

TEST REPORT

of

FCC CFR 47 part 1, 1.1307(b), 1.1310

FCC ID: TQ8-ACB10GWGG

1. Equipment Under Test : DIGITAL CAR AUDIO SYSTEM
2. Model Name : ACB10GWGG
3. Variant Model Name(s) : Refer to page 3
4. Applicant : Hyundai Mobis Co., Ltd.
5. Manufacturer : Hyundai Mobis Co., Ltd.
6. Date of Receipt : 2020.03.26
7. Date of Test(s) : 2020.04.12 ~ 2020.04.14
8. Date of Issue : 2020.04.20

In the configuration tested, the EUT complied with the standards specified above. This test report does not assure KOLAS accreditation.

- 1) The results of this test report are effective only to the items tested.
- 2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.

Tested by:



Jinhyoung Cho

Technical Manager:



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1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- Designation number: KR0150

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>.

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1.2. Details of Applicant

Applicant : Hyundai Mobis Co., Ltd.

Address : 203, Teheran-ro, Gangnam-gu, Seoul, South Korea, 135-977

Contact Person : Choe, Seung-hoon

Phone No. : +82 31 260 0098

1.3. Details of Manufacturer

Company : Same as applicant

Address : Same as applicant

1.4. Description of EUT

Kind of Product	DIGITAL CAR AUDIO SYSTEM
Model Name	ACB10GWGG
Variant Model Names	ACB10GWDG, ACB11GWGG, ACB10GWGN, ACB10GWEG, ACB10GWEP, ACB11GWEP, AU210GWRP, ACB10GTMG, ACB11GTMG, ACB10GTMN, ACB10GTEG, ACB10GTEP, AU211GTEP, AU211GTFN, ACB11GTEP, ACB12GTEP
Power Supply	DC 14.4 V
Frequency Range	2 402 MHz ~ 2 480 MHz (Bluetooth)
Modulation Technique	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channels	79 channels (Bluetooth)
Antenna Type	Pattern antenna
Antenna Gain	-0.01 dB i

1.5. Information of Variant Models

Model	Model Name	LOCAL	BT	UI	RDS	DAB	SXM	HD	HANDLE	FM/AM Code
Basic Model	ACB10GWGG	General	O	GEN	X	X	X	X	LHD	A1
Variant Models	ACB10GWDG	Domestic	O	GEN	X	X	X	X	LHD	A1
	ACB11GWGG	General	O	GEN	O	X	X	X	LHD	A1
	ACB10GWGN	General	O	GEN	X	X	X	X	LHD	A2
	ACB10GWEG	Europe	O	GEN	X	X	X	X	LHD	A1
	ACB10GWEP	Europe	O	GEN	X	X	X	X	LHD	A8
	ACB11GWEP	Europe	O	GEN	O	X	X	X	LHD	A8
	AU210GWRP	Russia	O	GEN	O	X	X	X	LHD	A8
	ACB10GTMG	Middle East	O	GEN	X	X	X	X	LHD	A1
	ACB11GTMG	Middle East	O	GEN	O	X	X	X	LHD	A1
	ACB10GTMN	Middle East	O	GEN	X	X	X	X	LHD	A2
	ACB10GTEG	Colombia	O	GEN	X	X	X	X	LHD	A5
	ACB10GTEP	Europe	O	GEN	X	X	X	X	LHD	A1
	AU211GTEP	Europe	O	GEN	X	X	X	X	LHD	A8
	AU211GTFN	Mexico	O	GEN	O	X	X	X	LHD	A2
	ACB11GTEP	Europe	O	GEN	O	X	X	X	LHD	A8
	ACB12GTEP	Europe	O	GEN	O	O	X	X	LHD	A8

CODE	BAND	FREQUENCY RANGE	STEP	LOCAL
A1	FM	87.5-108.0 MHz	100 kHz	DOM/GEN
	AM	531-1 602 kHz	9 kHz	
A2	FM	87.5-107.9 MHz	200 kHz	NA/GEN
	AM	530-1 710 kHz	10 kHz	
A3	FM	87.5-108.0 MHz	50 kHz	EU
	AM	522-1 620 kHz	9 kHz	
A4	FM	76.0-90.0 MHz	100 kHz	JAPAN
	AM	522-1 629 kHz	9 kHz	
A5	FM	87.5-107.9 MHz	100 kHz	COLOMBIA
	AM	530-1 710 kHz	10 kHz	
A6	FM	87.5-107.9 MHz	200 kHz	GUAM
	AM	531-1 701 kHz	9 kHz	
A7	FM	76.1-107.9 MHz	100 kHz	BRAZIL
	AM	530-1 710 kHz	10 kHz	
A8	FM	87.5-108.0 MHz	100 kHz	EU
	AM	522-1 620 kHz	9 kHz	

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1.6. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL000563	2020.04.20	Initial

2. RF Exposure Evaluation

2.1. Environmental evaluation and exposure limit according to FCC CFR 47 part 1, 1.1307(b), 1.1310

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time
(A) Limits for Occupational/Controlled Exposure				
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
300-1 500	-	-	f/300	6
1 500-100 000	-	-	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
300-1 500	-	-	f/1500	30
<u>1 500-100 000</u>	-	-	<u>1.0</u>	<u>30</u>

2.1.1. Friis transmission formula: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

2.1.2. Test Result of RF Exposure Evaluation

Test Item : RF Exposure Evaluation Data

Test Mode : Normal Operation

2.1.3. Output Power into Antenna & RF Exposure Evaluation Distance

- Maximum tune up tolerance

Frequency (MHz)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
2 402 ~ 2 480	4	-0.01	0.000 499	1

Note;

- The power density Pd (5th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm².
- This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
- This equipment should be installed and operated with minimum 20 cm between the radiator and your body.
- The antenna gain of this transmitter is less than 6 dB i and must not be collocated or operating in conjunction with any other antenna or transmitter unless authorized to do so by the FCC.
- According to KDB 447498 D01 RF Exposure Guidance 4.1.d, Output Average Power to Antenna applied Maximum Tune up power considering tolerance.

- End of the Test Report -