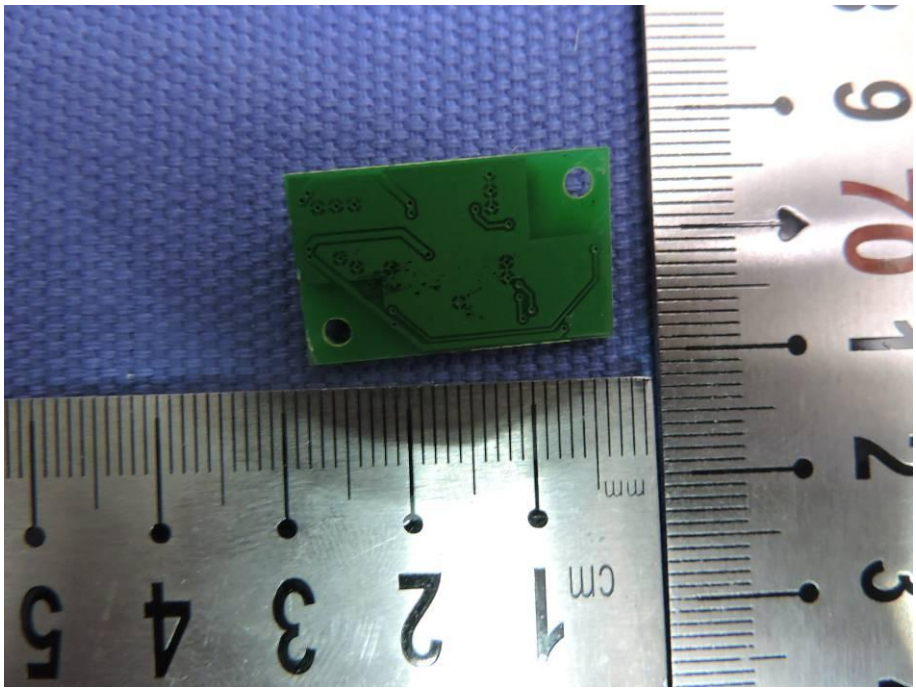
R11
R12
R13
R14
R15
D2
cm
1
2
3
4
5
6
7
70

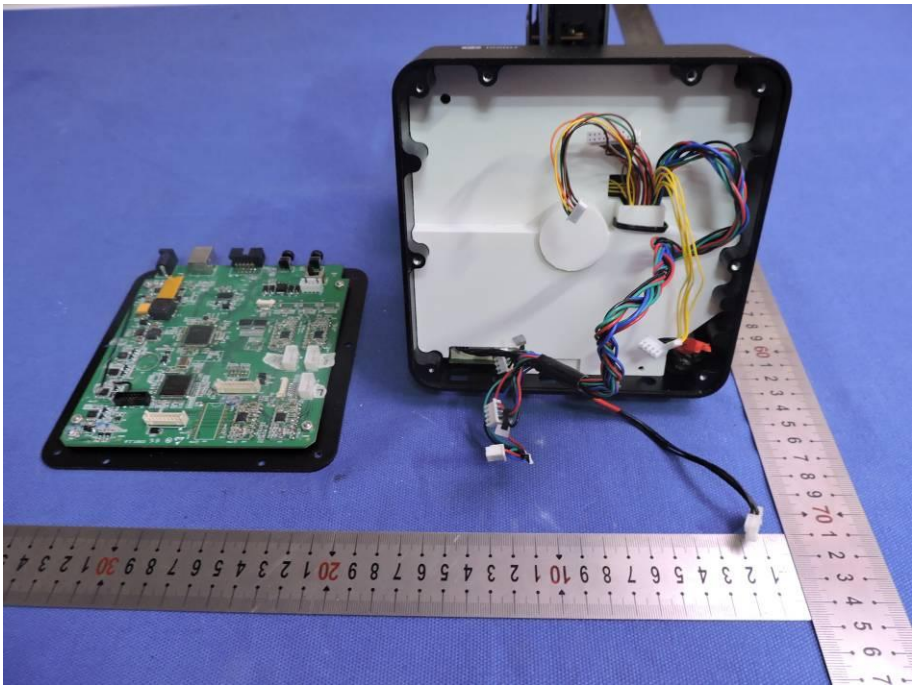


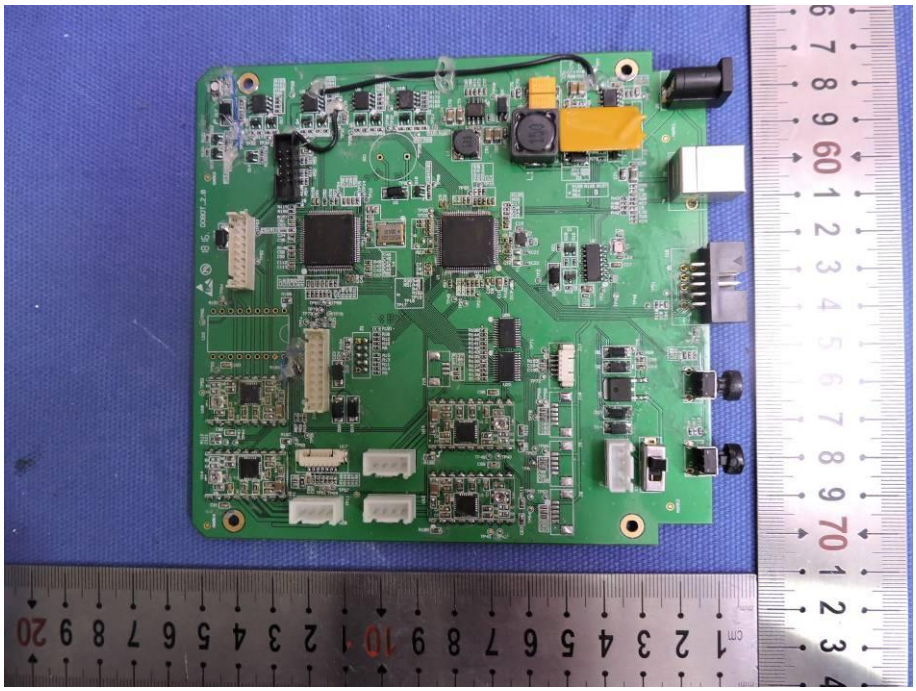


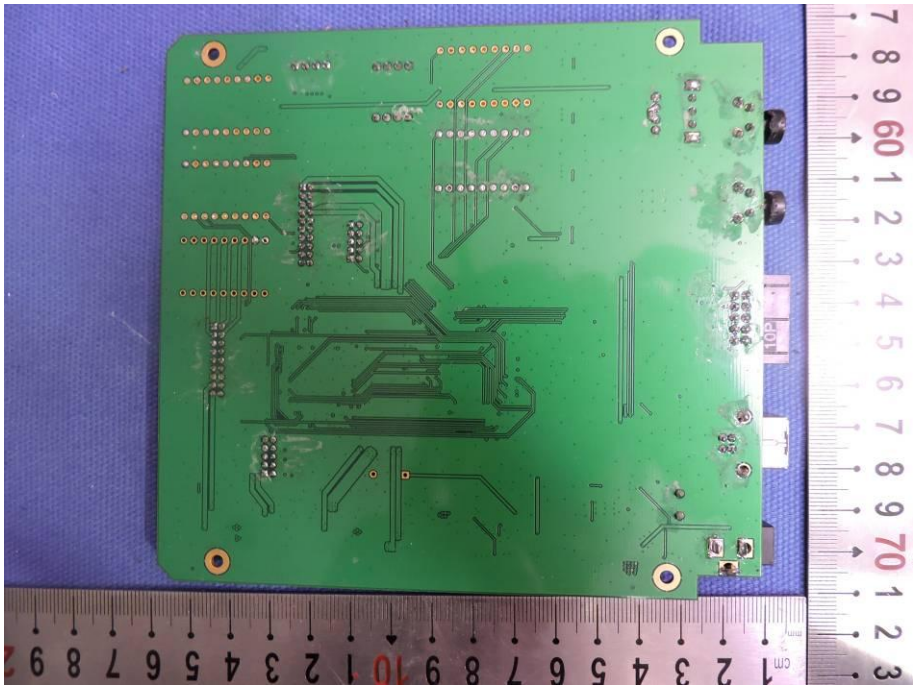












END OF THE REPORT