

TEST REPORT

of

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

FCC ID: TQ8-ACB10D4RE

Equipment Under Test : DIGITAL CAR AUDIO SYSTEM
Model Name : ACB10D4RE
Variant Model Names : ACB10D4GG, ACB10D4GN, ACB10D4GE,
ACB10D4GL, ACB11D4GG, ACB10D4EE
Applicant : Hyundai MOBIS Co., Ltd.
Manufacturer : Hyundai MOBIS Co., Ltd.
Date of Receipt : 2017.08.17
Date of Test(s) : 2017.08.20 ~ 2017.08.25
Date of Issue : 2017.09.05

In the configuration tested, the EUT complied with the standards specified above.

Tested By:



Date:

2017.09.05

Jinhyoung Cho

Technical
Manager:



Date:

2017.09.05

Harim Lee

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SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

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1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

-Wireless Div. 2FL, 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807

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>.

Phone No. : +82 31 688 0901

Fax No. : +82 31 688 0921

1.2. Details of Applicant

Applicant : Hyundai MOBIS Co., Ltd.

Address : 203, Teheran-ro, Gangnam-gu, Seoul, 06141, Korea

Contact Person : Hyun, Sae-Rom

Phone No. : +82 31 260 2714

1.3. Details of manufacturer

Company : Hyundai MOBIS Co., Ltd.

Address : 203, Teheran-ro, Gangnam-gu, Seoul, 06141, Korea

1.4. Description of EUT

Kind of Product	DIGITAL CAR AUDIO SYSTEM
Model Name	ACB10D4RE
Variant Model Names	ACB10D4GG, ACB10D4GN, ACB10D4GE, ACB10D4GL, ACB11D4GG, ACB10D4EE
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
Antenna Type	Dielectric Chip Antenna
Antenna Gain	-0.10 dBi

1.5. Test report revision

Revision	Report number	Date of Issue	Description
0	F690501/RF-RTL011788	2017.09.05	Initial

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1.6. Information of variant models

Model name		HMC PART No.	Main T/UP		Local				
					Region		Frequency code		
Basic model	ACB10D4RE	96150-D4300	M1565582100		Russia		A3		
Variant models	ACB10D4GG	96150-D4100	M1565579100		General		A1		
	ACB10D4GN	96150-D4120	M1565579100		General		A2		
	ACB10D4GE	96150-D4140	M1565579100		General		A3		
	ACB10D4GL	96150-D4160	M1565579100		Colombia		A5		
	ACB11D4GG	96150-D4180	M1565580100		General /Republic of South Africa		A1		
	ACB10D4EE	96150-D4200	M1565581100		Europe		A3		
Model name		Int./Ext.	Bluetooth	RDS	CAN	e-Call	CLOCK	Multilingual display	EU KNOB
Basic model	ACB10D4RE	Int.	O	O	O	O	O	16 Europe Languages	O
Variant models	ACB10D4GG	Int.	O	X	X	X	O	4 General Languages	O
	ACB10D4GN	Int.	O	X	X	X	O	4 General Languages	X
	ACB10D4GE	Int.	O	X	X	X	O	4 General Languages	O
	ACB10D4GL	Int.	O	X	X	X	O	4 General Languages	X
	ACB11D4GG	Int.	O	O	X	X	O	4 General Languages	O
	ACB10D4EE	Int.	O	O	X	X	O	16 Europe Languages	O

Frequency 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	
A5	FM	87.5 - 107.9 MHz	100 kHz	Colombia
	AM	530 - 1 710 kHz	10 kHz	

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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.

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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

Bluetooth

- Maximum tune up tolerance

Operating 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	-0.10	0.000 488	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.

- End of the Test Report -

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