

Radio Test Report

FCC ID:2AVE6TG5B

IC:25970-TG5B

Change II

Report No.	:	TBR-C-202412-0212-10
Applicant	:	Tractive GmbH
Equipment Under Test (EUT)		
EUT Name	:	Tractive CAT Mini
Model No.	:	TG5
Series Model No.	:	----
Brand Name	:	Tractive
Sample ID	:	HC-C-202412-0212-03-01# & HC-C-202412-0212-05-01#
Receipt Date	:	2025-02-05
Test Date	:	2025-02-05 to 2025-03-18
Issue Date	:	2025-03-18
Standards	:	FCC Part 2, FCC Part 22 Subpart H, FCC Part 24 Subpart E, RSS-Gen Issue 5 April 2018+Amendment 1 (March 2019)+Amendment 2 (February 2021), RSS-132 Issue 4, RSS-133 Issue 7
Test Method	:	ANSI C63.26 2015
Conclusions	:	PASS
		In the configuration tested, the EUT complied with the standards specified above.
Test By	:	<i>Rick Chen</i> Rick Chen
Reviewed By	:	<i>Camille Li</i> Camille Li
Approved By	:	<i>IVAN SU</i> Ivan Su

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

TB-RF-074-1.0

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Revision History

Report No.	Version	Description	Issued Date
TBR-C-202412-0212-10	Rev.01	Initial issue of report	2025-03-18
Remarks1:Please refer to The Original Grant FCC ID:2AVE6TG5B Test Report and The Original Grant IC:25970-TG5B Test Report. Remarks2:The following two points have been changed, and only the radiation spurious test needs to be added 1.Added Power Amplifier alternative mount option component, pin to pin compatible, same performance and specifications 2.Software drivers update to support the new PA alternative			

1. General Information about EUT

1.1 Client Information

Applicant	:	Tractive GmbH
Address	:	Poststrasse 4, 4061 Pasching, AUSTRIA
Manufacturer	:	Tractive GmbH
Address	:	Poststrasse 4, 4061 Pasching, AUSTRIA

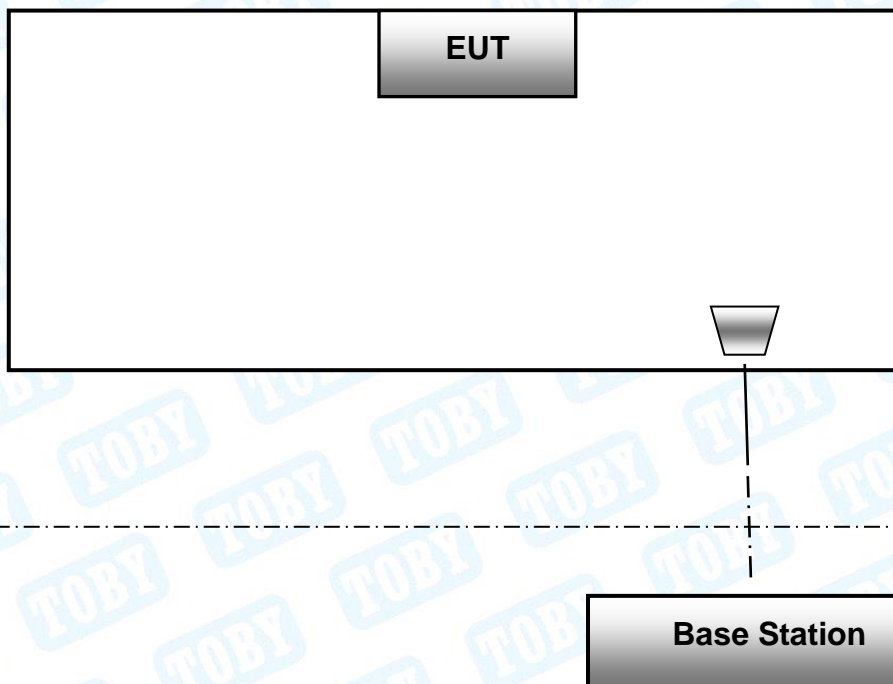
1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	Tractive CAT Mini	
Models No.	:	TG5	
Model Different	:	----	
Product Description	:	FCC Operating Frequency:	GSM 850: 824.20MHz-848.80MHz PCS1900: 1850.20MHz-1909.80MHz
	:	Antenna Gain:	-3.3dBi for GSM850 0.9dBi for GSM1900
	:	Modulation Type:	GPRS: GMSK EDGE: 8PSK
Power Rating	:	Input: DC 5V	
Li-ion Polymer Battery	:	3.8V by 450mAh Rechargeable Li-ion battery	
Software Version	:	----	
Hardware Version	:	----	
Remark:			
(1) The antenna gain provided by the applicant, the verified for the RF conduction test provided by TOBY test lab.			
(2) The above antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.			

Note:

For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

1.3 Block Diagram Showing the Configuration of System Tested



The above block diagram of setup is the normal mode. And more detail please refer to the test setup of each test item of bellow.

1.4 Description of Support Units

The EUT has been tested as an independent unit.

1.5 Description of Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned follow was evaluated respectively.

During all testing, EUT is link mode with base station at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range. Frequency range investigated for radiated emission as below:

1. 9kHz~10GHz for GSM85.
2. 9kHz~20GHz for PCS1900.

Test Channel		
Mode	Channel	Frequency(MHz)
GSM 850	128	824.20
	190	836.60
	251	848.80
PCS 1900	512	1850.20
	661	1880.00
	810	1909.80

Test Mode	Description
GPRS 850	highest , middle, lowest channels
EGPRS 850	highest , middle, lowest channels
GPRS 1900	highest , middle, lowest channels
EGPRS 1900	highest , middle, lowest channels

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) During the testing procedure, the EUT is in link mode with base station emulator at maximum power level in each test mode.
- (3) The EUT has GSM, GPRS, EDGE functions, and after pre-testing, GSM function is the worst case for all the emission tests.
- (4) The EUT is considered a portable unit; it was pre-tested on the positioned of each 3 axis, X-plane, Y-plane and Z-plane. The worst case was found positioned on Z-plane as the normal use. Therefore only the test data of this Z-plane was used for radiated emission measurement test.

1.6 Measurement Uncertainty

Test Item	Parameters	Expanded Uncertainty (U _{Lab})
RF Power, conducted	/	±0.82 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	±4.60 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	±4.40 dB
Radiated Emission	Level Accuracy: Above 1000MHz	±4.20 dB

1.7 Test Facility

The testing report were performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at 1/F., Building 6, Rundongsheng Industrial Zone, Longzhu, Xixiang, Bao'an District, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

A2LA Certificate No.: 4750.01

The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01.FCC Accredited Test Site Number: 854351. Designation Number: CN1223.

IC Registration No.: (11950A)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A. CAB identifier: CN0056.

2. Test Summary

Test Standards and Test Results			
Standard	Document Title		
FCC Part 2 (10-1-05 Edition)	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations		
FCC Part 22 10-1-05 Edition)	Public Mobile Services		
FCC Part 24 (10-1-05 Edition)	Personal Communications Services		
Standard Section	Test Item	Judgment	Remark
2.1051; 2.1057; 22.917; 24.238	Radiated Out of Band Emissions	PASS	PASS
<p>Note1:Please refer to The Original Grant FCC ID:2AVE6TG5B Test Report.</p> <p>Note2:The following two points have been changed, and only the radiation spurious test needs to be added</p> <p>1.Added Power Amplifier alternative mount option component, pin to pin compatible, same performance and specifications</p> <p>2.Software drivers update to support the new PA alternative</p>			

Test Standards and Test Results			
Standard Section	Test Item	Judgment	Remark
RSS-132 Section 5.5 RSS-133 Section 6.5	Radiated Out of Band Emissions	PASS	PASS
<p>Note1:Please refer to The Original Grant IC:25970-TG5BTest Report.</p> <p>Note2:The following two points have been changed, and only the radiation spurious test needs to be added</p> <p>1.Added Power Amplifier alternative mount option component, pin to pin compatible, same performance and specifications</p> <p>2.Software drivers update to support the new PA alternative</p>			

3. Test Software

Test Item	Test Software	Manufacturer	Version No.
Radiation Emission	EZ-EMC	EZ	FA-03A2RE+
RF Test System	JS1120	Tonscend	V3.1.46

4. Test Equipment and Test Site

Test Site				
No.	Test Site	Manufacturer	Specification	Used
TB-EMCSR001	Shielding Chamber #1	YIHENG	7.5*4.0*3.0 (m)	X
TB-EMCSR002	Shielding Chamber #2	YIHENG	8.0*4.0*3.0 (m)	√
TB-EMCCA001	3m Anechoic Chamber #A	ETS	9.0*6.0*6.0 (m)	X
TB-EMCCB002	3m Anechoic Chamber #B	YIHENG	9.0*6.0*6.0 (m)	√

Radiation Emission Test (B Site)					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	N9020A	MY49100060	Aug. 29, 2024	Aug. 28, 2025
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102197	Jun. 17, 2024	Jun. 16, 2025
EMI Test Receiver	Rohde & Schwarz	ESU-8	100472/008	Feb.22, 2025	Feb.21, 2026
Bilog Antenna	SCHWARZBECK	VULB 9168	1225	Nov. 13, 2023	Nov. 12, 2025
Horn Antenna	SCHWARZBECK	BBHA 9120 D	2463	Jun. 14, 2024	Jun. 13, 2026
Horn Antenna	SCHWARZBECK	BBHA 9170	1118	Feb. 27, 2024	Feb.26, 2026
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Jun. 14, 2024	Jun. 13, 2026
HF Amplifier	Tonscend	TAP9E6343	AP21C806117	Aug. 29, 2024	Aug. 28, 2025
HF Amplifier	Tonscend	TAP051845	AP21C806141	Aug. 29, 2024	Aug. 28, 2025
HF Amplifier	Tonscend	TAP0184050	AP21C806129	Aug. 29, 2024	Aug. 28, 2025
Highpass Filter	CD	HPM-6.4/18G	---	N/A	N/A
Highpass Filter	CD	HPM-2.8/18G	---	N/A	N/A
Highpass Filter	XINBO	XBLBQ-HTA67(8-25G)	22052702-1	N/A	N/A
Antenna Conducted Emission					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102197	Jun. 17, 2024	Jun. 16, 2025
MXA Signal Analyzer	KEYSIGHT	N9020B	MY60110172	Aug. 29, 2024	Aug. 28, 2025
MXA Signal Analyzer	Agilent	N9020A	MY47380425	Aug. 29, 2024	Aug. 28, 2025
Vector Signal Generator	Agilent	N5182A	MY50141294	Aug. 29, 2024	Aug. 28, 2025
Analog Signal Generator	Agilent	N5181A	MY48180463	Aug. 29, 2024	Aug. 28, 2025
Vector Signal Generator	KEYSIGHT	N5182B	MY59101429	Aug. 29, 2024	Aug. 28, 2025
Analog Signal Generator	KEYSIGHT	N5173B	MY61252685	Aug. 29, 2024	Aug. 28, 2025
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO26	Aug. 29, 2024	Aug. 28, 2025
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO29	Aug. 29, 2024	Aug. 28, 2025
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO31	Aug. 29, 2024	Aug. 28, 2025
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO33	Aug. 29, 2024	Aug. 28, 2025
RF Control Unit	Tonsced	JS0806-1	21C8060380	N/A	N/A
RF Control Unit	Tonsced	JS0806-2	21F8060439	Aug. 29, 2024	Aug. 28, 2025
Power Control Box	Tonsced	JS0806-4ADC	21C8060387	N/A	N/A
Wideband Radio	Rohde & Schwarz	CMW500	144382	Aug. 29, 2024	Aug. 28, 2025

Communication Tester					
Universal Radio Communication Tester	Rohde&Schwarz	CMW500	168796	Feb.22, 2025	Feb.21, 2026
Temperature and Humidity Chamber	ZhengHang	ZH-QTH-1500	ZH2107264	Jun. 14, 2024	Jun. 13, 2026

5. Radiated Out Band of Emissions

12.1 Test Standard and Limit

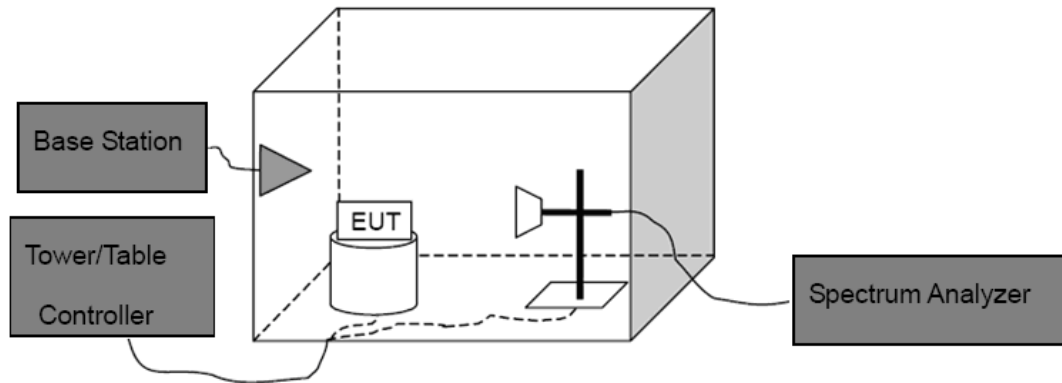
12.1.1 Test Standard

FCC Part 2: 2.1053, 2.1057
FCC Part 22H: 22.917
FCC Part 24E: 24.238
RSS-132 Section 5.5
RSS-133 Section 6.5

12.1.2 Test Limit

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power(P) by a factor of at least $43+10\log(P)$ dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

12.2 Test Setup



12.3 Test Procedure

- (1) The test system setup as show in the block diagram above.
- (2) The EUT was placed on an non-conductive rotating platform in an anechoic chamber. The radiated spurious emissions from 30MHz to 10th harmonious of fundamental frequency were measured at 3 m with a test antenna and a spectrum analyzer with RBW=1 MHz, VBW=1 MHz, peak detector settings.
- (3) During the measurement, the EUT was enforced in maximum power and linked with a base station. All the spurious emissions at 3m were measured by rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
- (4) When found the maximum level of emissions from the EUT. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB= $10 \log(\text{TX power in Watts}/0.001)$ -the absolute level

Spurious attenuation limit in dB= $43+10 \log(\text{power out in Watts})$

12.4 Deviation From Test Standard

No deviation

12.5 EUT Operating Mode

The EUT was continuously connected with the Base station and transmitting in the max power during the test.

12.6 Test Data

Please refer to the Attachment B.

ATTACHMENT A--RADIATED OUT BAND OF EMISSIONS

Measurement Data (worst case)

Test mode:	GSM 850						
Channel:	Middle						
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
1678.69	Horizontal	-53.68	14.94	6.12	-32.62	-13.00	Pass
2443.04	H	-65.07	13.87	7.86	-43.34		
3219.82	H	-72.50	14.49	9.54	-48.47		
1767.34	Vertical	-36.61	8.02	3.97	-24.62	-13.00	Pass
2564.04	V	-46.42	10.47	5.05	-30.90		
3243.94	V	-54.68	16.92	5.98	-31.78		
Remark: 1, The testing has been conformed to 10*836.6MHz=8,366MHz.							
2, All other emissions more than 30 dB below the limit.							
3, Emission Level= Read Level+ Antenna Correct Factor +Cable Loss							

Test mode:	GSM 1900						
Channel:	Middle						
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
3619.32	Horizontal	-54.91	14.94	6.12	-33.85	-13.00	Pass
5726.36	H	-64.40	13.87	7.86	-42.67		
7307.49	H	-68.80	14.49	9.54	-44.77		
3895.31	Vertical	-37.23	8.02	3.97	-25.24	-13.00	Pass
5241.57	V	-48.63	10.47	5.05	-33.11		
7385.33	V	-59.40	16.92	5.98	-36.50		
Remark: 1, The testing has been conformed to 10*1880.0MHz=18,800MHz.							
2, All other emissions more than 30 dB below the limit.							
3, Emission Level= Read Level+ Antenna Correct Factor +Cable Loss							

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