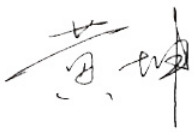
TEST REPORT

Applicant:	INGENICO
EUT Description:	LTE Module
Model:	INGE808-NA
Brand:	INGENICO
FCC ID:	XKB-INGE808NA
Standards:	FCC 47 CFR Part 2.1091
Date of Receipt:	2024/09/04
Date of Issue:	2024/10/11

TOWE. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

the results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of the model are manufactured with identical electrical and mechanical components. All sample tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise. without written approval of TOWE, the test report shall not be reproduced except in full.



Huangkun
Approved By:

ChenChengfu
Reviewed By:

Revision History

Rev.	Issue Date	Description	Revised by
01	2024/10/11	Original	ChenChengfu

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1 General Description

1.1 Lab Information

1.1.1 Testing Location

These measurements tests were conducted at the Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. facility located at F401 and F101, Building E, Hongwei Industrial Zone, Liuxian 3rd Road, Bao'an District, Shenzhen, China. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014
Tel.: +86-755-27212361
Contact Email: info@towewireless.com

1.1.2 Test Facility / Accreditations

A2LA (Certificate Number: 7088.01)
This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

FCC Designation No.: CN1353
Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. has been recognized as an accredited testing laboratory. Designation Number: CN1353.

ISED CAB identifier: CN0152
Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. has been recognized by ISED as an accredited testing laboratory.
CAB identifier: CN0152
Company Number: 31000

1.2 Client Information

1.2.1 Applicant

Applicant:	INGENICO
Address:	9 Avenue de la gare - Rovaltain TGV , Valence Cedex 9,N/A France 26958

1.2.2 Manufacturer

Manufacturer:	INGENICO
Address:	9 Avenue de la gare - Rovaltain TGV , Valence Cedex 9,N/A France 26958

1.3 General Description of EUT

EUT Description:	LTE Module			
Model No.:	INGE808-NA			
Brand:	INGENICO			
Hardware Version:	V1.0.4			
Software Version:	INGE808-NA-Q62.01.119			
Antenna Type:	☒ External, ☐ Integrated			
Antenna gain:	GSM850:	1.61dBi	GSM1900:	1.00dBi
	WCDMA Band II:	1.00dBi	WCDMA Band IV:	1.94dBi
	WCDMA Band V:	1.61dBi		
	LTE Band 2:	1.00dBi	LTE Band 4:	1.94dBi
	LTE Band 5:	1.61dBi	LTE Band 7:	1.52dBi
	LTE Band 12:	0.19dBi	LTE Band 13:	0.92dBi
	LTE Band 17:	0.19dBi	LTE Band 25:	1.00dBi
	LTE Band 26: (814 ~ 824 MHz)	1.42dBi	LTE Band 26: (824 ~ 849 MHz)	1.61dBi
	LTE Band 41:	1.83dBi	LTE Band 66:	1.94dBi
	Bluetooth:	1.83dBi	Wi-Fi 2.4G:	1.83dBi
	5150 ~ 5250MHz:	4.29dBi	5250 ~ 5350MHz:	4.43dBi
	5470 ~ 5725MHz:	3.68dBi	5725 ~ 5850MHz:	1.47dBi
Remark: The above EUT's information was declared by applicant, please refer to the specifications or user manual for more detailed description.				

2 Maximum Permissible RF Exposure

2.1 RF Exposure Limit Introduction

§1.1310 the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to RF radiation as specified in §1.1307(b).

(1) Table 1 to § 1.1310(e)(1)sets forth limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fi elds.

Table 1 to § 1.1310(e)(1) - Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strengtl (A/m)	Power density (mW/cm)	Averaging time (minutes)
(i) 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
1500~100000			5	<6
(ii) 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
300~1500			f/1500	<30
1500~100000			1.0	<30

Note: f = frequency in MHz. * = Plane-wave equivalent power density.

(2) Occupational/controlled exposure limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. The phrase *fully aware* in the context of applying these exposure limits means that an exposed person has received written and/or verbal information fully explaining the potential for RF exposure resulting from his or her employment. With the exception of transient persons, this phrase also means that an exposed person has received appropriate training regarding work practices relating to controlling or mitigating his or her exposure. In situations when an untrained person is transient through a location where occupational/controlled limits apply, he or she must be made aware of the potential for exposure and be supervised by trained personnel pursuant to § 1.1307(b)(2) of this part where use of time averaging is required to ensure compliance with the general population exposure limit. The phrase exercise control means that an exposed person is allowed and also knows how to reduce or avoid exposure by administrative or engineering work practices, such as use of personal protective equipment or time averaging of exposure.

(3) General population/uncontrolled exposure limits apply in situations in which the general public may be exposed, or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure. For example, RF sources intended for consumer use shall be subject to the limits for general population/uncontrolled exposure in this section.

The MPE was calculated at **20cm** to show compliance with the power density limit.

2.2 Equations

Power Density is given by:

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

Where:
S = Power density in mW/cm^2
EIRP= Equivalent isotropic Radiated power in mW
R = Distance from transmitting antenna in cm

Power density in units of mW/cm^2 is converted to units of W/m^2 by multiplying by 10.

Distance:

$$R=\sqrt{\frac{EIRP}{4\pi S}}$$

Where:
S = Power density in mW/cm^2
EIRP= Equivalent isotropic Radiated power in mW
R = Distance from transmitting antenna in cm

EIRP:

$$EIRP = P+G$$

Where:
EIRP = Equivalent isotropic Radiated power in Mw
P = Output power at Antenna Terminals
G = Gain of Transmit Antenna (linear gain)

Source-Based Duty Cycle:
Where applicable (for example, multi-slot cell phone applications) a duty cycle factor may be applied.
Source-based time-averaged EIRP = (DC / 100)* EIRP
Where:
DC = Duty Cycle in %, as applicable
EIRP= Equivalent isotropic Radiated power in mW

MIMO and collocated transmitters (identical limit for all transmitters):
For multiple chain devices, and collocated transmitters operating simultaneously in frequency bands where the limit is identical, the total power density is calculated using the total EIRP obtained by summing the PG (in linear units) of each transmitter.
Total EIRP = (EIRP 1) + (EIRP 2) + … + (EIRP n)

MIMO and collocated transmitters:
For multiple collocated transmitters operating simultaneously in frequency bands where different limit apply:
The power density at the specified separation distance is calculated for each transmitter chain or transmitter.
The fraction of the exposure limit is calculated for each chain or transmitter as
Power density of chain or transmitter / limit applicable to the chain or transmitter.
The fractions are summed.
Compliance is established if the sum of the fractions is less than or equal to one.

3 RF Exposure Results

3.1 Standalone Exposure Calculations

For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.
The manufacturing configures output power so that the maximum power, after accounting for manufacturing tolerances, will never exceed the maximum power level measured.
The antenna gain in the tables below is the maximum antenna gain among various channels within the specified band.

Operating Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	EIRP/ERP (dBm)	EIRP/ERP Limit (dBm)	EIRP/ERP (mW)	Power Density at R=20cm (mW/cm2)	Limit (mW/cm2)	Gain According to EIRP/ERP (dBi)	Gain According to Pd (dBi)	Maximum Gain Allowed (dBi)	Results
GSM 850	824.2	1.61	35.00	34.46	38.45	336.5116	0.0970	0.5495	5.60	9.14	5.60	Pass
PCS 1900	1850.2	1.00	32.00	33.00	33.01	240.4363	0.0602	1.0000	1.01	13.20	1.01	Pass
WCDMA Band II	1852.4	1.00	26.00	27.00	33.01	501.1872	0.1255	1.0000	7.01	10.01	7.01	Pass
WCDMA Band IV	1712.4	1.94	26.00	27.94	30.00	622.3003	0.1935	1.0000	4.00	9.07	4.00	Pass
WCDMA Band V	826.4	1.61	26.00	25.46	38.45	351.5604	0.1013	0.5509	14.60	8.96	8.96	Pass
LTE Band 2	1850.7	1.00	25.00	26.00	33.01	398.1072	0.0997	1.0000	8.01	11.01	8.01	Pass
LTE Band 4	1710.7	1.94	25.00	26.94	30.00	494.3107	0.1537	1.0000	5.00	10.07	5.00	Pass
LTE Band 5	824.7	1.61	25.00	24.46	38.45	279.2544	0.0805	0.5498	15.60	9.95	9.95	Pass
LTE Band 7	2502.5	1.52	25.00	26.52	33.01	448.7454	0.1267	1.0000	8.01	10.49	8.01	Pass
LTE Band 12	699.7	0.19	25.00	23.04	34.77	201.3724	0.0419	0.4665	11.92	10.66	10.66	Pass
LTE Band 13	779.50	0.92	25.00	23.77	34.77	238.2319	0.0586	0.5197	11.92	10.39	10.39	Pass
LTE Band 17	706.5	0.19	25.00	23.04	34.77	201.3724	0.0419	0.4710	11.92	10.70	10.70	Pass
LTE Band 25	1850.7	1.00	25.00	26.00	33.01	398.1072	0.0997	1.0000	8.01	11.01	8.01	Pass
LTE Band 26 (814~824)	814.7	1.42	25.00	24.27	50.00	267.3006	0.0737	0.5431	27.15	10.09	10.09	Pass
LTE Band 26 (824~849)	824.7	1.61	25.00	24.46	38.45	279.2544	0.0805	0.5498	15.60	9.95	9.95	Pass
LTE Band 41	2498.5	1.83	25.00	26.83	33.01	481.9478	0.1461	1.0000	8.01	10.18	8.01	Pass
LTE Band 66	1710.7	1.94	25.00	26.94	30.00	494.3107	0.1537	1.0000	5.00	10.07	5.00	Pass
Bluetooth	2402	1.83	13.5	15.33	30.00	34.1193	0.0103	1.0000	NA			Pass
2.4GWIFI	2412	1.83	20	21.83	30.00	152.4053	0.0462	1.0000				Pass
Wifi 5GHz B1	5180.0	4.29	20	24.29	30.00	268.5344	0.1435	1.0000				Pass
Wifi 5GHz B2	5260.0	4.43	20	24.43	30.00	277.3320	0.1530	1.0000				Pass
Wifi 5GHz B3	5500.0	3.68	20	23.68	30.00	233.3458	0.1083	1.0000				Pass
Wifi 5GHz B4	5745.0	1.47	20	21.47	30.00	140.2814	0.0391	1.0000				Pass

Remark:
1. GSM Operating Band: Frame-average power=Burst power+ Division Factors (-9.19).
2. "Maximum Power" comes from the largest "Tune-up" provided by the customer.

3.2 Multiple Sources Exposure Calculations

When a number of sources at different frequencies, and/or broadband sources, contribute to the total exposure, it becomes necessary to weigh each contribution relative to the MPE in accordance with the provisions of Table(A) and Table(B). To comply with the MPE, the fraction of the MPE in terms of E2, H2 (or power density) incurred within each frequency interval should be determined and the sum of all such fractions should not exceed unity.
In order to ensure compliance with the MPE for a controlled environment, the sum of the ratios of the power density to the corresponding MPE should not exceed unity.

$$\sum_{i=1}^{n} \frac{S_i}{MPE_i} \leq 1$$

The product also has multiple transmitters The Simultaneous Transmission Possibilities are as below:

Simultaneous Tx Combination	Configuration
1	WLAN 5GHz + Bluetooth
2	WWAN + WLAN 2.4GHz + Bluetooth
3	WWAN + WLAN 5GHz + Bluetooth

Operating Band	Frequency (MHz)	Power Density at R=20cm (mW/cm2)	Limit (mW/cm2)	MEs
GSM 850	824.2	0.0970	0.5495	0.0312
PCS 1900	1850.2	0.0602	1.0000	0.0036
WCDMA Band II	1852.4	0.1255	1.0000	0.0158
WCDMA Band IV	1712.4	0.1935	1.0000	0.0375
WCDMA Band V	826.4	0.1013	0.5509	0.0338
LTE Band 2	1850.7	0.0997	1.0000	0.0099
LTE Band 4	1710.7	0.1537	1.0000	0.0236
LTE Band 5	824.7	0.0805	0.5498	0.0214
LTE Band 7	2502.5	0.1267	1.0000	0.0160
LTE Band 12	699.7	0.0419	0.4665	0.0081
LTE Band 13	779.50	0.0586	0.5197	0.0127
LTE Band 17	706.5	0.0419	0.4710	0.0079
LTE Band 25	1850.7	0.0997	1.0000	0.0099
LTE Band 26 (814~824)	814.7	0.0737	0.5431	0.0184
LTE Band 26 (824~849)	824.7	0.0805	0.5498	0.0214
LTE Band 41	2498.5	0.1461	1.0000	0.0214
LTE Band 66	1710.7	0.1537	1.0000	0.0236
Bluetooth	2402	0.0103	1.0000	0.0001
2.4GWIFI	2412	0.0462	1.0000	0.0021
Wifi 5GHz B1	5180.0	0.1435	1.0000	0.0206
Wifi 5GHz B2	5260.0	0.1530	1.0000	0.0234
Wifi 5GHz B3	5500.0	0.1083	1.0000	0.0117
Wifi 5GHz B4	5745.0	0.0391	1.0000	0.0015

The worst-case combination:

Combination	*MEs*	Total *MEs*	Limit	Conclusion
WCDMA Band IV	0.0375	0.0610	<1	PASS
WLAN 5GHz	0.0234			
Bluetooth	0.0001			

~The End~