

TEST REPORT



Report No. : CHTW24070055 Report verification: 

Project No. : SHT2406041802W

FCC ID : 2BGNSDM660U

Applicant's name : SATELRADIO TELECOMUNICACAO LTDA

Address..... : AV.FRANCISCO MATARAZZO, 1752, SALAS 516, AGUA
BRANCA, SAO PAULO/SP, BRAZIL

Product name..... : Digital Mobile Radio

Trade Mark : -

Model No. : DM660 U(1)

Listed Model(s) : -

Standard : FCC CFR Title 47 Part 2.1091

Date of receipt of test sample..... : Jun.13, 2024

Date of testing..... : Jun.14, 2024- Jul.09, 2024

Date of issue..... : Jul.17, 2024

Result..... : PASS

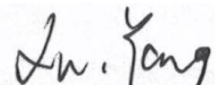
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Testing Laboratory Name : Shenzhen Huatongwei International Inspection Co., Ltd.

Address..... : Building 7, Baiwang Idea Factory, No.1051, Songbai Road,
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The test report merely correspond to the test sample.

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1 TEST STANDARDS AND REPORT VERSION

1.1. Test standard

The tests were performed according to following standards:

[FCC 47 Part 2.1091](#): Radiofrequency radiation exposure evaluation: mobile devices.

[FCC 47 Part 1.1310](#): Radiofrequency radiation exposure limits.

[FCC 47 Part 1.1307\(b\)](#): Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.

[KDB 447498 D04 Interim General RF Exposure Guidance v01](#): Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies

1.2. Report revised information

Revised No.	Date of issued	Description
N/A	2024-07-17	Original

2 SUMMARY

2.1 Client information

Applicant:	SATELRADIO TELECOMUNICACAO LTDA
Address:	AV.FRANCISCO MATARAZZO, 1752, SALAS 516, AGUA BRANCA, SAO PAULO/SP, BRAZIL
Manufacturer:	SATELRADIO TELECOMUNICACAO LTDA
Address:	AV.FRANCISCO MATARAZZO, 1752, SALAS 516, AGUA BRANCA, SAO PAULO/SP, BRAZIL

2.2 Product description

Main unit information:	
Product name:	Digital Mobile Radio
Trade mark:	-
Model No.:	DM660 U(1)
Listed model(s):	-
Power supply:	DC 13.6V
Hardware version:	V2.00.10
Software version:	DM660UHFMB_A

2.3 Radio Specification Description ^{*1}

PMR		
Operation Band:	400MHz~470MHz	
Rated Output Power:	☒ High Power 45W	☒ Low Power 5W
Modulation Type:	Analog Voice:	FM
	Digital Voice/Digital Data:	4FSK
Channel Separation	Analog Voice:	12.5kHz
	Digital Voice/Digital Data:	12.5kHz

2.4 Testing laboratory information

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.	
Laboratory Location	Building 7, Baiwang Idea Factory, No.1051, Songbai Road, Yangguang Community, Xili Subdistrict, Nanshan District, Shenzhen, Guangdong, China	
Connect information:	Tel: 86-755-26715499 E-mail: cs@szhtw.com.cn http://www.szhtw.com.cn	
Qualifications	Type	Accreditation Number
	FCC Test Firm Registration Number	762235
	FCC Designation Number	CN1181

3 TEST CONFIGURATION

3.1 Test frequency list

Frequency Bands (MHz)	Test Channel	Test Frequency (MHz)
400~470	CH _L	400.0125
	CH _M	435.0000
	CH _H	469.9875

3.2 Operation mode

Test Mode	Transmitting	Digital	Analog	Power Level
		12.5kHz	12.5kHz	High
TX-DNH	√	√		√
TX-ANH	√		√	√

Note: √: is operation mode.

3.3 Testing environmental condition

Type	Requirement	Actual
Temperature:	15~35°C	25°C
Relative Humidity:	25~75%	50%
Air Pressure:	860~1060mbar	1000mbar

3.4 Measurement uncertainty

No.	Test Items	Measurement Uncertainty
1	Radiofrequency radiation exposure evaluation	4.54dB for 30MHz-1GHz 5.10dB for above 1GHz

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

3.5 Equipment used during the testing

● Radiated Spurious Emission							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	HTWE0122	SAC-3m-01	C11121	2023/04/17	2026/04/16
●	Field Probe	AR	HTWE0591	FL7006/KIT	0357798	2024/4/30	2025/4/29

4 TEST CONDITIONS AND RESULTS

4.1. Limit

The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

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

Note: f = frequency in MHz

EVALUATION METHOD

Transmission formula: $Pd = (Pout \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

Pd = power density in mW/cm², **Pout** = output power to antenna in mW, **G** = gain of antenna in linear scale;
Pi = 3.1416, **R** = distance between observation point and center of the radiator in cm

TEST RESULT

☒ Passed ☐ Not Applicable

Radio Type	Frequency (MHz)	Conducted Average Power (dBm)*	Maximum Tune-up (dBm)	r (m)	Power Density (mW/cm2)	Limit (mW/cm2)	Result
PMR	400.0125	47.3	47.5	0.87	1.324	1.333	PASS
PMR	435.0000	47.2	47.5	0.84	1.420	1.450	PASS
PMR	469.9875	46.9	47.5	0.80	1.565	1.567	PASS

Note:

- 1) r is the distance from observation point to the antenna which is declared by the applicant.
- 2) *: refer to the RF report.
- 3) Antenna Gain is 3.5dBi.

If the gain of the antenna is 3.5dBi, the separation distance is at least 0.87m from body and the antenna, so meet this standard requirement.

4.2. Measurement Procedure

1. Polarization of the EUT's antenna was vertical, which is its polarization in actual use.
2. The EUT at the chosen modulation was set to transmit at the chosen frequency at maximum RF power and at 50% duty cycle (50% duty cycle is simulated either by lowering the radio's power by 3dB or by using a 3 dB pad on the output of the radio). During preliminary measurements, we set the distance between the power density probe and the investigated EUT's antenna equal to the average calculated R_{safe} applicable either for controlled or uncontrolled environments.
3. Power density measurements were taken at different heights of the probe from the ground (0.1 to 2 meters) while rotating versus azimuth (from 0° to 360°) the antenna.
4. The azimuth between the probe and the antenna position corresponding to the highest MPE level was chosen as the "worst case" position for the final measurements.
5. For the final measurements, we adjusted the distance between the test probe and the tested antenna to the real safe distance, R_{real} , such that the measured highest power density in the "worst case" position was the same or slightly less than the test limit.
6. The measurement results of final measurements conducted at the chosen azimuth and different heights of the probe above the ground.
7. Average values of power density were calculated for the imaginary whole human body (0.1–2.0 m), for the lower part of the body (0.1–0.9 m) and for the upper part of the body (1.0–2.0 m).

4.3. Test Results

EME Data:

Measuring Antenna Height(cm)	FCC Part 2.1091		
	Controlled RF Exposure(mW/cm ²)		
	3.5dBi Antenna 87cm	3.5dBi Antenna 97cm	3.5dBi Antenna 107cm
10	0.68	0.60	0.54
20	0.76	0.67	0.59
30	0.85	0.73	0.64
40	0.95	0.81	0.69
50	1.04	0.88	0.74
60	1.14	0.94	0.79
70	1.22	1.00	0.83
80	1.29	1.04	0.86
90	1.32	1.06	0.87
100	1.32	1.06	0.87
110	1.29	1.04	0.86
120	1.22	1.00	0.83
130	1.14	0.94	0.79
140	1.04	0.88	0.74
150	0.95	0.81	0.69
160	0.85	0.73	0.64
170	0.76	0.67	0.59
180	0.68	0.60	0.54
190	0.60	0.54	0.49
200	0.54	0.49	0.45

EME for Body Parts:

Part of the body/averaging points(m)	FCC Part 2.1091
	Controlled RF Exposure
	3.5dBi Antenna 87cm (mW/cm ²)
Whole body (0.1 to 2.0)	1.32
Lower body (0.1 to 0.9)	1.32
Upper body (1.0 to 2.0)	1.32

4.4. Conclusion

The User Manual shall include RF radiation safety warnings:

The antenna of this device must be installed on the roof or trunk of the vehicle. If the gain of the used antenna is 3.5dBi, the minimum mobile separation distance $R_{safe} = 87.00\text{cm}$.

5 TEST SETUP PHOTOS



6 EXTERNAL AND INTERNAL PHOTOS

Refer to the test report No.: CHTW24070054