Prüfbericht-Nr.: *Test report no.*:	**CN24WR67 004**	**Auftrags-Nr.:** *Order no.*:	168458166	Seite 1 von 11 *Page 1 of 11*
Kunden-Referenz-Nr.: *Client reference no.*:	N/A	**Auftragsdatum:** *Order date:*	2023-12-22	
Auftraggeber: *Client*:	Measurement Specialties (China), Ltd. No.26 LangShan Road, Nanshan District, Shenzhen City, 518057 Guangdong, P. R China			
Prüfgegenstand: *Test item*:	WIRELESS LORAWAN® and BLUETOOTH® TEMPERATURE SENSOR			
Bezeichnung / Typ-Nr.: *Identification / Type no.*:	7XXXN-XX-X-XX, the variables "X" stands for the contents as detailed in Section 3.1			
Auftrags-Inhalt: *Order content*:	Test Report			
Prüfgrundlage: *Test specification*:	CFR47 FCC Part 2: Section 2.1091 CFR47 FCC Part 1: Section 1.1310 RSS-102 Issue 5 February 2021			

Wareneingangsdatum: *Date of sample receipt*:	2024-08-19	Please refer to Photo Document
Prüfmuster-Nr.: *Test sample no:*	A003785824-003~004	
Prüfzeitraum: *Testing period*:	2024-08-31 - 2024-09-03	
Ort der Prüfung: *Place of testing*:	Shenzhen PSI Testing Co., Ltd.	
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (Shenzhen) Co., Ltd.	
Prüfergebnis*: *Test result**:	Pass	

geprüft von: tested by:	x Bell Hu Signed by: Bell Hu	**genehmigt von:** *authorized by*:	x Jonathan Li Signed by: Jonathan Li
Datum: *Date:* 2024-11-26		**Ausstellungsdatum:** *Issue date:* 2024-11-26	
Stellung / Position:	Sachverständige(r)/Expert	**Stellung** / Position:	Sachverständige(r)/Expert

Sonstiges / *Other*:
FCC ID: 2A85PA7XXXN
IC: 29620-A7XXXN,
HVIN: 7,
FVIN: SW_79XX_HCC512B_3.4.1_all.hex,SW_75XX_HCC512B_3.4.1_all.hex
PMN: WIRELESS LORAWAN® and BLUETOOTH® TEMPERATURE SENSOR

Zustand des Prüfgegenstandes bei Anlieferung: *Condition of the test item at delivery*: Prüfmuster vollständig und unbeschädigt *Test item complete and undamaged*

* Legende:	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
* *Legend:*	*P(ass) = passed a.m. test specification(s)*	*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

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. *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.*
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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. *Test clauses with remark of * are subcontracted to qualified subcontractors and descripted under the respective test clause in the report.* *Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.*
4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnisen 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 bezueglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. *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.*

Test Summary

3.1.1 RF EXPOSURE COMPLIANCE

RESULT: Pass

Contents

1. Test Sites

1.1 Test Facilities

Shenzhen PSI Testing Co., Ltd.
1-2F, Building 5, Yudafu Industrial Park, No.10, Xingye West Road, Shajing Street, Bao'an District, Shenzhen, Guangdong, China 518104

FCC Registration Number: 916281
IC Registration Number: 31123 and the CAB identifier: CN0158

Note: TÜV Rheinland (Shenzhen) Co., Ltd. subcontracts the all test to Shenzhen PSI Testing Co., Ltd., the tests at the test sites have been conducted under the supervision of a TÜV engineer.

1.2 Traceability

All measurement equipment calibrations are traceable to NIST or where calibration is performed outside the United States, to equivalent nationally recognized standards organizations.

1.3 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 basics using in house standards or comparisons.

1.4 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendixes of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) file for certification follow-up purposes.

1.5 Status of Facility Used for Testing

The Shenzhen PSI Testing Co., Ltd. Test facility located at 1-2F, Building 5, Yudafu Industrial Park, No.10, Xingye West Road, Shajing Street, Bao'an District, Shenzhen, Guangdong, China 518104is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

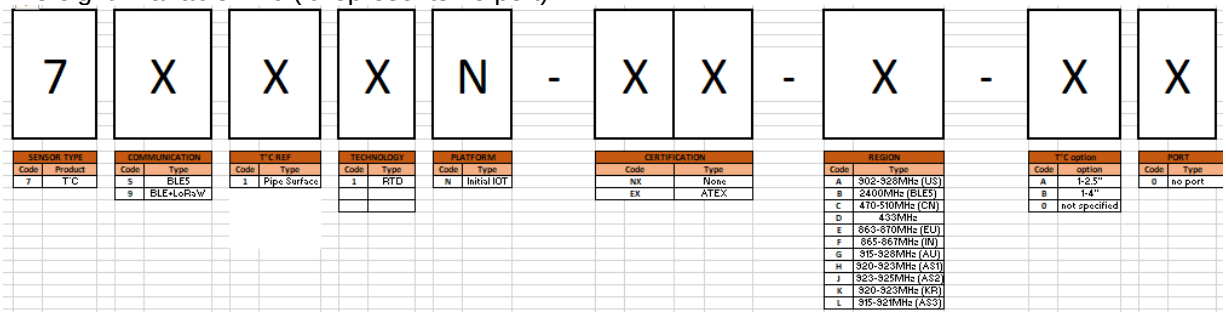
2. General Product Information

2.1 General Description

The product is Wireless Temperature Sensor which support 915MHz LoRa and BLE functions.
This product has multiple models 7XXXN-XX-X-XX, differences among them are as following, which have no impacts on EMC/RF characteristics.
The X is a variable, details listed as below.
The first variable X=5 or 9 (5 represents supporting BLE only, 9 represents supporting both BLE and LoRa. They share the same hardware, only different in software version).

Type No.:	Software Version	Remarks
79XXN-XX-E-XX	SW_79XX_HCC512B_3.4.1_all.hex	1.All of them share the same hardware. 2.The 79XXN-XX-E-XX supports 868MHz LoRa and BLE, corresponding to FVIN **SW_79XX_HCC512B_3.4.1_all.hex.** 3.As to 75XXN-XX-B-XX, the 868MHz LoRa disabled via Firmware setting, only BLE reserved, corresponding to FVIN **SW_75XX_HCC512B_3.4.1_all.hex.**
75XXN-XX-B-XX	SW_75XX_HCC512B_3.4.1_all.hex	

The second variable X=1 (represents the installment type-pipe surface).
The third variable X=1(represents RTD, Resistance temperature detector).
The fourth and fifth variable XX=NX or EX (EX represents Explosive Atmospheres, NX represents Ordinary installations).
The sixth variable X=B or A (A represents US market, B represents BLE)
The seventh variable X=A, B or 0(It represents the pipe size that the product will be installed on. A=1-2.5", B=1-4" or 0=not specified).
The eighth variable X=0 (It represents no port)



Above differences share the same hardware which will not affect the test result specified in this standard, and the tests were conducted on model 7911N-NX-A-A0.

2.2 Rating and System details

Table 1: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment	WIRELESS LORAWAN® and BLUETOOTH® TEMPERATURE SENSOR
Type Designation	7XXXN-XX-X-XX, the variables "X" stands for the contents as detailed in Section 3.1
FCC ID	2A85PA7XXXN
IC ID	29620-A7XXXN
PMN	WIRELESS LORAWAN® and BLUETOOTH® TEMPERATURE SENSOR
HVIN	7
FVIN	SW_79XX_HCC512B_3.4.1_all.hex; SW_75XX_HCC512B_3.4.1_all.hex.
Operating Voltage	3.6V DC (Supplied by internal battery)
Testing Voltage	3.6V DC (Full battery)
Extreme Temperature Range	-30°C to +60 °C
Technical Specification of Bluetooth LE	
Operating Frequency	2402-2480MHz
Type of Modulation	GFSK
Data Rate	125Kbps, 500Kbps, 1Mbps, 2Mbps
Channel Number	40 channels for Bluetooth BLE
Channel Separation	2MHz
Antenna Type	Integral Antenna
Antenna Number	1Tx1Rx
Antenna Gain	-1.48 dBi (Declared by client)
The type of wideband data transmission equipment	Non-FHSS for Bluetooth BLE
Technical Specification of LoRa DTS	
Operating Frequency	903 – 914.2MHz
Type of Modulation	LoRa
Data Rate	SF8 / DR4
Channel Number	8 channels (Upstream)
Channel Separation	1.6 MHz
Occupied Bandwidth	500 kHz
Antenna Type	Integral Antenna
Antenna Gain	-0.66 dBi (Declared by client)
Technical Specification of LoRa FHSS	
Frequency Range	902.3 – 914.9MHz
Type of Modulation	LoRa
Data Rate	SF7 to SF10 / DR0 to DR3
Channel Number	64 channels (Upstream)
Channel Separation	200 kHz
Occupied Bandwidth	125 kHz
Antenna Type	Integral Antenna
Antenna Gain	-0.66 dBi (Declared by client)

3. Test Results

3.1 Transmitter Requirements & Test Suites

3.1.1 RF Exposure Compliance

RESULT: **Pass**

Test standard	:	CFR47 FCC Part 2: Section 2.1091 FCC KDB Publication 447498 D01 v06 FCC KDB Publication 865664 D02 v01r02 RSS-102 Issue 5 February 2021
Limit	:	Table 1 of 47 CFR FCC Part 1.1310 Section 2.5.2 of RSS-102 Issue 5

3.1.1.1 RF Exposure Compliance Requirement for FCC

FCC requirement: Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 20cm normally can be maintained between the user and the device.
Antenna Gain: Max -1.48 dBi BLE, Max -0.66 dBi LoRa.

➢ **Radio Frequency Exposure Limit**

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)
300-1,500	--	--	f/1500
1,500-100,000	--	--	1.0

➢ **Radio Frequency Exposure Calculation Formula**

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density (in appropriate units, e.g. mW/cm^2)
P = power input to the antenna (in appropriate units, e.g., mW)
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 (appropriate units, e.g., cm)

or:

$$S = \frac{EIRP}{4\pi R^2}$$

where: EIRP = equivalent (or effective) isotropically radiated power

Table 2: Test Results of RF Exposure Calculations for FCC

Operating Mode	Measured RF Output Power (dBm)	Max. EIRP (dBm)	Distance (cm)	MPE P_d (mW/cm^2)	Limit (mW/cm^2)	Verdict
Bluetooth LE	5.11	3.63	20	0.00046	1.0	Pass
LoRa	14.15	13.49	20	0.0044	0.6	Pass

Note:
1. BLE RF Output Power: Refer to CN24WR67 002.
2. LoRa RF Output Power: Refer to CN24WR67 003.

Test Results of RF Exposure Calculations for FCC, Simultaneous mode

Not supported.

- **Conclusion**

Therefore the maximum calculations result of above are meet the requirement of Radio Frequency Exposure (MPE) limit.

3.1.1.2 RSS-102 Exemption Limits for Routine Evaluation – RF Exposure Evaluation

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

• at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1.31 x 10-2 f0.6834 W (adjusted for tune-up tolerance), where f is in MHz;

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

Table 3: Test Results of RF Exposure Calculations for ISED

Operating Mode	Maximum EIRP (dBm)	Distance (cm)	Maximum EIRP (W)	Threshold power (W)	Verdict
Bluetooth LE	3.63	20	0.0023	2.68	Pass
LoRa	13.49	20	0.0223	1.38	Pass

Test Results of RF Exposure Calculations for ISED, Simultaneous mode

Not supported.

➢ **Conclusion**

"RF Radiation Exposure Statement Caution: This Transmitter must be installed to provide a separation distance of at least 20 cm from all persons."

4. List of Tables