



TEST REPORT

FCC MPE Test for DA651ZZGG
Certification

APPLICANT

Hyundai Mobis Co., Ltd

REPORT NO.

HCT-RF-2506-FC047-R2

DATE OF ISSUE

July 1, 2025

Tested by
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Technical Manager
Jong Seok Lee



Accredited by KOLAS, Republic of KOREA

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Additional Model
DA653ZZGG, DA654ZZGG, DA656ZZGG

Applicant	Hyundai Mobis Co., Ltd 203, Teheran-ro, Gangnam-gu, Seoul, Republic of Korea
Product Name	Car infotainment system
Model Name	DA651ZZGG
FCC ID	TQ8-DA651ZZGG
Frequency range	2 402 MHz – 2 480 MHz (Bluetooth, BT LE) 2 412 MHz ~ 2 462 MHz (WLAN) 5 180 MHz ~ 5 240, 5 745 ~ 5 805 MHz (UNII)
Date of Test	February 25, 2025 ~ June 11, 2025
Test Standard Used	§ 1.1310, § 2.1091
Location of Test	<input checked="" type="checkbox"/> Permanent Testing Lab <input type="checkbox"/> On Site Testing Lab (Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea)
Test Results	PASS

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	June 11, 2025	Initial Release
1	June 30, 2025	Revised the Antenna Gain and MPE calculation for UNII Band.
2	July 01, 2025	Revised the Antenna Gain and MPE calculation separately for the UNII-1 and UNII-3 bands.

Notice

Content

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.

The results shown in this test report only apply to the sample(s), as received, provided by the applicant, unless otherwise stated.

The test results have only been applied with the test methods required by the standard(s).

The laboratory is not accredited for the test results marked *.

Information provided by the applicant is marked **.

Test results provided by external providers are marked ***.

When confirmation of authenticity of this test report is required, please contact www.hct.co.kr

This test report provides test result(s) under the scope accredited by the Korea Laboratory Accreditation Scheme (KOLAS), which signed the ILAC-MRA.
(KOLAS (KS Q ISO/IEC 17025) Accreditation No. KT197)

This test report provides test result(s) under the lab's valid Scope of Accreditation by A2LA (American Association for Laboratory Accreditation), signatory of the ILAC-MRA.
(A2LA (ISO/IEC 17025) Certificate No. 4114.01)

RF Exposure Statement

1. Limit

According to §1.1310, §2.1091 RF exposure is calculated.

(B) Limits for General Population/Uncontrolled Exposures

Frequency range (MHz)	Electric field Strength (V/m)	Magneticfield Strength (A/m)	Powerdensity (mW/cm ²)	Averagingtime (minutes)
0.3 - 1.34.....	614	1.63	^(a) (100)	30
1.34 - 30.....	824/f	2.19/f	^(a) (180/f ²)	30
30 - 300.....	27.5	0.073	0.2	30
300 - 1500.....	f/1500	30
1500 - 100.000.....	1.0	30

F = frequency in MHz

^(a) = Plane-wave equivalent power density

2. Maximum Permissible Exposure Prediction

Prediction of MPE limit at a given distance

$$S = PG/4\pi R^2$$

S = Power density

P = Power input to antenna

G = Power gain to the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

3. RESULTS

3-1. Bluetooth

Average output Power at antenna input terminal	3.00	dBm
Average output Power at antenna input terminal	1.995	mW
Prediction distance	20.00	cm
Prediction frequency	2402 – 2480	MHz
Antenna Gain(typical)	4.220	dBi
Antenna Gain(numeric)	2.642	-
Power density at prediction frequency(S)	0.0010	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.0000	mW/cm ²

3-2. Bluetooth LE

Average output Power at antenna input terminal	9.00	dBm
Average output Power at antenna input terminal	7.943	mW
Prediction distance	20.00	cm
Prediction frequency	2402 – 2480	MHz
Antenna Gain(typical)	4.220	dBi
Antenna Gain(numeric)	2.642	-
Power density at prediction frequency(S)	0.0042	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.0000	mW/cm ²

3-3. DTS

Average output Power at antenna input terminal	14.00	dBm
Average output Power at antenna input terminal	25.119	mW
Prediction distance	20.00	cm
Prediction frequency	2412 – 2462	MHz
Antenna Gain(typical)	3.300	dBi
Antenna Gain(numeric)	2.138	-
Power density at prediction frequency(S)	0.0107	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.0000	mW/cm ²

3-4. UNII

3-4-1. UNII 1

Average output Power at antenna input terminal	5.00	dBm
Average output Power at antenna input terminal	3.162	mW
Prediction distance	20.00	cm
Prediction frequency	5180 - 5440	MHz
Antenna Gain(typical)	5.700	dBi
Antenna Gain(numeric)	3.715	-
Power density at prediction frequency(S)	0.0023	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.0000	mW/cm ²

3-4-2. UNII 3

Average output Power at antenna input terminal	5.00	dBm
Average output Power at antenna input terminal	3.162	mW
Prediction distance	20.00	cm
Prediction frequency	5745 - 5805	MHz
Antenna Gain(typical)	3.600	dBi
Antenna Gain(numeric)	2.291	-
Power density at prediction frequency(S)	0.0014	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.0000	mW/cm ²

Simultaneous transmission operations

Worst Case: Simultaneous MPE 20cm is

$$\sum_{i=1}^n \frac{\text{Power density } i}{\text{Limit } i} < 1$$

Simultaneous MPE

- 5 GHz WLAN UNII 1 (0.0023) + BT LE (0.0042) = 0.0065 < 1
- 5 GHz WLAN UNII 3 (0.0014) + BT LE (0.0042) = 0.0056 < 1
- 2.4G WLAN (0.0107) + BT LE (0.0042) = 0.0149 < 1