

Prüfbericht-Nr.: Test report no.:	CN24W8IH 003	Auftrags-Nr.: Order no.:	168438670	Seite 1 von 30 Page 1 of 30
Kunden-Referenz-Nr.: Client reference no.:	N/A	Auftragsdatum: Order date:	2023-11-09	
Auftraggeber: Client:	SZ DJI TECHNOLOGY CO., LTD Lobby of T2, DJI Sky City, No. 53 Xianyuan Road, Xili Community, Xili Street, Nanshan District, Shenzhen, China			
Prüfgegenstand: Test item:	DJI Avata 2			
Bezeichnung / Typ-Nr.: Identification / Type no.:	QF3W4K (Trademark: DJI)			
Auftrags-Inhalt: Order content:	Test Report			
Prüfgrundlage: Test specification:	CFR47 FCC Part 15: Subpart E Section 15.407 CFR47 FCC Part 15: Subpart C Section 15.207 CFR47 FCC Part 15: Subpart C Section 15.209 RSS-247 Issue 3 August 2023 RSS-Gen Issue 5 February 2021			
Wareneingangsdatum: Date of sample receipt:	2023-11-15	Please refer to Photo Document		
Prüfmuster-Nr.: Test sample no:	A003598699-001 A003598699-003~013			
Prüfzeitraum: Testing period:	2023-11-24 - 2024-01-09			
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:	2024-02-21	Signed by: Bell Hu	Ausstellungsdatum: Issue date:	2024-02-21
Stellung / Position:		Sachverständige(r)/Expert	Stellung / Position: Sachverständige(r)/Expert	
Sonstiges / Other:	FCC ID: SS3-QF3W4K23, IC: 11805A-QF3W4K23, PMN: DJI Avata 2, HVIN: QF3W4K This report is for 5.8GHz SDR and 5.8GHz Wi-Fi.			
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				
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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

5.1.1 ANTENNA REQUIREMENT

RESULT: Pass

5.1.2 MAXIMUM OUTPUT POWER

RESULT: Pass

5.1.3 CONDUCTED POWER SPECTRAL DENSITY

RESULT: Pass

5.1.4 FREQUENCY STABILITY

RESULT: Pass

5.1.5 6dB BANDWIDTH

RESULT: Pass

5.1.6 99% BANDWIDTH

RESULT: Pass

5.1.7 RADIATED SPURIOUS EMISSION

RESULT: Pass

5.1.8 CONDUCTED EMISSION ON AC MAINS

RESULT: Pass

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1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Test Results of 5.8GHz SDR

Appendix B: Test Results of 5.8GHz Wi-Fi

Appendix C: Photographs of the Test Set-up.

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.

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

FCC Accreditation Designation No.: 694916

ISED wireless device testing laboratory: 25069

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Radio Spectrum Testing (SRD-Tonscend)					
Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. until
EXA Signal Analyzer, Multi-touch	Keysight	N9010B	MY60241175	2023-09-22	2024-09-21
MXG X-Series RF Vector Signal Generator	Keysight	N5182B	MY61250137	2023-09-22	2024-09-21
EXG X-Series Microwave Analog Signal Generator	Keysight	N5173B	MY61250141	2023-09-22	2024-09-21
DC power supply	Keysight	E3642A	MY61276100	2023-09-22	2024-09-21
Power Control Unit	Tonscend	JS0806-4ADC	N/A	2023-09-22	2024-09-21
Automation Control Unit	Tonscend	JS0806-2	21C8060396	2023-09-22	2024-09-21
Test Software	Tonscend	JS1120-3	N/A	N/A	N/A
Control PC	Lenovo	TianYi510S-071MB	YLX23JMF	N/A	N/A
Shielding Room 8#	Albatross	SR8	APC17151-SR8	2021-06-22	2024-06-22
Unwanted Emission Testing (TS9975)					
Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. until
EMI Test Receiver	R&S	ESR 7	102021	2023-07-26	2024-07-25
Signal Analyzer	R&S	FSV 40	101439	2023-07-26	2024-07-25
System Controller Interface	R&S	SCI-100	S10010038	N/A	N/A
Filterbank	R&S	Wlan	100759	2023-07-26	2024-07-25
OSP	R&S	OSP 120	102040	N/A	N/A
Pre-amplifier	R&S	SCU08F1	08320031	2023-07-26	2024-07-25
Amplifier	R&S	SCU-18F	180070	2023-07-26	2024-07-25
Amplifier	R&S	SCU40A	100475	2023-07-26	2024-07-25
Trilog Broadband Antenna (30 MHz - 7 GHz)	Schwarzbeck	VULB 9162	193	2022-08-07	2024-08-06

Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218717	2022-08-07	2024-08-06
Wideband Ridged Horn Antenna (18-40 GHz)	Steatite	QMS-00880	19067	2022-08-28	2024-08-27
Active Loop Antenna	Schwarzbeck	FMZB 1513	302	2022-08-07	2024-08-06
Test software	R&S	EMC32 (V10.60.10)	N/A	N/A	N/A
Control PC	Dell	OptiPlex 7050	36NV9P2	N/A	N/A
3m Semi-Anechoic Chamber	Albatross	SAC-3m	APC17151-SAC	2021-06-22	2024-06-22

Conducted Emission				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
EMI Test Receiver	R&S	ESR3	102680	2024-02-23
Artificial Mains Network	R&S	ENV216	101445	2024-02-23
EMC32 test software	R&S	EMC32(Ver.10.50.00)	N/A	N/A

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 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.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table.

Table 2: Measurement Uncertainty

Parameter	Uncertainty (k=2)
RF output power, conducted	± 0.99 dB
Occupied Channel Bandwidth	± 2.08 %
RF power density, conducted	± 0.99 dB
Unwanted Emissions, conducted	± 0.89 dB
All emissions, radiated	±4.17 dB
Conducted Emission, (9kHz to 150kHz)/(150kHz to 30MHz)	± 3.70 dB / ± 3.30 dB

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2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B & C of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. Test 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.

3 General Product Information

3.1 Product Function and Intended Use

The Product is DJI Avata 2 which supports Bluetooth, 2.4GHz SDR, 2.4GHz Wi-Fi, 5.2GHz SDR, 5.8GHz Wi-Fi, 5.8GHz SDR and GNSS functions.

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

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

3.2 Ratings and System Details

Table 3: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment	DJI Avata 2
Type Designation	QF3W4K
Trademark	DJI
FCC ID	SS3-QF3W4K23
IC	11805A-QF3W4K23
Operating Voltage	14.76V DC by built-in battery or DC 5V/9V by AC/DC adapter
Testing Voltage:	Fully charged battery
Radiofrequency operating mode	1) Bluetooth: operating within 2400-2483.5MHz, Bluetooth BLE (1Mbps&2Mbps) 2) 2.4GHz SDR: operating within 2400-2483.5MHz, supports 1.4MHz/3MHz/5MHz/10MHz/20MHz/40MHz/60MHz Bandwidth 3) 2.4GHz Wi-Fi: operating within 2400-2483.5MHz, supports 20MHz/40MHz Bandwidth and IEEE 802.11 b/g/n20/n40 4) 5.2GHz SDR: operating within 5150-5250MHz, supports 10MHz/20MHz/40MHz Bandwidth(Only for US, not for IC) 5) 5.8GHz SDR: operating within 5725-5850MHz, supports 1.4MHz/3MHz/5MHz/10MHz/20MHz/40MHz/60MHz/80MHz Bandwidth 6) 5.8GHz Wi-Fi: operating within 5725-5850MHz, supports 20MHz/40MHz/80MHz Bandwidth and IEEE 802.11 a/n20/n40/ac20/ac40/ac80 7) GPS & BDS & Galileo (receiver): operating within 1559-1610MHz
Technical Specification of 5.8GHz SDR	
Operating Frequency	5728.5-5844.5MHz for 1.4MHz Bandwidth 5730.12-5846.12MHz for 1.4MHz Bandwidth (CA mode) 5727.5-5844.5MHz for 3MHz Bandwidth 5730.2-5847.2MHz for 3MHz Bandwidth (CA mode) 5732.5-5842.5MHz for 5MHz Bandwidth 5730.5-5844.5MHz for 10MHz Bandwidth 5735.5-5839.5MHz for 20MHz Bandwidth 5745.5-5829.5MHz for 40MHz Bandwidth 5755.5-5819.5MHz for 60MHz Bandwidth 5765.5-5809.5MHz for 80MHz Bandwidth

Type of Modulation	OFDM (QPSK, 16QAM, 64QAM)
Channel Number	59 channels for 1.4MHz Bandwidth 59 channels for 1.4MHz Bandwidth (CA mode) 40 channels for 3MHz Bandwidth 40 channels for 3MHz Bandwidth (CA mode) 23 channels for 5MHz Bandwidth 115 channels for 10MHz Bandwidth 105 channels for 20MHz Bandwidth 85 channels for 40MHz Bandwidth 65 channels for 60MHz Bandwidth 45 channels for 80MHz Bandwidth
Channel Separation	2MHz for 1.4MHz Bandwidth 2MHz for 1.4MHz Bandwidth (CA mode) 3MHz for 3MHz Bandwidth 3MHz for 3MHz Bandwidth (CA mode) 5MHz for 5MHz Bandwidth 1MHz for 10MHz/20MHz/40MHz/60MHz/80MHz Bandwidth
Antenna Type	Integral Antenna
Antenna Number	1Tx4Rx for SISO mode (ANT0 or ANT1 or ANT2 or ANT3) 2Tx4Rx for MIMO mode (ANT0+ANT1, or ANT0+ANT3, or ANT2+ANT1, or ANT2+ANT3)
Antenna Gain	2.0 dBi for ANT0/ANT1/ANT2/ANT3 (Provided by the Client)
The type of wideband data transmission equipment	DTS
Technical Specification of 5.8GHz Wi-Fi	
Operating Frequency:	5745–5825MHz for 802.11 a/n20/n40/ac20/ac40/ac80
Type of Modulation	OFDM(BPSK/QPSK/16QAM/64QAM) OFDMA(BPSK/QPSK/16QAM/64QAM/256QAM/1024QAM)
Data Rate	6/9/12/18/24/36/48/54 Mbps for 802.11a MCS0 ~ MCS15 for 802.11 20/n40/ac20/ac40/ac80
Channel Number	5 channels for 802.11a/n20/ac20 2 channels for 802.11n40/ac40 1 channels for 802.11ac80
Channel Separation	20MHz, 40MHz, 80MHz
Antenna Type	Integral Antenna
Antenna Number	1
Antenna Gain	2.0 dBi (Provided by the Client)

Table 4: RF Channel and Frequency of 5.8GHz SDR

5.8GHz 1.4MHzBandwidth					
RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
1	5728.5	21	5768.5	41	5808.5
2	5730.5	22	5770.5	42	5810.5
3	5732.5	23	5772.5	43	5812.5
4	5734.5	24	5774.5	44	5814.5
5	5736.5	25	5776.5	45	5816.5
6	5738.5	26	5778.5	46	5818.5
7	5740.5	27	5780.5	47	5820.5
8	5742.5	28	5782.5	48	5822.5
9	5744.5	29	5784.5	49	5824.5
10	5746.5	30	5786.5	50	5826.5
11	5748.5	31	5788.5	51	5828.5
12	5750.5	32	5790.5	52	5830.5
13	5752.5	33	5792.5	53	5832.5
14	5754.5	34	5794.5	54	5834.5
15	5756.5	35	5796.5	55	5836.5
16	5758.5	36	5798.5	56	5838.5
17	5760.5	37	5800.5	57	5840.5
18	5762.5	38	5802.5	58	5842.5
19	5764.5	39	5804.5	59	5844.5
20	5766.5	40	5806.5	/	/

5.8GHz 1.4MHz Bandwidth (CA Mode)					
RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
1	5730.12	21	5770.12	41	5810.12
2	5732.12	22	5772.12	42	5812.12
3	5734.12	23	5774.12	43	5814.12
4	5736.12	24	5776.12	44	5816.12
5	5738.12	25	5778.12	45	5818.12
6	5740.12	26	5780.12	46	5820.12
7	5742.12	27	5782.12	47	5822.12
8	5744.12	28	5784.12	48	5824.12
9	5746.12	29	5786.12	49	5826.12
10	5748.12	30	5788.12	50	5828.12
11	5750.12	31	5790.12	51	5830.12
12	5752.12	32	5792.12	52	5832.12
13	5754.12	33	5794.12	53	5834.12
14	5756.12	34	5796.12	54	5836.12
15	5758.12	35	5798.12	55	5838.12
16	5760.12	36	5800.12	56	5840.12
17	5762.12	37	5802.12	57	5842.12
18	5764.12	38	5804.12	58	5844.12
19	5766.12	39	5806.12	59	5846.12
20	5768.12	40	5808.12	/	/

5.8GHz 3MHz Bandwidth					
RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
1	5727.5	15	5769.5	29	5811.5
2	5730.5	16	5772.5	30	5814.5
3	5733.5	17	5775.5	31	5817.5
4	5736.5	18	5778.5	32	5820.5
5	5739.5	19	5781.5	33	5823.5
6	5742.5	20	5784.5	34	5826.5
7	5745.5	21	5787.5	35	5829.5
8	5748.5	22	5790.5	36	5832.5
9	5751.5	23	5793.5	37	5835.5
10	5754.5	24	5796.5	38	5838.5
11	5757.5	25	5799.5	39	5841.5
12	5760.5	26	5802.5	40	5844.5
13	5763.5	27	5805.5	/	/
14	5766.5	28	5808.5	/	/

5.8GHz 3MHz Bandwidth CA Mode					
RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
1	5730.2	15	5772.2	29	5814.2
2	5733.2	16	5775.2	30	5817.2
3	5736.2	17	5778.2	31	5820.2
4	5739.2	18	5781.2	32	5823.2
5	5742.2	19	5784.2	33	5826.2
6	5745.2	20	5787.2	34	5829.2
7	5748.2	21	5790.2	35	5832.2
8	5751.2	22	5793.2	36	5835.2
9	5754.2	23	5796.2	37	5838.2
10	5757.2	24	5799.2	38	5841.2
11	5760.2	25	5802.2	39	5844.2
12	5763.2	26	5805.2	40	5847.2
13	5766.2	27	5808.2	/	/
14	5769.2	28	5811.2	/	/

5.8GHz 5MHz Bandwidth					
RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
1	5732.5	9	5772.5	17	5812.5
2	5737.5	10	5777.5	18	5817.5
3	5742.5	11	5782.5	19	5822.5
4	5747.5	12	5787.5	20	5827.5
5	5752.5	13	5792.5	21	5832.5
6	5757.5	14	5797.5	22	5837.5
7	5762.5	15	5802.5	23	5842.5
8	5767.5	16	5807.5	/	/

5.8GHz 10MHzBandwidth					
RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
1	5730.5	40	5769.5	79	5808.5
2	5731.5	41	5770.5	80	5809.5
3	5732.5	42	5771.5	81	5810.5
4	5733.5	43	5772.5	82	5811.5
5	5734.5	44	5773.5	83	5812.5
6	5735.5	45	5774.5	84	5813.5
7	5736.5	46	5775.5	85	5814.5
8	5737.5	47	5776.5	86	5815.5
9	5738.5	48	5777.5	87	5816.5
10	5739.5	49	5778.5	88	5817.5
11	5740.5	50	5779.5	89	5818.5
12	5741.5	51	5780.5	90	5819.5
13	5742.5	52	5781.5	91	5820.5
14	5743.5	53	5782.5	92	5821.5
15	5744.5	54	5783.5	93	5822.5
16	5745.5	55	5784.5	94	5823.5
17	5746.5	56	5785.5	95	5824.5
18	5747.5	57	5786.5	96	5825.5
19	5748.5	58	5787.5	97	5826.5
20	5749.5	59	5788.5	98	5827.5
21	5750.5	60	5789.5	99	5828.5
22	5751.5	61	5790.5	100	5829.5
23	5752.5	62	5791.5	101	5830.5
24	5753.5	63	5792.5	102	5831.5
25	5754.5	64	5793.5	103	5832.5
26	5755.5	65	5794.5	104	5833.5
27	5756.5	66	5795.5	105	5834.5
28	5757.5	67	5796.5	106	5835.5
29	5758.5	68	5797.5	107	5836.5
30	5759.5	69	5798.5	108	5837.5
31	5760.5	70	5799.5	109	5838.5
32	5761.5	71	5800.5	110	5839.5
33	5762.5	72	5801.5	111	5840.5
34	5763.5	73	5802.5	112	5841.5
35	5764.5	74	5803.5	113	5842.5
36	5765.5	75	5804.5	114	5843.5
37	5766.5	76	5805.5	115	5844.5
38	5767.5	77	5806.5	/	/
39	5768.5	78	5807.5	/	/

5.8GHz 20MHz Bandwidth					
RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
1	5735.5	36	5770.5	71	5805.5
2	5736.5	37	5771.5	72	5806.5
3	5737.5	38	5772.5	73	5807.5
4	5738.5	39	5773.5	74	5808.5
5	5739.5	40	5774.5	75	5809.5

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6	5740.5	41	5775.5	76	5810.5
7	5741.5	42	5776.5	77	5811.5
8	5742.5	43	5777.5	78	5812.5
9	5743.5	44	5778.5	79	5813.5
10	5744.5	45	5779.5	80	5814.5
11	5745.5	46	5780.5	81	5815.5
12	5746.5	47	5781.5	82	5816.5
13	5747.5	48	5782.5	83	5817.5
14	5748.5	49	5783.5	84	5818.5
15	5749.5	50	5784.5	85	5819.5
16	5750.5	51	5785.5	86	5820.5
17	5751.5	52	5786.5	87	5821.5
18	5752.5	53	5787.5	88	5822.5
19	5753.5	54	5788.5	89	5823.5
20	5754.5	55	5789.5	90	5824.5
21	5755.5	56	5790.5	91	5825.5
22	5756.5	57	5791.5	92	5826.5
23	5757.5	58	5792.5	93	5827.5
24	5758.5	59	5793.5	94	5828.5
25	5759.5	60	5794.5	95	5829.5
26	5760.5	61	5795.5	96	5830.5
27	5761.5	62	5796.5	97	5831.5
28	5762.5	63	5797.5	98	5832.5
29	5763.5	64	5798.5	99	5833.5
30	5764.5	65	5799.5	100	5834.5
31	5765.5	66	5800.5	101	5835.5
32	5766.5	67	5801.5	102	5836.5
33	5767.5	68	5802.5	103	5837.5
34	5768.5	69	5803.5	104	5838.5
35	5769.5	70	5804.5	105	5839.5

5.8GHz 40MHz Bandwidth					
RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
1	5745.5	30	5774.5	59	5803.5
2	5746.5	31	5775.5	60	5804.5
3	5747.5	32	5776.5	61	5805.5
4	5748.5	33	5777.5	62	5806.5
5	5749.5	34	5778.5	63	5807.5
6	5750.5	35	5779.5	64	5808.5
7	5751.5	36	5780.5	65	5809.5
8	5752.5	37	5781.5	66	5810.5
9	5753.5	38	5782.5	67	5811.5
10	5754.5	39	5783.5	68	5812.5
11	5755.5	40	5784.5	69	5813.5
12	5756.5	41	5785.5	70	5814.5
13	5757.5	42	5786.5	71	5815.5
14	5758.5	43	5787.5	72	5816.5
15	5759.5	44	5788.5	73	5817.5
16	5760.5	45	5789.5	74	5818.5

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17	5761.5	46	5790.5	75	5819.5
18	5762.5	47	5791.5	76	5820.5
19	5763.5	48	5792.5	77	5821.5
20	5764.5	49	5793.5	78	5822.5
21	5765.5	50	5794.5	79	5823.5
22	5766.5	51	5795.5	80	5824.5
23	5767.5	52	5796.5	81	5825.5
24	5768.5	53	5797.5	82	5826.5
25	5769.5	54	5798.5	83	5827.5
26	5770.5	55	5799.5	84	5828.5
27	5771.5	56	5800.5	85	5829.5
28	5772.5	57	5801.5	/	/
29	5773.5	58	5802.5	/	/

5.8GHz 60MHz Bandwidth					
RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
1	5755.5	23	5777.5	45	5799.5
2	5756.5	24	5778.5	46	5800.5
3	5757.5	25	5779.5	47	5801.5
4	5758.5	26	5780.5	48	5802.5
5	5759.5	27	5781.5	49	5803.5
6	5760.5	28	5782.5	50	5804.5
7	5761.5	29	5783.5	51	5805.5
8	5762.5	30	5784.5	52	5806.5
9	5763.5	31	5785.5	53	5807.5
10	5764.5	32	5786.5	54	5808.5
11	5765.5	33	5787.5	55	5809.5
12	5766.5	34	5788.5	56	5810.5
13	5767.5	35	5789.5	57	5811.5
14	5768.5	36	5790.5	58	5812.5
15	5769.5	37	5791.5	59	5813.5
16	5770.5	38	5792.5	60	5814.5
17	5771.5	39	5793.5	61	5815.5
18	5772.5	40	5794.5	62	5816.5
19	5773.5	41	5795.5	63	5817.5
20	5774.5	42	5796.5	64	5818.5
21	5775.5	43	5797.5	65	5819.5
22	5776.5	44	5798.5	/	/

5.8GHz 80MHz Bandwidth					
RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
1	5765.5	16	5780.5	31	5795.5
2	5766.5	17	5781.5	32	5796.5
3	5767.5	18	5782.5	33	5797.5
4	5768.5	19	5783.5	34	5798.5
5	5769.5	20	5784.5	35	5799.5
6	5770.5	21	5785.5	36	5800.5
7	5771.5	22	5786.5	37	5801.5
8	5772.5	23	5787.5	38	5802.5

9	5773.5	24	5788.5	39	5803.5
10	5774.5	25	5789.5	40	5804.5
11	5775.5	26	5790.5	41	5805.5
12	5776.5	27	5791.5	42	5806.5
13	5777.5	28	5792.5	43	5807.5
14	5778.5	29	5793.5	44	5808.5
15	5779.5	30	5794.5	45	5809.5

Table 5: RF Channel and Frequency of 5.8GHz Wi-Fi

U-NII-3					
20MHz Bandwidth		40MHz Bandwidth		80MHz Bandwidth	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	151	5755	155	5775
153	5765	159	5795		
157	5785				
161	5805				
165	5825				

3.3 Independent Operation Modes

The basic operation modes are:

- A. On, 5.8GHz SDR wireless transmitting mode
 - 1) Low Channel
 - 2) Middle Channel
 - 3) High Channel
- B. On, 5.8GHz Wi-Fi wireless transmitting mode
 - 1) Low Channel
 - 2) Middle Channel
 - 3) High Channel
- C. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- Application Form
- User Manual
- ID Label and Location Info
- Operation Description

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All testing were performed according to the procedures in ANSI C63.10: 2013.

According to clause 3.1, all tests were performed on model QF3W4K in this report.

4.3 Special Accessories and Auxiliary Equipment

Table 6: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	Remark
Laptop	Lenovo	T480	PF-16A6N8
AC/DC Adapter	/	PD-30CN	Input: 100-240V, 50/60Hz, 0.8A Max Output: 3.3-11V, 2.72A or 5V/3A or 9V/3A or 12V/2.5A or 15V/2A

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

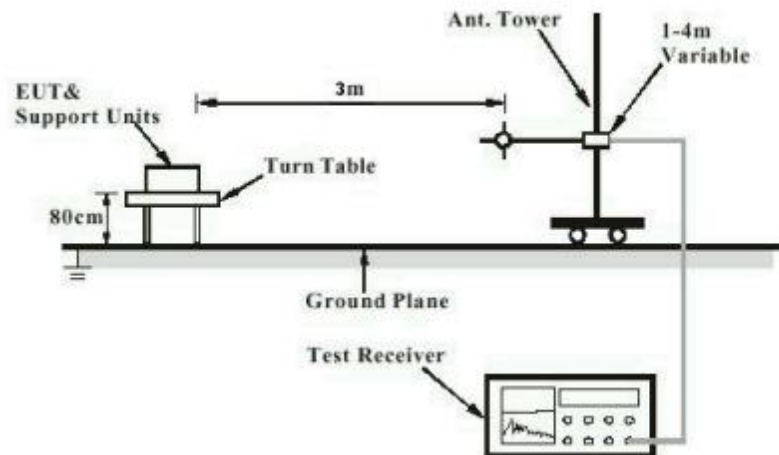


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

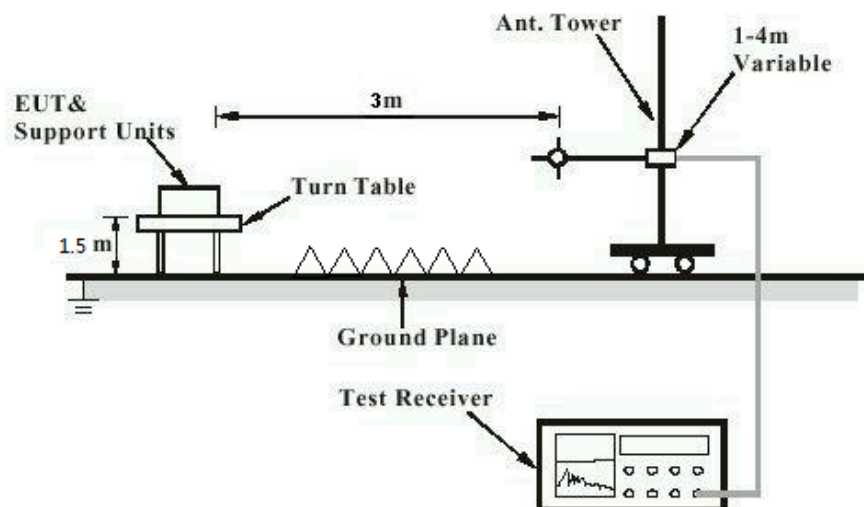


Diagram of Measurement Configuration for Mains Conduction Measurement

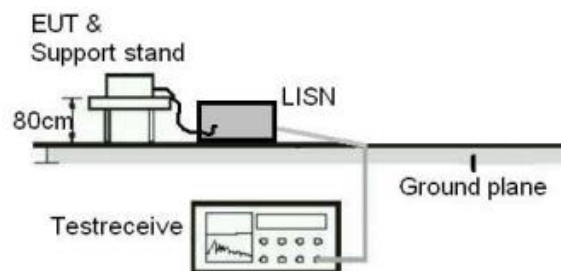
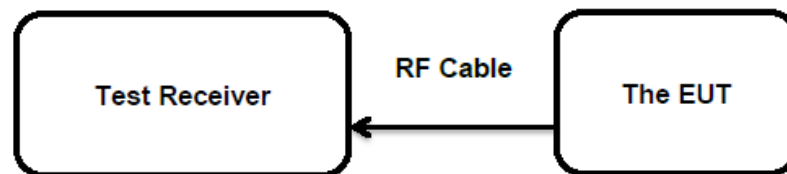


Diagram of Measurement Configuration for Conducted Transmitter Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:**Pass****Test Specification**

Test standard	:	FCC Part 15.203 RSS-Gen Clause 6.8
Limit	:	the use of antennas with directional gains that do not exceed 6 dBi

According to the manufacturer declared, the EUT have four Integral Antennas, the max. antenna gain antenna is 2.0dBi for 5.8GHz Wi-Fi, 2.0dBi for 5.8GHz SDR, permanent attachment and no consideration of replacement..

Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

5.1.2 Maximum Output Power

RESULT:

Pass

Test Specification

Test standard : FCC Part 15.407 (a)
RSS-247 clause 6.2
Basic standard : ANSI C63.10: 2013
Limits : <1W (30dBm) (5725-5850MHz)
Kind of test site : Shielded Room

Test Setup

Date of testing : 2023-12-20 to 2024-01-03
Input voltage : Fully charged battery
Operation mode : A, B
Test channel : Low / Middle / High
Ambient temperature : 25.2 °C
Relative humidity : 31 %
Atmospheric pressure : 101 kPa

For details refer to following test result.

Table 7: Test Result of Maximum Conducted Output Power, 5.8GHz Wi-Fi

Test Mode	Data Rate	Test Channel (MHz)	Measured Average Power		Limit (W)	
			(dBm)	(W)		
802.11a	1 Mbps	5745	13.8	0.0240	< 1.0	
		5785	14	0.0251		
		5825	14.12	0.0258		
802.11n (HT20)	MCS0	5745	13.85	0.0243		
		5785	14.18	0.0262		
		5825	14.34	0.0272		
802.11n (HT40)	MCS0	5745	13.77	0.0238		
		5785	14.11	0.0258		
802.11ac (VHT20)	MCS0	5825	14.35	0.0272		
		5755	13.65	0.0232		
		5795	13.98	0.0250		
802.11ac (VHT40)	MCS0	5755	13.62	0.0230		
		5795	13.91	0.0246		
802.11ac (VHT80)	MCS0	5775	14.27	0.0267		
Maximum Measured Value			14.35	0.0272		
Max. e.i.r.p.=14.35dBm+2.0dBi=16.35dBm, which is less than 36dBm=4W.						

Table 8: Test Result of Maximum Conducted Output Power, 5.8GHz SDR

Worst case: SISO mode (ANT 3)

Test Mode	Test Channel (MHz)	Measured Average Power		Limit (W)	
		(dBm)	(W)		
1.4MHz BW	5728.5	19.1	0.0813	< 1.0	
	5786.5	19.11	0.0815		
	5844.5	18.96	0.0787		
1.4MHz BW CA	5730.12	19.11	0.0815		
	5788.12	19.1	0.0813		
	5846.12	18.51	0.0710		
3MHz BW	5727.5	19.64	0.0920		
	5784.5	19.21	0.0834		
	5844.5	19.33	0.0857		
3MHz BW CA	5730.2	18.96	0.0787		
	5787.2	19.16	0.0824		
	5847.2	18.49	0.0706		
5MHz BW	5732.5	18.48	0.0705		
	5787.5	19.02	0.0798		
	5842.5	18.56	0.0718		
10MHz BW	5730.5	28.13	0.6501		
	5786.5	27.59	0.5741		
	5844.5	27.62	0.5781		
20MHz BW	5735.5	27.94	0.6223		
	5786.5	27.92	0.6194		
	5839.5	27.23	0.5284		
40MHz BW	5745.5	23.12	0.2051		
	5786.5	26.87	0.4864		
	5829.5	25.62	0.3648		
60MHz BW	5755.5	20.05	0.1012		
	5785.5	20.07	0.1016		
	5786.5	26.31	0.4276		
	5787.5	19.79	0.0953		
	5819.5	19.6	0.0912		
80MHz BW	5765.5	20.71	0.1178		
	5786.5	23.12	0.2051		
	5809.5	20.83	0.1211		
Maximum Measured Value		28.13	0.6501		
Max. e.i.r.p.=28.13dBm+2.0dBi=30.13dBm, which is less than 36dBm=4W.					

Worst case: MIMO mode (ANT 2+1)

Test Mode	Test Channel (MHz)	Measured Average Power		Limit (W)
		(dBm)	(W)	
1.4MHz BW	5728.5	18.39	0.0690	< 1.0
	5786.5	19.29	0.0849	
	5844.5	18.31	0.0678	
1.4MHz BW CA	5730.12	18.43	0.0697	
	5788.12	19.2	0.0832	
	5846.12	17.77	0.0598	
3MHz BW	5727.5	17.78	0.0600	
	5784.5	19.27	0.0845	
	5844.5	19.16	0.0824	
3MHz BW CA	5730.2	18.91	0.0778	
	5787.2	19.01	0.0796	
	5847.2	18.35	0.0684	
5MHz BW	5732.5	19.01	0.0796	
	5787.5	19.06	0.0805	
	5842.5	19.15	0.0822	
10MHz BW	5730.5	28.32	0.6792	
	5786.5	29.09	0.8110	
	5844.5	27.87	0.6124	
20MHz BW	5735.5	28.64	0.7311	
	5786.5	29.26	0.8433	
	5839.5	27.39	0.5483	
40MHz BW	5745.5	26.02	0.3999	
	5786.5	26.62	0.4592	
	5829.5	25.63	0.3656	
60MHz BW	5755.5	25.10	0.3236	
	5786.5	26.41	0.4375	
	5819.5	24.99	0.3155	
80MHz BW	5765.5	24.02	0.2523	
	5786.5	26.28	0.4246	
	5809.5	23.33	0.2153	
Maximum Measured Value		29.26	0.8433	
Max. e.i.r.p.=29.26dBm+2.0dBi=31.26dBm, which is less than 36dBm=4W.				

Note:

- 1) The cable loss is taken into account in results, $e.i.r.p. = P_{(Peak\ power)} + G$
- 2) Antenna gain(G) of 5.8GHz Wi-Fi : 2.0dBi
Antenna gain(G) of 5.8GHz SDR: 2.0dBi

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5.1.3 Conducted Power Spectral Density

RESULT:

Pass

Test Specification

Test standard : FCC Part 15.407 (a)
RSS-247 clause 6.2
Basic standard : ANSI C63.10: 2013
Limits : <30dBm/500KHz (5725-5850MHz)
Kind of test site : Shielded Room

Test Setup

Date of testing : 2023-12-20 to 2024-01-03
Input voltage : Fully charged battery
Operation mode : A, B
Test channel : Low / Middle / High
Ambient temperature : 25.2 °C
Relative humidity : 31 %
Atmospheric pressure : 101 kPa

For the measurement records, refer to the appendix A, B.

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5.1.4 Frequency Stability

RESULT:

Pass

Test Specification

Test standard : FCC Part 15.407 (g)
RSS-Gen Clause 6.11

Basic standard : ANSI C63.10: 2013

Limits : Within assigned bands

Kind of test site : Shielded Room

Test Setup

Date of testing : 2023-12-20 to 2024-01-03

Input voltage : Fully charged battery

Operation mode : A, B

Test channel : Low / Middle / High

Ambient temperature : 25.2 °C

Relative humidity : 31 %

Atmospheric pressure : 101 kPa

For the measurement records, refer to the appendix A, B.

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5.1.5 6dB Bandwidth

RESULT:

Pass

Test Specification

Test standard : FCC Part 15.407 (e)
RSS-247 clause 6.2.4.1

Basic standard : ANSI C63.10: 2013

Limits : At least 500KHz (5725-5850MHz)

Kind of test site : Shielded Room

Test Setup

Date of testing : 2023-12-20 to 2024-01-03

Input voltage : Fully charged battery

Operation mode : A, B

Test channel : Low / Middle / High

Ambient temperature : 25.2 °C

Relative humidity : 31 %

Atmospheric pressure : 101 kPa

For the measurement records, refer to the appendix A, B.

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5.1.6 99% Bandwidth

RESULT:

Pass

Test Specification

Test standard : FCC Part 15.407
RSS-Gen Clause 6.6
Basic standard : ANSI C63.10: 2013
Limits : N/A
Kind of test site : Shielded Room

Test Setup

Date of testing : 2023-12-20 to 2024-01-03
Input voltage : Fully charged battery
Operation mode : A, B
Test channel : Low / Middle / High
Ambient temperature : 25.2 °C
Relative humidity : 31 %
Atmospheric pressure : 101 kPa

For the measurement records, refer to the appendix A, B.

5.1.7 Radiated Spurious Emission

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.407(b) & FCC Part 15.205 & FCC Part 15.209 RSS-247 clause 6.2 & RSS-GEN clause 8.9 and 8.10
Basic standard	: ANSI C63.10: 2013 • For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. • Restricted Bands meet the requirement of 15.209 limit • Restricted Bands meet the requirement of RSS-GEN
Limits	: edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
Kind of test site	: 3m Semi-anechoic Chamber

Test Setup

Date of testing	: 2023-12-28 to 2024-01-09
Input voltage	: Fully charged battery
Operation mode	: A, B
Test channel	: Low / Middle / High
Ambient temperature	: Refer to test result
Relative humidity	: Refer to test result
Atmospheric pressure	: 101 kPa

Remark:

Testing was carried out within frequency range 9kHz to the tenth harmonics. Only the worst case spurious emissions configuration of the each mode were reported.

For the measurement records, refer to the appendix A, B.

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5.1.8 Conducted Emission on AC Mains

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.207(a) RSS-Gen Section 8.8
Basic standard	: ANSI C63.10: 2013
Frequency range	: 0.15 – 30MHz
Classification	: Class B
Limits	: FCC Part 15.207(a) RSS-Gen Table 4
Kind of test site	: Shielded Room

Test Setup

Date of testing	: 2023-11-24
Input voltage	: AC 120V, 60Hz
Operation mode	: A, B
Earthing	: Not connected
Ambient temperature	: 25.0 °C
Relative humidity	: 51.2 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix A, B.

6 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the appendix C.

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