

Prüfbericht-Nr.: <i>Test report no.:</i>	CN22CBU2 005	Auftrags-Nr.: <i>Order no.:</i>	168342360	Seite 1 von 11 <i>Page 1 of 11</i>
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2021-11-20	
Auftraggeber: <i>Client:</i>	SZ DJI TECHNOLOGY CO., LTD 14th Floor, West Wing, Skyworth Semiconductor Design Building No.18 Gaoxin South 4th Ave Nanshan District, Shenzhen, P.R. China			
Prüfgegenstand: <i>Test item:</i>	Agras T40, Agras T20P			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	3WWDZ-40A, 3WWDZ-20A			
Auftrags-Inhalt: <i>Order content:</i>	Test Report			
Prüfgrundlage: <i>Test specification:</i>	47 CFR FCC Part 2.1091		RSS-102 Issue 5	
Wareneingangsdatum: <i>Date of sample receipt:</i>	2021-11-24	Refer to photos document		
Prüfmuster-Nr.: <i>Test sample no.:</i>	A003168006 007			
Prüfzeitraum: <i>Testing period:</i>	2022-01-05			
Ort der Prüfung: <i>Place of testing:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: <i>tested by:</i>			genehmigt von: <i>authorized by:</i>	
Datum: <i>Date:</i>	2022-02-08	Signed by: Bell Hu	Ausstellungsdatum: <i>Issue date:</i>	2022-02-08
Stellung / Position:	Project Manager		Stellung / Position:	Reviewer
Sonstiges / Other:	FCC ID: SS3-T40A2112; IC:11805A-T40A2112; PMN: Agras T40, Agras T20P; HVIN: 3WWDZ-40A, 3WWDZ-20A			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	4 = ausreichend N/A = nicht anwendbar
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory F(ail) = failed a.m. test specification(s)	4 = sufficient N/A = not applicable
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 a. m. 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>				

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.

(FCC Registration No.: 694916 & IC Registration Number: 25069)

Address: No. 362 Huanguan Road Middle, Longhua District, Shenzhen 518110, P.R. China

A2LA accredited certificate number: 5162.01

1.2 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Table 1: List of Test and Measurement Equipment

Description	Manufacturer	Model	Serial No.	Calibrated until (DD.MM.YYYY)
Radio Spectrum Testing				
Wireless Connectivity Tester	R&S	CMW270	101375	09.08.2022
Signal Analyzer	R&S	FSV 40	101441	09.08.2022

1.3 Traceability

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

1.4 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.

1.5 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.

1.6 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. facility located at No. 362 Huanguan Road Middle, Longhua District, Shenzhen 518110, 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 (Equipment Under Test) is an Aircraft. It supports 2.4GHz SDR, 5.8GHz SDR, 24GHz Radar and GNSS functions.

*remark: SDR means specific defined radio, and cannot changes radio specification via software/firmware by end-users.

According to the declaration of the applicant, the electrical circuit design and PCB layout are identical, only the model number, battery capacity and overall size are different for market strategy.

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

2.2 RATING AND SYSTEM DETAILS

Table 2: Rating of EUT

General Information of EUT	Value
Kind of Equipment:	Agras T40, Agras T20P
Type Designation:	3WWDZ-40A, 3WWDZ-20A
Trademark:	DJI
Operating Temperature Range:	0 °C ~ 45 °C
Operating Voltage:	Battery operated 52.2V DC. Intelligent Flight Battery in Agras T40: Model: BAX601-30000mAh 52.22V Capacity: 30000 mAh Intelligent Flight Battery in Agras T20P: Model: BAX601-13000mAh 52.22V Capacity: 13000 mAh
Testing Voltage:	Built-in battery
Radiofrequency operating mode	1) 2.4GHz SDR: operating within 2400-2483.5MHz, supports 1.4MHz/3MHz/10MHz/20MHz/40MHz Bandwidth 2) 5.8GHz SDR: operating within 5725-5850MHz, supports 1.4MHz/3MHz/10MHz/20MHz/40MHz Bandwidth 3) GPS & BDS & Galileo & Glonass (receiver): operating within 1559-1610MHz. 4) Phased Array Omnidirectional Radar & Downward Rear Radar: Operating within 24.05-24.25 GHz band.

Table 3: Technical Specification of EUT

Technical Specification of 5.8GHz SDR	
Operating Frequency	5728.5-5846.5MHz for 1.4MHz Bandwidth 5727.5-5844.5MHz for 3MHz Bandwidth 5730.5-5844.5MHz for 10MHz Bandwidth 5735.5-5839.5MHz for 20MHz Bandwidth 5745.5-5829.5MHz for 40MHz Bandwidth

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Type of Modulation	OFDM (QPSK, 16QAM, 64QAM)
Channel Number	60 channels for 1.4MHz Bandwidth 40 channels for 3MHz Bandwidth 115 channels for 10MHz Bandwidth 105 channels for 20MHz Bandwidth 85 channels for 40MHz Bandwidth
Channel Separation	2MHz for 1.4MHz Bandwidth 3MHz for 3MHz Bandwidth 1MHz for 10MHz Bandwidth 1MHz for 20MHz Bandwidth 1MHz for 40MHz Bandwidth
Antenna Type	Integral Antennas
Antenna Number	1Tx1Rx for SISO mode (ANT1 or ANT2) 2TxTRx for MIMO mode (ANT1+ANT2), Un-correlated signals.
Antenna Gain	Max 2.0dBi for 2.4GHz Band, Max 0.5dBi for 5.8GHz Band.
The type of wideband data transmission equipment	Non-FHSS
Technical Specification of 2.4GHz SDR	
Operating Frequency	2403.5-2473.5MHz for 1.4MHz Bandwidth 2405.5-2474.5MHz for 3MHz Bandwidth 2405.5-2475.5MHz for 10MHz Bandwidth 2410.5-2471.5MHz for 20MHz Bandwidth 2420.5-2462.5MHz for 40MHz Bandwidth
Type of Modulation	OFDM (QPSK, 16QAM, 64QAM)
Channel Number	38 channels for 1.4MHz Bandwidth 24 channels for 3MHz Bandwidth 71 channels for 10MHz Bandwidth 62 channels for 20MHz Bandwidth 43 channels for 40MHz Bandwidth
Channel Separation	1.4MHz Bandwidth: 2MHz channel separation for 2403.5~2469.5MHz 1MHz channel separation for 2469.5~2473.5MHz 3MHz Bandwidth: 3MHz channel separation 10MHz Bandwidth: 1MHz channel separation 20MHz Bandwidth: 1MHz channel separation 40MHz Bandwidth: 1MHz channel separation
Antenna Type	Integral Antennas
Antenna Number	1Tx1Rx for SISO mode (ANT1 or ANT2) 2TxTRx for MIMO mode (ANT1+ANT2), Un-correlated signals.
Antenna Gain	Max 2.0dBi for 2.4GHz Band, Max 0.5dBi for 5.8GHz Band.
The type of wideband data transmission equipment	Non-FHSS

3. Test Results

3.1 Transmitter Requirements & Test Suites

3.1.1 RF Exposure Compliance

RESULT:**Pass**

Test standard	:	RSS-102 Issue 5 FCC Part 1.1091
Limit	:	Table 1 of 47 CFR FCC Part 1.1310 Section 2.5.2 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 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

Table 4: Test Results of RF Exposure Calculations for FCC, stand-alone mode

Operating Mode	Max. EIRP incl. tune-up (dBm)	Distance (cm)	MPE P _d (mW/cm ²)	Limit (mW/cm ²)	Verdict
2.4GHz Band, (Worst-Case)	29.98	20	0.198	1.0	Pass
5.8GHz Band, (Worst-Case)	28.70	20	0.148	1.0	Pass
24GHz Radar	9.42	20	0.0017	1.0	Pass

Table 5: Test Results of RF Exposure Calculations for FCC, simultaneous mode

Operating Mode (Worst-Case)	Sum of the MPE ratios for all simultaneously	Limit	Verdict
2.4GHz SDR+24GHz Radars*	Far less than 1.0	1.0	Pass

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:

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

Operating Mode	Max. EIRP incl. tune-up (dBm)	Distance (cm)	Maximum EIRP (W)	Threshold power (W)	Verdict
2.4GHz Band, (Worst-Case)	29.98	20	0.995	2.67	Pass
5.8GHz Band, (Worst-Case)	28.70	20	0.621	4.84	Pass
24GHz Radar	9.42	20	0.0087	5.00	Pass

Note: The maximum EIRP lower than the threshold power in section 2.5.2, thus compliant.

Table 7: Test Results of RF Exposure Calculations for ISED, simultaneous mode

Operating Mode (Worst-Case)	Sum of the ratios for all simultaneously	Limit	Verdict
2.4GHz SDR+24GHz Radars*	Less than 1.0	1.0	Pass

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