TEST REPORT

Application No.:	SZCR2505001809MO
Applicant/ Manufacturer:	INGENICO
Address of Applicant/ Manufacturer:	9 Avenue de la gare - Rovaltain TGV, BP25156, Valence Cedex 9 26958 France
Factory:	1. ZHANGZHOU WANLIDA TECHNOLOGY CO.,LTD. 2. Jabil Vietnam Co. Ltd. 3. Industria Eletroeletrônica do Brasil LTDA. 4. Cal-Comp Electronics (Thailand) Public Co., Ltd.
Address of Factory:	1. Wanlida Industrial Zone, Jingcheng Town, Nanjing, Zhangzhou, Fujian, China 2. Lot I8-1, Saigon High Tech Park, Long Thanh My Ward, Thu Duc City, Ho Chi Minh City, Vietnam 3. Rodovia Fernão Dias (BR 381) KM 433 S/N. Jardim das Alterosas –1º Seção Betim – Minas Gerais – CEP: 32670-790 Brazil. 4. 60 Moo 8, Sethakij Rd., Klong Maduea, 74110, Kratoom Bean, Samutsakorn Thailand
Equipment Under Test (EUT):	
EUT Name:	Smart Module
Model No.:	ING-A01-1-AM
Trade Mark:	ingenico
FCC ID:	XKB-INGA01AM
Standard(s) :	FCC Rules 47 CFR §2.1091 KDB 447498 D04 interim General RF Exposure Guidance v01
Date of Receipt:	2025-05-08
Date of Evaluation:	2025-05-14 to 2025-06-04
Date of Issue:	2025-06-09
Evaluation Result:	**Pass***

* In the configuration evaluated, the EUT complied with the standards specified above.

Keny Xu
EMC Laboratory Manager

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
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Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2025-06-09		Original

Authorized for issue by:				
		Calvin Weng **Calvin Weng/Project Engineer**		
		Eric Fu **Eric Fu/Reviewer**		

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2 Contents

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3 General Information

3.1 General Description of E.U.T.

Product Type:	☐ Portable device
	☒ Mobile device
	☐ Fixed device

3.2 Details of E.U.T.

Power supply:	DC3.9V for module
For BT:	
Cable Loss (for RF conducted test):	0.7dB
Operation Frequency:	2402MHz to 2480MHz
Modulation Type:	GFSK, pi/4DQPSK, 8DPSK
Number of Channels:	79
Channel Spacing:	1MHz
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)
Antenna Type:	Dipole Antenna
Antenna Gain:	1.92dBi
For BLE:	
Cable Loss (for RF conducted test):	0.7dB
Operation Frequency:	2402MHz to 2480MHz
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	Dipole Antenna
Antenna Gain:	1.92dBi
For 2.4G WIFI:	
Cable Loss (for RF conducted test):	0.7dB
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK);802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11;802.11n(HT40):7
Channel Spacing:	5MHz

Antenna Type:	Dipole Antenna
Antenna Gain:	1.92dBi
For 5G WIFI:	
Cable Loss (for RF conducted test):	1.5dB
Operation Frequency/Number of channels (20MHz):	U-NII-1: 5180-5240MHz (4 Channels) U-NII-2A: 5260-5320MHz (4 Channels) U-NII-2C: 5500-5700MHz (11 Channels) U-NII-3: 5745-5825MHz (5 Channels)
Operation Frequency/Number of channels/(40MHz):	U-NII-1:5190-5230MHz (2 Channels) U-NII-2A: 5270-5310MHz (2 Channels) U-NII-2C: 5510-5670MHz (5 Channels) U-NII-3: 5755-5795MHz (2 Channels)
Operation Frequency/Number of channels (80MHz):	U-NII-1:5210MHz (1 Channel); U-NII-2A: 5290MHz (1 Channels) U-NII-2C: 5530-5610MHz (2 Channels) U-NII-3: 5775MHz (1 Channel)
Modulation Type:	802.11a: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Channel Spacing:	802.11a/n/ac 20: 20MHz; 802.11n/ac 40: 40MHz; 802.11ac 80: 80MHz
DFS Function:	Slave without Radar detection
TPC Function:	Without TPC function
Antenna Type:	Dipole Antenna
Antenna Gain:	U-NII-1/2A:0dBi, U-NII-2C:0.49dBi, U-NII-3:0.3dBi
For 2G:	
Cable Loss (for RF conducted test):	Below 1GHz: 0.5dB, 1GHz~2GHz:0.7dB, Above 2GHz: 1dB
Sample Type:	Mobile product
Support Network:	GPRS, EGPRS
Operation Frequency Band:	GSM850/PCS1900
Modulation Type:	GMSK for GPRS/EGPRS; 8PSK for EGPRS
GPRS Class:	12
EGPRS Class:	12
Antenna Type:	Dipole Antenna
Antenna Gain:	GSM 850: -3.29dBi; 1900MHz: 1dBi

For 3G:	
Cable Loss (for RF conducted test):	Below 1GHz: 0.5dB, 1GHz~2GHz:0.7dB, Above 2GHz: 1dB
Sample Type:	Mobile product
Support Network:	RMC, HSDPA, HSUPA, HSPA+
Operation Frequency Band:	UMTS FDD Band II/IV/V
Modulation Type:	BPSK/QPSK/16QAM/64QAM for WCDMA
Supported Channel Bandwidth:	5MHz for WCDMA
UMTS Power Class:	Level 3
Antenna Type:	Dipole Antenna
Antenna Gain:	WCDMA B2: 2.86dBi, B4:1.24dBi, B5:-3.29dBi
For 4G:	
Sample Type:	Mobile product
LTE Operation Frequency Band:	LTE B2/4/5/7/12/13/17/25/26/41/66/71
Modulation Type:	QPSK, 16QAM, 64QAM
LTE Power Class:	Level 3
Antenna Type:	Dipole Antenna
Antenna Gain:	LTE B2:2.86dBi, B4:1.24dBi, B5:-3.29dBi, B7:0.39dBi, B12: -1.23Bi, B13:-3.04dBi, B17:-1.23Bi, B25:2.86dBi, B26:-3.11dBi, B41:0.97dBi, B66: 1.24dBi,B71:-0.42dBi

Remark:The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

3.3 Separation Distance

Minimum test separation distance:	20cm
Remark: This minimum test separation distance is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander.	

3.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

3.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI (Member No. 1937)

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen EMC laboratory have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1336

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1336. Test Firm Registration Number: 787754.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

3.6 Deviation from Standards

None

3.7 Abnormalities from Standard Conditions

None

4 FCC Radiofrequency radiation exposure limits

Test exemptions apply for devices used in general population/uncontrolled exposure environments, according to the SAR-based, or MPE-based exemption thresholds.

4.1 Blanket 1 mW Blanket Exemption

The 1 mW Blanket Exemption of §1.1307(b)(3)(i)(A) applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power of no more than 1 mW, regardless of separation distance.

The 1-mW blanket exemption applies at separation distances less than 0.5 cm, including where there is no separation. This exemption shall not be used in conjunction with other exemption criteria other than those for multiple RF sources in paragraph §1.1307(b)(3)(ii)(A).

The 1-mW exemption is independent of service type and covers the full range of 100 kHz to 100 GHz, but it shall not be used in conjunction with other exemption criteria or in devices with higher-power transmitters operating in the same time-averaging period. Exposure from such higher-power transmitters would invalidate the underlying assumption that exposure from the lower-power transmitter is the only contributor to SAR in the relevant volume of tissue.

4.2 MPE-based Exemption

General frequency and separation-distance dependent MPE-based effective radiated power (ERP) thresholds are in Table B.1 [Table 1 of §1.1307(b)(1)(i)(C)] to support an exemption from further evaluation from 300 kHz through 100 GHz.

Table B.1—Thresholds For Single RF Sources Subject to Routine Environmental Evaluation

RF Source Frequency			Minimum Distance			Threshold ERP
f_L MHz		f_H MHz	$\lambda_L / 2\pi$		$\lambda_H / 2\pi$	W
0.3	–	1.34	159 m	–	35.6 m	1,920 R^2
1.34	–	30	35.6 m	–	1.6 m	3,450 R^2/f^2
30	–	300	1.6 m	–	159 mm	3.83 R^2
300	–	1,500	159 mm	–	31.8 mm	0.0128 R^2f
1,500	–	100,000	31.8 mm	–	0.5 mm	19.2R^2
Subscripts L and H are low and high; λ is wavelength. From §1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns.						

The table applies to any RF source (i.e. single fixed, mobile, and portable transmitters) and specifies power and distance criteria for each of the five frequency ranges used for the MPE limits. These criteria apply at separation distances from any part of the radiating structure of at least λ/2π. The thresholds are

based on the general population MPE limits with a single perfect reflection, outside of the reactive near-field, and in the main beam of the radiator.

For mobile devices that are not exempt per Table B.1 [Table 1 of §1.1307(b)(1)(i)(C)] at distances from 20 cm to 40 cm and in 0.3 GHz to 6 GHz, evaluation of compliance with the exposure limits in §1.1310 is necessary if the ERP of the device is greater than ERP_{20cm} in Formula (B.1) [repeated from §2.1091(c)(1); also in §1.1307(b)(1)(i)(B)].

$$P_{th}\,(\mathrm{mW}) = ERP_{20\,cm}\,(\mathrm{mW}) = \begin{cases} 2040f & 0.3\ \mathrm{GHz} \le f < 1.5\ \mathrm{GHz} \\ 3060 & 1.5\ \mathrm{GHz} \le f \le 6\ \mathrm{GHz} \end{cases} \qquad (B.1)$$

If the ERP is not easily obtained, then the available maximum time-averaged power may be used (i.e., without consideration of ERP only if the physical dimensions of the radiating structure(s) do not exceed the electrical length of λ/4 or if the antenna gain is less than that of a half-wave dipole.

SAR-based exemptions are constant at separation distances between 20 cm and 40 cm to avoid discontinuities in the threshold when transitioning between SAR-based and MPE-based exemption criteria at 40 cm, considering the importance of reflections.

Limit calculation			
Frequency range	Frequency(MHz)	R(λ/2π)(m)	Threshold ERP(W)
300~1500MHz	**915**	0.0522	0.032
1500~100000MHz	**2480**	0.0193	0.007

4.3 SAR-based Exemption

SAR-based thresholds are derived based on frequency, power, and separation distance of the RF source. The formula defines the thresholds in general for either available maximum time-averaged power or maximum time-averaged ERP, whichever is greater.

If the ERP of a device is not easily determined, such as for a portable device with a small form factor, the applicant may use the available maximum time-averaged power exclusively if the device antenna or radiating structure does not exceed an electrical length of λ/4.

As for devices with antennas of length greater than λ/4 where the gain is not well defined, but always less than that of a half-wave dipole (length λ/2), the available maximum time-averaged power generated by the device may be used in place of the maximum time-averaged ERP, where that value is not known.

The separation distance is the smallest distance from any part of the antenna or radiating structure for all persons, during operation at the applicable ERP. In the case of mobile or portable devices, the separation distance is from the outer housing of the device where it is closest to the antenna.

The SAR-based exemption formula of §1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold P_{th} (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by Formula (B.2).

$$P_{\text{th}}\ (\text{mW}) = \begin{cases} ERP_{20\ \text{cm}}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\ \text{cm}} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases} \qquad \text{(B.2)}$$

where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ \text{cm}}\sqrt{f}}\right)$$

and f is in GHz, d is the separation distance (cm), and ERP_{20cm} is per Formula (B.1).

Example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance(mm)									
	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

Limit calculation				
Frequency range(GHz)	Frequency(GHz)	X	Distance(cm)	Pth (mW)
0.3~1.5	**0.915**	1.474	**0.5**	**8.133**
1.5~6	**2.48**	1.905	**0.5**	**2.717**

§ 1.1310(E)(1)—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	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
300–1,500			f/300	<6
1,500–100,000			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
300–1,500			f/1500	<30
1,500–100,000			1.0	<30

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

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5 Measurement and Calculation

Band	Burst Tune up Power(dBm)	DivisionFactors (dB)	Time-Averaged Tune upPower (dBm)
GSM 850	35	-9.03	25.97
PCS 1900	32	-9.03	22.97

Note:Division Factors
To average the power, the division factor is as follows:
1Txslot = 1 transmit time slot out of 8 time slots
=> conducted power divided by (8/1) => -9.03 dB
2Txslots = 2 transmit time slots out of 8 time slots
=> conducted power divided by (8/2) => -6.02 dB
3Txslots = 3 transmit time slots out of 8 time slots
=> conducted power divided by (8/3) => -4.26 dB
4Txslots = 4 transmit time slots out of 8 time slots=>
conducted power divided by (8/4) => -3.01 dB

Operating Band	Frequency (MHz)	Antenna Gain (dBi)	Max Conducted Power (dBm)	EIRP(ERP) (dBm)	EIRP(ERP) Limit (dBm)	Power Density at R = 20 cm (mW/cm2)	Limit (mW/cm2)	Gain according to EIRP(ERP) (dBi)	Gain according to Pd (dBi)	Max Gain Allowed (dBi)	conclusion	MPE Ratio
GSM850	824.2	-3.29	25.97	20.53	38.45	0.0225	0.5495	14.63	8.44	8.44	Pass	0.0409
PCS1900	1850.2	1	22.97	23.97	33.01	0.0496	1.0000	10.04	14.04	10.04	Pass	0.0496
WCDMA B2	1852.4	2.86	25.00	27.86	33.01	0.1215	1.0000	8.01	12.01	8.01	Pass	0.1215
WCDMA B4	1712.4	1.24	25.00	26.24	30.00	0.0837	1.0000	5.00	12.01	5.00	Pass	0.0837
WCDMA B5	826.4	-3.29	25.00	19.56	38.45	0.0180	0.5509	15.60	9.42	9.42	Pass	0.0326
LTE Band 2	1850.7	2.86	25.00	27.86	33.01	0.1215	1.0000	8.01	12.01	8.01	Pass	0.1215
LTE Band 4	1710.7	1.24	24.00	25.24	30.00	0.0665	1.0000	6.00	13.01	6.00	Pass	0.0665
LTE Band 5	824.7	-3.29	25.00	19.56	38.45	0.0180	0.5498	15.60	9.41	9.41	Pass	0.0327
LTE Band 7	2502.5	0.39	25.00	25.39	33.01	0.0688	1.0000	8.01	12.01	8.01	Pass	0.0688
LTE Band 12	699.7	-1.23	25.00	21.62	34.77	0.0289	0.4665	11.92	8.70	8.70	Pass	0.0619
LTE Band 13	779.5	-3.04	25.00	19.81	34.77	0.0190	0.5197	11.92	9.16	9.16	Pass	0.0366
LTE Band 17	706.5	-1.23	25.00	21.62	34.77	0.0289	0.4710		8.74	8.74	Pass	0.0613
LTE Band 25	1850.7	2.86	25.00	27.86	33.01	0.1215	1.0000	8.01	12.01	8.01	Pass	0.1215
LTE Band 26(814-824)	814.7	-3.11	25.00	19.74	50.00	0.0187	0.5431	27.15	9.36	9.36	Pass	0.0345
LTE Band 26(824-849)	824.7	-3.11	25.00	19.74	38.45	0.0187	0.5498	15.60	9.41	9.41	Pass	0.0341
LTE Band 41	2498.5	0.97	25.00	25.97	33.01	0.0787	1.0000	8.01	12.01	8.01	Pass	0.0787
LTE Band 66	1710.7	1.24	25.00	26.24	30.00	0.0837	1.0000	5.00	12.01	5.00	Pass	0.0837
LTE Band 71	665.5	-0.42	25.00	22.43	30.00	0.0348	0.4437	7.15	8.48	7.15	Pass	0.0785
BT/BLE	2441.0	1.92	10.50	12.42	N/A	0.0035	1.0000	N/A	26.51	26.51	Pass	0.0035
2.4G Wi-Fi	2437.0	1.92	18.00	19.92	N/A	0.0195	1.0000	N/A	19.01	19.01	Pass	0.0195
5G Wi-Fi	5700.0	0.49	17.00	17.49	N/A	0.0112	1.0000	N/A	20.01	20.01	Pass	0.0112

MPE Calculation

According to the formula $S=P/4\pi R^2$, we can calculate S which is MPE.

Note:

1) P (mW)
2) R = distance to the center of radiation of antenna (in centimeter)
3) MPE limit = 1mW/cm²

Exposure condition for simultaneous transmission operations

The Max. sum of the simultaneous transmission ratio = BT+5G WIFI+WWAN= 0.0035 +0.0112 +0.1215 = 0.1362 < 1

Therefore, the device is to qualify for simultaneous transmission SAR test exemption, the exemption report is in lieu of the SAR report.

So, the device is to qualify for SAR test exemption, the exemption report is in lieu of the SAR report.

6 EUT Constructional Details (EUT Photos)

Refer to Appendix – External and Internal Photos for SZCR2505001809MO

-End of the Report-