FCC TEST REPORT

Product Name:	Machine Control Terminal
Trade Mark:	FJDynamics
Model No.:	MT-10
Report Number:	24102114224EMC-1
Test Standards:	FCC 47 CFR Part 15 Subpart B
Test Result:	PASS
Date of Issue:	January 23, 2025

Prepared for:

FJ Dynamics Co., Ltd.
21F, Das Tower, No. 28, 1st South Keji Road, Nanshan District, Shenzhen, China

Prepared by:

Shenzhen UnionTrust Quality and Technology Co., Ltd.
16/F, Block A, Building 6th, Baoneng Science and Technology Park, Longhua Street, Longhua District, Shenzhen, China
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Prepared by:	David Chen	Reviewed by:	Henry Lu
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Approved by:	Robben Chen Assistant Manager	Date:	January 23, 2025

Version

Version No.	Date	Description
V1.0	January 23, 2025	Original

CONTENTS

1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	FJ Dynamics Co., Ltd.
Address of Applicant:	21F, Das Tower, No. 28, 1st South Keji Road, Nanshan District, Shenzhen, China
Manufacturer:	FJ Dynamics Co., Ltd.
Address of Manufacturer:	21F, Das Tower, No. 28, 1st South Keji Road, Nanshan District, Shenzhen, China

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Machine Control Terminal
Model No.:	MT-10
Trade Mark:	FJDynamics
DUT Stage:	Identical Prototype
Rated Voltage:	☒ Powered by USB port (with USB car charger 5V/3A)
	☒ Powered by DC port (with DC car charger)
	☒ 3.8Vdc (1x3.8V Lithium-ion rechargeable battery)
Classification of digital devices:	Class B
Highest Internal Frequency:	2655 MHz
Sample Received Date:	October 21, 2024
Sample Tested Date:	November 18, 2024 to November 20, 2024

Remark:
The above EUT's information was provided by customer. Please refer to the specifications or user's manual for more detailed description.

1.2.2 Description of Accessories

Battery	
Model No.:	446596PN3-1S2P
Battery Type:	Rechargeable Li-ion Battery
Rated Voltage:	3.8 Vdc
Limited Charge Voltage:	4.35Vdc
Typical Capacity:	10000 mAh

Others
Others metal structural parts DC car charger x 1

1.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
Machine Control Box	FJDynamics	M1	FJLQ27424A00059ZC	FJDynamics

1.4 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6th, Baoneng Science and Technology Park, Longhua Street, Longhua District, Shenzhen, China
Telephone: +86 (0) 755 2823 0888
Fax: +86 (0) 755 2823 0886

1.5 TEST FACILITY

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

CNAS-Lab Code: L9069
The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

A2LA-Lab Certificate No.: 4312.01
Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED Wireless Device Testing Laboratories
CAB identifier: CN0032

FCC Accredited Lab.
Designation Number: CN1194
Test Firm Registration Number: 259480

1.6 DEVIATION FROM STANDARDS

None.

1.7 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.9 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Measurement Uncertainty
1	Conducted emission 9kHz-150kHz	±3.2 dB
2	Conducted emission 150kHz-30MHz	±2.7 dB
3	Radiated emission 9kHz-30MHz	±4.7 dB
4	Radiated emission 30MHz-1GHz	±4.6 dB
5	Radiated emission 1GHz-18GHz	±4.4 dB
6	Radiated emission 18GHz-40GHz	±4.6 dB

2. TEST SUMMARY

FCC 47 CFR Part 15 Subpart B Test Cases			
Test Item	**Test Requirement**	**Test Method**	**Result**
Conducted Emission	FCC 47 CFR Part 15.107	ANSI C63.4-2014	N/A (Note 1, 2)
Radiated Emission	FCC 47 CFR Part 15.109	ANSI C63.4-2014	PASS

Note:
1) N/A: In this whole report not applicable.
2) The product is powered by the car charger.

3. EQUIPMENT LIST

Radiated Emission Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date**	**Cal. Due date**
☑	3m SAC	ETS-LINDGREN	3M	Euroshiedpn-CT001270-1317	11-Nov-2023	10-Nov-2026
☑	Receiver	R&S	ESIB26	100114	25-Oct-2024	24-Oct-2025
☐	Loop Antenna	ETS-LINDGREN	6502	00202525	28-Oct-2024	27-Oct-2025
☑	Broadband Antenna	ETS-LINDGREN	3142E	00201566	29-Oct-2024	28-Oct-2025
☑	6dB Attenuator	Talent	RA6A5-N-18	18103001	29-Oct-2024	28-Oct-2025
☑	Preamplifier	HP	8447F	2805A02960	25-Oct-2024	24-Oct-2025
☑	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201541	01-Apr-2024	31-Mar-2025
☑	Pre-amplifier	ETS-LINDGREN	00118385	00201874	01-Apr-2024	31-Mar-2025
☑	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	28-Oct-2024	27-Oct-2025
☑	Pre-amplifier	ETS-LINDGREN	00118384	00202652	28-Oct-2024	27-Oct-2025
☑	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☑	Test Software	Audix	e3	Software Version: 9.160323		

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

4.1.1 Normal or Extreme Test Conditions

Environment Parameter	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (V)	Relative Humidity (%)
NT/NV	+15 to +35	DC12V or DC24V or/and 3.8 V Battery	20 to 75
Remark: 1) NV: Normal Voltage; NT: Normal Temperature			

4.1.2 Record of Normal Environment and Test Sample

Test Item	Temp. (°C)	Relative Humidity (%)	Pressure (kPa)	Sample No.	Tested by
Radiated Emission	24.8	61.9	100.3	S202410284527-ZJB01/1	Fire Huo

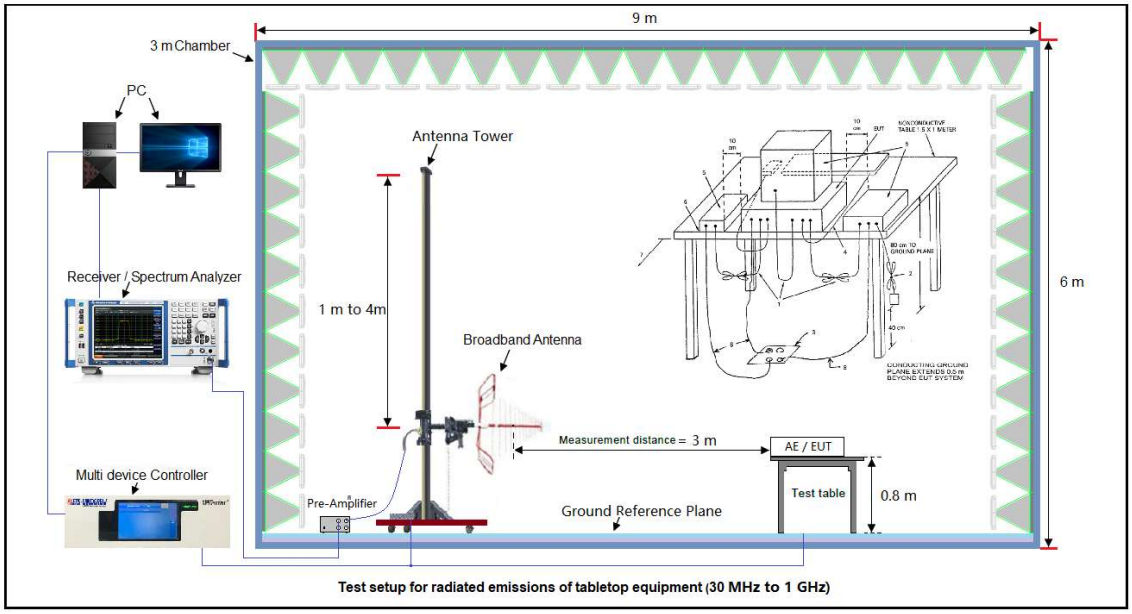
4.2 TEST MODES

Test Item	EMI Test Modes
Radiated Emission	Test Mode 1: Charging from car charger (with 12VDC) + **MP4 playing** + TF card + USB Disk + Earphone + GSM 850 idle + GNSS Rx Test Mode 2: Charging from car charger (with 12VDC) + **Camera (Front)** + TF card + USB Disk + Earphone + WCDMA Band V idle + GNSS Rx Test Mode 3: Charging from car charger (with 12VDC) + **Camera (Back)** + TF card + USB Disk + Earphone + LTE Band 5 idle + GNSS Rx Test Mode 4: Charging from car charger (with 12VDC) + **Data Sync (Connect Box via BT&Wi-Fi)** + TF card + USB Disk + Earphone + LTE Band 5 idle + GNSS Rx **Test Mode 5: Charging from car charger (with 12VDC) + Data Sync (Connect Box via RJ45) + TF card + USB Disk + Earphone + GSM 850 idle + GNSS Rx** Test Mode 6: Charging from Box (with 12VDC) + **Worse from test mode 1~5** + TF card + USB Disk + Earphone + WCDMA Band V idle + GNSS Rx **Test Mode 7: Charging from car charger (with 24VDC) + Worse from test mode 1~5 (for Test Mode 5)** Test Mode 8: Charging from USB Type-C (with 5V3A for Car charger) + **Worse from test mode 1~5** Test Mode 9: Only Battery mode + **Worse from test mode 1~5** + Earphone Test Mode 10: Data transfer with notebook + USB Cable + LTE Band 5 idle + GNSS Rx
Remark: The above test modes in boldface were the worst cases, only the test data of these modes were reported.	

4.3 TEST SETUP

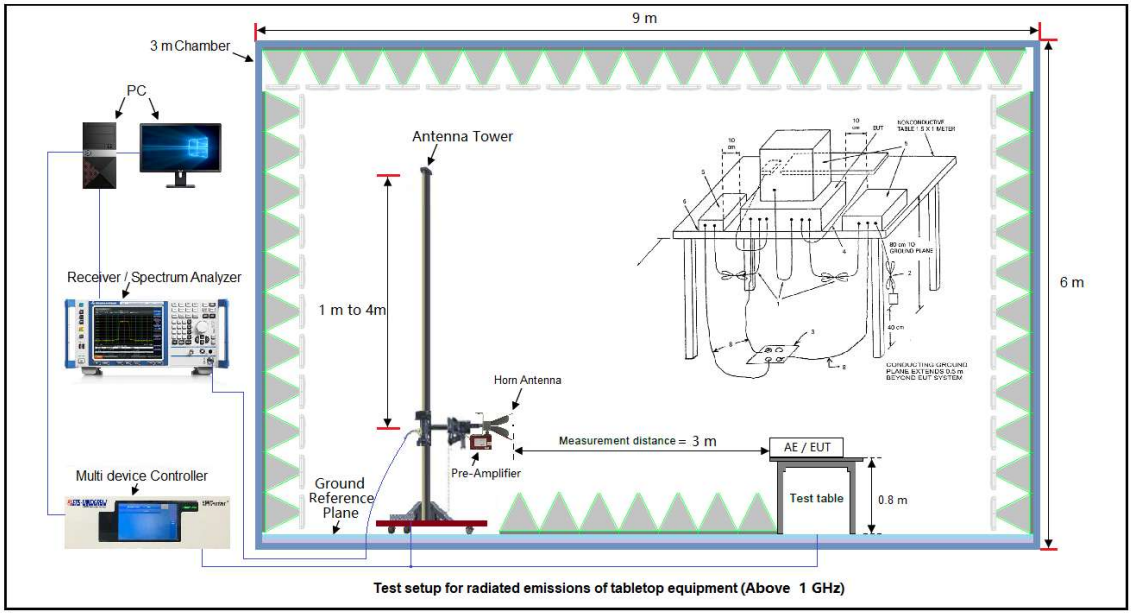
4.3.1 For Radiated Emissions test setup

Figure 1. 30MHz to 1GHz



Test setup for radiated emissions of tabletop equipment (30 MHz to 1 GHz)

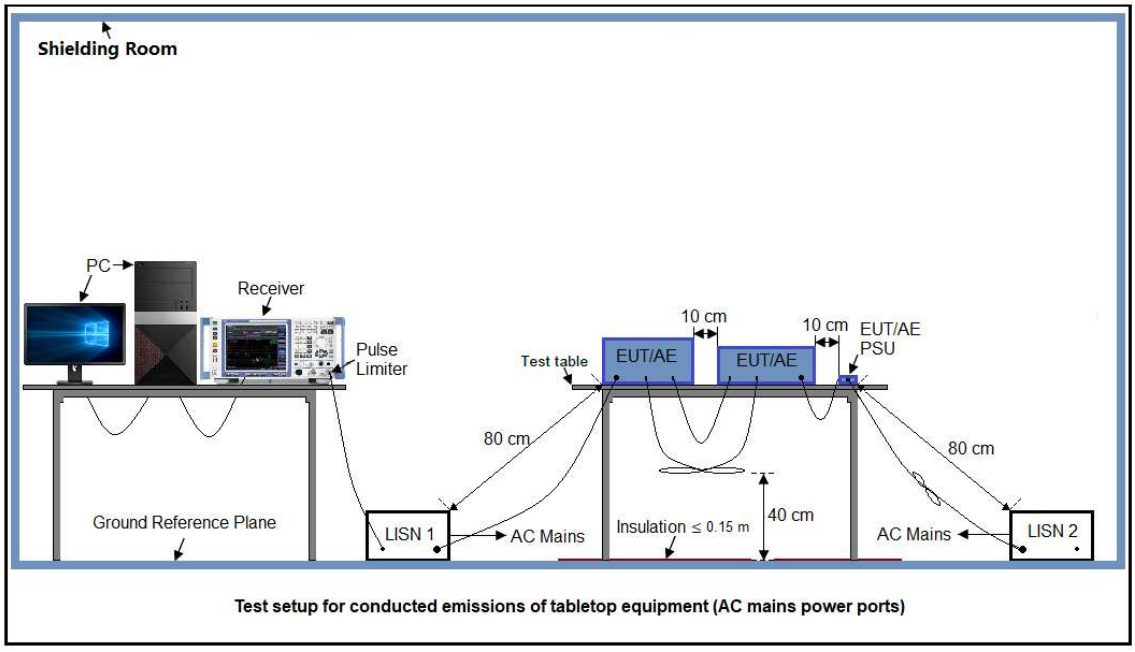
Figure 2. Above 1GHz



Test setup for radiated emissions of tabletop equipment (Above 1 GHz)

4.3.2 For Conducted Emissions test setup

Figure 3. Conducted Emissions setup



Test setup for conducted emissions of tabletop equipment (AC mains power ports)

4.4 SYSTEM TEST CONFIGURATION

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000MHz. The resolution is 1 MHz or greater for frequencies above 1000MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic (according to KDB 896810 D02 SDoC FAQ v01r01) of the highest fundamental frequency or to 40 GHz, whichever is lower.

5. REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title
1	FCC 47 CFR Part15 Subpart B	Unintentional Radiators
2	ANSI C63.4-2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
3	KDB 174176 D01 Line Conducted FAQ v01r01	AC power-line conducted emission frequency asked questions
4	KDB 896810 D02 SDoC FAQ v01r02	Supplier's Declaration of Conformity frequency asked questions

6. EMC REQUIREMENTS SPECIFICATION

6.1 RADIATED EMISSION

Test Requirement: FCC 47 CFR Part 15.109

Test Method: ANSI C63.4-2014

Receiver Setup:

Frequency: (f) (MHz)	Detector type	Measurement receiver bandwidth	
		RBW	VBW
30 ≤ f ≤ 1 000	Quasi Peak	120 kHz	300 kHz
f ≥1000	Peak	1 MHz	3 MHz
	Average	1 MHz	3 MHz

Measured frequency range

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

Limits:

Limits for Class B devices

Frequency (MHz)	limits at 3m (dBμV/m)		
	QP Detector	PK Detector	AV Detector
30-88	40.0	--	--
88-216	43.5	--	--
216-960	46.0	--	--
960 to 1000	54.0	--	--
Above 1000	--	74.0	54.0

Remark:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBμV/m) = 20 log Emission level (μV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

Test Setup: Refer to section 4.3.1 for details.

Test Procedures:

1. From 30 MHz to 1GHz test procedure as below:

1) The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
2) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
3) For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

2. Above 1GHz test procedure as below:

1) The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
2) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both

horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.

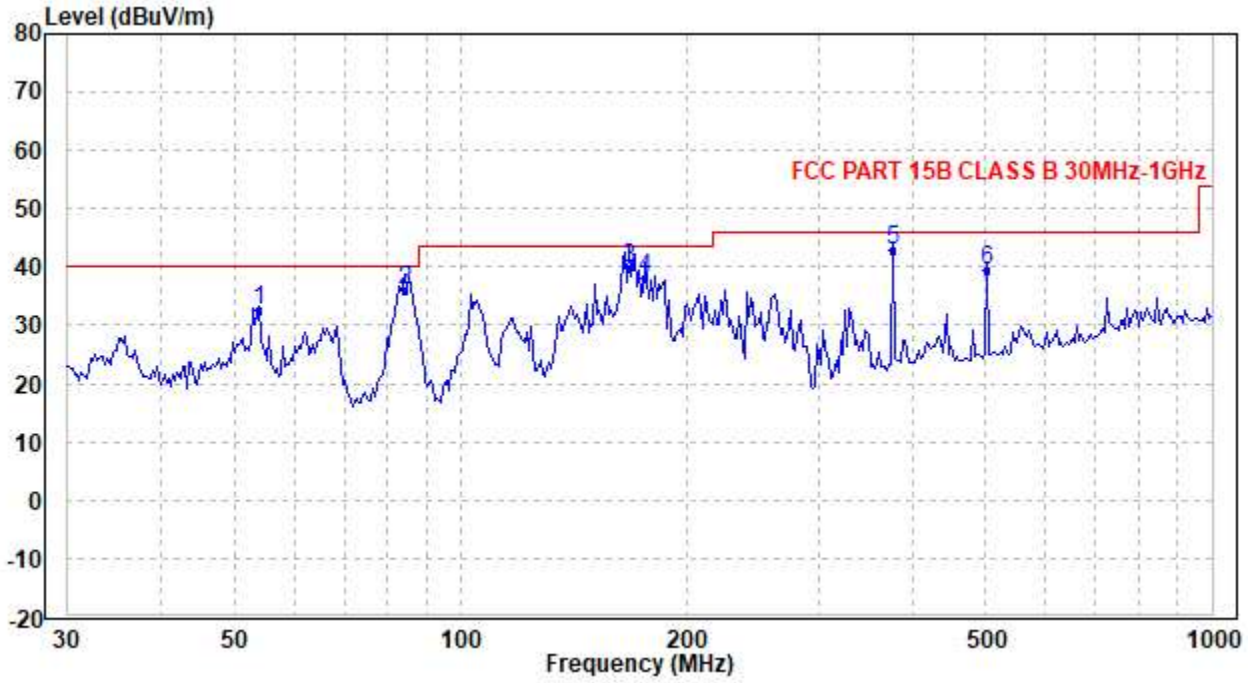
3) For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

Equipment Used: Refer to section 3 for details.

Test Result: Pass

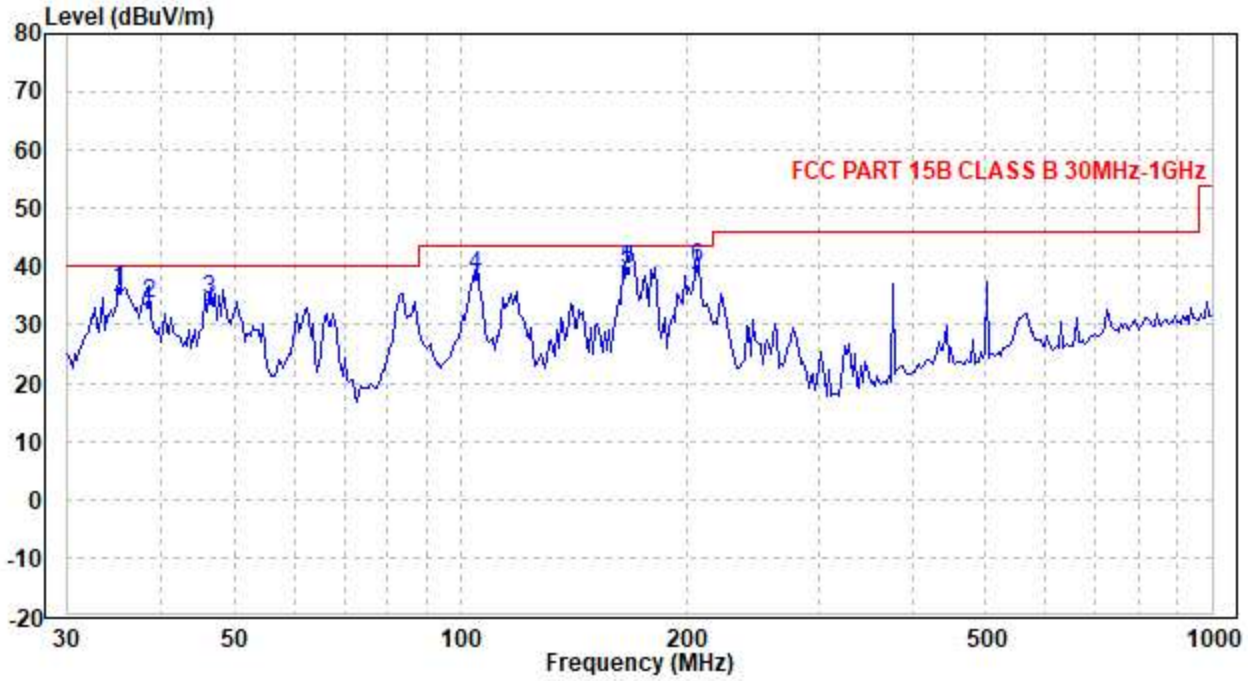
The worst measurement data as follows:

Below 1GHz (Quasi Peak):
Test Mode 7
Horizontal



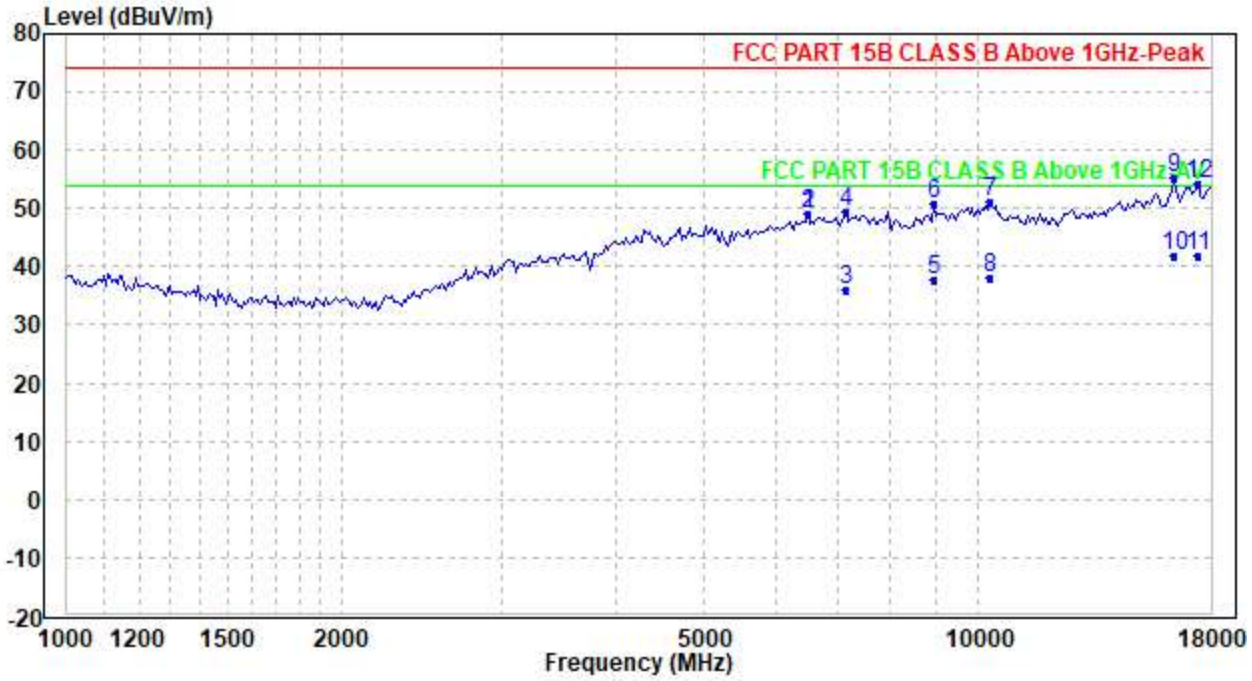
No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	53.756	47.98	-15.57	32.41	40.00	-7.59	QP
2	84.284	53.22	-17.34	35.88	40.00	-4.12	QP
3	167.814	52.05	-12.22	39.83	43.50	-3.67	QP
4	176.275	49.48	-11.54	37.94	43.50	-5.56	QP
5	376.523	48.66	-5.89	42.77	46.00	-3.23	QP
6	502.247	42.03	-2.45	39.58	46.00	-6.42	QP

Vertical



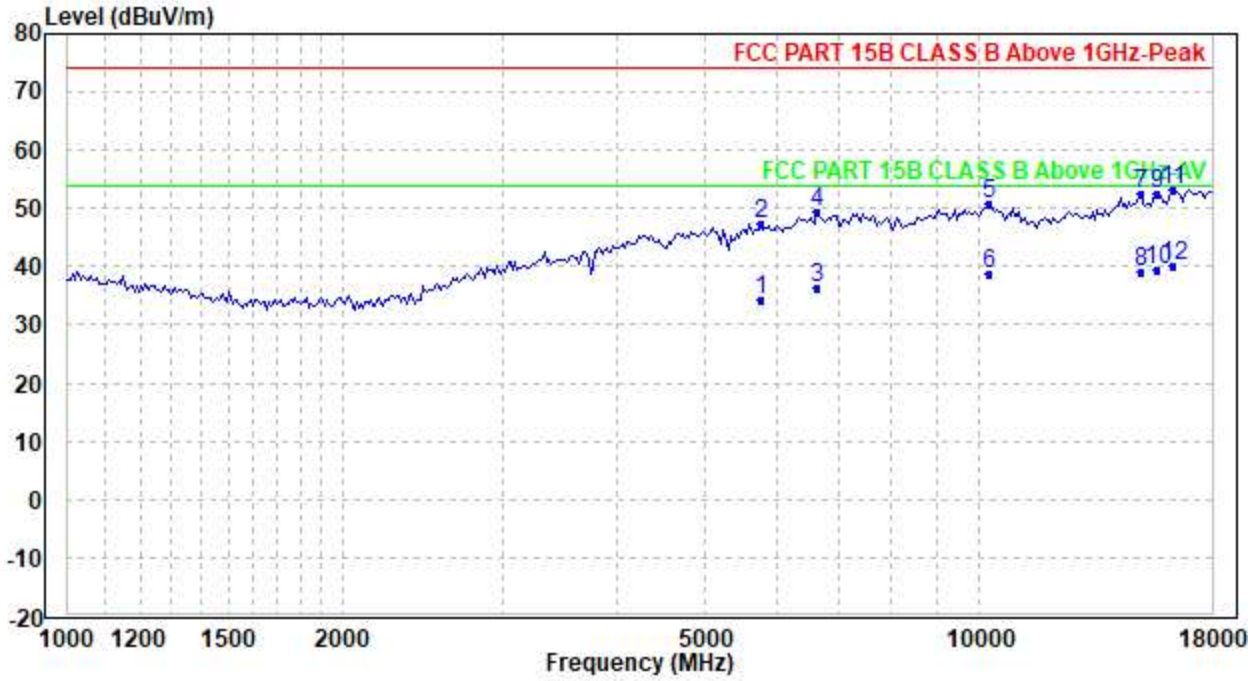
No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	35.016	42.71	-6.75	35.96	40.00	-4.04	QP
2	38.365	41.16	-7.52	33.64	40.00	-6.36	QP
3	46.381	47.07	-12.69	34.38	40.00	-5.62	QP
4	104.798	53.65	-15.37	38.28	43.50	-5.22	QP
5	166.639	51.88	-12.58	39.30	43.50	-4.20	QP
6	205.746	50.69	-11.06	39.63	43.50	-3.87	QP

Above 1GHz (Peak & Average)
Test Mode 5
Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	6494.281	48.01	1.23	49.24	74.00	-24.76	Peak
2	6494.281	48.01	1.23	49.24	74.00	-24.76	Peak
3	7166.315	34.86	1.29	36.15	54.00	-17.85	Average
4	7166.315	48.00	1.29	49.29	74.00	-24.71	Peak
5	8930.747	34.96	2.63	37.59	54.00	-16.41	Average
6	8930.747	48.09	2.63	50.72	74.00	-23.28	Peak
7	10322.320	47.71	3.37	51.08	74.00	-22.92	Peak
8	10322.320	34.57	3.37	37.94	54.00	-16.06	Average
9	16406.780	47.26	7.84	55.10	74.00	-18.90	Peak
10	16406.780	34.12	7.84	41.96	54.00	-12.04	Average
11	17385.170	32.80	9.21	42.01	54.00	-11.99	Average
12	17385.170	44.93	9.21	54.14	74.00	-19.86	Peak

Vertical



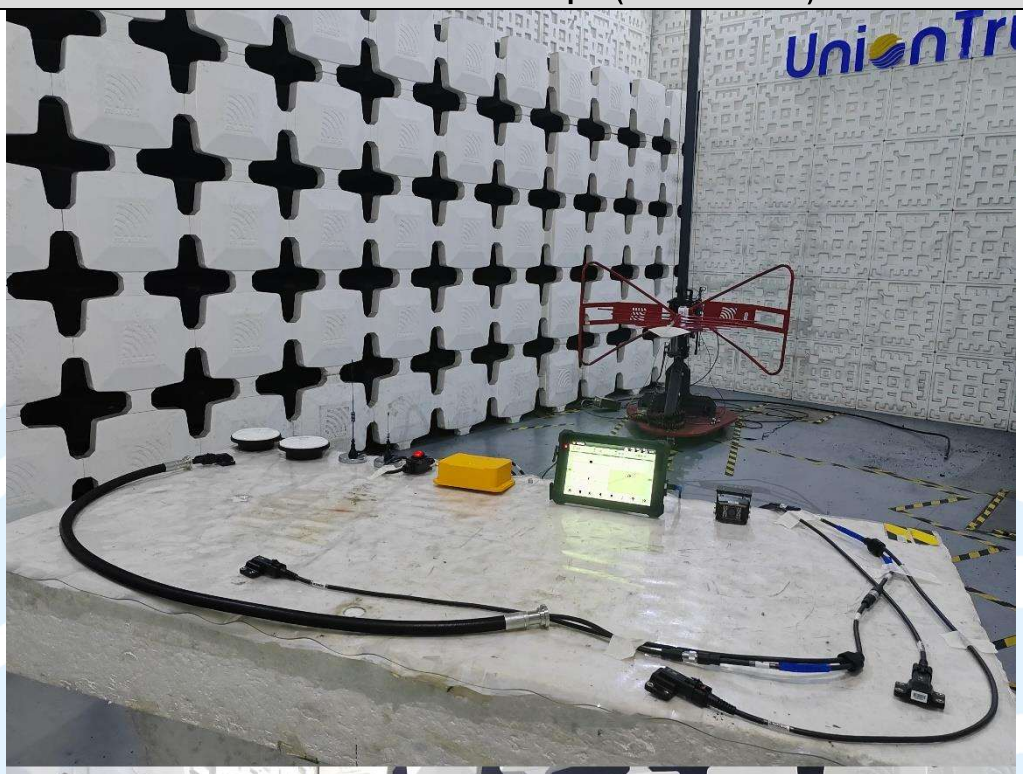
No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	5750.479	34.63	-0.29	34.34	54.00	-19.66	Average
2	5750.479	47.77	-0.29	47.48	74.00	-26.52	Peak
3	6646.506	34.94	1.25	36.19	54.00	-17.81	Average
4	6646.506	48.07	1.25	49.32	74.00	-24.68	Peak
5	10262.700	47.48	3.36	50.84	74.00	-23.16	Peak
6	10262.700	35.35	3.36	38.71	54.00	-15.29	Average
7	15041.450	44.44	7.92	52.36	74.00	-21.64	Peak
8	15041.450	31.30	7.92	39.22	54.00	-14.78	Average
9	15663.860	45.19	7.44	52.63	74.00	-21.37	Peak
10	15663.860	32.05	7.44	39.49	54.00	-14.51	Average
11	16312.020	45.66	7.68	53.34	74.00	-20.66	Peak
12	16312.020	32.53	7.68	40.21	54.00	-13.79	Average

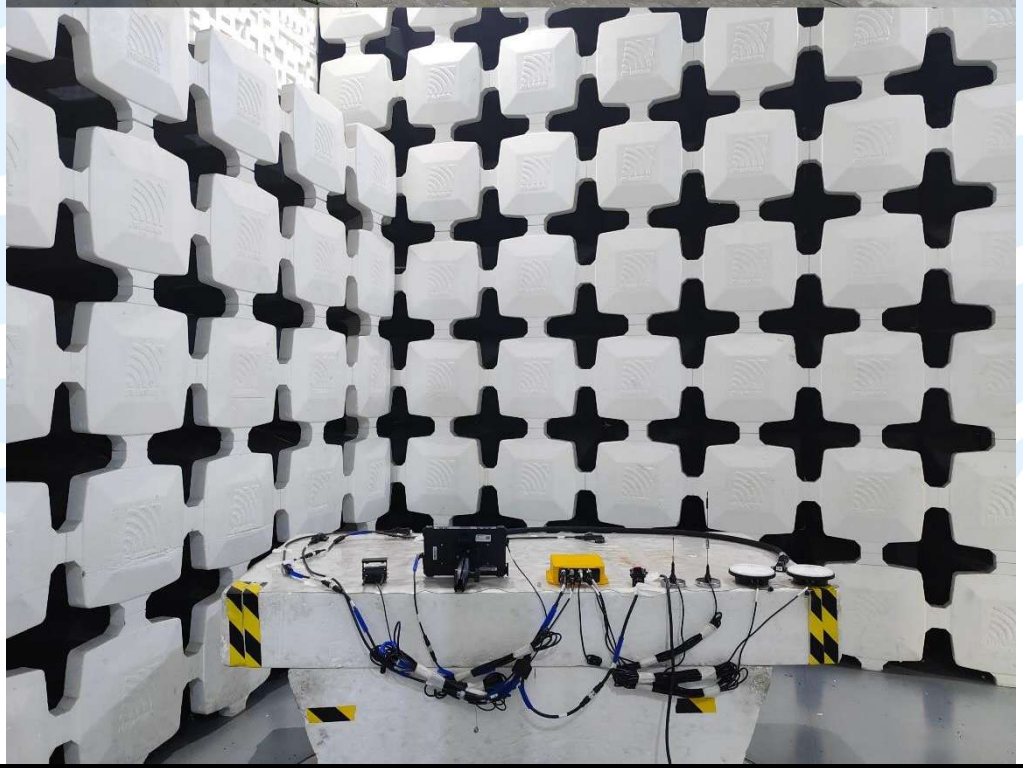
Remark:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result – Limit
4. For Radiated Emission above 18GHz, there was not any unwanted emission detected.

APPENDIX 1 PHOTOS OF TEST SETUP

Radiated emission Test Setup-1 (30 MHz~1 GHz)





APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

EUT EXTERNAL PHOTOS

EUT Photo


EUT Photo


EUT Photo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