

Prüfbericht-Nr.: Test report no.:	CN2554HU 005	Auftrags-Nr.: Order no.:	168512050	Seite 1 von 12 Page 1 of 12
Kunden-Referenz-Nr.: Client reference no.:	N/A	Auftragsdatum: Order date:	2024-11-12	
Auftraggeber: Client:	Shining 3D Tech Co., Ltd. No. 1398, Xiangbin Road, Wenyan, Xiaoshan, Hangzhou, Zhejiang, P.R. China			
Prüfgegenstand: Test item:	3D Printer, Dental Appliances Manufacturing Device			
Bezeichnung / Typ-Nr.: Identification / Type no.:	AccuFab-F1, Dcraft-4			
Auftrags-Inhalt: Order content:	Test Report			
Prüfgrundlage: Test specification:	CFR47 47 CFR FCC Part 2.1091 RSS-102 Issue 6			
Wareneingangsdatum: Date of sample receipt:	2024-12-03	Refer to Photos document		
Prüfmuster-Nr.: Test sample no.:	A003853025-001			
Prüfzeitraum: Testing period:	2024-12-25 - 2025-05-07			
Ort der Prüfung: Place of testing:	Refer to section 2.1			
Prüflaboratorium: Testing laboratory:	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: Test result*:	Pass			
geprüft von: tested by:	<u>X Bell Hu</u>		genehmigt von: authorized by:	<u>X Jonathan Li</u>
Datum: Date:	2025-06-27	Signed by: Bell Hu	Ausstellungsdatum: Issue date:	2025-06-27 Signed by: Jonathan Li
Stellung / Position:	Sachverständige(r)/Expert		Stellung / Position:	Sachverständige(r)/Expert
Sonstiges / Other:	FCC ID: 2AMG4-F1, IC: 24652-F1, HVIN: AccuFab-F1, Dcraft-4, PMN: 3D Printer, Dental Appliances Manufacturing Device			
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.

Address: 2-3F, 101 & 102, No.2, Nuclear Power Industrial Park, Fuming Community, Fucheng Street,
Longhua District, Shenzhen 518000, People's Republic of China
A2LA Cert. No.: 5162.01

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 2-3F, 101 & 102, No.2, Nuclear Power Industrial Park, Fuming Community, Fucheng Street, Longhua District, Shenzhen 518000, People's Republic of 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 product is a 3D Printer, it supports NFC, 5GHz Wi-Fi and 2.4GHz Wi-Fi.

2.2 RATING AND SYSTEM DETAILS

Table 1: Rating of EUT

General Information of EUT	Value
Kind of Equipment:	3D Printer, Dental Appliances Manufacturing Device
Type Designation:	AccuFab-F1,Dcraft-4
Operating Voltage:	100-240V AC; 50/60Hz;
Testing Voltage:	120V AC/50Hz;
FCC ID:	2AMG4-F1
IC ID:	24652-F1
PMN:	3D Printer, Dental Appliances Manufacturing Device (They are electrically identical, only named differently for marketing purpose)
HVIN:	AccuFab-F1,Dcraft-4 (They are electrically identical, only named differently for marketing purpose)
Antenna Type:	Integral Antenna
Antenna Gain:	Antenna: (provided by the client) 2400 MHz ~ 2483.5 MHz: 5.05 dBi 5150 MHz ~ 5250 MHz: 4.49 dBi 5725 MHz ~ 5850 MHz: 4.49 dBi
Technical Specification of Wi-Fi 802.11 b/g/n	
Operating Frequency:	2412 - 2462 MHz for 802.11b/g/n(HT20) 2422 - 2452 MHz for 802.11n(HT40)
Type of Modulation:	DSSS(DBPSK/DQPSK/CCK) OFDM, OFDMA(BPSK/QPSK/16QAM/64QAM)
Data Rate:	1/2/5.5/11 Mbps for 802.11b 6/9/12/18/24/36/48/54 Mbps for 802.11g MCS0~MCS 7 for 802.11n(HT20/40) (All data rates considered, only the Worst-cases reported)
Channel Number:	11 channels for 802.11b/g/n(HT20) 7 channels for 802.11n(HT40)
Antenna Type:	Integral Antennas
Number of Antenna:	1Tx1Rx
Antenna Gain:	Antenna: 5.05dBi (Provided by the Client)
Technical Specification of Wi-Fi 802.11 a/n	
Operating Frequency:	5180-5240MHz, 5745-5825MHz* *(The DFS bands 5250-5350MHz and 5470-5725MHz were blocked

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	when it integrated into the host 3D Printer)
Type of Modulation:	OFDM
Protocol:	802.11 a/n20/n40
Data Rate:	6/9/12/18/24/36/48/54 Mbps for 802.11a MCS0~MCS 7 for 802.11n (All data rates considered, only the Worst-cases reported)
Antenna Type:	Integral Antenna
Number of Antenna:	1TX1RX
Antenna Gain:	Antenna: 4.49dBi (Provided by the Client)
Technical Specification of NFC	
Operating Frequency:	13.56MHz
Type of Modulation:	ASK
Antenna Type:	Integral Antenna
Number of Antenna:	1

3. Test Results

3.1 Transmitter Requirements & Test Suites

3.1.1 RF Exposure Compliance

RESULT:**Pass**

Test standard	:	RSS-102 Issue 6 FCC Part 1.1091
Limit	:	Table 1 of 47 CFR FCC Part 1.1310 Section 6.6 of RSS-102 Issue 6
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 modelling 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.

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

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

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

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Table 2: Test Results of RF Exposure Calculations for FCC, Stand-alone mode

Operating Mode	Max. average EIRP incl. tune-up (dBm)	Distance (cm)	MPE (mW/cm ²)	Limit (mW/cm ²)	Verdict
*2.4GHz Wi-Fi	33.0	20	0.397	1.0	Pass
*5GHz Wi-Fi	24.0	20	0.050	1.0	Pass
**NFC	Less than -30dBm	20	< 0.000001	0.1	Pass

Note: *refer to reports CN2554HU 002 and 003 for output power.

**refer to the report CN2554HU 004.

Table 3: Test Results of RF Exposure Calculations for FCC, Simultaneous mode

Co-location Mode (Worst-case)	Sum of the MPE ratios	Limit	Verdict
2.4GHz Wi-Fi+ NFC	0.397	1.0	Pass

3.1.1.2 RSS-102 Field reference level exposure exemption limits

Field reference level (FRL) 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 (i.e. mobile devices), except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- 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 $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

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 4: Test Results of RF Exposure Calculations for ISED, Stand-alone

Operating Mode	Max. average EIRP incl. tune-up (dBm)	Distance (cm)	Maximum EIRP (W)	Threshold power (W)	Verdict
2.4GHz Wi-Fi	33.0	20	2.00	2.70	Pass
5GHz Wi-Fi	24.0	20	0.25	4.52	Pass
NFC*	Less than -30dBm	20	< 0.000001	1.0	Pass

Note: *refer to reports CN2554HU 002 and 003 for output power.
**refer to the report CN2554HU 004 (The NFC test for the host.)

Table 5: Test Results of RF Exposure Calculations for ISED, Simultaneous mode

Co-location Mode	Sum of the ratios	Limit	Verdict
2.4GHz Wi-Fi+ NFC	0.74	1.0	Pass

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