



FCC SDoC TEST REPORT

AVCOMM Technologies, Inc

INDUSTRIAL ETHERNET SWITCH

Test Model: 4026GX2

Additional Model No.: Please Refer to Page 9

Prepared for : AVCOMM Technologies, Inc
Address : 333 West Loop North, Suite 460, Houston, TX 77024, United States

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.
Address : Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China

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Date of receipt of test sample : June 13, 2022
Number of tested samples : 1
Samples number : A061322099
Date of Test : June 13, 2022 ~ June 30, 2022
Date of Report : July 04, 2022



Shenzhen LCS Compliance Testing Laboratory Ltd.

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FCC SDoC TEST REPORT

FCC 47 CFR Part 15 Subpart B, Class B(SDoC), ANSI C63.4 -2014

Report Reference No. : LCSA061322099E

Date Of Issue : July 04, 2022

Testing Laboratory Name : Shenzhen LCS Compliance Testing Laboratory Ltd.

Address : Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China

Testing Location/ Procedure... : Full application of Harmonised standards ■
Partial application of Harmonised standards □
Other standard testing method □

Applicant's Name : AVCOMM Technologies, Inc

Address : 333 West Loop North, Suite 460, Houston, TX 77024, United States

Test Specification

Standard : FCC 47 CFR Part 15 Subpart B, Class B(SDoC), ANSI C63.4 -2014

Test Report Form No. : LCSEMC-1.0

TRF Originator : Shenzhen LCS Compliance Testing Laboratory Ltd.

Master TRF : Dated 2011-03

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Test Item Description. : INDUSTRIAL ETHERNET SWITCH

Test Model : 4026GX2

Trade Mark :  AVCOMM

Ratings : Please Refer to Page 7

Result : Positive

Compiled by:

Cindy Nie

Cindy Nie/ File administrators

Supervised by:

Baron Wen

Baron Wen/ Technique principal

Approved by:

Gavin Liang

Gavin Liang/ Manager



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**FCC -- TEST REPORT****Test Report No. : LCSA061322099E**July 04, 2022

Date of issue

Test Model : 4026GX2

EUT..... : INDUSTRIAL ETHERNET SWITCH

Applicant..... : AVCOMM Technologies, IncAddress..... : 333 West Loop North, Suite 460, Houston, TX 77024,
United States

Telephone..... : /

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Manufacturer..... : AVCOMM Technologies, IncAddress..... : 333 West Loop North, Suite 460, Houston, TX 77024,
United States

Telephone..... : /

Fax..... : /

Factory..... : AVCOMM Technologies, IncAddress..... : 333 West Loop North, Suite 460, Houston, TX 77024,
United States

Telephone..... : /

Fax..... : /

Test Result according to the standards on page 6: **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.



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Revision History

Revision	Issue Date	Revision content	Revised By
000	July 04, 2022	Initial Issue	/





TABLE OF CONTENTS

Test Report Description	Page
1. SUMMARY OF STANDARDS AND RESULTS	6
1.1. Description of Standards and Results	6
2. GENERAL INFORMATION	7
2.1. Description of Device (EUT)	7
2.2. Support equipment List	7
2.3. Description of Test Facility	8
2.4. Statement of the Measurement Uncertainty	8
2.5. Measurement Uncertainty	8
3. TEST RESULTS	9
3.1. POWER LINE CONDUCTED EMISSION MEASUREMENT	9
3.2. Radiated emission Measurement	13
4. PHOTOGRAPH	18
5. EXTERNAL AND INTERNAL PHOTOS OF THE EUT	19





1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION			
Description of Test Item	Standard	Limits	Results
Conducted disturbance at mains terminals	FCC 47 CFR Part 15 Subpart B, Class B(SDoC), ANSI C63.4 -2014	---	PASS
Radiated disturbance	FCC 47 CFR Part 15 Subpart B, Class B(SDoC), ANSI C63.4 -2014	---	PASS
N/A is an abbreviation for Not Applicable.			

Test mode:

Mode	communication	Record
------	---------------	--------





2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT : INDUSTRIAL ETHERNET SWITCH

Trade Mark :  AVCOMM

Test Model : 4026GX2

Additional Model No. : 400Series(402MC, 403FX, 405FX, 405TX, 406FX2, 408TX, 408F X, 408FX2, 410FX2, 412FX4, 416TX, 410GX2, 412GX4, 428GX4), 4000Series(4002MC, 4003GX, 4005GX, 4005TX, 4006GX2, 4008TX, 4016TX, 4010GX2, 4012GX4, 4020GX4, 4028GX4)

Model Declaration : PCB board, structure and internal of these model(s) are the same, So no additional models were tested

Power Supply : Input:100/240V~, 50Hz-60Hz, 0.25A

Highest internal frequency : $F_x \leq 108\text{MHz}$

Highest internal frequency (Fx)	Highest measured frequency
$F_x \leq 1.705\text{ MHz}$	30 MHz
$1.705\text{ MHz} < F_x \leq 108\text{ MHz}$	1 GHz
$108\text{ MHz} < F_x \leq 500\text{ MHz}$	2 GHz
$500\text{ MHz} < F_x \leq 1000\text{ MHz}$	5 GHz
$F_x > 1\text{ GHz}$	5 x Fx up to a maximum of 40 GHz

2.2. Support equipment List

Name	Manufacturers	M/N	S/N
PC	Lenovo	WB0202140H	WB05067151





2.3. Description of Test Facility

Site Description

EMC Lab. : NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier is CN0071.

CNAS Registration Number is L4595.

2.4. 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 LCS 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.

2.5. Measurement Uncertainty

Test	Parameters	Expanded Uncertainty (Ulab)	Expanded Uncertainty (Ucisp)
Conducted Emission	Level accuracy (9kHz to 150kHz) (150kHz to 30MHz)	± 2.63 dB ± 2.35 dB	± 3.8 dB ± 3.4 dB
Radiated Emission	Level accuracy (9kHz to 30MHz)	± 3.68 dB	N/A
Radiated Emission	Level accuracy (30MHz to 1000MHz)	± 3.48 dB	± 5.3 dB
Radiated Emission	Level accuracy (above 1000MHz)	± 3.90 dB	± 5.2 dB

(1) Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.

(2) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.



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3. TEST RESULTS

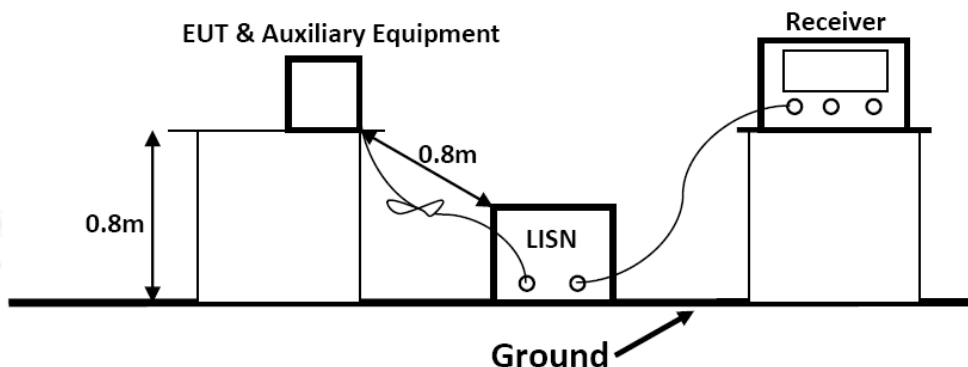
3.1. POWER LINE CONDUCTED EMISSION MEASUREMENT

3.1.1. Test Equipment

The following test equipments are used during the power line conducted measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Software	Farad	EZ	/	N/A	N/A
2	EMI Test Receiver	R&S	ESR3	102312	2022-02-18	2023-02-17
3	Artificial Mains	R&S	ENV216	101288	2022-06-16	2023-06-15
4	Pulse Limiter	R&S	ESH3-Z2	102750-NB	2021-08-19	2022-08-18

3.1.2. Block Diagram of Test Setup



3.1.3. Test Standard

Power Line Conducted Emission Limits

Frequency (MHz)			Limit (dB μ V)	
			Quasi-peak Level	Average Level
0.15	~	0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50	~	5.00	56.0	46.0
5.00	~	30.00	60.0	50.0

NOTE1-The lower limit shall apply at the transition frequencies.

NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

3.1.4. EUT Configuration on Test

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.



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3.1.5. Operating Condition of EUT

3.1.5.1. Setup the EUT as shown on Section 3.1.2

3.1.5.2. Turn on the power of all equipments.

3.1.5.3. Let the EUT work in measuring communication and measure it.

3.1.6. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC/ANSI C63.4-2014 on Conducted Emission Measurement.

The bandwidth of the test receiver is set at 9kHz.

The frequency range from 150kHz to 30MHz is investigated

3.1.7. Test Results

PASS.

The test result please refer to the next page.



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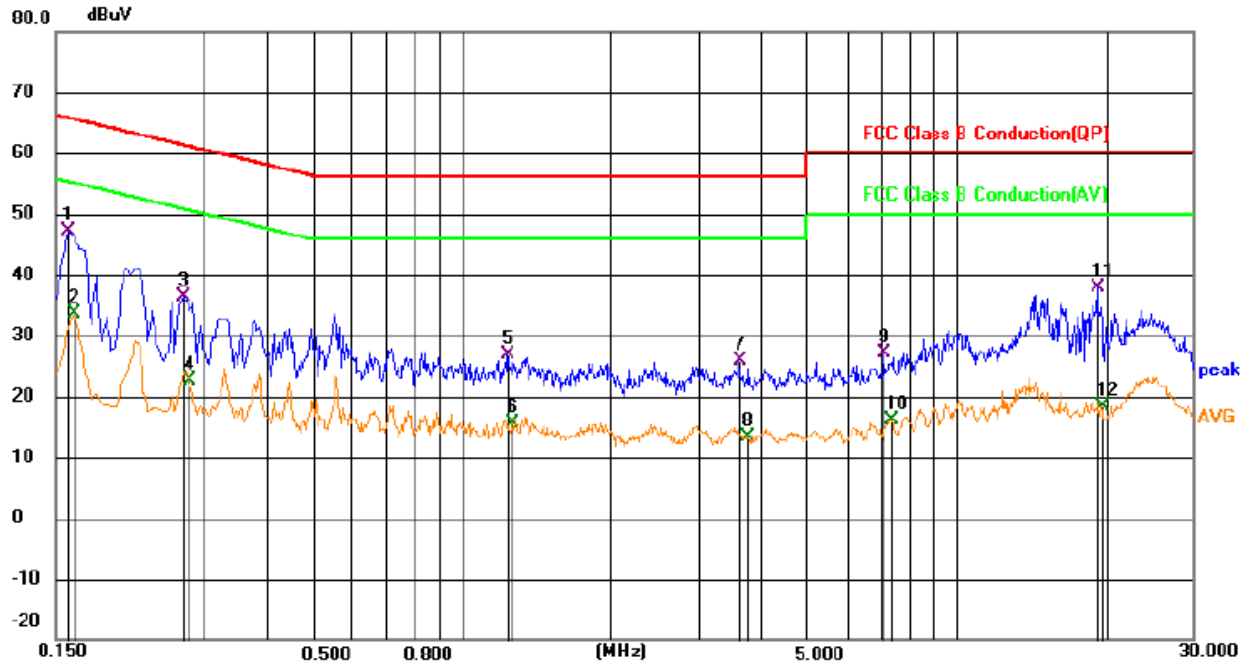
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Test Model	4026GX2	Test Mode	communication
Environmental Conditions	22.5°C, 53.5% RH	Test Engineer	Hy Luo
Pol	Line	Test Voltage	AC 120V/60Hz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	*	0.1590	27.44	19.63	47.07	65.52	-18.45	QP	
2		0.1636	14.07	19.63	33.70	55.28	-21.58	AVG	
3		0.2716	16.64	19.63	36.27	61.07	-24.80	QP	
4		0.2788	3.03	19.63	22.66	50.85	-28.19	AVG	
5		1.2346	7.24	19.66	26.90	56.00	-29.10	QP	
6		1.2571	-4.06	19.66	15.60	46.00	-30.40	AVG	
7		3.6241	6.22	19.70	25.92	56.00	-30.08	QP	
8		3.7681	-6.41	19.70	13.29	46.00	-32.71	AVG	
9		7.1341	7.32	19.73	27.05	60.00	-32.95	QP	
10		7.3321	-3.57	19.74	16.17	50.00	-33.83	AVG	
11		19.2481	17.64	20.19	37.83	60.00	-22.17	QP	
12		19.5541	-1.91	20.19	18.28	50.00	-31.72	AVG	



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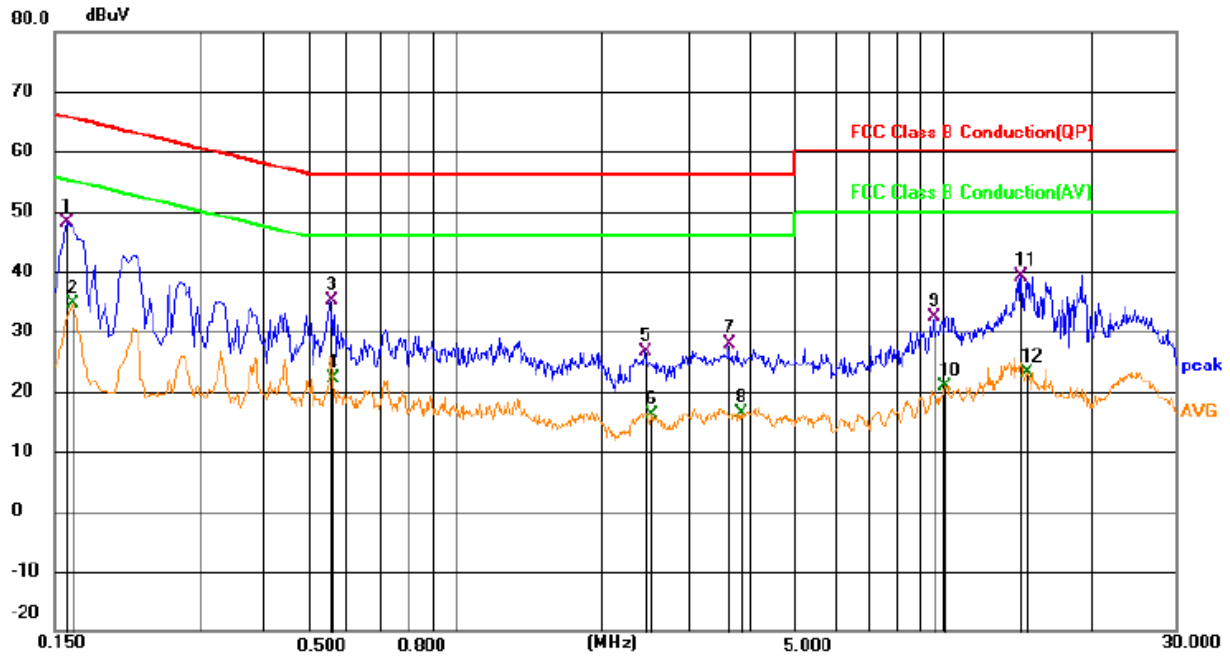
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Test Model	4026GX2	Test Mode	communication
Environmental Conditions	22.5°C, 53.5% RH	Test Engineer	Hy Luo
Pol	Neutral	Test Voltage	AC 120V/60Hz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	*	0.1590	28.44	19.63	48.07	65.52	-17.45	QP	
2		0.1636	15.07	19.63	34.70	55.28	-20.58	AVG	
3		0.5551	15.40	19.65	35.05	56.00	-20.95	QP	
4		0.5596	2.40	19.65	22.05	46.00	-23.95	AVG	
5		2.4406	6.98	19.68	26.66	56.00	-29.34	QP	
6		2.5396	-3.43	19.68	16.25	46.00	-29.75	AVG	
7		3.6241	8.22	19.70	27.92	56.00	-28.08	QP	
8		3.8446	-3.36	19.70	16.34	46.00	-29.66	AVG	
9		9.5641	12.56	19.84	32.40	60.00	-27.60	QP	
10		10.0950	1.02	19.85	20.87	50.00	-29.13	AVG	
11		14.5096	19.25	19.86	39.11	60.00	-20.89	QP	
12		14.8336	3.25	19.87	23.12	50.00	-26.88	AVG	

Note: Pre-Scan all mode, Thus record worse case mode result in this report.





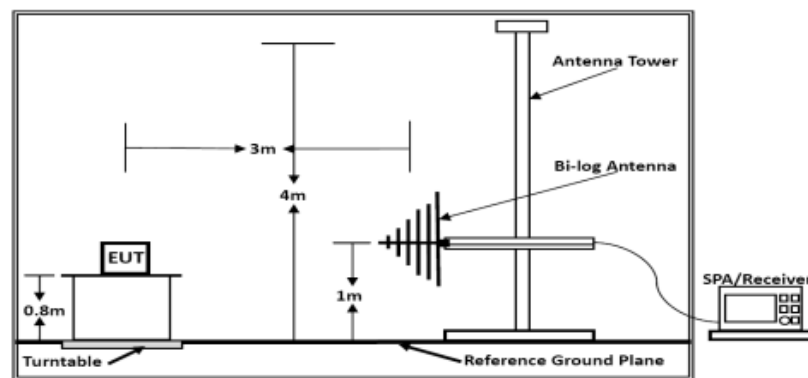
3.2. Radiated emission Measurement

3.2.1. Test Equipment

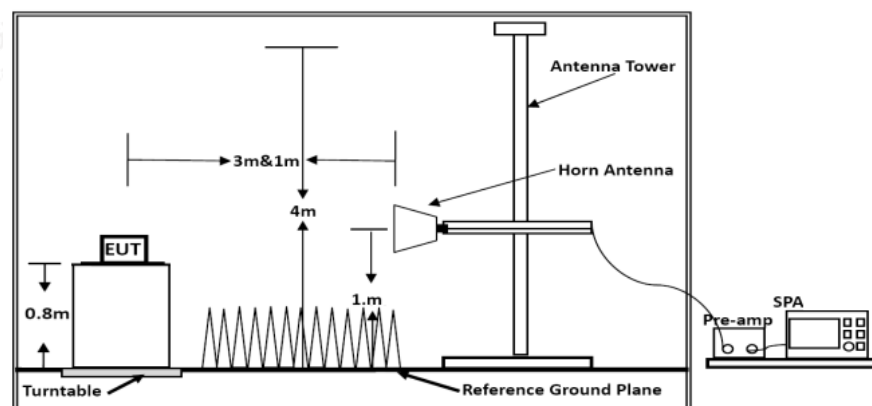
The following test equipments are used during the radiated emission measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Software	AUDIX	E3	/	N/A	N/A
2	By-log Antenna	SCHWARZBEC K	VULB9163	9163-470	2021-09-12	2024-09-11
3	Horn Antenna	SCHWARZBEC K	BBHA 9120D	9120D-1925	2021-09-05	2024-09-04
4	EMI Test Receiver	R&S	ESR7	102311	2021-08-19	2022-08-18
5	Broadband Preamplifier	/	BP-01M18G	P190501	2022-06-16	2023-06-15
6	EMI Test Software	Farad	EZ	/	N/A	N/A
7	MXA Signal Analyzer	Agilent	N9020A	MY50510140	2021-11-15	2022-11-14
8	EMI Test Receiver	R&S	ESPI	101940	2021-08-19	2022-08-18

3.2.2. Block Diagram of Test Setup



Below 1GHz



Above 1GHz





3.2.3. Radiated Emission Limit

Limits for Radiated Disturbance Below 1GHz

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V})/\text{m}$
30 ~ 88	3	100	40
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46
960 ~ 1000	3	500	54

Remark: (1) Emission level $(\text{dB})\mu\text{V} = 20 \log \text{Emission level } \mu\text{V/m}$
(2) The smaller limit shall apply at the cross point between two frequency bands.
(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

Limits for Radiated Emission Above 1GHz

Frequency (MHz)	Distance (Meters)	Peak Limit ($\text{dB}\mu\text{V/m}$)	Average Limit ($\text{dB}\mu\text{V/m}$)
Above 1000	3	74	54

***Note: The lower limit applies at the transition frequency.

3.2.4. EUT Configuration on Measurement

The following equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

3.2.5. Operating Condition of EUT

3.2.5.1. Setup the EUT as shown in Section 3.2.2.

3.2.5.2. Let the EUT work in test communication and measure it.

3.2.6. Test Procedure

EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated by-log antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2014 on radiated emission measurement.



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3.2.7. Measuring Instruments and Setting

Please refer to equipment list in this report. The following table is the setting of spectrum analyzer and receiver

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB/VB 200Hz/1KHz for QP/AVG
Start ~ Stop Frequency	150kHz~30MHz / RB/VB 9kHz/30KHz for QP/AVG
Start ~ Stop Frequency	30MHz~1000MHz / RB/VB 120kHz/1MHz for QP

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10 th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average

The frequency range from 30MHz to 1000MHz and above 1000MHz is checked.

3.2.8. Radiated Emission Noise Measurement Result

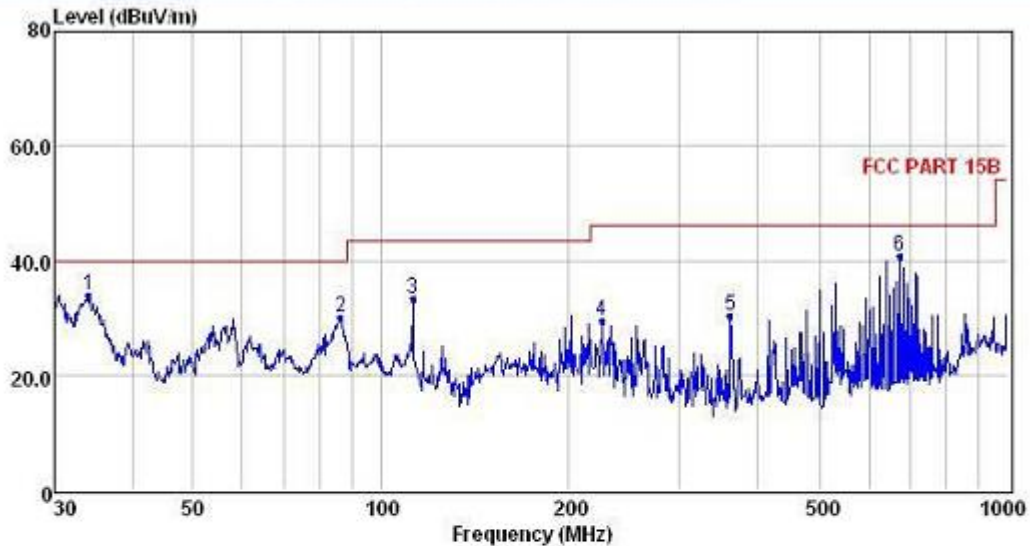
PASS.

The scanning waveforms please refer to the next page.





Test Model	4026GX2	Test Mode	communication
Environmental Conditions	22.3°C, 53.3% RH	Detector Function	Quasi-peak
Pol	Vertical	Distance	3m
Test Engineer	Hy Luo	Test Voltage	AC 120V/60Hz



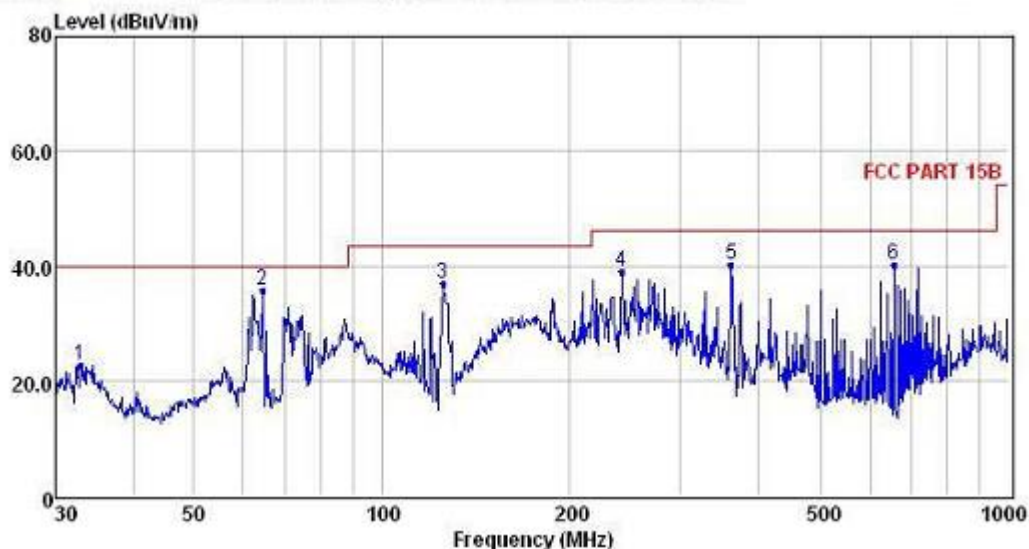
	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	34.04	22.66	0.45	10.85	33.96	40.00	-6.04	QP
2	86.20	19.75	0.76	9.61	30.12	40.00	-9.88	QP
3	112.52	21.21	0.87	11.19	33.27	43.50	-10.23	QP
4	226.10	16.27	1.24	11.92	29.43	46.00	-16.57	QP
5	362.98	14.30	1.37	14.69	30.36	46.00	-15.64	QP
6	672.84	20.28	1.72	18.65	40.65	46.00	-5.35	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that are 20db below the official limit are not reported





Test Model	4026GX2	Test Mode	communication
Environmental Conditions	22.3°C, 53.3% RH	Detector Function	Quasi-peak
Pol	Horizontal	Distance	3m
Test Engineer	Hy Luo	Test Voltage	AC 120V/60Hz



	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	32.86	11.41	0.44	10.78	22.63	40.00	-17.37	QP
2	64.43	23.46	0.67	11.44	35.57	40.00	-4.43	QP
3	125.01	25.95	0.93	9.99	36.87	43.50	-6.63	QP
4	241.68	25.49	1.25	12.24	38.98	46.00	-7.02	QP
5	362.98	24.04	1.37	14.69	40.10	46.00	-5.90	QP
6	656.53	19.99	1.68	18.61	40.28	46.00	-5.72	QP

Note: 1. All readings are Quasi-peak values.

2. Measured= Reading + Antenna Factor + Cable Loss

3. The emission that are 20db below the official limit are not reported

Note: Pre-Scan all mode, Thus record worse case mode result in this report.

Remark: For above 1000MHz, Because the emission it too low to be reported.



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4. PHOTOGRAPH



Photo of Power Line Conducted Measurement

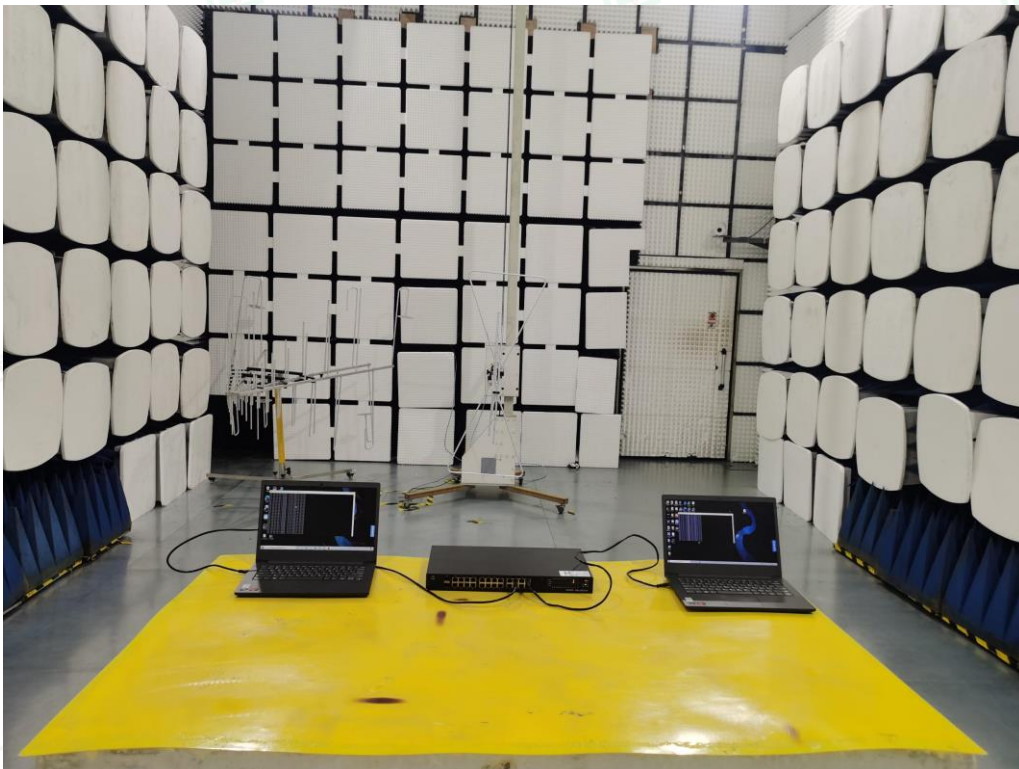


Photo of Radiated emission Measurement





5. EXTERNAL AND INTERNAL PHOTOS OF THE EUT



Fig. 1



Fig. 2





Fig. 3



Fig. 4





Fig. 5

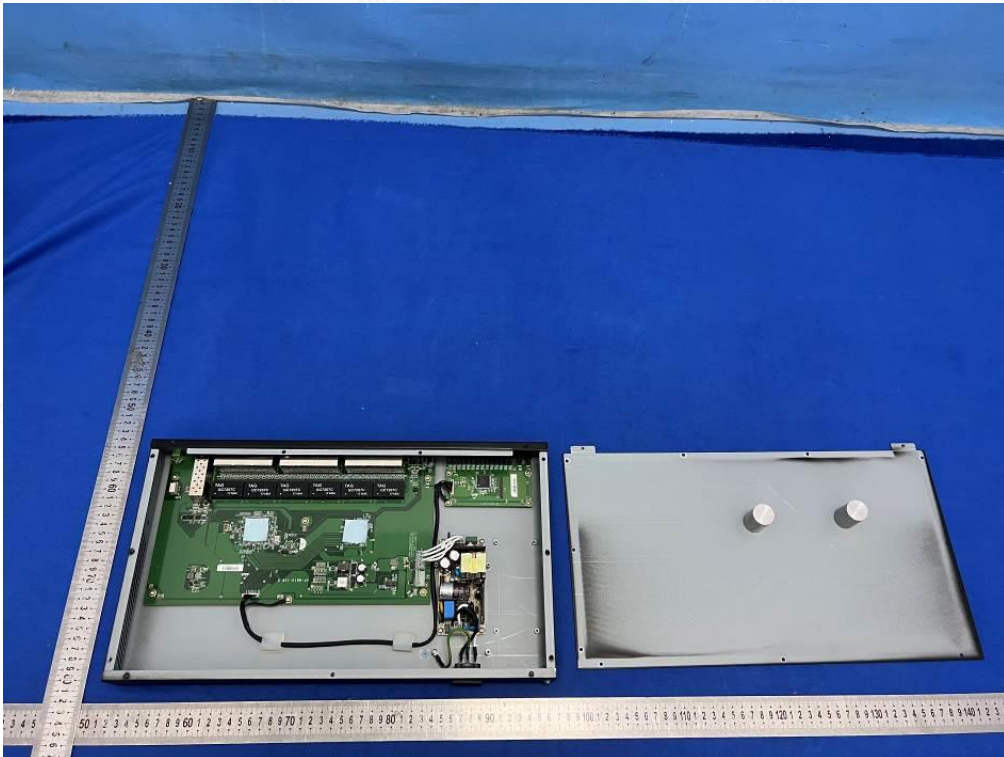


Fig. 6



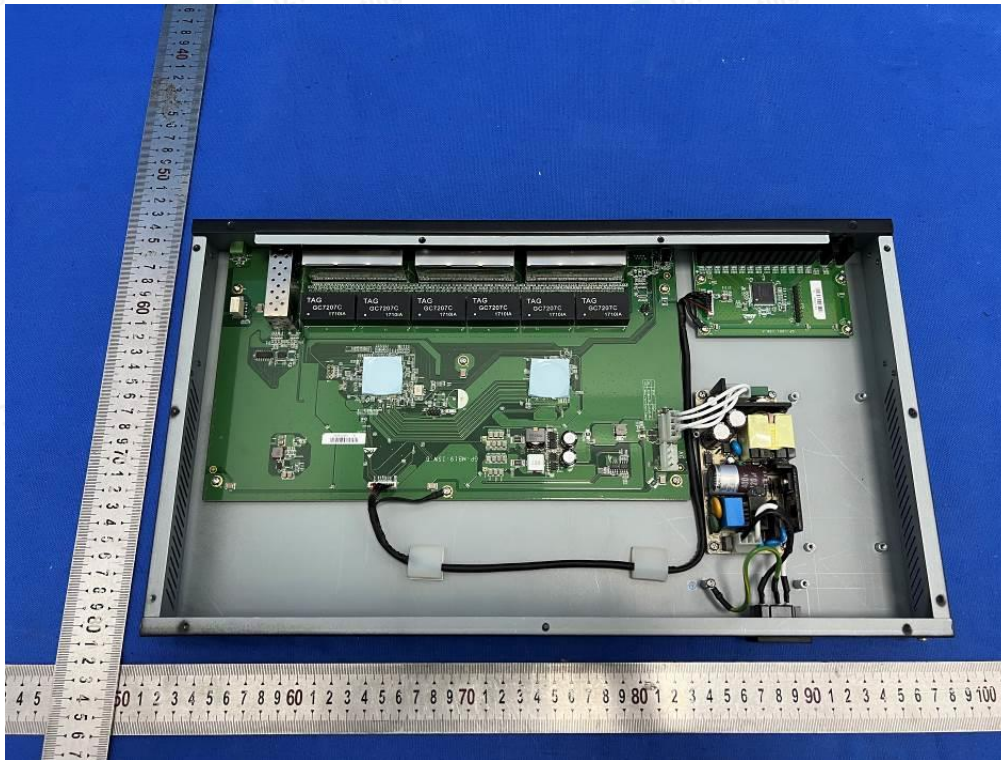


Fig. 7

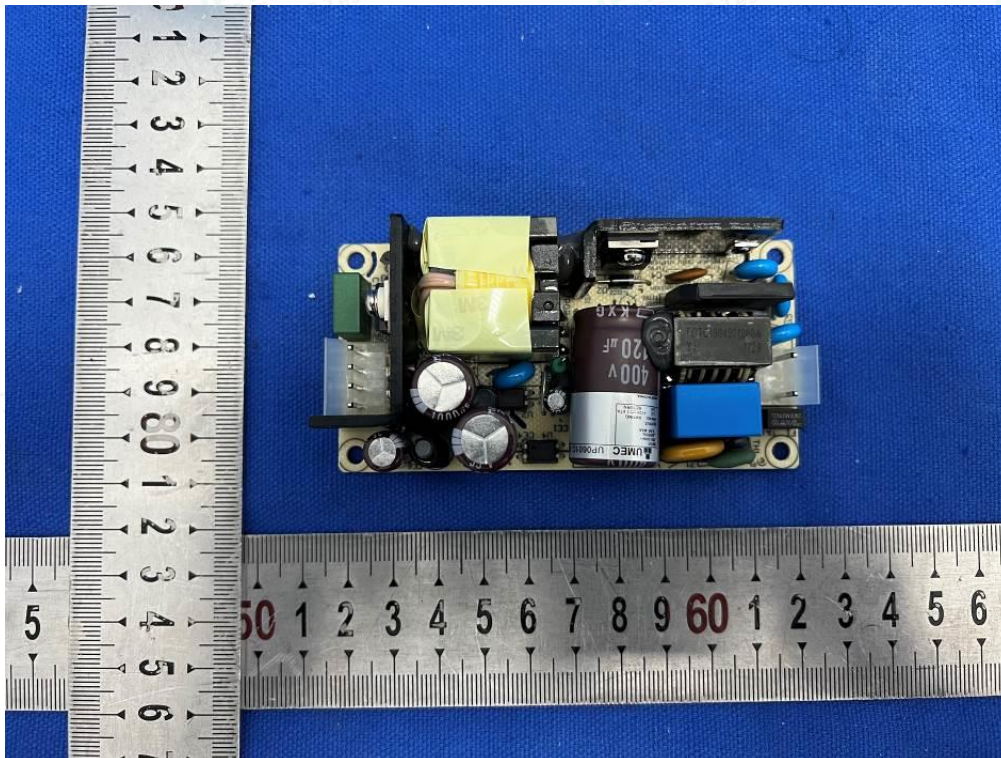


Fig. 8



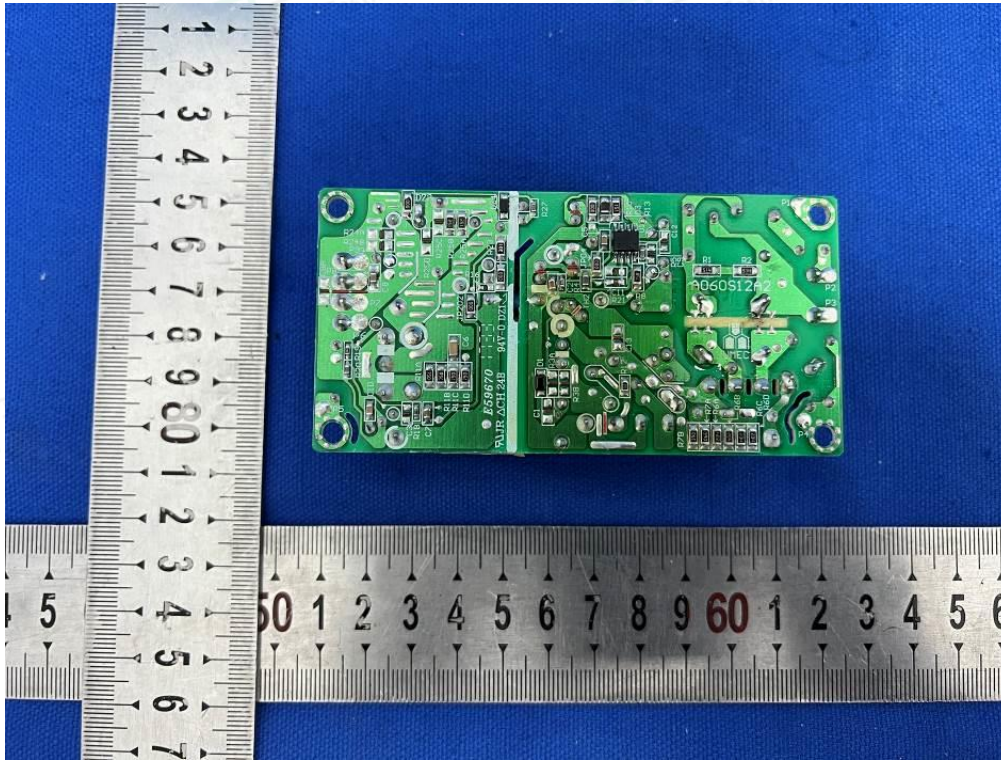


Fig. 9

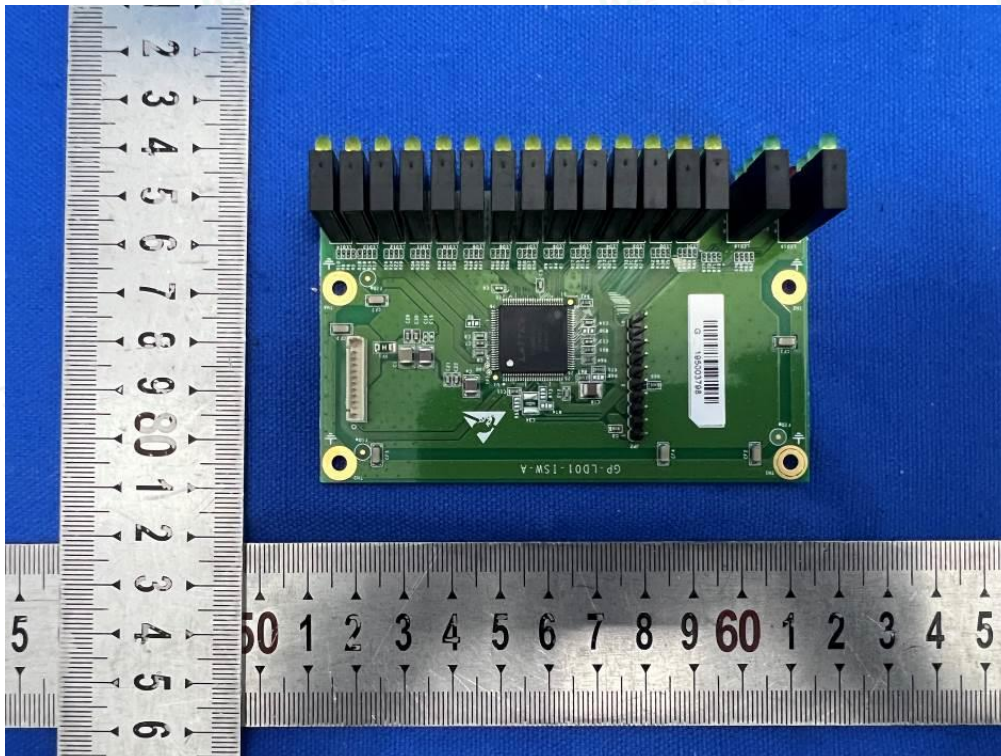


Fig. 10



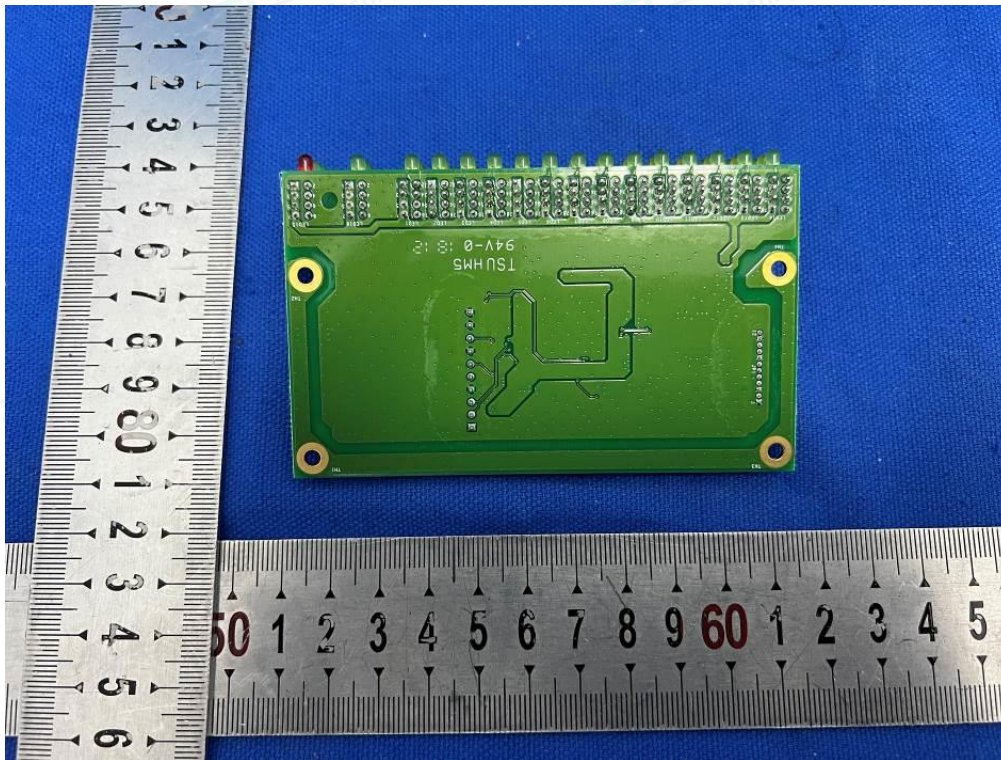


Fig. 11

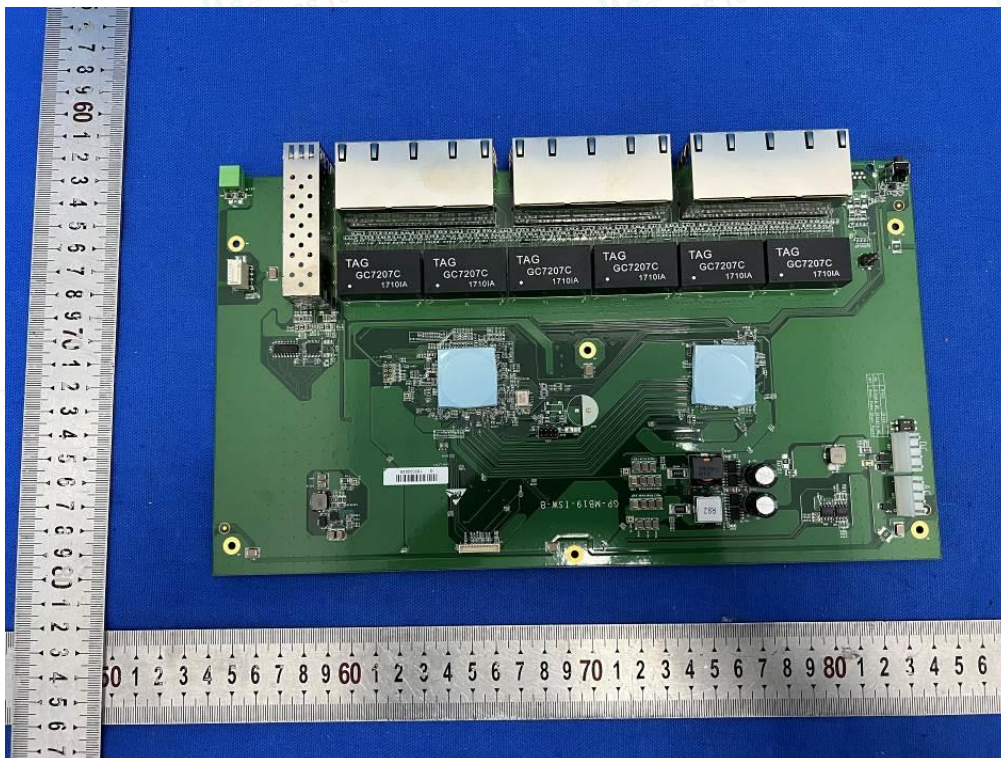


Fig. 12



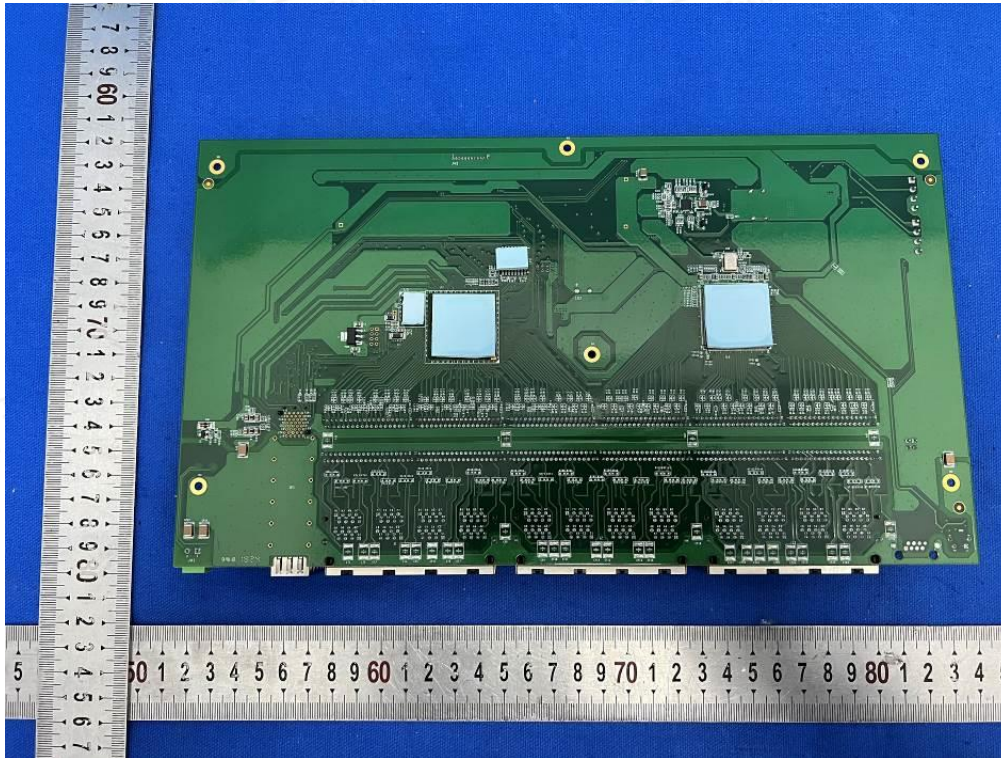


Fig. 13



-----THE END OF TEST REPORT-----

