

Prüfbericht-Nr.: Test report no.:	CN24W8IH 004	Auftrags-Nr.: Order no.:	168438670	Seite 1 von 23 Page 1 of 23
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			
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 Signed by: Jonathan Li
Stellung / Position:	Sachverständige(r)/Expert		Stellung / Position:	Sachverständige(r)/Expert
Sonstiges / Other:	FCC ID: SS3-QF3W4K23 This report is for 5.2GHz SDR.			
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

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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 26dB BANDWIDTH AND 99% BANDWIDTH

RESULT: Pass

5.1.6 RADIATED SPURIOUS EMISSION

RESULT: Pass

5.1.7 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 5.2GHz SDR

Appendix B: 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	Y LX23JMF	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 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
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 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 5.2GHz SDR	
Operating Frequency	5157-5245MHz for 10MHz Bandwidth 5161-5240MHz for 20MHz Bandwidth 5170-5230MHz for 40MHz Bandwidth
Type of Modulation	OFDM (QPSK, 16QAM, 64QAM)
Channel Number	89 channels for 10MHz Bandwidth 80 channels for 20MHz Bandwidth 61 channels for 40MHz Bandwidth
Channel Separation	1MHz for 10MHz/20MHz/40MHz
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

Table 4: RF Channel and Frequency of 5.2GHz SDR

5.2GHz 10MHzBandwidth (5157MHz-5245MHz)							
RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
1	5157	24	5180	47	5203	70	5226
2	5158	25	5181	48	5204	71	5227
3	5159	26	5182	49	5205	72	5228
4	5160	27	5183	50	5206	73	5229
5	5161	28	5184	51	5207	74	5230
6	5162	29	5185	52	5208	75	5231
7	5163	30	5186	53	5209	76	5232
8	5164	31	5187	54	5210	77	5233
9	5165	32	5188	55	5211	78	5234
10	5166	33	5189	56	5212	79	5235
11	5167	34	5190	57	5213	80	5236
12	5168	35	5191	58	5214	81	5237
13	5169	36	5192	59	5215	82	5238
14	5170	37	5193	60	5216	83	5239
15	5171	38	5194	61	5217	84	5240
16	5172	39	5195	62	5218	85	5241
17	5173	40	5196	63	5219	86	5242
18	5174	41	5197	64	5220	87	5243
19	5175	42	5198	65	5221	88	5244
20	5176	43	5199	66	5222	89	5245
21	5177	44	5200	67	5223	/	/
22	5178	45	5201	68	5224	/	/
23	5179	46	5202	69	5225	/	/

5.2GHz 20MHzBandwidth (5161MHz-5240MHz)							
RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
1	5161	21	5181	41	5201	61	5221
2	5162	22	5182	42	5202	62	5222
3	5163	23	5183	43	5203	63	5223
4	5164	24	5184	44	5204	64	5224
5	5165	25	5185	45	5205	65	5225
6	5166	26	5186	46	5206	66	5226
7	5167	27	5187	47	5207	67	5227
8	5168	28	5188	48	5208	68	5228
9	5169	29	5189	49	5209	69	5229
10	5170	30	5190	50	5210	70	5230
11	5171	31	5191	51	5211	71	5231
12	5172	32	5192	52	5212	72	5232
13	5173	33	5193	53	5213	73	5233
14	5174	34	5194	54	5214	74	5234
15	5175	35	5195	55	5215	75	5235
16	5176	36	5196	56	5216	76	5236

17	5177	37	5197	57	5217	77	5237
18	5178	38	5198	58	5218	78	5238
19	5179	39	5199	59	5219	79	5239
20	5180	40	5200	60	5220	80	5240

5.2GHz 40MHzBandwidth (5170MHz-5230MHz)							
RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
1	5170	17	5186	33	5202	49	5218
2	5171	18	5187	34	5203	50	5219
3	5172	19	5188	35	5204	51	5220
4	5173	20	5189	36	5205	52	5221
5	5174	21	5190	37	5206	53	5222
6	5175	22	5191	38	5207	54	5223
7	5176	23	5192	39	5208	55	5224
8	5177	24	5193	40	5209	56	5225
9	5178	25	5194	41	5210	57	5226
10	5179	26	5195	42	5211	58	5227
11	5180	27	5196	43	5212	59	5228
12	5181	28	5197	44	5213	60	5229
13	5182	29	5198	45	5214	61	5230
14	5183	30	5199	46	5215	/	/
15	5184	31	5200	47	5216	/	/
16	5185	32	5201	48	5217	/	/

3.3 Independent Operation Modes

The basic operation modes are:

- A. On, 5.2GHz SDR wireless transmitting mode
 - 1) Low Channel
 - 2) Middle Channel
 - 3) High Channel
- B. 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 5: 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)

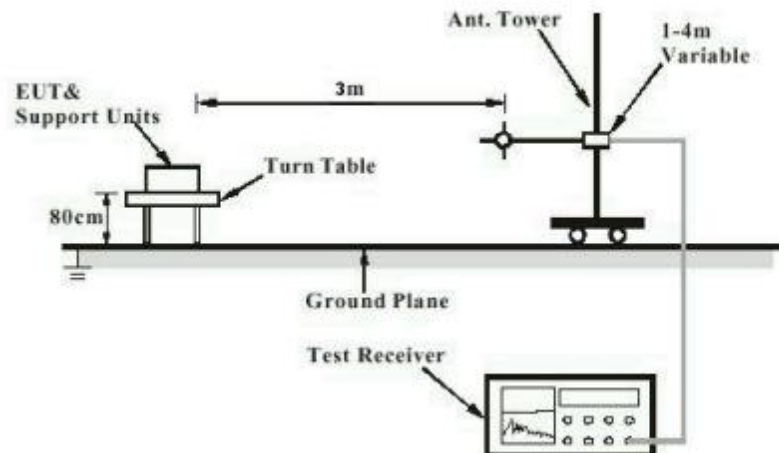


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

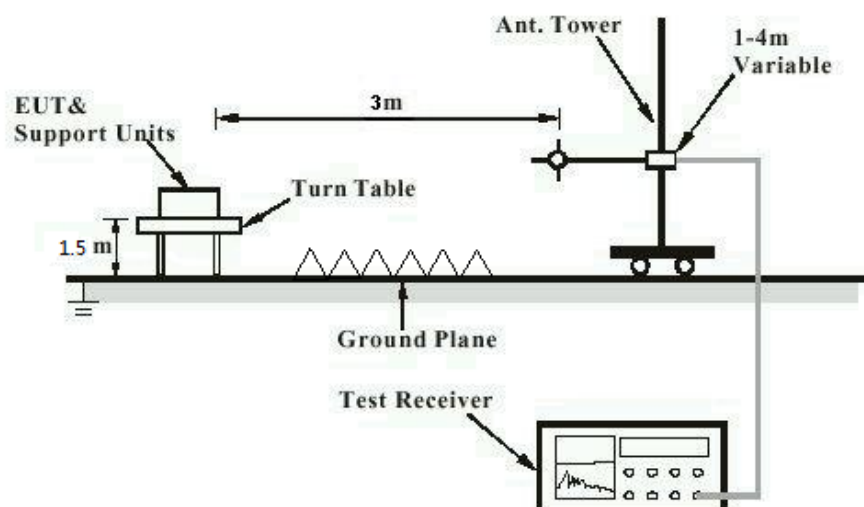


Diagram of Measurement Configuration for Mains Conduction Measurement

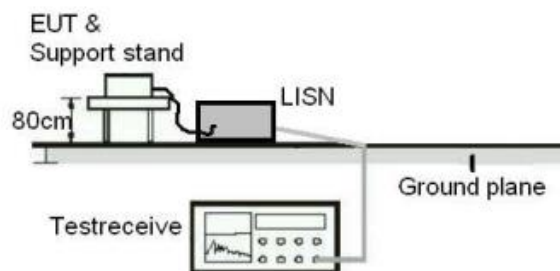
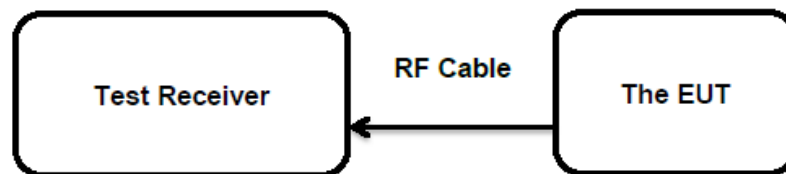


Diagram of Measurement Configuration for Conducted Transmitter Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:

Pass

Test Specification

Test standard	:	FCC Part 15.203
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 5.2GHz 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.

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5.1.2 Maximum Output Power

RESULT:

Pass

Test Specification

Test standard	: FCC Part 15.407 (a)
Basic standard	: ANSI C63.10: 2013
Limits	: <250mW (24dBm) (5150-5250MHz)
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
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 6: Test Result of Maximum Conducted Output Power, 5.2GHz SDR

Worst case: SISO mode (ANT 3)

Test Mode	Test Channel (MHz)	Measured Average Power		Limit (W)
		(dBm)	(W)	
10MHz BW	5157	5.88	0.0039	< 0.25
	5160	8.81	0.0076	
	5165	17.13	0.0516	
	5200	17.65	0.0582	
	5245	16.15	0.0412	
20MHz BW	5161	6.8	0.0048	
	5170	16.74	0.0472	
	5200	17.59	0.0574	
	5240	16.5	0.0447	
40MHz BW	5170	8.35	0.0068	
	5180	12.55	0.0180	
	5185	12.58	0.0181	
	5190	17.38	0.0547	
	5200	17.39	0.0548	
	5230	17.28	0.0535	
Maximum Measured Value		17.65	0.0582	

Worst case: MIMO mode (ANT 0+3)

Test Mode	Test Channel (MHz)	Measured Average Power		Limit (W)
		(dBm)	(W)	
10MHz BW	5157	5.02	0.0032	< 0.25
	5165	16.74	0.0472	
	5200	17.03	0.0505	
	5245	15.25	0.0335	
20MHz BW	5161	6.59	0.0046	
	5170	16.84	0.0483	
	5200	17.45	0.0556	
	5240	16.07	0.0405	
40MHz BW	5170	8.21	0.0066	
	5180	12.86	0.0193	
	5190	17.21	0.0526	
	5200	17.4	0.0550	
	5230	16.56	0.0453	
Maximum Measured Value		17.45	0.0556	

Note:

- 1) The cable loss is taken into account in results, $e.i.r.p. = P_{(Peak\ power)} + G$
- 2) Antenna gain(G) of 5.2GHz 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)
Basic standard	: ANSI C63.10: 2013
Limits	: <11dBm/MHz (5150-5250MHz)
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
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.

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5.1.4 Frequency Stability

RESULT:

Pass

Test Specification

Test standard : FCC Part 15.407 (g)
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
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.

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5.1.5 26dB Bandwidth and 99% Bandwidth

RESULT:

Pass

Test Specification

Test standard	: FCC Part 15.407
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
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.

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5.1.6 Radiated Spurious Emission

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

Test standard	: FCC Part 15.407(b) & FCC Part 15.205 & FCC Part 15.209
Basic standard	: ANSI C63.10: 2013
Limits	: • For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz. • Restricted Bands meet the requirement of 15.209 limit
Kind of test site	: 3m Semi-anechoic Chamber

Test Setup

Date of testing	: 2024-01-06 to 2024-01-09
Input voltage	: Fully charged battery
Operation mode	: A
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.

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5.1.7 Conducted Emission on AC Mains

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

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

Test Setup

Date of testing	: 2023-11-24
Input voltage	: AC 120V, 60Hz
Operation mode	: A
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.

6 Photographs of the Test Set-Up

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

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