

FCC 47 CFR Part 15 Subpart B

TEST REPORT

For

RK3588 Core Board

MODEL NUMBER: ATK-CLRK3588B

REPORT NUMBER: E04A24041167F00201

ISSUE DATE: May 29, 2024

Prepared for

**Guangzhou Xingyi Electronic Technology Co., Ltd
Room 805-808, Room 801, Building 4, No. 1, 3, and 5, Kesheng Road, Guangzhou
Private Science and Technology Park, No. 1633 Beitai Road, Baiyun District,
Guangzhou City**

Prepared by

Guangdong Global Testing Technology Co., Ltd.

**Room 101-105, 203-210, Building 1, No.2, Keji 8 Road, Songshan Lake Park,
Dongguan city, Guangdong, People's Republic of China, 523808**

This report is based on a single evaluation of the submitted sample(s) of the above mentioned product, it does not imply an assessment of the production of the products.

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Guangdong Global Testing Technology Co., Ltd.**

Revision History

Rev.	Issue Date	Revisions	Revised By
V0	May 29, 2024	Initial Issue	

Summary of Test Results

Emission			
Standard	Test Item	Limit	Result
FCC 47 CFR Part 15 Subpart B	Conducted emissions	FCC Part 15.107	N/A
	Radiated emissions below 1GHz	FCC Part 15.109	Pass
	Radiated emissions above 1GHz	FCC Part 15.109	Pass

Note:

1. N/A: In this whole report not applicable.

*This test report is only published to and used by the applicant, and it is not for evidence purpose in China.

*The measurement result for the sample received is <Pass> according to <FCC 47 CFR Part 15 Subpart B> when <Accuracy Method> decision rule is applied.

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: Guangzhou Xingyi Electronic Technology Co., Ltd
Address: Room 805-808, Room 801, Building 4, No. 1, 3, and 5, Kesheng Road, Guangzhou Private Science and Technology Park, No. 1633 Beitai Road, Baiyun District, Guangzhou City

Manufacturer Information

Company Name: Guangzhou Xingyi Electronic Technology Co., Ltd
Address: Room 805-808, Room 801, Building 4, No. 1, 3, and 5, Kesheng Road, Guangzhou Private Science and Technology Park, No. 1633 Beitai Road, Baiyun District, Guangzhou City

Factory Information

Company Name: Dongguan Zhichen Electronic Technology Co., Ltd
Address: 301, Building 1, No. 16 Xingui Road, Lincun, Tangxia Town, Dongguan City, Guangdong Province

EUT Information

Product Description: RK3588 Core Board
Model: ATK-CLRK3588B
Brand: ALIENTEK
Sample Received Date: 13 May 2024
Sample Status: Normal
Sample ID: A24041167 001
Date of Tested: May 25, 2024 to May 29, 2024

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC 47 CFR Part 15 Subpart B	Pass

Prepared By:

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Shawn Wen

Laboratory Manager



2. TEST METHODOLOGY

All tests were performed in accordance with the standard FCC 47 CFR Part 15 Subpart B

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	<p>A2LA (Certificate No.: 6947.01) Guangdong Global Testing Technology Co., Ltd. has been assessed and proved to be in compliance with A2LA.</p> <p>FCC (FCC Designation No.: CN1343) Guangdong Global Testing Technology Co., Ltd. has been recognized to perform compliance testing on equipment subject to Supplier's Declaration of Conformity (SDoC) and Certification rules</p> <p>ISED (Company No.: 30714) Guangdong Global Testing Technology Co., Ltd. has been registered and fully described in a report filed with ISED. The Company Number is 30714 and the test lab Conformity Assessment Body Identifier (CABID) is CN0148.</p>
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Note: All tests measurement facilities use to collect the measurement data are located at Room 101-105, 203-210, Building 1, No.2, Keji 8 Road, Songshan Lake Park, Dongguan city, Guangdong, People's Republic of China, 523808

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Measurement Frequency Range	K	U(dB)
Radiated emissions below 1GHz	30 MHz -1 GHz	2	3.79
Radiated emissions above 1GHz	1 GHz - 18 GHz	2	5.62
Note1: This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.			
Note 2: According to the standard CISPR 16-4-2, the MU for the Conducted emissions from the AC mains power ports using AMN should not exceed 3.8 in range of 9kHz to 150kHz and 3.4 in range of 150kHz to 30MHz. We have considered the test results containing the value of U _{lab} (in dB) for the measurement instrumentation actually used for the measurements.			

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

EUT Name		RK3588 Core Board
Model		ATK-CLRK3588B
EUT Classification		Class B
Ratings		DC12V,2.5A
Power Supply	DC	DC12V from adapter AC120V/60Hz

5.2. TEST MODE

Test Mode	Description
M01	Normal working

5.3. EUT ACCESSORY

Adapter	
Model No.:	GQ30B-120250-AC
Input:	AC100-240V,50/60 Hz, 1.0 A Max
Output:	DC12V 2.5A
DC Cable:	1.2 Meter, Shielded without ferrite

5.4. SUPPORT UNITS FOR SYSTEM TEST

The EUT has been tested as an independent unit

6. MEASURING EQUIPMENT AND SOFTWARE USED

Test Equipment of Radiated emissions below 1GHz					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
Chamber	ETS	9*6*6	Q2146	2022/8/30	2025/8/29
Receiver	R&S	ESCI3	101409	2023/9/18	2024/9/17
Loop Antenna	ETS	6502	243668	2022/3/30	2025/3/30
Pre-Amplifier	HzEMC	HPA-9K0130	HYP A21001	2023/9/18	2024/9/17
Biconilog Antenna	Schwarzbeck	VULB 9168	1315	2022/10/10	2025/10/9
Biconilog Antenna	ETS	3142E	243646	2022/3/23	2025/3/22
Test Software for RE	Farad	EZ-EMC	V1.1.4.2	N/A	N/A

Test Equipment of Radiated emissions above 1GHz					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
Spectrum Analyzer	R&S	FSV40	101413	2023/9/18	2024/9/17
Pre-Amplifier	HzEMC	HPA-1G1850	HYP A21003	2023/9/18	2024/9/17
Horn antenna	ETS	3117	246069	2022/3/11	2025/3/10
Pre-Amplifier	ETS	HPA-184057	HYP A21004	2023/9/18	2024/9/17
Horn antenna	ETS	3116C	246265	2022/3/29	2025/3/28
Test Software for RE	Farad	EZ-EMC	V1.1.4.2	N/A	N/A

7. EMISSION TEST

7.1. RADIATED EMISSIONS BELOW 1GHZ

LIMITS

Below 1 GHz

CFR 47 FCC Part 15 Subpart B		
Frequency (MHz)	Class A	Class B
	Field strength (dBuV/m) (at 3 m)	Field strength (dBuV/m) (at 3 m)
30 - 88	49.5	40
88 - 216	53.9	43.5
216 - 960	56.9	46
Above 960	60	54

Test Frequency Range of Radiated Disturbance Measurement

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 - 108	1000
108 - 500	2000
500 - 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

NOTE:

- (1) The limit for radiated test was performed according to FCC Part 15, Subpart B;
- (2) The tighter limit applies at the band edges;
- (3) Emission level (dBuV/m) = 20log Emission level (uV/m),
3m Emission level = 10 m Emission level + 20log(10 m/3 m);

TEST PROCEDURE

Below 1 GHz and above 30 MHz

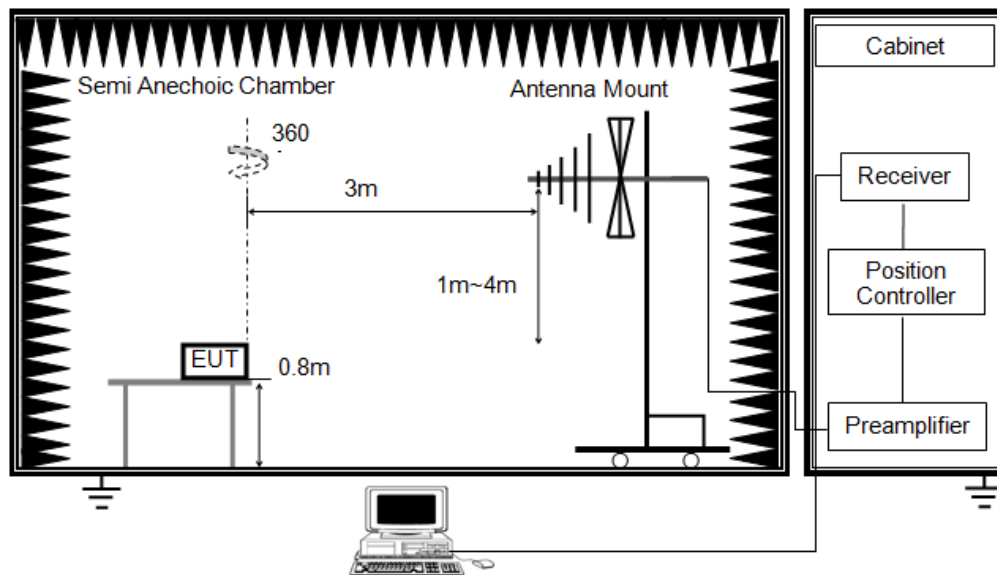
The setting of the spectrum analyser

RBW	120 kHz
VBW	300 kHz
Sweep	Auto
Detector	Peak and QP
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.4-2014.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp was used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 80 cm above ground.
4. 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.
5. 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.
6. Cables of hand-operated devices, such as keyboards and mice, shall be placed as for normal used.
7. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
8. For measurement below 1 GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.

TEST SETUP



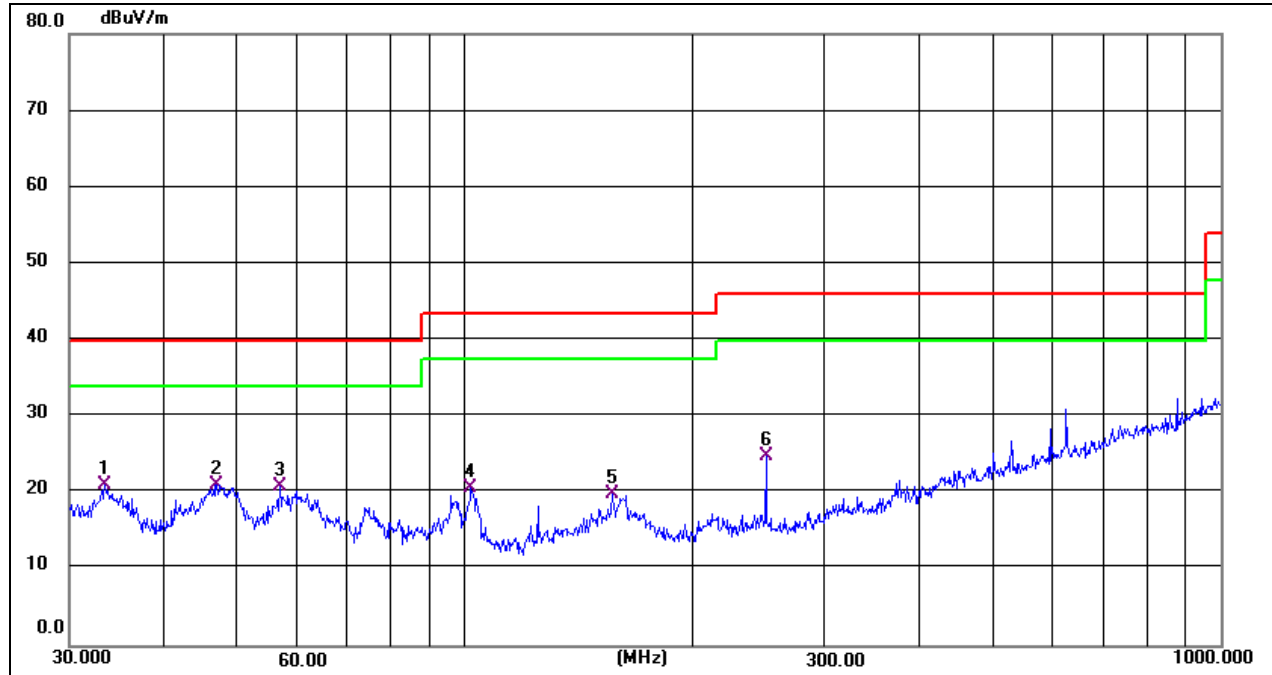
TEST ENVIRONMENT

Temperature	22.8°C	Relative Humidity	53%
Atmosphere Pressure	101kPa		

TEST MODE

Pre-test Mode:	M01 ~ M01
Final Test Mode:	M01

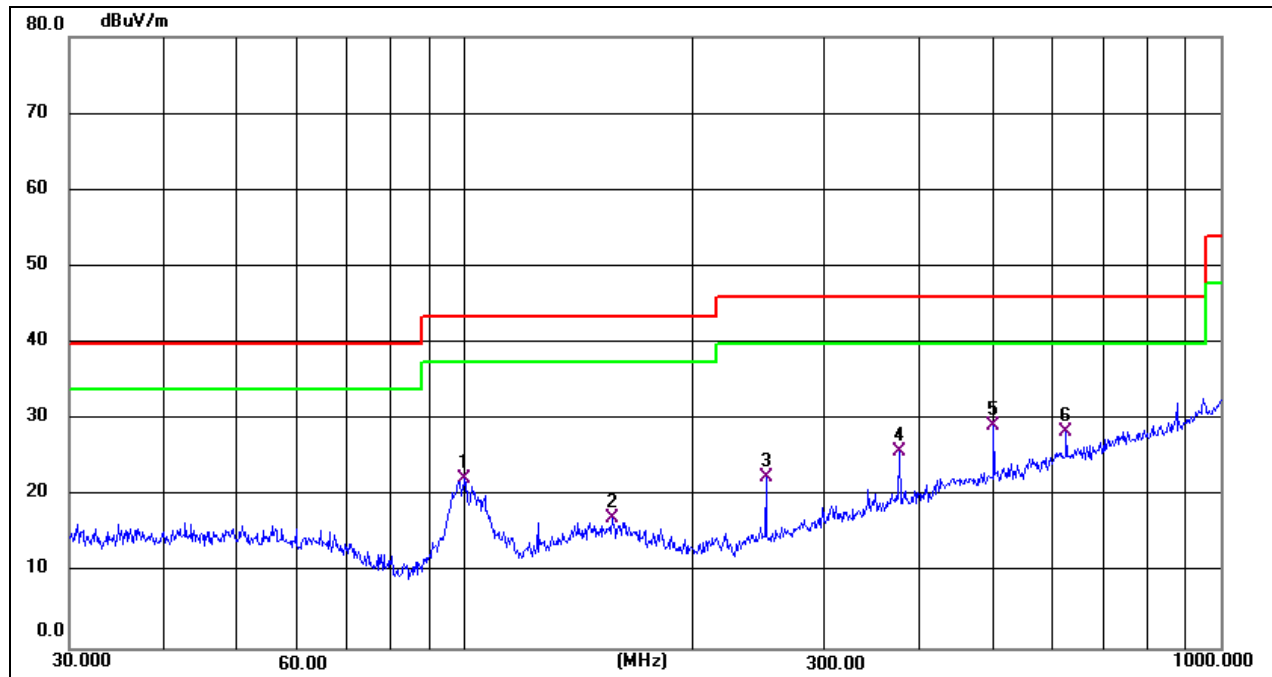
Note: All test modes had been tested, but only the worst data recorded in the report.

TEST RESULTS

Antenna::Vertical

Mode: M01

No .	Frequenc y (MHz)	Reading Level(dBuV)	Correct Factor(dB/m)	Measure- ment(dBuV/m)	Limit (dBuV/m)	Margi n (dB)	Detecto r	Commen t
1	33.4450	33.32	-12.16	21.16	40.00	-18.84	QP	
2 *	46.9947	33.33	-12.16	21.17	40.00	-18.83	QP	
3	56.9912	33.75	-12.88	20.87	40.00	-19.13	QP	
4	102.0013	37.01	-16.30	20.71	43.50	-22.79	QP	
5	157.0073	32.12	-12.23	19.89	43.50	-23.61	QP	
6	250.3011	38.65	-13.82	24.83	46.00	-21.17	QP	



Antenna::Horizontal

Mode: M01

No .	Frequenc y (MHz)	Reading Level(dBuV)	Correct Factor(dB/m)	Measure- ment(dBuV/m)	Limit (dBuV/m)	Margi n (dB)	Detecto r	Commen t
1	99.8777	38.78	-16.51	22.27	43.50	-21.23	QP	
2	157.0073	29.45	-12.23	17.22	43.50	-26.28	QP	
3	250.3011	36.37	-13.82	22.55	46.00	-23.45	QP	
4	375.9385	35.43	-9.59	25.84	46.00	-20.16	QP	
5 *	501.1790	35.41	-6.19	29.22	46.00	-16.78	QP	
6	625.0780	31.74	-3.26	28.48	46.00	-17.52	QP	

Remark: 1. Result = Reading +Correct (Amplifier Factor + Cable Loss + Antenna Factor)

2. Margin = Result - Limit

7.2. RADIATED EMISSIONS ABOVE 1GHZ

LIMITS

Above 1 GHz

CFR 47 FCC Part 15 Subpart B				
Frequency (MHz)	Class A		Class B	
	(dBuV/m) (at 3 m)		(dBuV/m) (at 3 m)	
	Peak	Average	Peak	Average
Above 1000	80	60	74	54

Test Frequency Range of Radiated Disturbance Measurement

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 - 108	1000
108 - 500	2000
500 - 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

NOTE:

- (1) The limit for radiated test was performed according to FCC Part 15, Subpart B;
- (2) The tighter limit applies at the band edges;
- (3) Emission level (dBuV/m) = 20log Emission level (uV/m),
3m Emission level = 10 m Emission level + 20log(10 m/3 m);

TEST PROCEDURE

Above 1 GHz

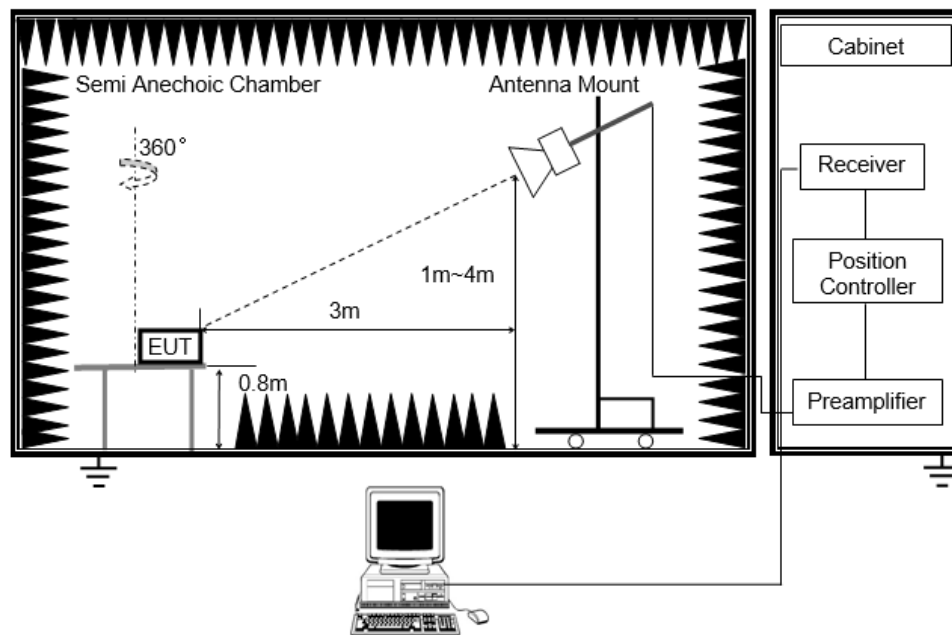
The setting of the spectrum analyser

RBW	1 MHz
VBW	3 MHz
Sweep	Auto
Detector	Peak: Peak AVG: RMS
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.4-2014.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 80 cm above ground.

4. 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.
5. 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.
6. Cables of hand-operated devices, such as keyboards and mice, shall be placed as for normal used.
7. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
8. For measurement above 1 GHz, the peak emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the peak limit specified in Section 15.109. If peak result complies with average limit, average result is deemed to comply with average limit.
9. The average emission measurement will be measured by the RMS detector and must comply with the average limit specified in Section 15.109.

TEST SETUP



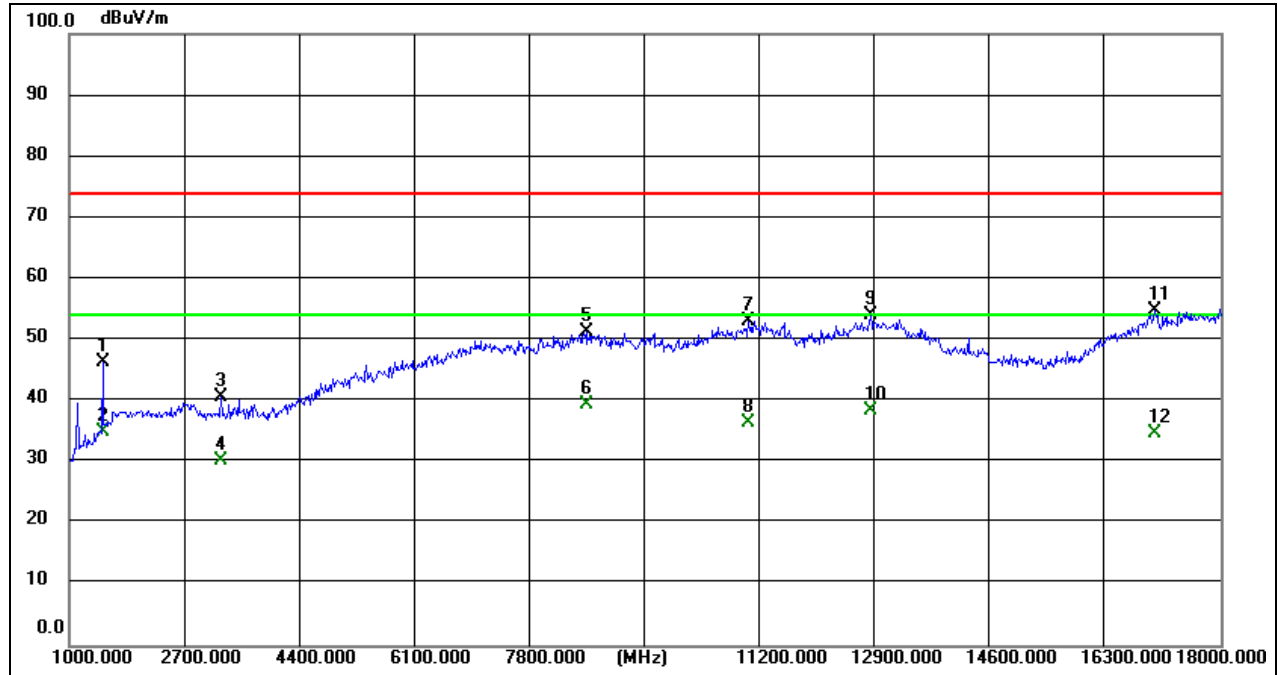
TEST ENVIRONMENT

Temperature	20.3°C	Relative Humidity	51%
Atmosphere Pressure	101kPa		

TEST MODE

Pre-test Mode:	M01 ~ M01
Final Test Mode:	M01

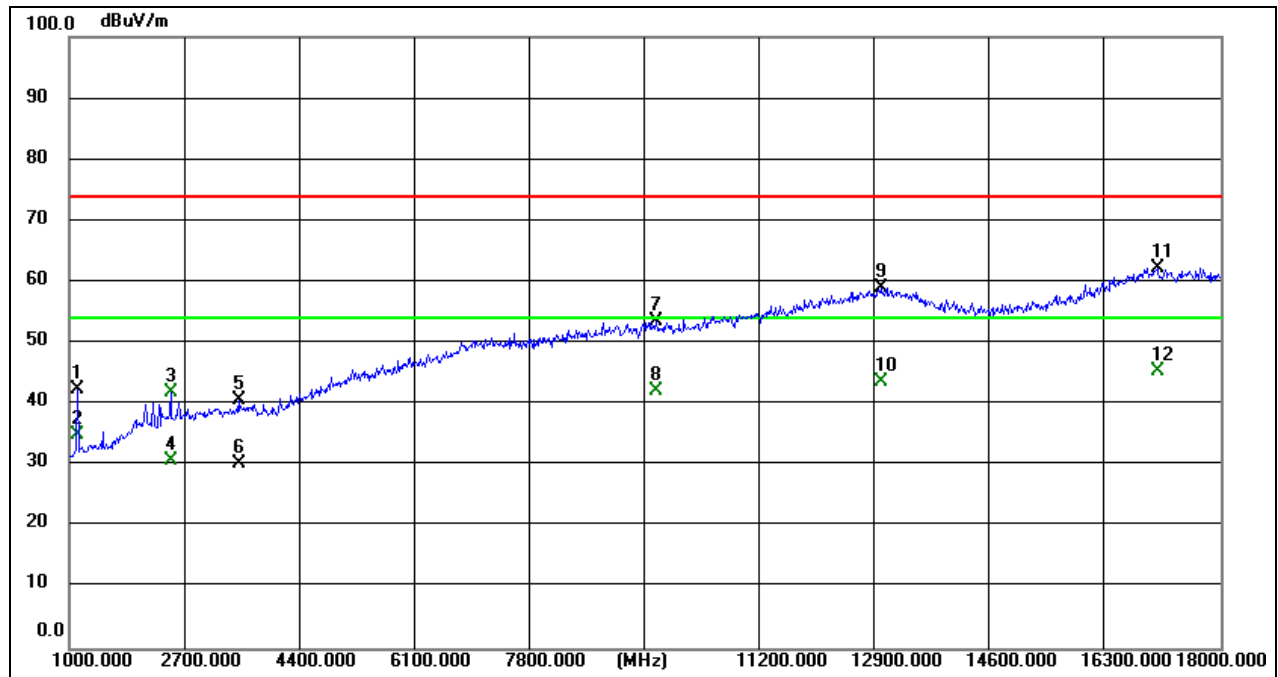
Note: All test modes had been tested, but only the worst data recorded in the report.

TEST RESULTS

Antenna::Horizontal

Mode: M01

No .	Frequenc y (MHz)	Reading Level(dBuV)	Correct Factor(dB/m)	Measure- ment(dBuV/m)	Limit (dBuV/m)	Margi n (dB)	Detecto r	Commen t
1	1499.800	61.11	-14.78	46.33	74.00	-27.67	peak	
2	1499.800	49.90	-14.78	35.12	54.00	-18.88	AVG	
3	3250.800	47.13	-6.31	40.82	74.00	-33.18	peak	
4	3250.800	36.53	-6.31	30.22	54.00	-23.78	AVG	
5	8636.400	45.16	6.25	51.41	74.00	-22.59	peak	
6 *	8636.400	33.27	6.25	39.52	54.00	-14.48	AVG	
7	11031.700	43.92	9.21	53.13	74.00	-20.87	peak	
8	11031.700	27.27	9.21	36.48	54.00	-17.52	AVG	
9	12842.200	42.13	12.07	54.20	74.00	-19.80	peak	
10	12842.200	26.48	12.07	38.55	54.00	-15.45	AVG	
11	17041.200	37.87	16.98	54.85	74.00	-19.15	peak	
12	17041.200	17.80	16.98	34.78	54.00	-19.22	AVG	



Antenna::Vertical

Mode: M01

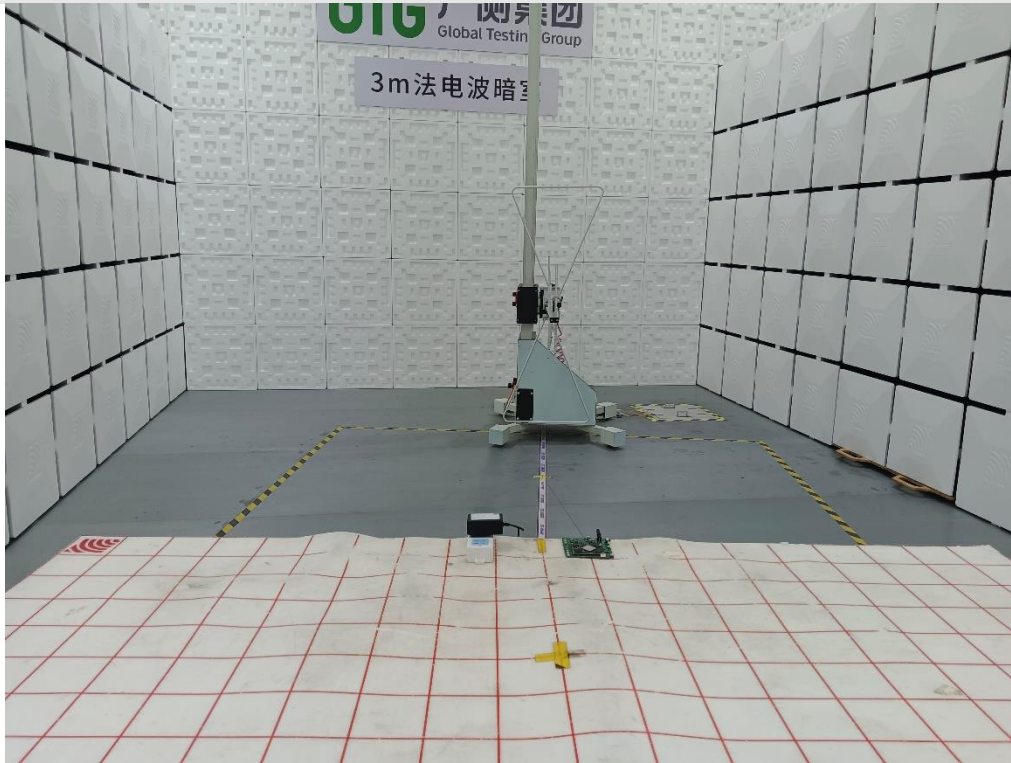
No .	Frequenc y (MHz)	Reading Level(dBuV)	Correct Factor(dB/m)	Measure- ment(dBuV/m)	Limit (dBuV/m)	Margi n (dB)	Detecto r	Commen t
1	1125.800	58.13	-15.73	42.40	74.00	-31.60	peak	
2	1125.800	50.84	-15.73	35.11	54.00	-18.89	AVG	
3	2501.100	51.92	-9.94	41.98	54.00	-12.02	AVG	
4	2501.100	40.83	-9.94	30.89	54.00	-23.11	AVG	
5	3500.700	45.52	-4.88	40.64	74.00	-33.36	peak	
6	3500.700	35.32	-4.88	30.44	74.00	-43.56	peak	
7	9681.900	45.89	7.78	53.67	74.00	-20.33	peak	
8	9681.900	34.37	7.78	42.15	54.00	-11.85	AVG	
9	12991.800	46.75	12.25	59.00	74.00	-15.00	peak	
10	12991.800	31.42	12.25	43.67	54.00	-10.33	AVG	
11	17065.000	45.35	17.01	62.36	74.00	-11.64	peak	
12	17065.000	28.37	17.01	45.38	54.00	-8.62	AVG	

Remark: 1. Result = Reading +Correct (Amplifier Factor + Cable Loss + Antenna Factor)

2. Margin = Result - Limit

APPENDIX: PHOTOGRAPHS OF TEST CONFIGURATION

Radiated emissions below 1GHz

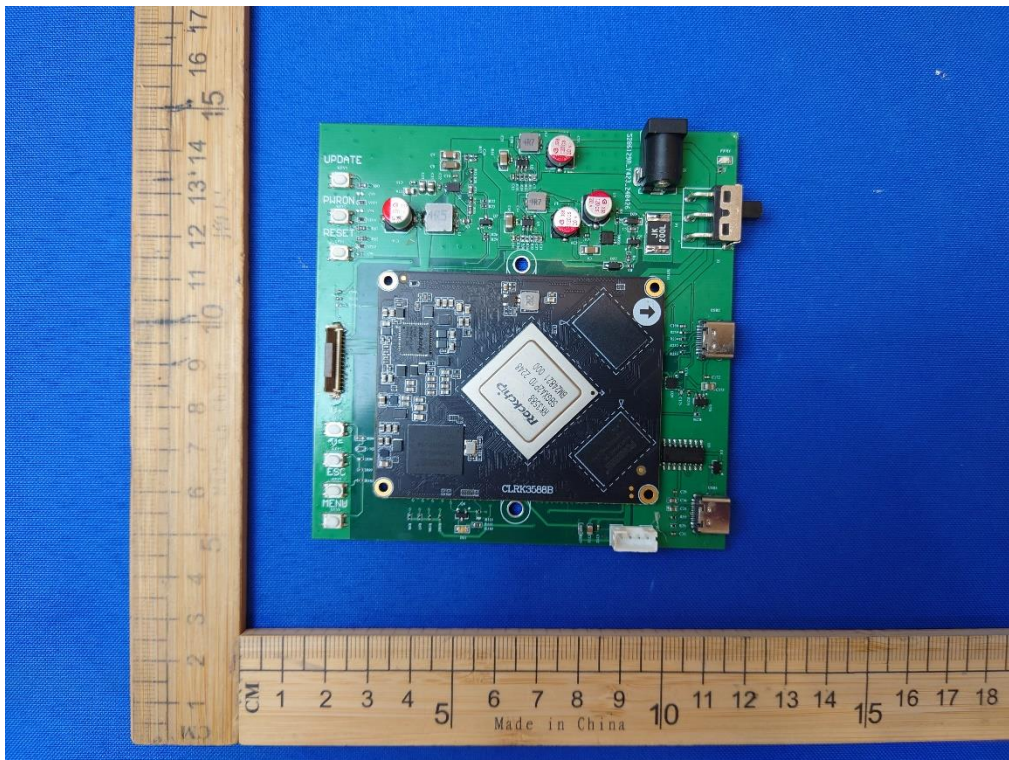


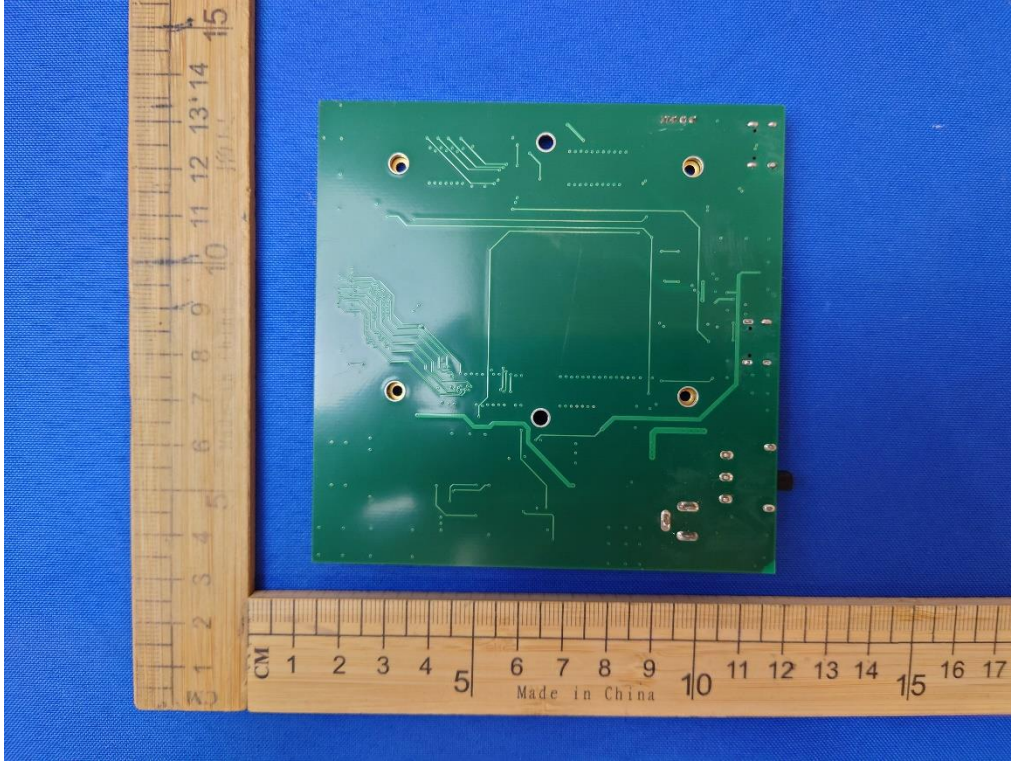
Radiated emissions above 1GHz



APPENDIX: PHOTOGRAPHS OF THE EUT

External







END OF REPORT