

Prüfbericht-Nr.: <i>Test report no.:</i>	CN2479N8 005	Auftrags-Nr.: <i>Order no.:</i>	168493211	Seite 1 von 10 <i>Page 1 of 10</i>
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2024-07-08	
Auftraggeber: <i>Client:</i>	Sensitech Inc. 800 Cummings Center Suite 258X, Beverly MA 01915-6197 USA			
Prüfgegenstand: <i>Test item:</i>	Quarterback Gateway			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	T11013310			
Auftrags-Inhalt: <i>Order content:</i>	Test Report			
Prüfgrundlage: <i>Test specification:</i>	CFR47 FCC Part 2: Section 2.1091 RSS-102 Issue 6			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2020-05-15 2024-07-10	Please refer to photo documents		
Prüfmuster-Nr.: <i>Test sample no.:</i>	A002920612-001 A003791751-004/005			
Prüfzeitraum: <i>Testing period:</i>	2021-05-25 - 2024-09-27			
Ort der Prüfung: <i>Place of testing:</i>	Refer to Clause 2.1			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: <i>tested by:</i>	X  Yan	genehmigt von: <i>authorized by:</i>	X  Lin Lin	
Datum: <i>Date:</i>	2024-12-05	Ausstellungsdatum: <i>Issue date:</i>	2024-12-06	
Stellung / Position:	Sachverständige(r)/Expert	Stellung / Position:	Sachverständige(r)/Expert	
Sonstiges / <i>Other:</i>	FCC ID: SRMT11013310 IC: 6654A-T11013310 HVIN: T11013310			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende: <i>* Legend:</i>	P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested			
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the above mentioned test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

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Anmerkungen
Remarks

1	Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden. <i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i>
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3	Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt. <i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.</i> <i>Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i>
4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. <i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i>

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1 General Remarks

1.1 Complementary Materials

None.

2 Test Sites

2.1 Test Facilities

Location 1: TÜV Rheinland (Shenzhen) Co., Ltd.

362 Huanguan Road Middle Longhua District, Shenzhen 518110 People's Republic of China

FCC Registration No.: 694916

ISED Company Number: 25069

Location 2: Shanghai ATBL Technology Co., Ltd.

5-6/F., Unit 1, No 8, Free Trade One Life Science and Sci-Tech Industrial Park, No.160, Basheng Road, Pudong New District, Shanghai City, China

FCC Registration No.: 0031025281

ISED Company Number: 27371

2.2 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.3 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.4 Location of Original Data

The original copies of all test data taken during actual testing. A copy has been retained in the TÜV Rheinland (Shenzhen) Co., Ltd.. file for certification follow-up purposes.

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2.5 Status of Facility Used for Testing

The **Error! Reference source not found.** Test facility located at 362 Huanguan Road Middle Longhua District, Shenzhen 518110 People's Republic of China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The T11013310 is a tracking device supporting LTE-M/NB-IoT/2G, WiFi/Bluetooth and 915MHz wireless technology.

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 1: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment	Error! Reference source not found.
Type Designation	Error! Reference source not found.
FCC ID	SRMT11012860
Testing Voltage	12 / 24V DC Charger AC/DC Adapter Rechargeable Battery (4.2V)
WiFi/Bluetooth and 915MHz SRD Transmitter	
Frequency Range	2412-2462MHz, 2402-2480MHz, 902.306 - 922.396MHz
Type of Modulation	WiFi: DSSS, OFDM, 915MHz Transmitter: GFSK Bluetooth: GFSK, $\pi/4$ -DQPSK, 8-DPSK
Antenna Gain	WiFi/Bluetooth: max. 3.4dBi 915MHz SRD: max. 0 dBi
Type of Antenna:	Integral Antenna
GPRS/EGPRS	
Wireless Technology:	GPRS, EGPRS
Operation Frequency band(s)	GPRS/EGPRS: 850/1900
Power Class:	GPRS 900: Class 4 GPRS1800: Class 1 EGPRS 900/1800: E2
GPRS Class	Multi-slot: 12
EGPRS Class	Multi-slot: 12
Type of Modulation:	GPRS: GMSK EGPRS: GMSK, 8PSK
Channel separation	200KHz
Type of Antenna:	External Antenna
Antenna number:	1
Antenna Gain:	2.0dBi
eMTC	
Wireless Technology:	eMTC
Operation Frequency band(s)	Band 2/4/5/12/13/26
Power Class:	Class 3
Type of Modulation:	QPSK, 16QAM
Type of Antenna:	External Antenna
Antenna number:	1
Antenna Gain:	2.0 dBi
NB-IoT	

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Wireless Technology:	NB-IoT
Operation Frequency band(s)	Band 2/5/12/13/26
Power Class:	Class 3
Type of Modulation:	BPSK, QPSK
Type of Antenna:	External Antenna
Antenna number:	1
Antenna Gain:	2.0 dBi

3.3 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.4 Submitted Documents

- FCC/IC Label and Location Info

- User Manual

4 RF Exposure Compliance

4.1 Test Standards

Test standard : FCC 47 CFR Part 2 Section 2.1091
RSS-102 Issue 6

4.2 MPE Limits of FCC and IC

MPE Limit for FCC

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

MPE Limit for IC

Frequency range (MHz)	Electric field (V _{RMS} /m)	Magnetic field (A _{RMS} /m)	Power density (W/m ²)	Reference period (minutes)
10-20	27.46	0.0728	2	6
20-48	58.07 / f ^{0.25}	0.1540 / f ^{0.25}	8.944 / f ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 f ^{0.3417}	0.008335 f ^{0.3417}	0.02619 f ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/f ^{1.2}
150000-300000	0.158 f ^{0.5}	4.21 × 10 ⁻⁴ f ^{0.5}	6.67 × 10 ⁻⁵ f	616000/f ^{1.2}

4.3 Test Result

Test Result: PASS

This device is mobile device, and the applicant declares that the minimum separation distance is greater than 20cm, detail minimum distance refer to below calculation table. Therefore MPE measurement or computational modeling should be used to determine compliance.

MPE Calculation is based on the conducted power, and considering maximum power and antenna gain. The following formula is used to MPE evaluation.

- (1) The power density according to far-field model is:

$$S = \frac{P \times G_{(\theta, \phi)}}{4 \times \pi \times R^2}$$

Where:

- P = input power of the antenna.
 G = antenna gain relative to an isotropic antenna.
 θ, ϕ = elevation and azimuth angles.
 R = distance from the antenna to the point of investigation.

- (2) For single or multiple RF sources, the calculated power density should comply with following:

$$\sum_i \frac{S_i}{S_{Limit, i}} \leq 1$$

Where:

- S_i = the power density when the f is i .
 $S_{Limit, i}$ = the reference level requirement for power density when f is i .
 f = operating frequency.

A. Stand-alone operation mode

Operating Mode	Band	Maximum Conducted Output Power	Antenna Gain (dBi)	Min. Distance (cm)	Calculation (mW/cm ²)	FCC Limit (mW/cm ²)	ISED Limit (mW/cm ²)	Result
NB-IoT	2	24	2	20	0.079	1.0	0.460	PASS
	5	24	2	20	0.079	0.549	0.263	PASS
	12	24	2	20	0.079	0.466	0.231	PASS
	13	24	2	20	0.079	0.518	0.242	PASS
	26	24	2	20	0.079	0.543	0.263	PASS
eMTC	2	24	2	20	0.079	1.0	0.460	PASS
	4	23	2	20	0.063	1.0	0.489	PASS
	5	24	2	20	0.079	0.549	0.263	PASS
	12	24	2	20	0.079	0.466	0.231	PASS
	13	24	2	20	0.079	0.518	0.242	PASS
	26	24	2	20	0.079	0.543	0.263	PASS
GPRS/EGPRS	850	23.97	2	20	0.079	0.549	0.263	PASS
GPRS/EGPRS	1900	20.97	2	20	0.039	1.0	0.460	PASS
WiFi	2.4GHz	26	3.4	20	0.173	1.0	0.535	PASS
Bluetooth	2.4GHz	10	3.4	20	0.002	1.0	0.535	PASS
SRD	915MHz	14	0	20	0.005	0.602	0.277	PASS

B. Simultaneous Transmission operation mode

FCC						
Operating Mode	915MHz Ratio	WiFi Ratio	GPRS/eMTC/ NB-IoT Ratio	Sum Ratio	Limit	Result
915MHz TX+WiFi + License TX	0.008	0.173	0.170	0.351	<1	Pass

ISED						
Operating Mode	915MHz Ratio	WiFi Ratio	GPRS/eMTC/ NB-IoT Ratio	Sum Ratio	Limit	Result
915MHz TX+WiFi + License TX	0.018	0.323	0.342	0.683	<1	Pass

Note:

1. The GPRS/EGPRS, eMTC and NB-IOT modes cannot transmit simultaneous.
2. The GPRS/EGPRS, eMTC and NB-IOT RF output power refer to test reports RXA1706-0199RF01R1, RXA1706-0199RF02R1, RXA1706-0199RF03R1, RXA1706-0199RF04R1, RXA1706-0199RF05, RXA1706-0199RF06, RXA1706-0199RF07, RXA1706-0199RF08, R1811A0536-R7, R1811A0536-R8, R1811A0536-R9, R1811A0536-R10 and R1811A0536-R11 issued by TA Technology (Shanghai) Co., Ltd. and report CN2479N8 003 issued by TÜV Rheinland (Shenzhen) Co., Ltd
3. The WiFi/Bluetooth output power refer to test report RSHD200218007-00B, RSHD200218007-00A and RSHD200618005-08B and RSHD200618005-08A issued Bay Area Compliance Laboratories Corp. (Kunshan). and report CN2479N8 002 issued by TÜV Rheinland (Shenzhen) Co., Ltd.
4. The WiFi/Bluetooth antenna gain is 3.4dBi, 915MHz SRD antenna Gain: 0dBi.
5. The GPRS/EGPRS, eMTC and NB-IOT antenna gain is 2dBi.
6. $R = 0.2m$