

Prüfbericht-Nr.: <i>Test report no.:</i>	60443732 005	Auftrags-Nr.: <i>Order no.:</i>	168266574	Seite 1 von 8 <i>Page 1 of 8</i>	
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2020-05-15		
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>	T11012860				
Auftrags-Inhalt: <i>Order content:</i>	RF Exposure				
Prüfgrundlage: <i>Test specification:</i>	CFR47 FCC Part 2: Section 2.1091				
Wareneingangsdatum: <i>Date of sample receipt:</i>	2020-05-15	Please refer to photo documents			
Prüfmuster-Nr.: <i>Test sample no.:</i>	A002920612-001				
Prüfzeitraum: <i>Testing period:</i>	2020-11-02 - 2021-07-01				
Ort der Prüfung: <i>Place of testing:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.				
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.				
Prüfergebnis*: <i>Test result*:</i>	Pass				
geprüft von: <i>tested by:</i>	genehmigt von: <i>authorized by:</i>				
Datum: <i>Date:</i> 2022-06-29	Ausstellungsdatum: <i>Issue date:</i> 2022-06-29				
Stellung / Position	Project Manager	Stellung / Position	Review er		
Sonstiges / Other:	FCC ID: SRMT11012860				
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>				
Legend:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n) 1 = very good P(ass) = passed a.m. test specifications(s)	2 = gut 2 = good	3 = befriedigend F(ail) = entspricht nicht o.g. Prüfgrundlage(n) 3 = satisfactory F(ail) = failed a.m. test specifications(s)	4 = ausreichend N/A = nicht anwendbar 4 = sufficient N/A = not applicable	5 = mangelhaft N/T = nicht getestet 5 = poor 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 a. m. 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>					

Contents

1	GENERAL REMARKS.....	3
1.1	COMPLEMENTARY MATERIALS	3
2	TEST SITES	3
2.1	TEST FACILITIES	3
2.2	TRACEABILITY	3
2.3	CALIBRATION	3
2.4	LOCATION OF ORIGINAL DATA	3
2.5	STATUS OF FACILITY USED FOR TESTING	3
3	GENERAL PRODUCT INFORMATION	4
3.1	PRODUCT FUNCTION AND INTENDED USE.....	4
3.2	RATINGS AND SYSTEM DETAILS	4
3.3	NOISE GENERATING AND NOISE SUPPRESSING PARTS.....	5
3.4	SUBMITTED DOCUMENTS	5
4	RF EXPOSURE COMPLIANCE	6
4.1	TEST STANDARDS	6
4.2	MPE LIMITS OF FCC AND IC.....	6
4.3	TEST RESULT	7

1 General Remarks

1.1 Complementary Materials

None.

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.

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

FCC Accreditation Designation No.: CN1260

ISED wireless device testing laboratory: 25069

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.

2.5 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. 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 T11012860 is a tracking device supporting LTE-M/NB-IoT/2G, WiFi 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	Quarterback Gateway
Type Designation	T11012860
FCC ID	SRMT11012860
Testing Voltage	12 / 24V DC Charger AC/DC Adapter Rechargeable Battery (4.2V)
WiFi and 915MHz SRD Transmitter	
Frequency Range	2421-2462MHz, 902.306 - 922.396MHz
Type of Modulation	WiFi: DSSS, OFDM, 915MHz Transmitter: GFSK
Antenna Gain	WiFi: max. 3.77 dBi 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	
Wireless Technology:	NB-IoT

Prüfbericht - Nr.: 60443732 005
Test Report No.Seite 5 von 8
Page 5 of 8

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

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

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)	Result
NB-IoT	2	24	2	20	0.079	1.0	PASS
	5	24	2	20	0.079	0.549	PASS
	12	24	2	20	0.079	0.466	PASS
	13	24	2	20	0.079	0.518	PASS
	26	24	2	20	0.079	0.543	PASS
eMTC	2	24	2	20	0.079	1.0	PASS
	4	23	2	20	0.063	1.0	PASS
	5	24	2	20	0.079	0.549	PASS
	12	24	2	20	0.079	0.466	PASS
	13	24	2	20	0.079	0.518	PASS
	26	24	2	20	0.079	0.543	PASS
GPRS/EGPRS	850	23.97	2	20	0.079	0.549	PASS
GPRS/EGPRS	1900	20.97	2	20	0.039	1.0	PASS
WiFi	2.4GHz	20	3.77	20	0.047	1.0	PASS
915MHz TX	915MHz	18	0	20	0.013	0.602	ASS

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	0.022	0.047	0.170	0.239	<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 issued by TA Technology (Shanghai) Co., Ltd. and report 60443732 003 issued by TÜV Rheinland (Shenzhen) Co., Ltd
3. The WiFi output power refer to test report RXA1709-0323RF02R3 issued by TA Technology (Shanghai) Co., Ltd. and report 60443732 002 issued by TÜV Rheinland (Shenzhen) Co., Ltd.
4. The WiFi antenna gain is 3.77dBi
5. The GPRS/EGPRS, eMTC and NB-IOT antenna gain is 2dBi.
6. $R = 0.2m$