

Prüfbericht-Nr.: Test report no.:	CN24WLOH 002	Auftrags-Nr.: Order no.:	168459825	Seite 1 von 10 Page 1 of 10
Kunden-Referenz-Nr.: Client reference no.:	N/A	Auftragsdatum: Order date:	2024-01-05	
Auftraggeber: Client:	Xiamen Intretech Inc. No. 100, Dongfu West Road, Haicang District, Xiamen, Fujian, China			
Prüfgegenstand: Test item:	M4GM			
Bezeichnung / Typ-Nr.: Identification / Type no.:	M4GM-NA-01 (Trademark:  SDATAWAY)			
Auftrags-Inhalt: Order content:	Test Report			
Prüfgrundlage: Test specification:	CFR47 FCC Part 2.1091 RSS-102 Issue 5 February 2021			
Wareneingangsdatum: Date of sample receipt:	2024-03-26	Please refer to Photo Document		
Prüfmuster-Nr.: Test sample no.:	A003680014-001~014			
Prüfzeitraum: Testing period:	2024-03-27 - 2024-04-26			
Ort der Prüfung: Place of testing:	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüflaboratorium: Testing laboratory:	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: Test result*:	Pass			
geprüft von: tested by:			genehmigt von: authorized by:	
Datum: Date: 2024-05-06	Signed by: Jonathan Li		Ausstellungsdatum: Issue date: 2024-05-06	Signed by: Bell Hu
Stellung / Position:	Sachverständige(r)/Expert		Stellung / Position:	Sachverständige(r)/Expert
Sonstiges / Other:	FCC ID: S96M4GMN IC: 22175-M4GMN, HVIN: M4GM-NA-01			
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				
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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TEST SUMMARY

3.1.1 RF EXPOSURE COMPLIANCE

RESULT: Pass

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1. TEST SITES

1.1 TEST FACILITIES

TÜV Rheinland (Shenzhen) Co., Ltd.
No. 362 Huanguan Road Middle, Longhua District, 518110, Shenzhen, P. R. China.

FCC Accreditation Designation No.: CN1260
ISED Wireless Device Testing Laboratory: 25069

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 basis 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 TÜV Rheinland (Shenzhen) Co., Ltd. facility located at No. 362 Huanguan Road Middle, Longhua District, 518110, Shenzhen, P. R. China. is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

2. GENERAL PRODUCT INFORMATION

2.1 GENERAL DESCRIPTION

The EUT is a 4G module, which support WCDMA and LTE wireless technologies.

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

2.2 RATING AND SYSTEM DETAILS

Table 1: Technical Specification of EUT

General Information of EUT	Value
Product Name:	M4GM
Test Model No.:	M4GM-NA-01
Trademark:	
FCC ID:	S96M4GMN
IC:	22175-M4GMN
HVIN:	M4GM-NA-01
Operating Voltage:	DC 8V~30V
Testing Voltage:	DC 24V
Operation Temperature:	0°C to +40°C
Technical Specification of WCDMA	
Operational Frequency:	WCDMA Band II: Uplink: 1850-1910MHz, Downlink: 1930-1990MHz WCDMA Band IV: Uplink: 1710-1755MHz, Downlink: 2110-2155MHz WCDMA Band V: Uplink: 824-849MHz, Downlink: 869-894MHz
Type of Modulation:	QPSK, 16QAM
Power Class:	Class 3
TX and RX Antenna Ports:	1 * TRX, 1 * RX-only
Antenna Type:	External Antenna
Antenna Number:	1
Max Antenna Gain:	3.4 dBi for WCDMA Band 2 2.8 dBi for WCDMA Band 4 5.4 dBi for WCDMA Band 5 (Provided by the Client)
Technical Specification of LTE	
Operational Frequency:	LTE Band 2: Uplink: 1850-1910MHz, Downlink: 1930-1990MHz LTE Band 4: Uplink: 1710-1755MHz, Downlink: 2110-2155MHz LTE Band 12: Uplink: 699-716MHz, Downlink: 729-746MHz
Type of Modulation:	QPSK, 16QAM
Power Class:	Class 3
Subcarrier spacing:	LTE Band 2: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 4: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 12: 1.4MHz, 3MHz, 5MHz, 10MHz

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TX and RX Antenna Ports:	1 * TRX, 1 * RX-only
Antenna Type:	External Antenna
Antenna Number:	1
Max Antenna Gain:	3.4 dBi for LTE Band 2 2.8 dBi for LTE Band 4 4.5 dBi for LTE Band 12 (Provided by the Client)

3. Test Results

3.1 Transmitter Requirements & Test Suites

3.1.1 RF Exposure Compliance

RESULT:**Pass**

Test standard	:	RSS-102 Issue 5 47 CFR FCC Part 2.1091
Limit	:	Table 1 of 47 CFR FCC Part 1.1310 Table 4 of RSS-102 Issue 5
Kind of test site	:	Shielded room

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

Radio Frequency Exposure Calculation Formula:

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

$$Pd = \frac{P_{out} * G}{4R^2\pi}$$

Where,

P_d = power density in mW/cm² or W/m²

P_{out} = output power to antenna in mW or W

G_{num} = Antenna gain in numeric

π = 3.14159

R = Distance between observation point and the center of radiator in cm or m

3.1.1.1 FCC Part 1.1310, Part 2.1091

Radio Frequency Exposure of FCC Limit

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
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
1500-100,000			5	6
(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
300-1500			f/1500	30
1500-100,000			1.0	30

Table 2: RF Exposure Calculations for FCC, stand-alone mode

Operating Mode	Maximum Conducted Output Power		Antenna Gain (dBi)	Max. E.R.P./E.I.R.P. (dBm)	Min. Distance (cm)	Calculation (mW/cm ²)	FCC Limit (mW/cm ²)	Result
	Measured Power (dBm)	Max. Power incl. tune-up (dBm)						
WCDMA band 2	23.10	25	3.4	28.40	20	0.13764	1.0	PASS
WCDMA band 4	23.81	25	2.8	27.80	20	0.11988	1.0	PASS
WCDMA band 5	23.81	25	5.4	28.25	20	0.13296	0.549	PASS
LTE band 2	23.45	25	3.4	28.40	20	0.13764	1.0	PASS
LTE band 4	23.49	25	2.8	27.80	20	0.11988	1.0	PASS
LTE band 12	24.04	25	4.5	27.35	20	0.10808	0.466	PASS

Note: The WCDMA and LTE modes cannot transmit simultaneously.

➤ 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

Exemption from Routine Evaluation Limits – RF Exposure Evaluation

**Table 4: RF Field Strength Limits for Devices Used by the General Public
(Uncontrolled Environment)**

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²¹	83	90	-	Instantaneous*
0.1-10	-	0.73/ f	-	6**
1.1-10	87/ $f^{0.5}$	-	-	6**
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 x 10 ⁻⁴ $f^{0.5}$	6.67 x 10 ⁻⁵ f	616000/ $f^{1.2}$

Note: f is frequency in MHz.
*Based on nerve stimulation (NS).
** Based on specific absorption rate (SAR).

Table 3: RF Exposure Calculations for ISSED, Stand-alone mode

Operating Mode	Maximum Conducted Output Power		Antenna Gain (dBi)	Max. E.R.P./E.I.R.P. (dBm)	Min. Distance (cm)	Calculation (W/m ²)	IC Limit (W/m ²)	Result
	Measured Power (dBm)	Max. Power incl. tune-up (dBm)						
WCDMA band 2	23.10	25	3.4	28.40	20	1.3764	4.476	PASS
WCDMA band 4	23.81	25	2.8	27.80	20	1.1988	4.242	PASS
WCDMA band 5	23.81	25	5.4	28.25	20	1.3296	2.576	PASS
LTE band 2	23.45	25	3.4	28.40	20	1.3764	4.476	PASS
LTE band 4	23.49	25	2.8	27.80	20	1.1988	4.242	PASS
LTE band 12	24.04	25	4.5	27.35	20	1.0808	2.302	PASS

Both e.i.r.p. for WCDMA and LTE are less than the RF exposure evaluation exempted power. So RF exposure evaluation is not required.

➤ Conclusion

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