

TEST REPORT

of

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

FCC ID: TQ8-AV2B4SDAN

Equipment Under Test : DIGITAL CAR AVN SYSTEM

Model Name : FCC: AV2B4SDAN
IC: AV2B3SDKN

Serial No. : N/A

Applicant : Hyundai MOBIS Co., Ltd.

Manufacturer : Hyundai MOBIS Co., Ltd.

Date of Test(s) : 2013.05.07 ~ 2013.05.07

Date of Issue : 2013.05.07

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

Tested By:



Harim Lee

Date:

2013.05.07

Approved By:



Hyunchae You

Date:

2013.05.07

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1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- Wireless Div. 3FL, 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea 435-040 (Lab)
- Wireless Div. 1FL, 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea 435-040 (Chamber)

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

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1.2. Details of Applicant

Applicant : Hyundai MOBIS Co., Ltd.

Address : 80-9, Mabook-Dong, Giheung-Gu Yongin-Shi, Gyeonggi-Do, 446-912, South Korea

Contact Person : Kim, Jong-Tae

Phone No. : +82 31 260 0092

1.3. Description of EUT

Kind of Product	DIGITAL CAR AVN SYSTEM
Model Name	FCC: AV2B4SDAN IC: AV2B3SDKN
Serial Number	N/A
Power Supply	DC 14.4 V (Lead-acid battery power source used on vehicles)
Frequency Range	2 402 MHz ~ 2 480 MHz
Modulation Technique	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channels	79
Antenna Type	Chip Antenna
Antenna Gain	3.5 dBi

1.4. Test report revision

Revision	Report number	Description
0	F690501/RF-RTL006496	Initial

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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

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	1.07	3.5	46	0.000 262	1
Middle	2 441	0.54	3.5	46	0.000 232	1
High	2 480	0.27	3.5	46	0.000 218	1

FHSS: $\pi/4$ DQPSK

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	0.51	3.5	46	0.000 230	1
Middle	2 441	-0.20	3.5	46	0.000 196	1
High	2 480	-0.62	3.5	46	0.000 178	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	0.63	3.5	47	0.000 242	1
Middle	2 441	-0.04	3.5	47	0.000 207	1
High	2 480	-0.46	3.5	47	0.000 188	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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