

# TEST REPORT

of

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

FCC ID / IC Certification: TQ8-AN340DHAN / 5074A-AN340DHKN

Equipment Under Test : DIGITAL CAR AVN SYSTEM

Model Name : FCC: AN340DHAN (Alt. : AN341DHAN)  
IC: AN340DHKN

Serial No. : N/A

Applicant : Hyundai MOBIS Co., Ltd.

Manufacturer : Hyundai MOBIS Co., Ltd.

Date of Test(s) : 2013.07.15 ~ 2013.07.19

Date of Issue : 2013.07.22

Tested By:



Date:

2013.07.22

Hyunchae You

Approved By:



Date:

2013.07.22

Feel Jeong

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SGS Korea Co., Ltd. (Gunpo Laboratory) 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea, 435-040

Tel. +82 31 428 5700 / Fax. +82 31 427 2371

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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)
- 400-2, Gomae-Dong, Giheung-Gu, Yongin-Si, Gyeonggi-Do, South Korea. (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

FAX : +82 31 427 2371

### 1.2. Details of Applicant

Applicant : Hyundai MOBIS Co., Ltd.

Address : 80-9, Mabook-Dong, Giheung-Gu, Yongin-Shi, Gyunggi-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 CAN AVN SYSTEM
Model Name	FCC: AN340DHAN (Alt. : AN341DHAN) IC: AN340DHKN
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, π/4DQPSK, 8DPSK
Number of Channels	79
Antenna Type	Chip antenna
Antenna Gain	1.0 dB i

### 1.4. Test report revision

Revision	Report number	Description
0	F690501/RF-RTL006787	Initial

### 1.5. Alternative models

Model name	Information
AN340DHAN	- Basic model - Model for North America, Not interlocked with UVO
AN341DHAN	- Same to basic model but it is different below function - Model for North America, Interlocked with UVO
AN340DHKN	- Same to basic model but it is different below function - Model for Canada

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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 <sup>2</sup> )	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  $\text{mW/cm}^2$

$P_{out}$  = output power to antenna in  $\text{mW}$

$G$  = gain of antenna in linear scale

$\pi = 3.1416$

$R$  = distance between observation point and center of the radiator in  $\text{cm}$

$P_d$  the limit of MPE,  $1 \text{ mW/cm}^2$ . 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 <sup>2</sup> )	Power Density at 20 cm (W/m <sup>2</sup> )	Limits (mW/cm <sup>2</sup> )
Low	2 402	1.85	1.0	46	0.000 18	0.001 76	1
Middle	2 441	1.23	1.0	46	0.000 15	0.001 53	1
High	2 480	1.33	1.0	46	0.000 16	0.001 56	1

**FHSS: π/4DQPSK**

Channel	Channel Frequency (MHz)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Duty Cycle (%)	Power Density at 20 cm (mW/cm <sup>2</sup> )	Power Density at 20 cm (W/m <sup>2</sup> )	Limits (mW/cm <sup>2</sup> )
Low	2 402	1.14	1.0	46	0.000 15	0.001 50	1
Middle	2 441	0.44	1.0	46	0.000 13	0.001 27	1
High	2 480	0.38	1.0	46	0.000 13	0.001 26	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 <sup>2</sup> )	Power Density at 20 cm (W/m <sup>2</sup> )	Limits (mW/cm <sup>2</sup> )
Low	2 402	1.18	1.0	46	0.000 15	0.001 51	1
Middle	2 441	0.51	1.0	46	0.000 13	0.001 30	1
High	2 480	0.41	1.0	46	0.000 13	0.001 27	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/cm<sup>2</sup>.

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