

FCC Test Report

Client Name : Cermate Technologies Inc.

Client Address : 7F.-1, No.168, Liancheng Rd. Zhonghe
Dist., New Taipei City 235, Taiwan

Product Name : Human machine interface

Report Date : Mar. 23, 2023

Shenzhen Anbotech Compliance Laboratory Limited



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TEST REPORT

Applicant : Cermate Technologies Inc.
Manufacturer : Cermate Technologies Inc.
Product Name : Human machine interface
Test Model No. : PM207
Reference Model No. : See Chapter 1.9 for model list
Trade Mark : N.A.
Rating(s) : Input: 12V~24V 0.8A(Battery: DC3V 240mAh)

Test Standard(s) : FCC 47 CFR Part 15 Subpart B: 2022

Test Method(s) : ANSI C63.4-2014

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited To determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC 47 CFR Part 15 Subpart B limits both radiated and conducted emissions. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited Is assumed full responsibility for the accuracy and completeness of these measurements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited

Date of Receipt: Nov. 09, 2022

Date of Test: Nov. 09~Dec. 06, 2022

Prepared By:

We Zeng

(We Zeng)

Approved & Authorized Signer:

KingKong Jin

(KingKong Jin)



1. General Information

1.1. Client Information

Applicant	:	Cermate Technologies Inc.
Address	:	7F.-1, No.168, Liancheng Rd. Zhonghe Dist.,New Taipei City 235, Taiwan
Manufacturer	:	Cermate Technologies Inc.
Address	:	7F.-1, No.168, Liancheng Rd. Zhonghe Dist.,New Taipei City 235, Taiwan
Factory	:	Cermate Technologies Inc.
Address	:	7F.-1, No.168, Liancheng Rd. Zhonghe Dist.,New Taipei City 235, Taiwan

1.2. Description of Device (EUT)

Product Name	:	Human machine interface
Test Model No.	:	PM207
Reference Model No.	:	See Chapter 1.9 for model list (Note: All samples are the same except the model number & appearance, so we prepare “PM207” for test only.)
Trade Mark	:	N.A.
Test Power Supply	:	DC 24V
Test Sample No.	:	1-1-1
Product Description	:	N/A
Remark: (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. (2)The test report 18250EC20110101-M1 supersedes the test report 18250EC20110101 which is withdrawn.		

1.3. Auxiliary Equipment Used During Test

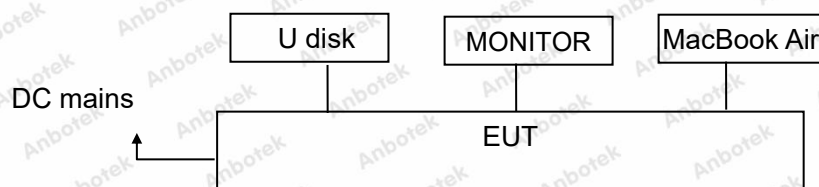
Notebook	:	MacBook Air
		Model: A1466 Input: 14.85V/3.05A CMIIT ID:C02HXB48DRVC



1.4. Description of Test Mode

Pretest Mode	Description
Mode 1	On

For Mode 1 Block Diagram of Test Setup



1.5. Test Summary

Test Items	Test Mode	Status
Power Line Conducted Emission Test	Mode 1	P
Radiated Emission Test (Below 1 GHz)	Mode 1	P
Radiated Emission Test (Above 1GHz)	Mode 1	P
P) Indicates "PASS". F) Indicates "Fail". N) Indicates "Not applicable".		

1.6. Test Equipment List

☒ Power Line Conducted Emission Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	Oct. 23, 2022	1 Year
2.	Three Phase V-type Artificial Power Network	CYBERTEK	EM5040DT	E215040D T001	Jul. 05, 2022	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Oct. 13, 2022	1 Year
4.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Oct. 22, 2022	1 Year
5.	Software Name EZ-EMC	Ferrari Technology	ANB-03A	N/A	N/A	N/A



☒ Radiated Emission Test (Below 1 GHz)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	Oct. 23, 2022	1 Year
2.	Pre-amplifier	SONOMA	310N	186860	Oct. 23, 2022	1 Year
3.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Oct. 23, 2022	1 Year
4.	Software Name EZ-EMC	Ferrari Technology	ANB-03A	N/A	N/A	N/A

☒ Radiated Emission Test (Above 1GHz)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	Oct. 23, 2022	1 Year
2.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Oct. 23, 2022	1 Year
3.	Pre-amplifier	SONOMA	310N	186860	Oct. 23, 2022	1 Year
4.	Software Name EZ-EMC	Ferrari Technology	ANB-03A	N/A	N/A	N/A
5.	EMI Preamplifier	SKET Electronic	LNPA-0118G-45	SKET-PA-002	Oct. 13, 2022	1 Year
6.	Double Ridged Horn Antenna	SCHWARZBECK	BBHA 9120D	02555	Oct. 16, 2022	3 Year

1.7. Measurement Uncertainty

Radiation Uncertainty(30MHz-1GHz)	:	Ur = 4.46 dB (Horizontal)
	:	Ur = 5.04 dB (Vertical)
Radiation Uncertainty(1GHz-6GHz)	:	Ur = 4.92 dB (Horizontal)
	:	Ur = 4.92 dB (Vertical)
Conduction Uncertainty	:	Uc = 3.4 dB
Disturbance Uncertainty	:	Ud = 3.4 dB



1.8. Description of Test Facility

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

FCC-Registration No.: 184111

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory 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 No. 184111.

ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.

1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518128

1.9. Model List

WOP-107E-SAE, PM207-C20, KSM-207, AST-207CHS-0, PM207-xxx0, FM207-xxx0, RM207-xxx0, KM207-xxx0, GM207-xxx0, Xpm207-xxx0, LCM207-xxx0, IPM207-xxx0, PMM207-xxx0, LKM207-xxx0, SM207-xxx0, HM207-xxx0, WM207-xxx0, UM207-xxx0, CM207-xxx0, VM207-xxx0, MHM207-xxx0, GPM207-xxx0, SPM207-xxx0

(The first x represents the number 0 or 1, "0" means LCM 800*480, "1" means LCM 1024*600; The second x represents the letters A,B,C or D, "A" represents the work gauge screen LCM (-30~70℃), "B" represents the work gauge screen LCM (-10~60℃), "C" represents the business gauge LCM (0~50℃), "D" represents the custom specification LCM; The third X represents the number 2 for build-in 2 serial ports / 3 for build-in 3 serial ports / 4 for build-in 2 serial ports & extension bus / 5 for build-in 3 serial ports & extension bus)



2. Power Line Conducted Emission Test

2.1. Test Standard and Limit

Test Standard:	FCC 47 CFR Part 15 Subpart B
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☒ Limits for conducted emission at the AC mains power ports of Class A equipment

Frequency (MHz)	Limits (dB μ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	79.0	66.0
0.50 ~ 30.00	73.0	60.0

Remark: The lower limit shall apply at the transition frequencies.

☐ Limits for conducted emission at the AC mains power ports of Class B equipment

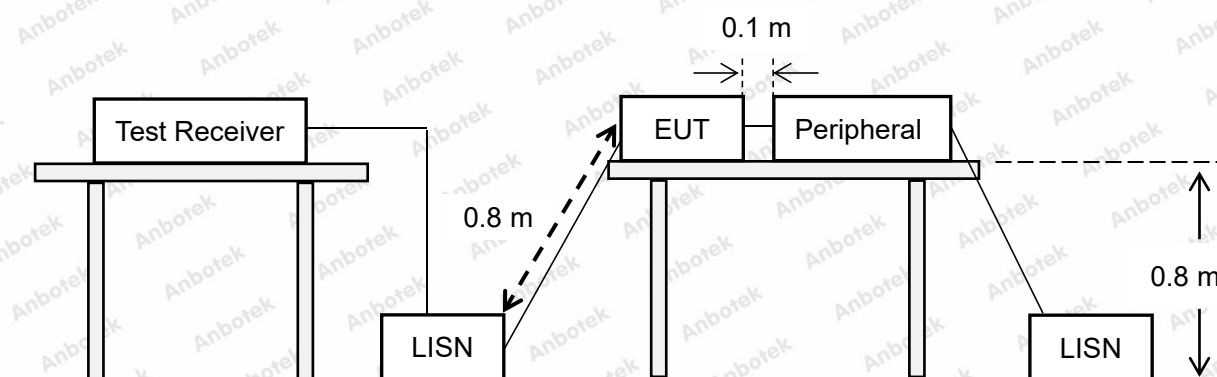
Frequency (MHz)	Limits (dB μ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50 ~ 5.00	56.0	46.0
5.00 ~ 30.00	60.0	50.0

Remark:

(1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

2.2. Test Setup



2.3. Test Procedure

The table-top EUT is placed on a non-conductive table 0.8 m above the horizontal ground reference plane, and the back of the EUT is 0.4 m away from the vertical ground reference plane, and at least 0.8 m from any other metal surface or ground plane. The floor-standing EUT is placed on an insulating support 0.1 m above the horizontal ground reference plate, at least 0.8 m away from other metal objects.

Connect EUT to the power mains through an LISN. Where the mains cable supplied by the manufacturer is longer than 1 m, the excess should be folded at the center into a bundle no longer than 0.4 m, so that its length is shortened to 1 m. All the peripherals are connecting to the other LISN.

The initial testing identified the frequency that has the highest disturbance relative to the limit while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration.

The identification of the frequency of highest disturbance with respect to the limit was found by investigating disturbances at a number of significant frequencies. The probable frequency of maximum disturbance had been found and that the associated cable and EUT configuration and mode of operation had been identified.

Set the test-receiver to quasi peak detect function and average detect function, and to measure the conducted emissions values.

2.4. Test Results

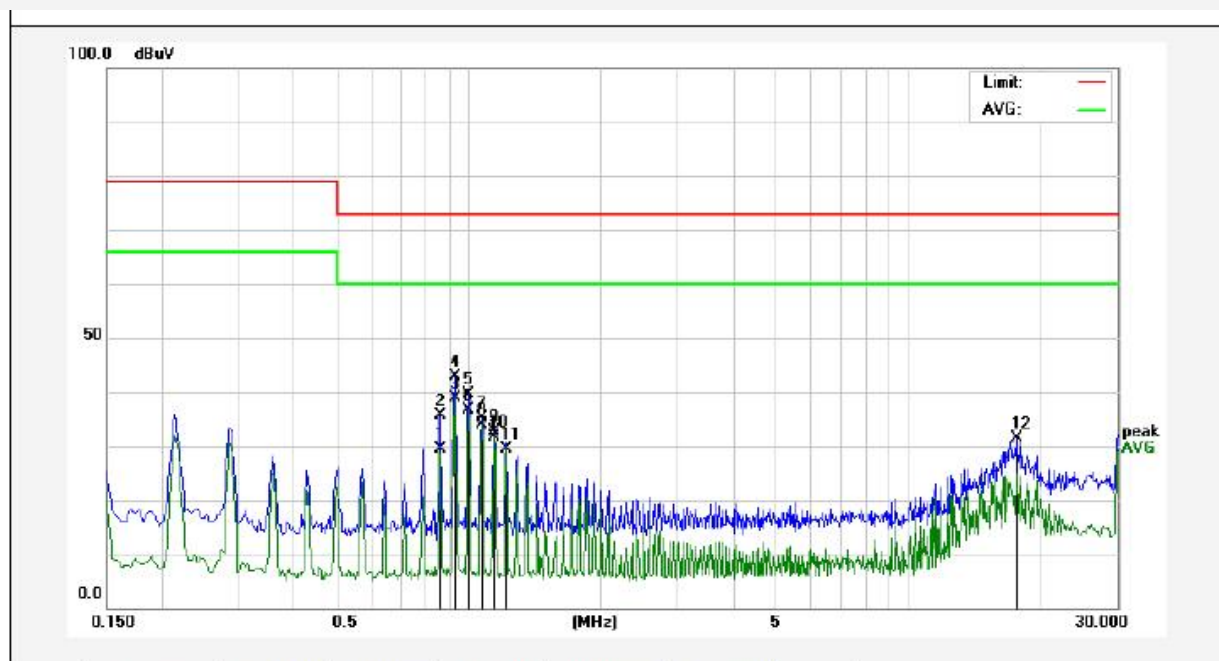
PASS

The test curves are shown in the following pages.



Power Line Conducted Test Data

Test Site: 1# Shielded Room
Test Specification: DC 24V
Comment: +
Temp.: 23.9℃ Hum.: 45%



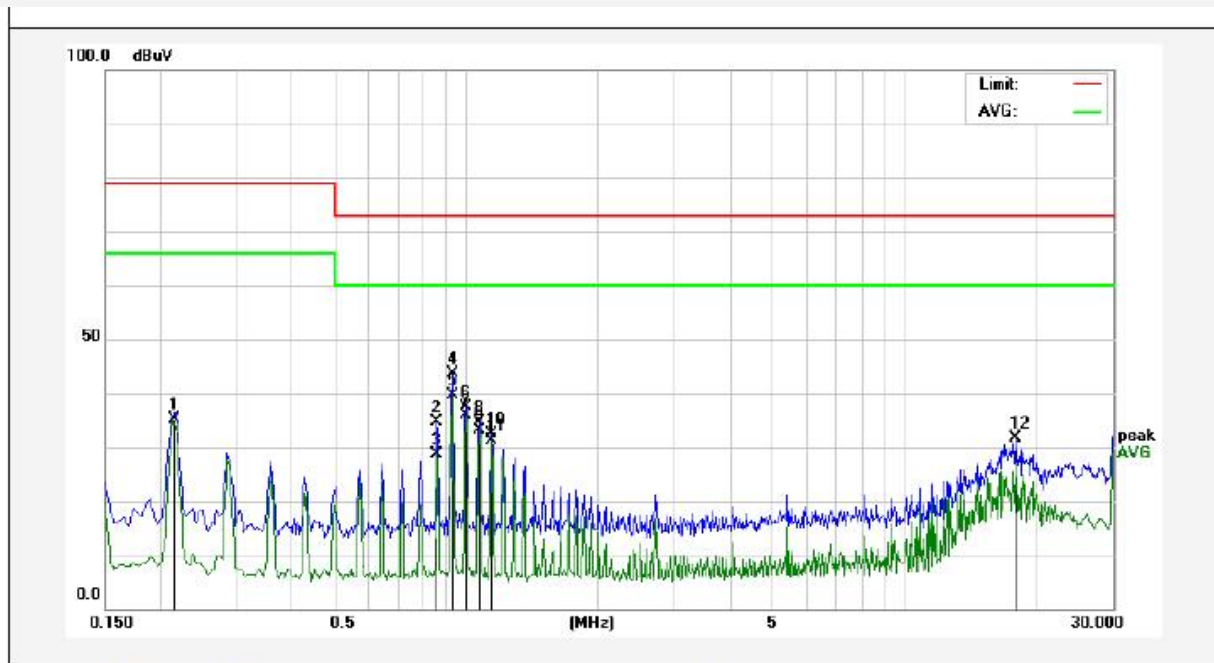
No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.8580	19.60	9.86	29.46	60.00	-30.54	AVG	
2	0.8620	25.80	9.86	35.66	73.00	-37.34	QP	
3	0.9300	29.13	9.85	38.98	60.00	-21.02	AVG	
4	0.9340	33.15	9.85	43.00	73.00	-30.00	QP	
5	1.0020	29.79	9.85	39.64	73.00	-33.36	QP	
6	1.0020	26.66	9.85	36.51	60.00	-23.49	AVG	
7	1.0740	25.37	9.85	35.22	73.00	-37.78	QP	
8	1.0740	23.94	9.85	33.79	60.00	-26.21	AVG	
9	1.1460	22.84	9.85	32.69	73.00	-40.31	QP	
10	1.1460	21.85	9.85	31.70	60.00	-28.30	AVG	
11	1.2180	19.43	9.84	29.27	60.00	-30.73	AVG	
12	17.6780	21.09	10.25	31.34	73.00	-41.66	QP	

Note: Result = Reading + Factor Over Limit = Result - Limit



Power Line Conducted Test Data

Test Site: 1# Shielded Room
Test Specification: DC 24V
Comment: -
Temp.: 23.9℃ Hum.: 45%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.2140	25.24	9.83	35.07	66.00	-30.93	AVG	
2	0.8580	24.88	9.86	34.74	73.00	-38.26	QP	
3	0.8580	18.89	9.86	28.75	60.00	-31.25	AVG	
4	0.9300	33.87	9.85	43.72	73.00	-29.28	QP	
5	0.9300	29.79	9.85	39.64	60.00	-20.36	AVG	
6	1.0020	27.50	9.85	37.35	73.00	-35.65	QP	
7	1.0020	25.95	9.85	35.80	60.00	-24.20	AVG	
8	1.0740	24.66	9.85	34.51	73.00	-38.49	QP	
9	1.0740	23.34	9.85	33.19	60.00	-26.81	AVG	
10	1.1460	22.51	9.85	32.36	73.00	-40.64	QP	
11	1.1460	21.23	9.85	31.08	60.00	-28.92	AVG	
12	17.9780	21.31	10.25	31.56	73.00	-41.44	QP	

Note: Result = Reading + Factor Over Limit = Result - Limit



3. Radiated Emission Test (Below 1 GHz)

3.1. Test Standard and Limit

Test Standard	FCC 47 CFR Part 15 Subpart B
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☒ Limit for radiated emissions at frequencies up to 1 GHz for class A equipment

Test Limit	Frequency (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMIT	
			$\mu\text{V/m}$	(dB $\mu\text{V/m}$)
	30 ~ 88	3	300	49.5
	88 ~ 216	3	500	54.0
	216 ~ 960	3	700	56.9
	960 ~ 1000	3	1000	60.0

Remark: (1) Emission level (dB) μV = 20 log 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.

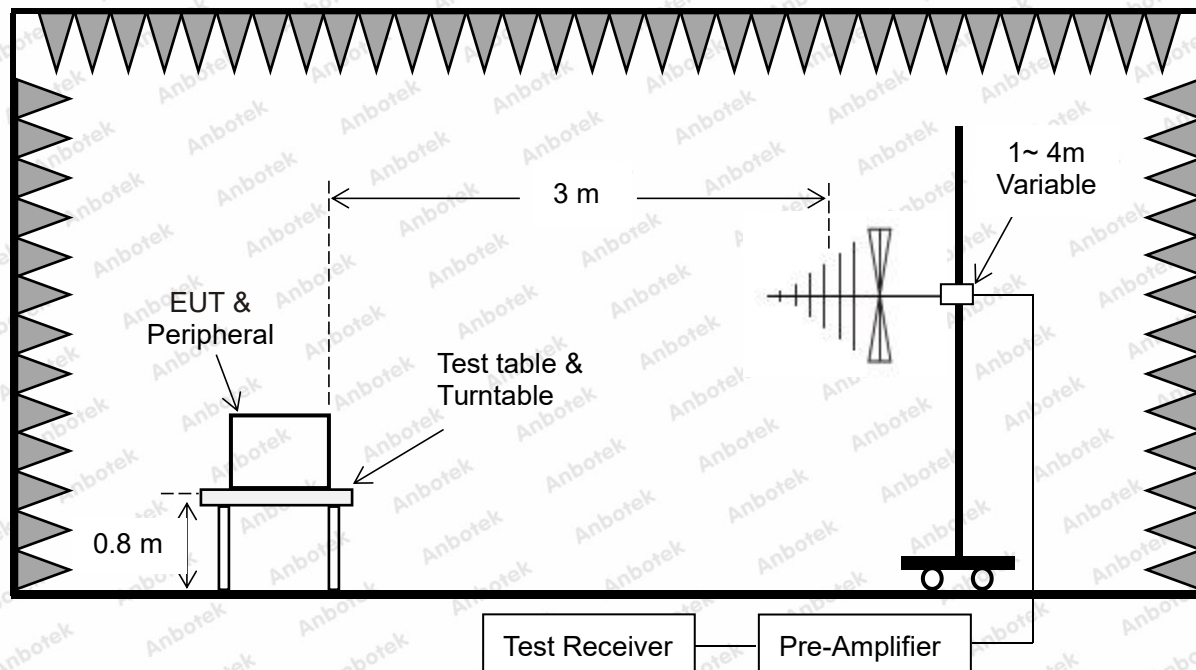
☐ Limit for radiated emissions at frequencies up to 1 GHz for class B equipment

Test Limit	Frequency (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMIT	
			$\mu\text{V/m}$	(dB $\mu\text{V/m}$)
	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 (dB) μV = 20 log 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.



3.2. Test Setup



3.3. Test Procedure

The table-top EUT is placed on a non-conductive table 0.8 m above the horizontal ground reference plane. The floor-standing EUT is placed on an insulating support 0.1 m above the horizontal ground reference plane.

The EUT was set 3 m away from the receiving antenna that was mounted on a non-conductive mast. The antenna can move up and down between 1 to 4 m to find out the maximum emission level.

The turntable can rotate 360 degree to determine the position of the maximum emission level.

The initial testing identified the frequency that has the highest disturbance relative to the limit while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration.

The identification of the frequency of highest emission with respect to the limit was found by investigating emissions at a number of significant frequencies. The probable frequency of maximum emission had been found and that the associated cable and EUT configuration and mode of operation had been identified.

The bandwidth of the Receiver is set at 120 kHz.



3.4. Test Results**PASS**

The test curves are shown in the following pages.



Test item: Radiation Test

Polarization:

Horizontal

Standard: (RE)FCC 47 CFR Part 15
Subpart B

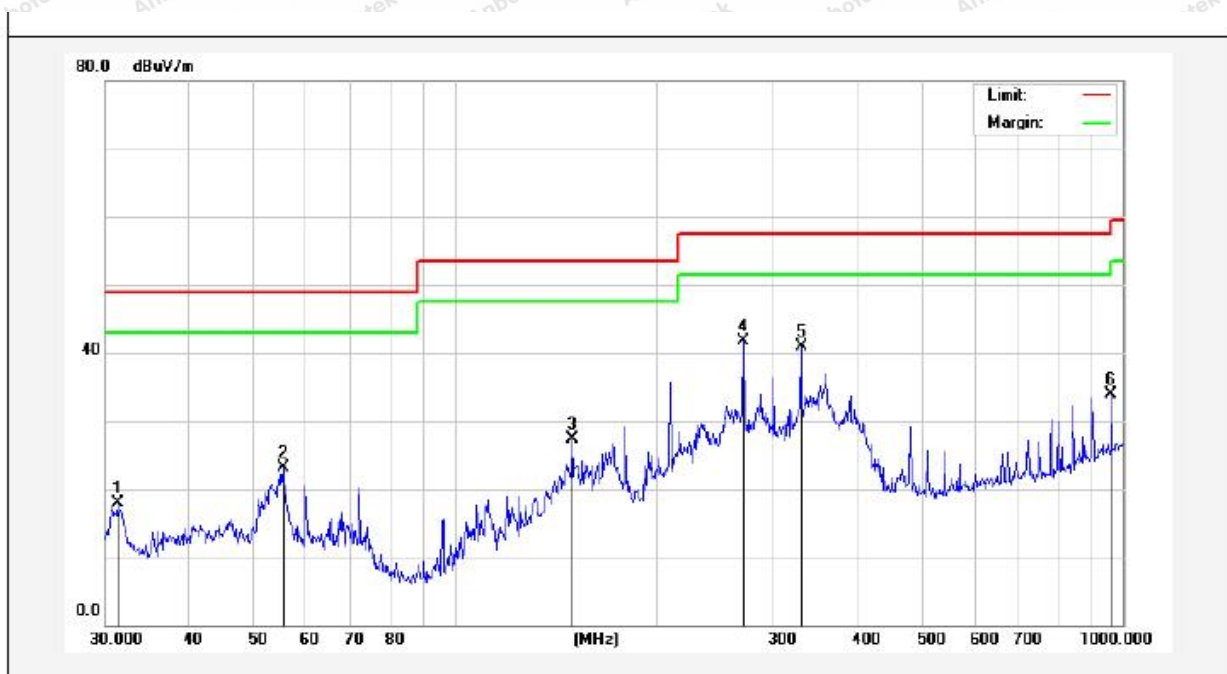
Power Source:

DC 24V

Frequency Range: 30MHz ~ 1000MHz

Temp.(°C)/Hum.(%RH): 23.6(°C)/47%RH

Distance: 3m



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	31.2893	37.74	-19.79	17.95	49.00	-31.05	QP			
2	55.4147	40.64	-17.62	23.02	49.00	-25.98	QP			
3	150.0108	50.13	-22.85	27.28	53.50	-26.22	QP			
4	270.3748	61.38	-19.72	41.66	57.50	-15.84	QP			
5	330.1949	57.30	-16.46	40.84	57.50	-16.66	QP			
6	962.1623	39.43	-5.44	33.99	59.50	-25.51	QP			

Note: Result= Reading + Factor Over Limit=Result-Limit



Test item: Radiation Test

Polarization:

Vertical

Standard: (RE)FCC 47 CFR Part 15
Subpart B

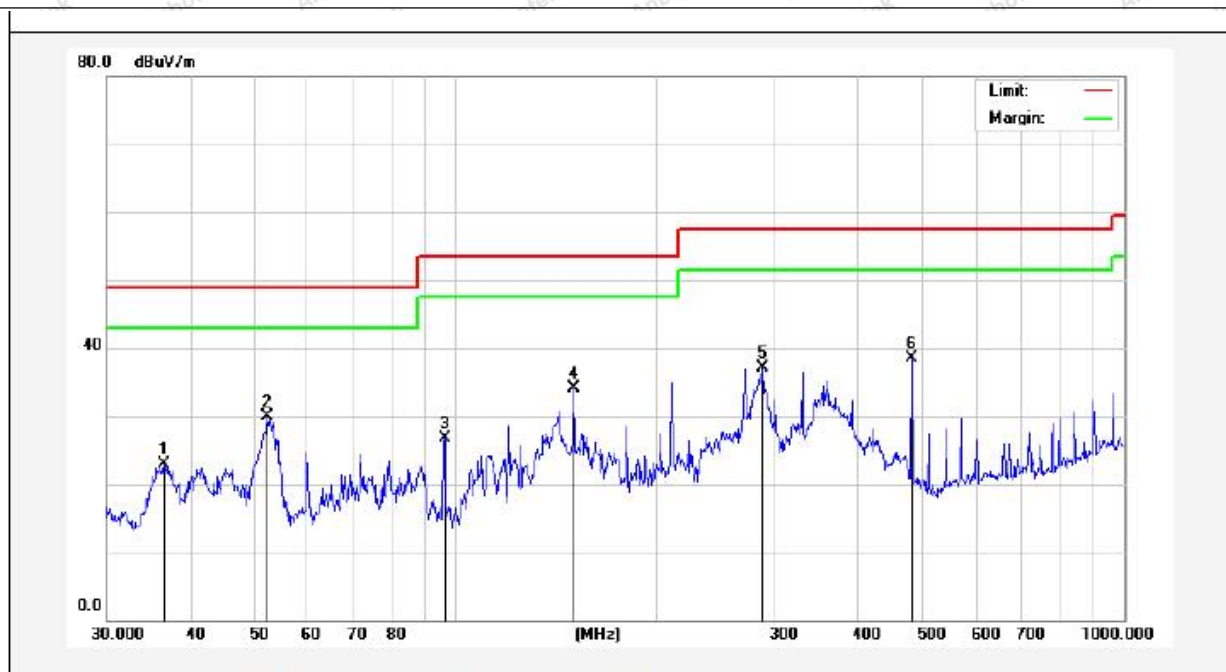
Power Source:

DC 24V

Frequency Range: 30MHz ~ 1000MHz

Temp.(°C)/Hum:(%RH): 23.6(°C)/47%RH

Distance: 3m



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	36.5092	39.33	-16.37	22.96	49.00	-26.04	QP			
2	52.2079	46.55	-16.59	29.96	49.00	-19.04	QP			
3	96.0986	43.88	-17.08	26.80	53.50	-26.70	QP			
4	150.0108	56.25	-22.09	34.16	53.50	-19.34	QP			
5	287.9904	53.80	-16.67	37.13	57.50	-20.37	QP			
6	480.5276	51.25	-12.79	38.46	57.50	-19.04	QP			

Note: Result= Reading + Factor Over Limit=Result-Limit



4. Radiated Emission Test (Above 1GHz)

4.1. Test Standard and Limit

Test Standard	FCC 47 CFR Part 15 Subpart B
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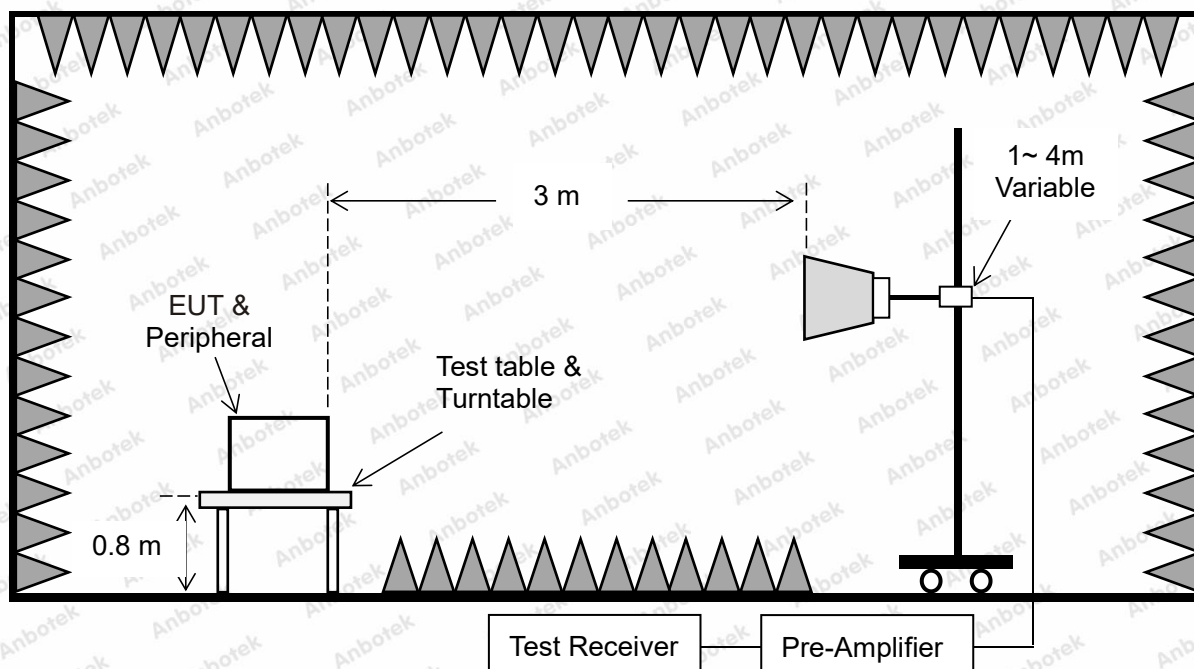
☒ Limit for radiated emissions at frequencies above 1 GHz for class A equipment

Frequency (MHz)	Distance (Meters)	Field Strengths Limit (dB μ V/m)	
		Peak	Average
1000 ~ 6000	3	79.5	59.5
Remark: N/A			

☐ Limit for radiated emissions at frequencies above 1 GHz for class B equipment

Frequency (MHz)	Distance (Meters)	Field Strengths Limit (dB μ V/m)	
		Peak	Average
1000 ~ 6000	3	74	54
Remark: N/A			

4.2. Test Setup



4.3. Test Procedure

The table-top EUT is placed on a non-conductive table 0.8 m above the horizontal ground reference plane. The floor-standing EUT is placed on an insulating support 0.1 m above the horizontal ground reference plane.

The EUT was set 3 m away from the receiving antenna that was mounted on a non-conductive mast. The antenna can move up and down between 1 to 4 m to find out the maximum emission level.

The turntable can rotate 360 degree to determine the position of the maximum emission level.

The initial testing identified the frequency that has the highest disturbance relative to the limit while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration.

The identification of the frequency of highest emission with respect to the limit was found by investigating emissions at a number of significant frequencies. The probable frequency of maximum emission had been found and that the associated cable and EUT configuration and mode of operation had been identified.

The test receiver is set to peak and average detects function.

The bandwidth of the test receiver is set at 1MHz.

4.4. Test Results

PASS

The test curves are shown in the following pages.



Test item: Radiation Test Polarization: Horizontal
Standard: (RE)FCC 47 CFR Part 15 Power Source: DC 24V
Subpart B
Frequency Range: 1GHz ~ 6GHz Temp.(°C)/Hum.(%RH): 24.2(°C)/52%RH
Distance: 3m



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	1327.611	68.03	-22.81	45.22	79.50	-34.28	peak			
2	1327.611	60.44	-22.81	37.63	59.50	-21.87	AVG			
3	1505.206	69.74	-22.62	47.12	79.50	-32.38	peak			
4	1505.206	63.57	-22.62	40.95	59.50	-18.55	AVG			
5	1765.716	64.40	-18.24	46.16	79.50	-33.34	peak			
6	1765.716	56.26	-18.24	38.02	59.50	-21.48	AVG			
7	1969.861	57.75	-14.02	43.73	79.50	-35.77	peak			
8	1969.861	50.32	-14.02	36.30	59.50	-23.20	AVG			
9	2991.757	59.09	-10.91	48.18	79.50	-31.32	peak			
10	2991.757	43.32	-10.91	32.41	59.50	-27.09	AVG			
11	4000.488	58.54	-11.52	47.02	79.50	-32.48	peak			
12	4000.488	45.01	-11.52	33.49	59.50	-26.01	AVG			

Note: Result=Reading + Factor Over Limit=Result - Limit



Test item: Radiation Test Polarization: Vertical
Standard: (RE)FCC 47 CFR Part 15 Subpart B Power Source: DC 24V
Frequency Range: 1GHz ~ 6GHz Temp.(°C)/Hum.(%RH): 24.2(°C)/52%RH
Distance: 3m



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	1518.765	67.76	-22.55	45.21	79.50	-34.29	peak			
2	1518.765	53.92	-22.55	31.37	59.50	-28.13	AVG			
3	1772.061	62.84	-17.96	44.88	79.50	-34.62	peak			
4	1772.061	54.86	-17.96	36.90	59.50	-22.60	AVG			
5	2105.019	62.60	-13.12	49.48	79.50	-30.02	peak			
6	2105.019	53.22	-13.12	40.10	59.50	-19.40	AVG			
7	2286.056	61.56	-12.72	48.84	79.50	-30.66	peak			
8	2286.056	46.73	-12.72	34.01	59.50	-25.49	AVG			
9	2804.690	58.92	-11.12	47.80	79.50	-31.70	peak			
10	2804.690	44.86	-11.12	33.74	59.50	-25.76	AVG			
11	4503.212	53.54	-10.14	43.40	79.50	-36.10	peak			
12	4503.212	39.94	-10.14	29.80	59.50	-29.70	AVG			

Note: Result=Reading + Factor Over Limit=Result - Limit



APPENDIX I -- TEST SETUP PHOTOGRAPH

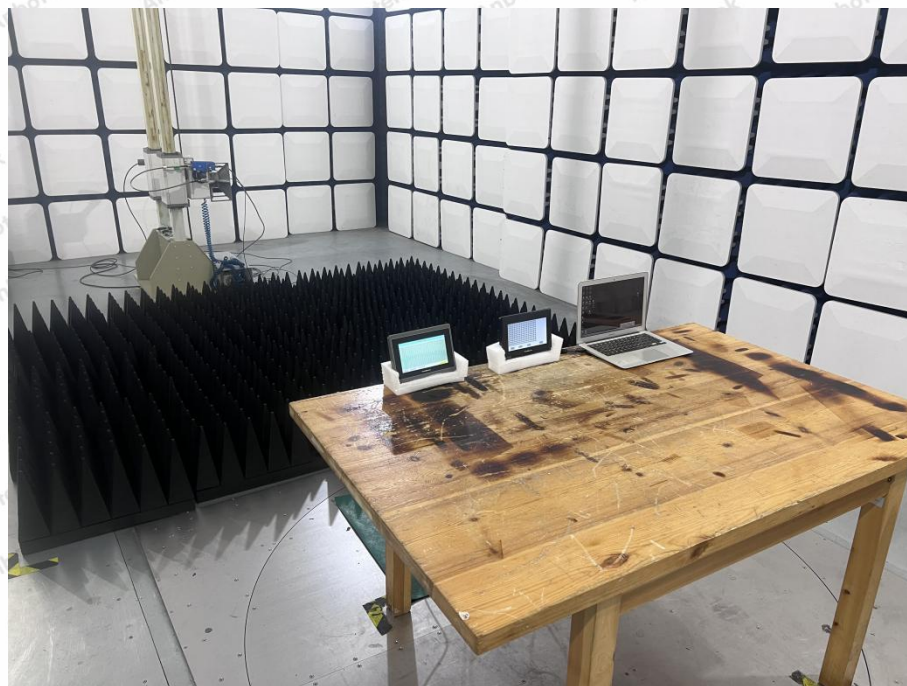
Photo of Power Line Conducted Emission Test



Photo of Radiated Emission Test (Below 1 GHz)

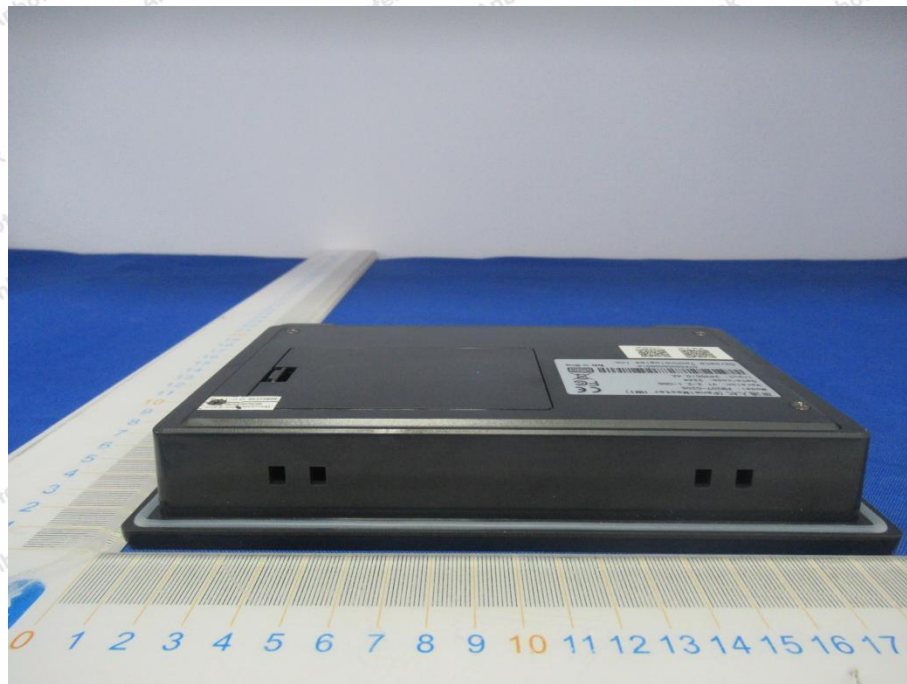


Photo of Radiated Emission Test (Above 1GHz)



APPENDIX II -- EXTERNAL PHOTOGRAPH





APPENDIX III -- INTERNAL PHOTOGRAPH

----- End of Report -----

