

TEST REPORT

FCC ID	2AGEB-TCT	
Test Report No.....	TCT240607E028	
Date of issue.....	Jun. 18, 2024	
Testing laboratory	SHENZHEN TONGCE TESTING LAB	
Testing location/ address:	2101 & 2201, Zhenchang Factory Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, 518103, People's Republic of China	
Applicant's name.....	Shenzhen ZKC Software Technology Co., Ltd	
Address.....	1st Floor, No. 1 Block, Zhongkenuo Industry Park, Beiqi Road, Xixiang Town, Bao'an District, Shenzhen, China	
Manufacturer's name ...	Shenzhen ZKC Software Technology Co., Ltd	
Address.....	1st Floor, No. 1 Block, Zhongkenuo Industry Park, Beiqi Road, Xixiang Town, Bao'an District, Shenzhen, China	
Standard(s)	FCC CFR Title 47 Part 15 Subpart C	
Product Name.....	TPMS Configuration Tool	
Trade Mark	N/A	
Model/Type reference.....	TCT	
Rating(s).....	Rechargeable Li-ion Battery DC 3.6V	
Date of receipt of test item	Jun. 07, 2024	
Date (s) of performance of test.....	Jun. 07, 2024 ~ Jun. 18, 2024	
Tested by (+signature) ...	Ronaldo LUO	
Check by (+signature)....	Beryl ZHAO	
Approved by (+signature):	Tomsin	

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1. General Product Information

1.1.EUT description

Product Name.....:	TPMS Configuration Tool
Model/Type reference.....:	TCT
Sample Number.....:	TCT240607E007-0101
Operation Frequency	125kHz
Modulation Technology	FSK
Antenna Type.....:	Internal Antenna
Rating(s).....:	Rechargeable Li-ion Battery DC 3.6V

Note: The antenna gain listed in this report is provided by applicant, and the test laboratory is not responsible for this parameter.

1.2.Model(s) list

None.

2. Test Result Summary

Requirement	CFR 47 Section	Result
Antenna requirement	§15.203	PASS
AC Power Line Conducted Emission	§15.207	PASS
Spurious Emission	§15.209(a)(f)	PASS

Note:

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

3. General Information

3.1. Test environment and mode

Operating Environment:		
Condition	Conducted Emission	Radiated Emission
Temperature:	22.8 °C	24.8 °C
Humidity:	49 % RH	51 % RH
Atmospheric Pressure:	1010 mbar	1010 mbar
Test Mode:		
Engineering mode:	Keep the EUT in continuous transmitting.	
The sample was placed 0.8m for the measurement below above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case(Z axis) are shown in Test Results of the following pages.		

3.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
Adapter	EP-TA200	R37R55T6KL2SE3	/	SAMSUNG

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4. Facilities and Accreditations

4.1. Facilities

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

- FCC - Registration No.: 645098

SHENZHEN TONGCE TESTING LAB

Designation Number: CN1205

The testing lab has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

- IC - Registration No.: 10668A-1

SHENZHEN TONGCE TESTING LAB

CAB identifier: CN0031

The testing lab has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

4.2. Location

SHENZHEN TONGCE TESTING LAB

Address: 2101 & 2201, Zhenchang Factory Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, 518103, People's Republic of China

TEL: +86-755-27673339

4.3. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	± 3.10 dB
2	RF power, conducted	± 0.12 dB
3	Spurious emissions, conducted	± 0.11 dB
4	All emissions, radiated(<1 GHz)	± 4.56 dB
5	All emissions, radiated(1 GHz - 18 GHz)	± 4.22 dB
6	All emissions, radiated(18 GHz- 40 GHz)	± 4.36 dB

5. Test Results and Measurement Data

5.1. Antenna requirement

Standard requirement:

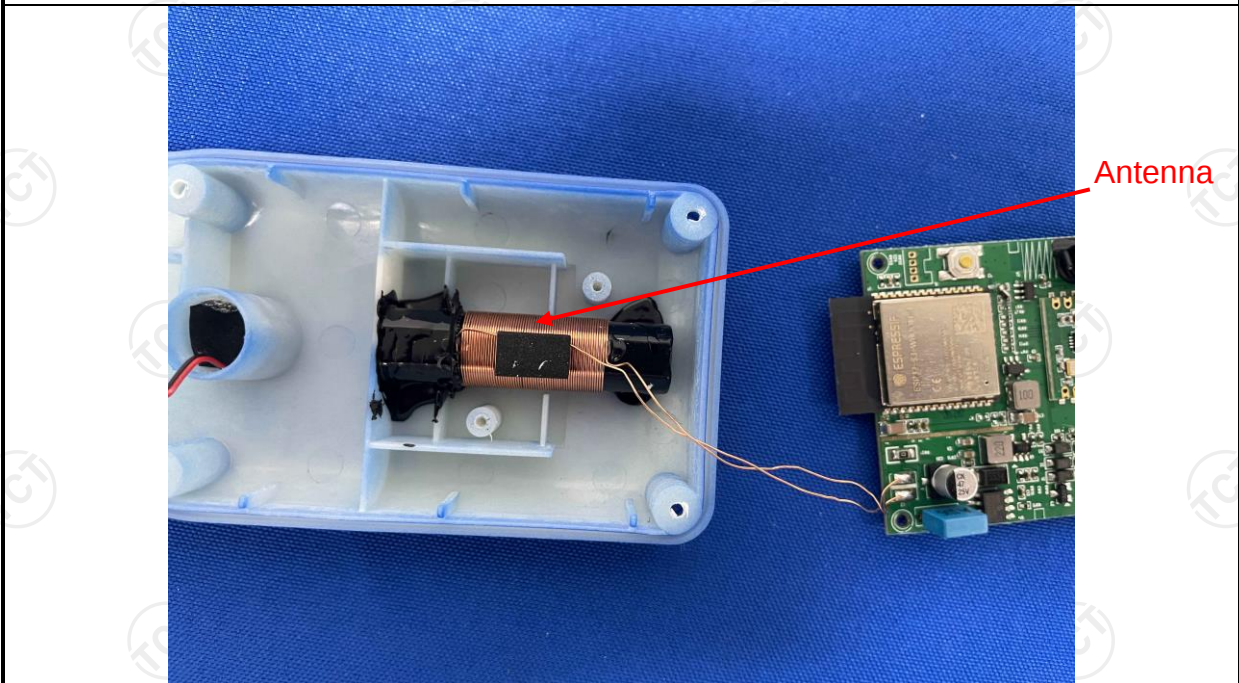
FCC Part15 C Section 15.203

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

E.U.T Antenna:

The antenna is internal antenna which permanently attached.



5.2. Conducted Emission

5.2.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.207														
Test Method:	ANSI C63.10: 2013														
Frequency Range:	150 kHz to 30 MHz														
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto														
Limits:	<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>	Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)														
	Quasi-peak	Average													
0.15-0.5	66 to 56*	56 to 46*													
0.5-5	56	46													
5-30	60	50													
Test Setup:	Reference Plane 40cm E.U.T AC power Test table/Insulation plane 80cm LISN Filter AC power EMI Receiver Remark E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m														
Test Mode:	Charging +Transmitting Mode														
Test Procedure:	1. The E.U.T is connected to an adapter through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.														
Test Result:	PASS														

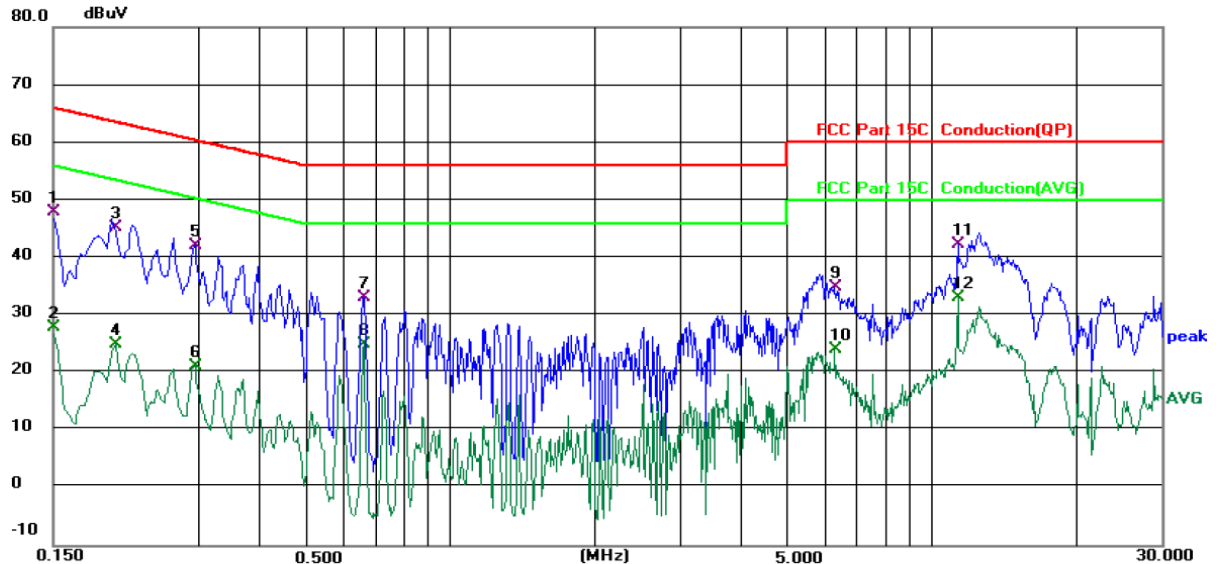
5.2.2. Test Instruments

Conducted Emission Shielding Room Test Site (843)				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESCI3	100898	Jun. 29, 2024
Line Impedance Stabilisation Newtork(LISN)	Schwarzbeck	NSLK 8126	8126453	Jan. 31, 2025
Line-5	TCT	CE-05	/	Jul. 03, 2024
EMI Test Software	Shurple Technology	EZ-EMC	/	/

5.2.3. Test data

Please refer to following diagram for individual

Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)



Site 844 Shielding Room

Phase: L1

Temperature: 22.8 (°C)

Humidity: 49 %

Limit: FCC Part 15C Conduction(QP)

Power: DC 5V(Adapter Input AC 120V/60Hz)

No.	Mk.	Freq. MHz	Reading Level dBμV	Correct Factor dB	Measure- ment dBμV	Limit dBμV	Over dB	Detector	Comment
1		0.1500	37.97	10.02	47.99	66.00	-18.01	QP	
2		0.1500	17.83	10.02	27.85	56.00	-28.15	AVG	
3		0.2020	35.27	10.04	45.31	63.53	-18.22	QP	
4		0.2020	14.95	10.04	24.99	53.53	-28.54	AVG	
5		0.2939	32.19	9.85	42.04	60.41	-18.37	QP	
6		0.2939	11.40	9.85	21.25	50.41	-29.16	AVG	
7		0.6620	23.95	9.20	33.15	56.00	-22.85	QP	
8		0.6620	15.87	9.20	25.07	46.00	-20.93	AVG	
9		6.2859	24.32	10.48	34.80	60.00	-25.20	QP	
10		6.2859	13.57	10.48	24.05	50.00	-25.95	AVG	
11		11.3219	31.76	10.64	42.40	60.00	-17.60	QP	
12	*	11.3219	22.52	10.64	33.16	50.00	-16.84	AVG	

Note:

Freq. = Emission frequency in MHz

Reading level (dBμV) = Receiver reading

Corr. Factor (dB) = LISN factor + Cable loss

Measurement (dBμV) = Reading level (dBμV) + Corr. Factor (dB)

Limit (dBμV) = Limit stated in standard

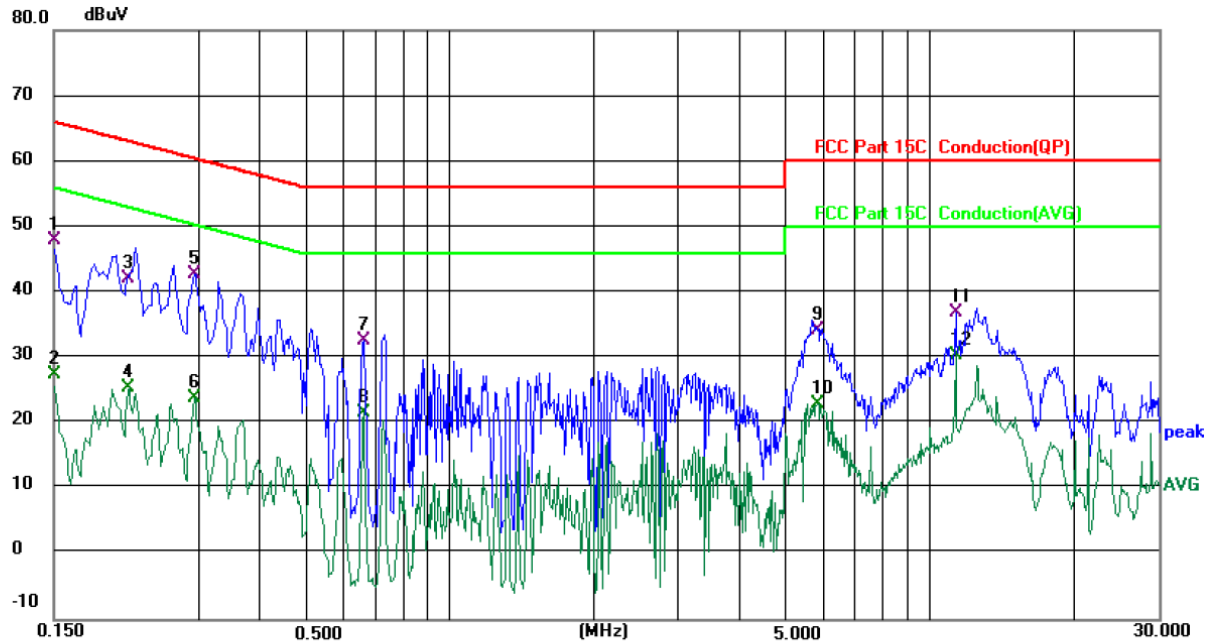
Margin (dB) = Measurement (dBμV) – Limits (dBμV)

Q.P. =Quasi-Peak

AVG =average

* is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz

Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)



Site 844 Shielding Room

Phase: **N**

Temperature: 22.8 (°C)

Humidity: 49 %

Limit: FCC Part 15C Conduction(QP)

Power: DC 5V(Adapter Input AC 120V/60Hz)

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1500	37.91	10.00	47.91	66.00	-18.09	QP	
2		0.1500	17.38	10.00	27.38	56.00	-28.62	AVG	
3		0.2139	32.35	9.82	42.17	63.05	-20.88	QP	
4		0.2139	15.56	9.82	25.38	53.05	-27.67	AVG	
5	*	0.2938	32.90	9.83	42.73	60.42	-17.69	QP	
6		0.2938	13.98	9.83	23.81	50.42	-26.61	AVG	
7		0.6620	23.43	9.17	32.60	56.00	-23.40	QP	
8		0.6620	12.53	9.17	21.70	46.00	-24.30	AVG	
9		5.8658	23.86	10.39	34.25	60.00	-25.75	QP	
10		5.8658	12.58	10.39	22.97	50.00	-27.03	AVG	
11		11.3218	26.28	10.62	36.90	60.00	-23.10	QP	
12		11.3218	19.77	10.62	30.39	50.00	-19.61	AVG	

Note:

Freq. = Emission frequency in MHz

Reading level (dBμV) = Receiver reading

Corr. Factor (dB) = LISN factor + Cable loss

Measurement (dBμV) = Reading level (dBμV) + Corr. Factor (dB)

Limit (dBμV) = Limit stated in standard

Margin (dB) = Measurement (dBμV) – Limits (dBμV)

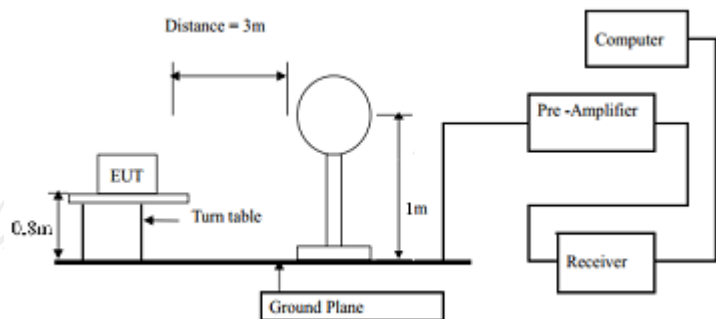
Q.P. =Quasi-Peak

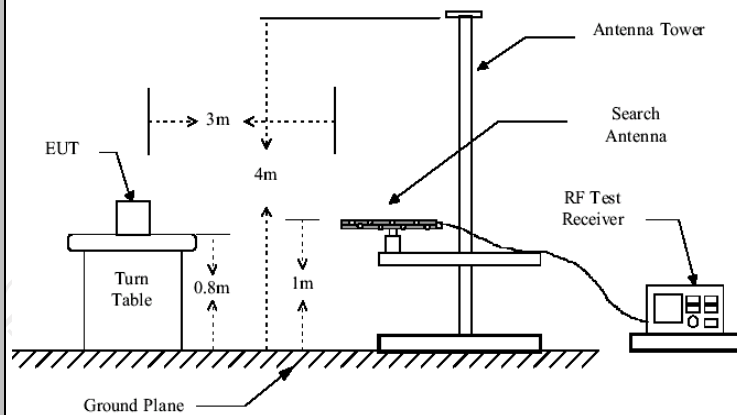
AVG =average

* is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.

5.3. Radiated Spurious Emission Measurement

5.3.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.209					
Test Method:	ANSI C63.10: 2013					
Frequency Range:	9 kHz to 25 GHz					
Measurement Distance:	3 m					
Antenna Polarization:	Horizontal & Vertical					
Operation mode:	Refer to item 3.1					
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark	
	9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value	
	150kHz- 30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value	
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value	
Limit:	Frequency		Field Strength (microvolts/meter)		Measurement Distance (meters)	
	0.009-0.490		2400/F(KHz)		300	
	0.490-1.705		24000/F(KHz)		30	
	1.705-30		30		30	
	30-88		100		3	
	88-216		150		3	
	216-960		200		3	
	Above 960		500		3	
	Frequency		Field Strength (microvolts/meter)	Measurement Distance (meters)	Detector	
	Above 1GHz		500	3	Average	
			5000	3	Peak	
	Test setup:	For radiated emissions below 30MHz				
						
		30MHz to 1GHz				



Test Procedure:

1. For the radiated emission test below 1GHz:
The EUT was placed on a turntable with 0.8 meter above ground. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower. 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.
For the radiated emission test above 1GHz:
Place the measurement antenna on a turntable with 1.5 meter above ground, which is 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 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.
2. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
3. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
4. Use the following spectrum analyzer settings:

	(1) Span shall wide enough to fully capture the emission being measured; (2) Set RBW=120 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold; For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
Test mode:	Refer to section 3.1 for details
Test results:	PASS

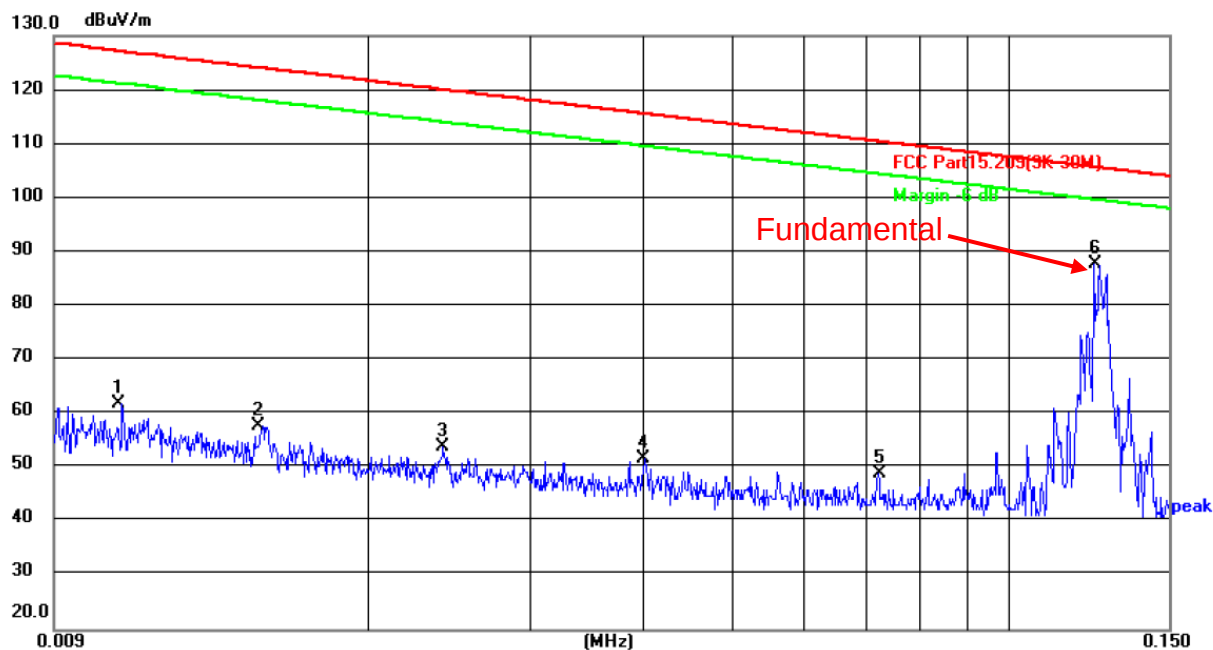
5.3.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESIB7	100197	Jun. 29, 2024
Spectrum Analyzer	R&S	FSQ40	200061	Jun. 29, 2024
Pre-amplifier	SKET	LNPA_0118G-45	SK2021012102	Jan. 31, 2025
Pre-amplifier	SKET	LNPA_1840G-50	SK202109203500	Jan. 31, 2025
Pre-amplifier	HP	8447D	2727A05017	Jun. 27, 2024
Loop antenna	Schwarzbeck	FMZB1519B	00191	Jul. 02, 2024
Broadband Antenna	Schwarzbeck	VULB9163	340	Jul. 01, 2024
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Jul. 01, 2024
Horn Antenna	Schwarzbeck	BBHA 9170	00956	Feb. 02, 2025
Antenna Mast	Keleto	RE-AM	/	/
Coaxial cable	SKET	RC-18G-N-M	/	Jan. 31, 2025
Coaxial cable	SKET	RC_40G-K-M	/	Jan. 31, 2025
EMI Test Software	Shurple Technology	EZ-EMC	/	/

5.3.3. Test Data

Please refer to following diagram for individual
9KHz-30MHz

9KHz-150KHz:



Site: 3m Anechoic Chamber

Polarization: **Coaxial**

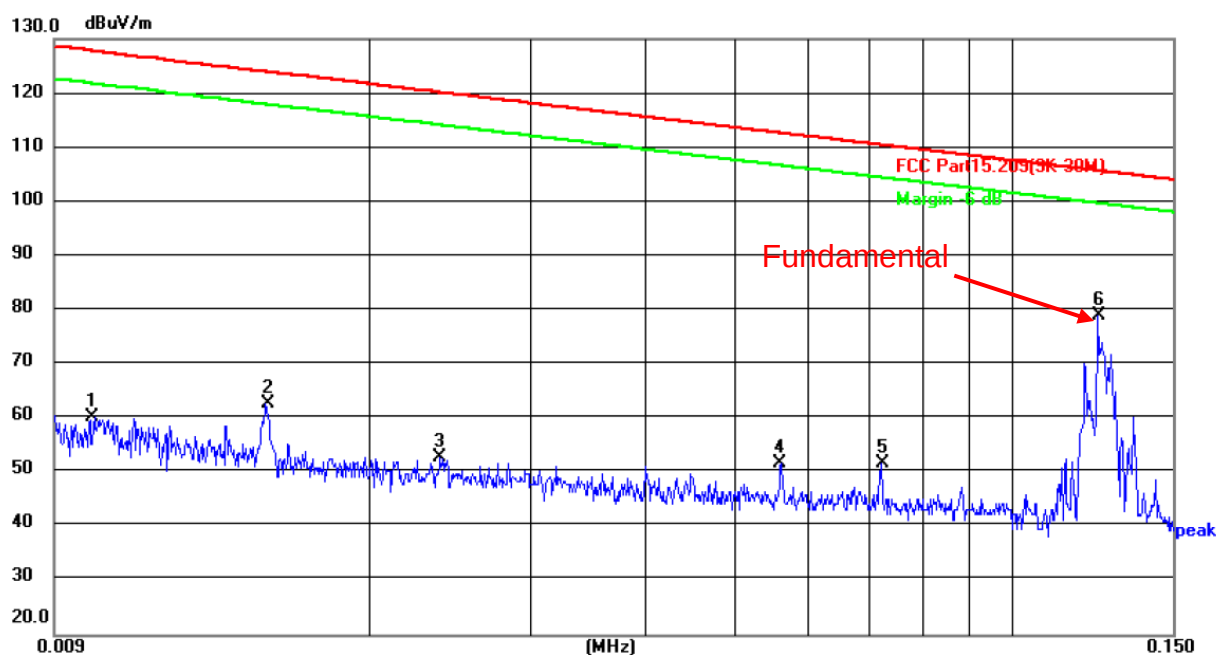
Temperature: 24.5(°C)

Humidity: 59 %

Limit: FCC Part15.209(9K-30M)

Power:DC 3.6V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	0.0106	41.50	20.33	61.83	127.10	-65.27	peak	P	
2	0.0151	37.48	20.32	57.80	124.03	-66.23	peak	P	
3	0.0240	33.69	20.28	53.97	120.00	-66.03	peak	P	
4	0.0400	31.39	20.29	51.68	115.56	-63.88	peak	P	
5	0.0720	28.75	20.25	49.00	110.46	-61.46	peak	P	
6 *	0.1243	67.30	20.45	87.75	105.71	-17.96	peak	P	



Site: 3m Anechoic Chamber

Polarization: **Coplanar**

Temperature: 24.5(°C)

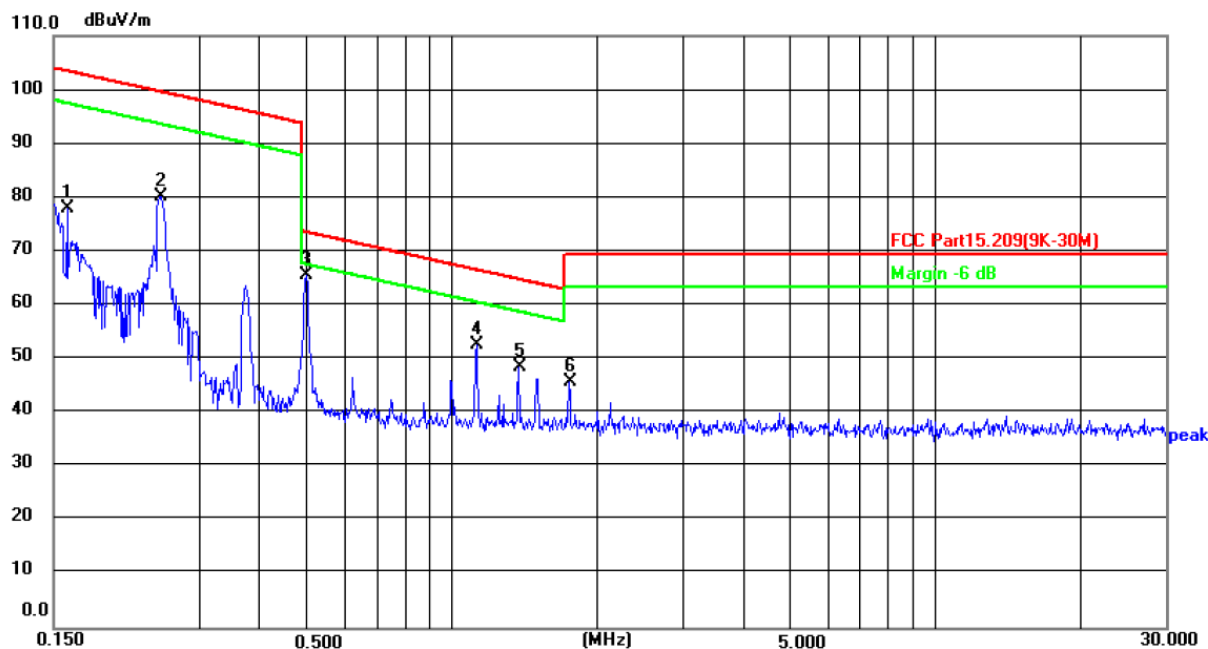
Humidity: 59 %

Limit: FCC Part15.209(9K-30M)

Power:DC 3.6V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	0.0100	39.87	20.33	60.20	127.60	-67.40	peak	P	
2	0.0152	42.32	20.32	62.64	123.97	-61.33	peak	P	
3	0.0238	32.68	20.28	52.96	120.07	-67.11	peak	P	
4	0.0560	31.39	20.30	51.69	112.64	-60.95	peak	P	
5	0.0720	31.46	20.25	51.71	110.46	-58.75	peak	P	
6 *	0.1243	58.61	20.45	79.06	105.71	-26.65	peak	P	

150KHz-30MHz:



Site: 3m Anechoic Chamber

Polarization: **Coaxial**

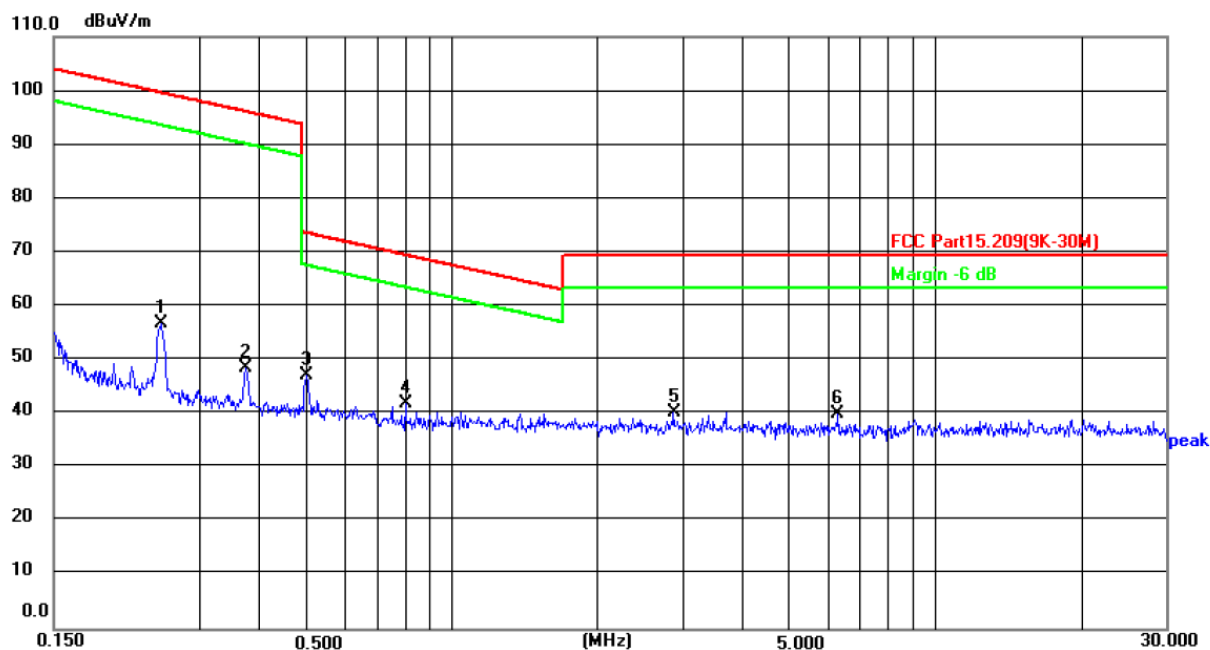
Temperature: 24.5(°C)

Humidity: 59 %

Limit: FCC Part15.209(9K-30M)

Power:DC 3.6V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	0.1603	57.89	20.14	78.03	103.51	-25.48	peak	P	
2	0.2502	60.02	20.28	80.30	99.64	-19.34	peak	P	
3 *	0.4999	44.94	20.72	65.66	73.63	-7.97	peak	P	
4	1.1253	30.67	21.88	52.55	66.60	-14.05	peak	P	
5	1.3752	26.17	22.38	48.55	64.86	-16.31	peak	P	
6	1.7501	22.73	23.12	45.85	69.50	-23.65	peak	P	



Site: 3m Anechoic Chamber

Polarization: **Coplanar**

Temperature: 24.5(°C)

Humidity: 59 %

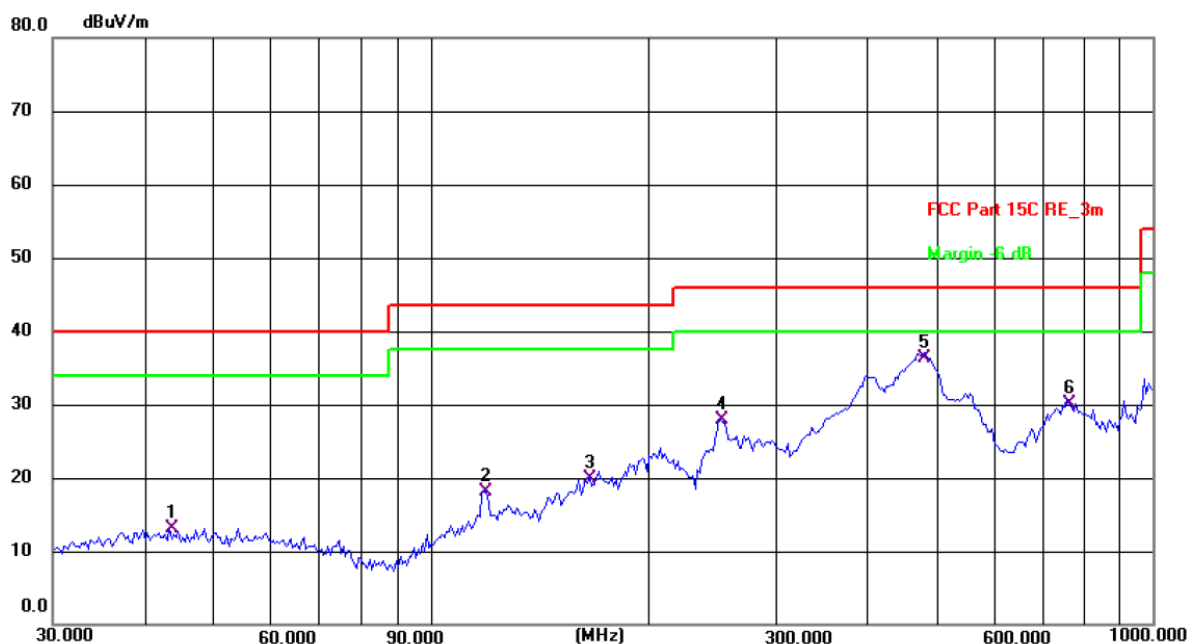
Limit: FCC Part15.209(9K-30M)

Power:DC 3.6V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	0.2507	36.54	20.28	56.82	99.62	-42.80	peak	P	
2	0.3735	28.13	20.49	48.62	96.16	-47.54	peak	P	
3 *	0.5008	26.51	20.72	47.23	73.61	-26.38	peak	P	
4	0.8008	20.57	21.26	41.83	69.55	-27.72	peak	P	
5	2.8760	15.03	25.39	40.42	69.50	-29.08	peak	P	
6	6.3018	7.70	32.18	39.88	69.50	-29.62	peak	P	

30MHz-1GHz

Horizontal:



Site: 3m Anechoic Chamber1

Polarization: **Horizontal**

Temperature: 24.8(C)

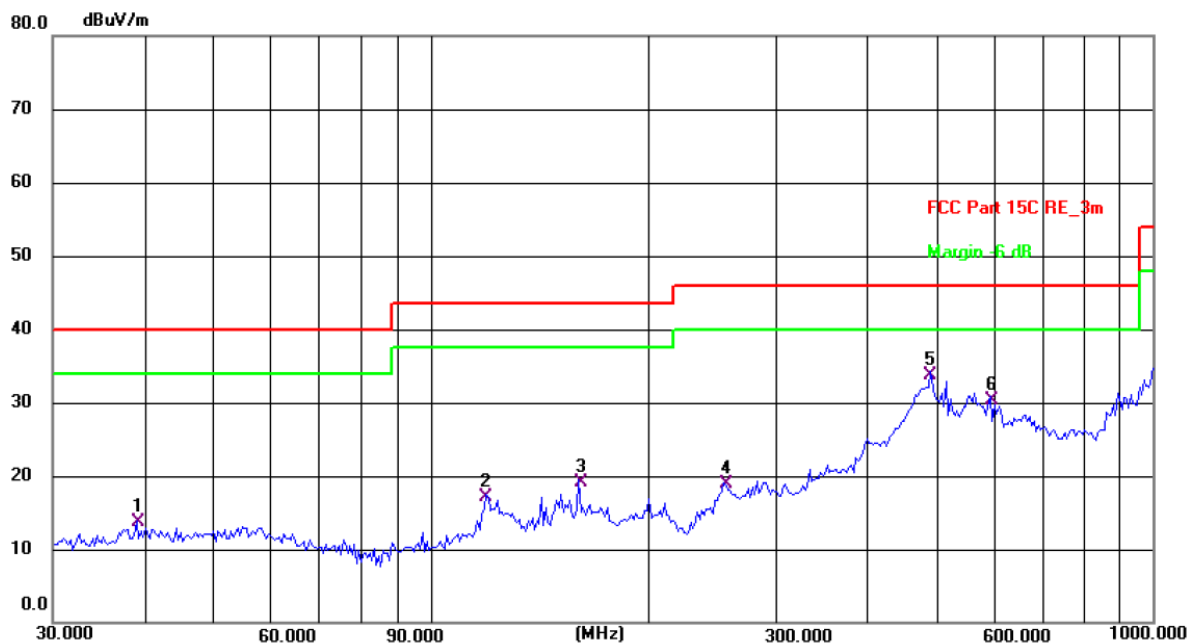
Humidity: 51 %

Limit: FCC Part 15C RE_3m

Power: DC 3.6V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	43.5057	25.64	-12.54	13.10	40.00	-26.90	QP	P	
2	119.4360	31.37	-13.34	18.03	43.50	-25.47	QP	P	
3	166.0680	31.14	-11.23	19.91	43.50	-23.59	QP	P	
4	251.1804	40.29	-12.44	27.85	46.00	-18.15	QP	P	
5 *	482.2155	43.26	-6.94	36.32	46.00	-9.68	QP	P	
6	760.7035	32.50	-2.33	30.17	46.00	-15.83	QP	P	

Vertical:



Site: 3m Anechoic Chamber1

Polarization: **Vertical**

Temperature: 24.8(C)

Humidity: 51 %

Limit: FCC Part 15C RE_3m

Power: DC 3.6V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	39.1615	26.01	-12.40	13.61	40.00	-26.39	QP	P	
2	119.4360	30.38	-13.34	17.04	43.50	-26.46	QP	P	
3	160.3456	30.20	-11.09	19.11	43.50	-24.39	QP	P	
4	254.7283	31.13	-12.28	18.85	46.00	-27.15	QP	P	
5 *	492.4685	40.29	-6.67	33.62	46.00	-12.38	QP	P	
6	595.1327	34.69	-4.41	30.28	46.00	-15.72	QP	P	

Note:

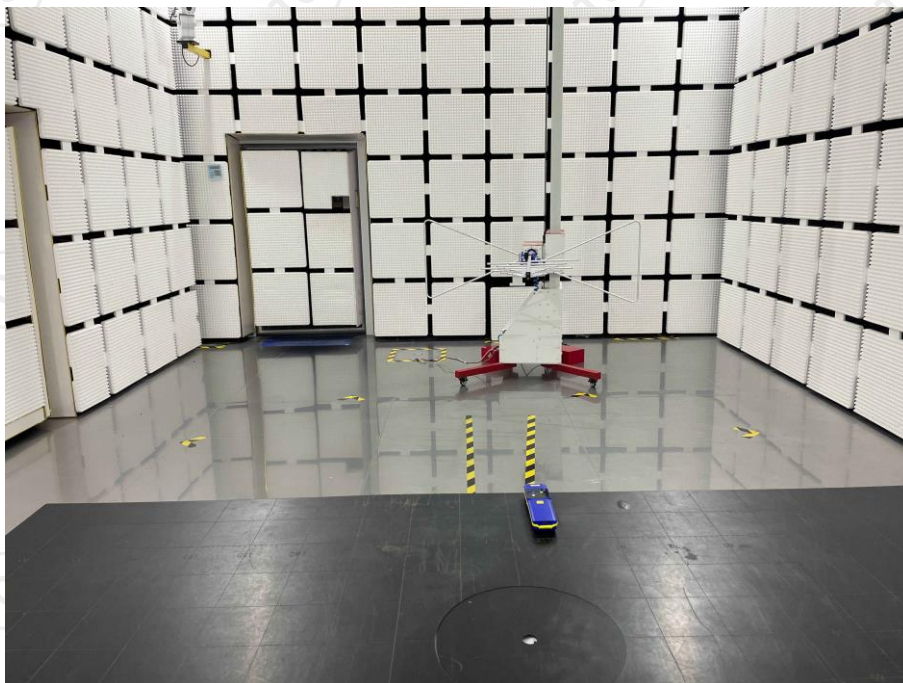
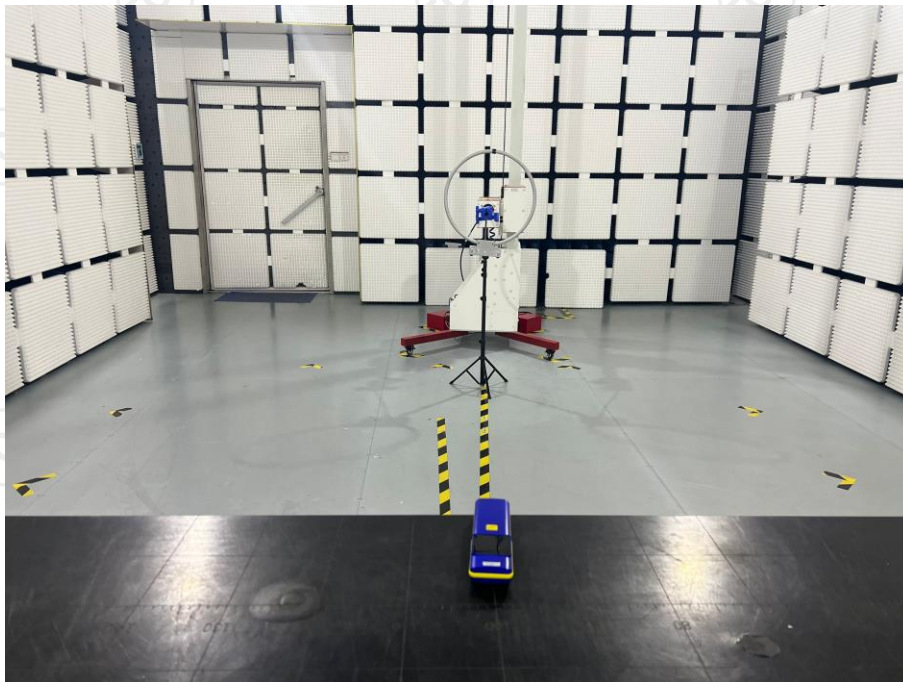
Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

Appendix B: Photographs of Test Setup

Product: TPMS Configuration Tool

Model: TCT

Radiated Emission



Conducted Emission



Appendix C: Photographs of EUT

Refer to the test report No. TCT240607E007

*******END OF REPORT*******