

MPE TEST REPORT

of

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

FCC ID : TQ8- AC1A3IHAN

Equipment Under Test : DIGITAL CAR AUDIO SYSTEM
Basic Model Name : AC1A3IHAN
Alternative Model Name : AC1A2IHAN, AC1A4IHAN, AC1A5IHAN,
AC1A2IHKH, AC1A3IHKH
Applicant : Hyundai MOBIS Co., Ltd.
Manufacturer : Hyundai MOBIS Co., Ltd.
Date of Test(s) : 2014.07.15 ~ 2014.07.18
Date of Issue : 2014.07.24

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

Tested By:



Lee Harim

Date:

2014.07.24

Approved By:



You Hyunchoe

Date:

2014.07.24

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

-Wireless Div. 3FL, 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-040

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>.

Telephone : +82 31 428 5700

FAX : +82 31 427 2371

1.2. Details of Applicant

Applicant : Hyundai MOBIS Co., Ltd.

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

Contact Person : Choi, Seung-Hoon

Phone No. : +82 31 260 0098

1.3. Description of EUT

Kind of Product	DIGITAL CAR AUDIO SYSTEM
Basic Model Name	AC1A3IHAN
Alternative Model Name	AC1A2IHAN, AC1A4IHAN, AC1A5IHAN, AC1A2IHKN, AC1A3IHKN
Power Supply	DC 14.4 V
Frequency Range	2 402 MHz ~ 2 480 MHz
Modulation Technique	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channels	79
Antenna Type	PCB Antenna
Antenna Gain	-4.30 dBi

1.4. Test report revision

Revision	Report number	Date of Issue	Description
0	F690501/RF-RTL007858	2014. 07. 24	Initial

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SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-040 <http://www.sgsgroup.kr>

RTT5041-20(2014.01.20)(2)

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

A4(210 mm x 297 mm)

2. RF Exposure Evaluation

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

According to FCC 1.1310 : 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)	Average Time
(A) Limits for Occupational /Control Exposures				
300 – 1 500	--	--	F/300	6
1 500 – 100 000	--	--	5	6
(B) Limits for General Population/Uncontrol Exposures				
300 – 1 500	--	--	F/1500	6
<u>1 500 – 100 000</u>	--	--	<u>1</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

FHSS : GFSK

Channel	Channel Frequency (MHz)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Duty Cycle (%)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
Low	2 402	2.34	-4.30	77.0	0.000 165	1
Middle	2 441	1.88	-4.30	77.0	0.000 148	1
High	2 480	2.06	-4.30	77.0	0.000 154	1

Mode	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	LIMITS (mW/cm ²)
Maximum tune up tolerance	4.00	-4.30	0.000 241	1

FHSS : 8DPSK

Channel	Channel Frequency (MHz)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Duty Cycle (%)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
Low	2 402	0.82	-4.30	77.0	0.000 116	1
Middle	2 441	0.35	-4.30	77.0	0.000 104	1
High	2 480	-0.30	-4.30	77.0	0.000 090	1

Mode	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	LIMITS (mW/cm ²)
Maximum tune up tolerance	4.00	-4.30	0.000 241	1

Note :

1. 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.

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