

TEST REPORT

of

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

FCC ID: TQ8-AVB40B0AN

Equipment Under Test : DIGITAL CAR AVN SYSTEM
Model Name : AVB40B0AN
Variant Models : AVB41A7AN, AVB42B0AN
Applicant : Hyundai MOBIS Co., Ltd.
Manufacturer : Hyundai MOBIS Co., Ltd.
Date of Test(s) : 2015.07.20 ~ 2015.07.28
Date of Issue : 2015.07.31

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

Tested By:



Wonjun Sim

Date:

2015.07.31

Approved By:



Logan Lee

Date:

2015.07.31

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.

INDEX

<u>Table of Contents</u>	Page
1. General Information -----	3
2. RF Exposure Evaluation -----	5

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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, 435-837

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, 135-977, Korea

Contact Person : Choi, Seung-Hoon

Phone No. : +82 31 260 0098

1.3. Description of EUT

Kind of Product	DIGITAL CAR AVN SYSTEM
Model Name	AVB40B0AN
Variant Models	AVB41A7AN, AVB42B0AN
Power Supply	DC 14.4 V
Frequency Range	2 402 MHz ~ 2 480 MHz (BT) 2 412 MHz ~ 2 462 MHz (11b/g/n_HT20)
Modulation Technique	GFSK, $\pi/4$ DQPSK, 8DPSK, DSSS, OFDM
Number of Channels	79 channels (BT), 11 channels (11b/g/n_HT20)
Antenna Type	PCB type
Antenna Gain	0.77 dB i (BT) 0.42 dB i (11b/g/n_HT20)

1.4. Test report revision

Revision	Report number	Date of Issue	Description
0	F690501/RF-RTL008983	2015.07.31	Initial

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1.5. Information of variant models

Model name	Information
AVB40B0AN	- Basic model
AVB41A7AN, AVB42B0AN	-Same to basic model, but they are separated models only marketing purpose.

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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

BT

- Maximum tune up tolerance

Operating Frequency Range (MHz)	Maximum Average Output 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	0.77	0.000 597	1

WLAN

- Maximum tune up tolerance

Operating Frequency Range (MHz)	Maximum Average Output Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
2 412 ~ 2 462	18	0.42	0.013 827	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.

Simultaneous transmission MPE test exclusion

BT : the ratio is 0.000 597 / 1

WLAN 802.11 : the ratio is 0.013 827 / 1

Confirm the sum result of individual MPEs ratio is ≤ 1.0 ;

$$(0.000\ 597 / 1) + (0.013\ 827 / 1) = 0.014\ 424 \leq 1.0$$

So this device meets the KDB447498 D01 v05r02 section 7.2 requirement of "Simultaneous transmission MPE test exclusion".