



RF Exposure Evaluation

For

GieseckeDevrient IoT Solutions GmbH

IoTgo Track-Solar iot

Test Model: iot

Prepared for : GieseckeDevrient IoT Solutions GmbH
Address : Max-Planck-Str. 8, 85716 Unterschlessheim, Germany

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.
Address : 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei,
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Date of receipt of test sample : May 22, 2025
Number of tested samples : 2
Sample No. : A250520004-1, A250520004-2
Serial number : Prototype
Date of Test : May 22, 2025 ~ June 18, 2025
Date of Report : June 19, 2025



**RF Exposure Evaluation****Report Reference No. : LCSA05215211EF**

Date of Issue..... : June 19, 2025

Testing Laboratory Name..... : Shenzhen LCS Compliance Testing Laboratory Ltd.Address..... : 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei,
Shajing Street, Baoan District, Shenzhen, 518000, ChinaTesting Location/ Procedure..... : Full application of Harmonised standards ■
Partial application of Harmonised standards □
Other standard testing method □**Applicant's Name..... : GieseckeDevrient IoT Solutions GmbH**

Address..... : Max-Planck-Str. 8, 85716 Unterschlessheim, Germany

Test SpecificationStandard..... : FCC KDB publication 447498 D01 General 1 RF Exposure
Guidance v06
FCC CFR 47 part1 1.1310
FCC CFR 47 part2 2.1091**Test Report Form No..... : TRF-4-E-214 A/0**

TRF Originator..... : Shenzhen LCS Compliance Testing Laboratory Ltd.

Master TRF..... : Dated 2011-03

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EUT Description..... : IoTgo Track-Solar iot

Trade Mark..... : IoTgo®

Test Model..... : 500

Ratings..... : Please Refer to Page 6

Result : **PASS****Compiled by:**

Ling Zhu/ Administrator

Supervised by:

Jack Liu / Technique principal

Approved by:

Gavin Liang/ Manager



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**FCC -- TEST REPORT**

Test Report No. : LCSA05215211EF	<u>June 19, 2025</u> Date of issue
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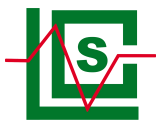
EUT.....	: IoTgo Track-Solar iot
Test Model.....	: iot
Applicant.....	: GieseckeDevrient IoT Solutions GmbH
Address.....	: Max-Planck-Str. 8, 85716 Unterschlessheim, Germany
Telephone.....	: /
Fax.....	: /
Manufacturer.....	: GieseckeDevrient IoT Solutions GmbH
Address.....	: Max-Planck-Str. 8, 85716 Unterschlessheim, Germany
Telephone.....	: /
Fax.....	: /
Factory.....	: GieseckeDevrient IoT Solutions GmbH
Address.....	: Max-Planck-Str. 8, 85716 Unterschlessheim, Germany
Telephone.....	: /
Fax.....	: /

Test Result:	Positive
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The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.





Revision History

Report Version	Issue Date	Revision Content	Revised By
000	June 19, 2025	Initial Issue	---



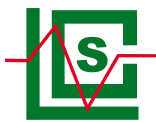


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1. Product Information

EUT : IoTgo Track-Solar iot
Test Model : iot
Ratings : Lithium Polymer Battery: DC 3.7V 22Ah 81.4Wh
Hardware Version : /
Software Version : /

Bluetooth

Frequency Range : 2402MHz~2480MHz
Channel Number : 40 channels for Bluetooth V5.0 (DTS)
Channel Spacing : 2MHz for Bluetooth V5.0 (DTS)
Modulation Type : GFSK for Bluetooth V5.0 (DTS)
Bluetooth Version : V5.0
Antenna Description : Ant 1: Ceramics Antenna, 3dBi(Max.)
Ant 2: Ceramics Antenna, 3dBi(Max.)

WIFI(2.4G Band)

Frequency Range : 2412MHz~2462MHz
Channel Spacing : 5MHz
Channel Number : 11 Channels for 20MHz bandwidth (2412~2462MHz)
7 Channels for 40MHz bandwidth (2422~2452MHz)
Modulation Type : IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)
IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)
IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Antenna Description : Ant 1: Ceramics Antenna, 3dBi(Max.)

2G

Support Band : ☒ GSM 850 (U.S.-Band) ☒ PCS 1900 (U.S.-Band)
Release Version : R99
GPRS Class : Class 12
EGPRS Class : Class 12
Type Of Modulation : GMSK for GSM/GPRS; GMSK/8PSK for EGPRS
Antenna Description : PIFA Antenna
0.03dBi (max.) For GSM 850
2.2dBi (max.) For PCS 1900

CatM1

Support Band : ☒ CatM1 Band 2(U.S.-Band)
☒ CatM1 Band 4(U.S.-Band)
☒ CatM1 Band 5(U.S.-Band)
☒ CatM1 Band 12(U.S.-Band)
☒ NB-IoT Band 13(U.S.-Band)
☒ CatM1 Band 25(U.S.-Band)
☒ CatM1 Band 26(U.S.-Band)
☒ CatM1 Band 66(U.S.-Band)
☒ CatM1 Band 85(U.S.-Band)





Release Version : R13

Type Of Modulation : UL: BPSK, QPSK
DL: QPSK

Antenna Description : PIFA Antenna
2.2dBi (max.) For CatM1 Band 2
1.84dBi (max.) For CatM1 Band 4
0.03dBi (max.) For CatM1 Band 5
1.71dBi (max.) For CatM1 Band 12
1.46dBi (max.) For CatM1 Band 13
2.2dBi (max.) For CatM1 Band 25
0.1dBi (max.) For CatM1 Band 26
3.74dBi (max.) For CatM1 Band 66
1.71dBi (max.) For CatM1 Band 85

Power Class : Class 3

NB-IoT :

Support Band : ☒ NB-IoT Band 2(U.S.-Band)
☒ NB-IoT Band 4(U.S.-Band)
☒ NB-IoT Band 5(U.S.-Band)
☒ NB-IoT Band 12(U.S.-Band)
☒ NB-IoT Band 13(U.S.-Band)
☒ NB-IoT Band 25(U.S.-Band)
☒ NB-IoT Band 66(U.S.-Band)
☒ NB-IoT Band 71(U.S.-Band)
☒ NB-IoT Band 85(U.S.-Band)

Release Version : R13

Type Of Modulation : UL: BPSK, QPSK
DL: QPSK

Antenna Description : PIFA Antenna
2.2dBi (max.) For NB-IoT Band 2
1.84dBi (max.) For NB-IoT Band 4
0.03dBi (max.) For NB-IoT Band 5
1.71dBi (max.) For NB-IoT Band 12
1.46dBi (max.) For NB-IoT Band 13
2.2dBi (max.) For NB-IoT Band 25
3.74dBi (max.) For NB-IoT Band 66
1.1dBi (max.) For NB-IoT Band 71
1.71dBi (max.) For NB-IoT Band 85

Power Class : Class 3

Extreme temp. Tolerance : -30°C to +50°C

Extreme vol. Limits : 3.23VDC to 4.37VDC (nominal: 3.8VDC)

Exposure category : General population/uncontrolled environment

EUT Type : Production Unit

Device Type : Mobile Devices

Note: For a more detailed antenna description, please refer to the antenna specifications or the antenna report provided by the customer.





2. Evaluation Method

Systems operating under the provisions of FCC 47 CFR section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as mobile device whereby a distance of 0.2m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.

In accordance with KDB447498D01 for Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modelled or measured field strengths or power density, is ≤ 1.0 . The MPE ratio of each antenna is determined at the minimum test separation distance required by the operating configurations and exposure conditions of the host device, according to the ratio of field strengths or power density to MPE limit, at the test frequency. Either the maximum peak or spatially averaged results from measurements or numerical simulations may be used to determine the MPE ratios. Spatial averaging does not apply when MPE is estimated using simple calculations based on far-field plane-wave equivalent conditions. The antenna installation and operating requirements for the host device must meet the minimum test separation distances required by all antennas, in both standalone and simultaneous transmission operations, to satisfy compliance.

3. Limit

3.1 Refer Evaluation Method

[ANSI C95.1-2019](#): IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz

[FCC KDB publication 447498 D01 General 1 RF Exposure Guidance v06](#): Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

[FCC CFR 47 part1 1.1310](#): Radiofrequency radiation exposure limits.

[FCC CFR 47 part2 2.1091](#): Radiofrequency radiation exposure evaluation: mobile devices.

3.2 Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	6
3.0 – 30	1842/f	4.89/f	(900/f ²)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	/	/	f/300	6
1500 – 100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Uncontrolled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 30	824/f	2.19/f	(180/f ²)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	/	/	f/1500	30
1500 – 100,000	/	/	1.0	30

F=frequency in MHz

*=Plane-wave equivalent power density



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4. MPE Calculation Method

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S=PG/4\pi R^2$$

Where: S=power density

P=power input to antenna

G=power gain of the antenna in the direction of interest relative to an isotropic radiator

R=distance to the center of radiation of the antenna

5. Conducted Power

[BT LE Ant 1]

Mode	Channel	Frequency (MHz)	Peak Conducted Output Power (dBm)	ANT Max. Tune Up Power (dBm)
GFSK	0	2402	-1.79	-1.0±1.0
	19	2440	0.93	0±1.0
	39	2480	-0.02	0±1.0

[BT LE Ant2]

Mode	Channel	Frequency (MHz)	Peak Conducted Output Power (dBm)	ANT Max. Tune Up Power (dBm)
GFSK	0	2402	-1.77	-1.0±1.0
	19	2440	0.66	0±1.0
	39	2480	-0.28	0±1.0

[2.4G WIFI Max Peak Power]

Mode	Channel	Frequency (MHz)	Max Conducted Power(dBm)	ANT Max. Tune Up Power (dBm)
IEEE 802.11b	1	2412	14.14	14.0±1.0
	6	2437	14.36	14.0±1.0
	11	2462	14.38	14.0±1.0
IEEE 802.11g	1	2412	18.33	18.0±1.0
	6	2437	18.66	18.0±1.0
	11	2462	18.60	18.0±1.0
IEEE 802.11n HT20	1	2412	17.46	17.0±1.0
	6	2437	17.63	17.0±1.0
	11	2462	17.53	17.0±1.0
IEEE 802.11n HT40	3	2422	15.74	15.0±1.0
	6	2437	16.21	16.0±1.0
	9	2452	16.15	16.0±1.0



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[GSM Max Average Power]

Test Mode	Channel	Frequency (MHz)	Max Average Power (dBm)	ANT Max. Tune Up Power (dBm)
GSM 850	Low	824.2	32.38	32.0±1.0
	Middle	836.6	32.39	32.0±1.0
	High	848.8	32.37	32.0±1.0
PCS 1900	Low	1850.2	29.44	29.0±1.0
	Middle	1880.0	29.44	29.0±1.0
	High	1909.8	29.43	29.0±1.0

[LTE Max Average Power]

Test Mode		Channel	Max Average Power (dBm)	ANT Max. Tune Up Power (dBm)
CatM1	Band 2	LCH	22.75	22.0±1.0
		MCH	22.53	22.0±1.0
		HCH	23.23	23.0±1.0
	Band 4	LCH	22.97	22.0±1.0
		MCH	22.79	22.0±1.0
		HCH	22.81	22.0±1.0
	Band 5	LCH	22.12	22.0±1.0
		MCH	19.03	19.0±1.0
		HCH	17.86	17.0±1.0
	Band 12	LCH	23.51	23.0±1.0
		MCH	23.12	23.0±1.0
		HCH	22.78	22.0±1.0
	Band 13	LCH	23.41	23.0±1.0
		MCH	24.18	24.0±1.0
		HCH	24.24	24.0±1.0
	Band 25	LCH	22.32	22.0±1.0
		MCH	22.21	22.0±1.0
		HCH	22.8	22.0±1.0
	Band 26	LCH	26.29	26.0±1.0
		MCH	26.38	26.0±1.0
		HCH	26.65	26.0±1.0
	Band 26	LCH	22.16	22.0±1.0
		MCH	21.75	21.0±1.0
		HCH	21.62	21.0±1.0
	Band 66	LCH	22.84	22.0±1.0
		MCH	22.31	22.0±1.0
		HCH	23.79	23.0±1.0
	Band 85	LCH	22.56	22.0±1.0
		MCH	22.31	22.0±1.0
		HCH	23.75	23.0±1.0



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Test Mode		Channel	Max Average Power (dBm)	ANT Max. Tune Up Power (dBm)
NB-IoT	Band 2	LCH	19.38	19.0±1.0
		MCH	20.29	20.0±1.0
		HCH	21.31	21.0±1.0
	Band 4	LCH	21.71	21.0±1.0
		MCH	21.87	21.0±1.0
		HCH	21.94	21.0±1.0
	Band 5	LCH	22.53	22.0±1.0
		MCH	22.67	22.0±1.0
		HCH	22.8	22.0±1.0
	Band 12	LCH	22.96	22.0±1.0
		MCH	23.01	23.0±1.0
		HCH	23.05	23.0±1.0
	Band 13	LCH	22.44	22.0±1.0
		MCH	22.57	22.0±1.0
		HCH	22.73	22.0±1.0
	Band 25	LCH	21.48	21.0±1.0
		MCH	21.5	21.0±1.0
		HCH	21.95	21.0±1.0
	Band 66	LCH	21.61	21.0±1.0
		MCH	21.57	21.0±1.0
		HCH	22.29	22.0±1.0
	Band 71	LCH	23.29	23.0±1.0
		MCH	23.02	23.0±1.0
		HCH	22.96	22.0±1.0
	Band 85	LCH	22.52	22.0±1.0
		MCH	22.79	22.0±1.0
		HCH	22.83	22.0±1.0



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6. Measurement Results

6.1 Standalone MPE Evaluation

As declared by the Applicant, the EUT is a wireless device used in a fix application, at least 20 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum separation distance, $r=20\text{cm}$, as well as the gain of the used antenna refer to antenna information, the RF power density can be obtained.

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW				
BT LE Ant1	1.0	1.2589	3	1.9953	0.0005	1.0000
BT LE Ant2	1.0	1.2589	3	1.9953	0.0005	1.0000
IEEE 802.11b	15	31.6228	3	1.9953	0.0126	1.0000
IEEE 802.11g	19	79.4328	3	1.9953	0.0315	1.0000
IEEE 802.11n HT20	18	63.0957	3	1.9953	0.0251	1.0000
IEEE 802.11n HT40	17	50.1187	3	1.9953	0.0199	1.0000
GSM 850	33	1995.2623	0.03	1.0069	0.3999	0.5493
GSM 1900	30	1000.0000	2.2	1.6596	0.3303	1.0000
CatM1 Band 2	24	251.1886	2.2	1.6596	0.0830	1.0000
CatM1 Band 4	23	199.5262	1.84	1.5276	0.0607	1.0000
CatM1 Band 5	23	199.5262	0.03	1.0069	0.0400	0.5493
CatM1 Band 12	24	251.1886	1.71	1.4825	0.0741	0.4660
CatM1 Band 13	25	316.2278	1.46	1.3996	0.0881	0.4973
CatM1 Band 25	23	199.5262	2.2	1.6596	0.0659	1.0000
CatM1 Band 26	27	501.1872	0.1	1.0233	0.1021	0.5427
CatM1 Band 26	23	199.5262	0.1	1.0233	0.0406	0.5427
CatM1 Band 66	24	251.1886	3.74	2.3659	0.1183	1.0000
CatM1 Band 85	24	251.1886	1.71	1.4825	0.0741	0.4653
NB-IoT Band 2	22	158.4893	2.2	1.6596	0.0524	1.0000
NB-IoT Band 4	22	158.4893	2.2	1.6596	0.0524	1.0000
NB-IoT Band 5	23	199.5262	1.84	1.5276	0.0607	0.5493
NB-IoT Band 12	24	251.1886	0.03	1.0069	0.0503	0.4660
NB-IoT Band 13	23	199.5262	1.71	1.4825	0.0589	0.4973
NB-IoT Band 25	22	158.4893	1.46	1.3996	0.0442	1.0000
NB-IoT Band 66	23	199.5262	3.74	2.3659	0.0940	0.5427
NB-IoT Band 71	24	251.1886	1.1	1.2882	0.0644	1.0000
NB-IoT Band 85	23	199.5262	1.71	1.4825	0.0589	0.4653

Remark:

1. Output power including tune-up tolerance;
2. Output power was adjust to duty cycle at 100% if measured duty cycle less than 98%;
3. MPE evaluate distance is 20cm from user manual provide by manufacturer.



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6.2 Simultaneous Transmission MPE Evaluation

The sample support one BLE Antenna and one BLE&2.4GWIFI Antenna another one GSM&CatM1&NB-IoT transmit antenna, so need consider simultaneous transmission;

Simultaneous transmission MPE

According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;

Σ of MPE ratios ≤ 1.0

Mode	Σ MPE max ratios	Limit	Results
2.4GWIFI + GSM850 + BT	0.4314	1.0	Pass
2.4GWIFI + CatM1 Band 13 +BT	0.1196	1.0	Pass

7. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

8. Description of Test Facility

NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier is CN0071.

CNAS Registration Number is L4595.

Test Firm Registration Number: 254912.

9. Measurement Uncertainty

BLE/2.4GWIFI/GSM/CatM1/ NB-IoT:

Test Item		Frequency Range	Uncertainty	Note
Output power	:	1GHz-40GHz	$\pm 0.57\text{dB}$	(1)

(1). This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

-----THE END OF REPORT-----



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