TEST REPORT

of

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

FCC ID: TQ8-ATB31E4AN

Equipment Under Test	: DIGITAL CAR AVN SYSTEM
Model Name	: ATB31E4AN
Applicant	: Hyundai MOBIS Co., Ltd.
Manufacturer	: Hyundai MOBIS Co., Ltd.
Date of Test(s)	: 2016.05.17 ~ 2016.05.18
Date of Issue	: 2016.05.18

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

Tested By: **Jungmin Yang** **Date:** **2016.05.18**

Approved By: **Logan Lee** **Date:** **2016.05.18**

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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.
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1.2. Details of applicant

Applicant : Hyundai MOBIS Co., Ltd.
Address : 203, Teheran-ro, Gangnam-gu, Seoul, 06141, Korea
Contact Person : Kwon, Heung-Chul
Phone No. : +82 31 260 2714

1.3. Description of EUT

Kind of Product	DIGITAL CAR AVN SYSTEM
Model Name	ATB31E4AN
Power Supply	DC 14.4 V
Frequency Range	2 402 ㎒ ~ 2 480 ㎒ (Bluetooth), 2 412 ㎒ ~ 2 462 ㎒ (11b/g/n_HT20)
Modulation Technique	DSSS, OFDM, GFSK, π/4DQPSK, 8DPSK
Number of Channels	79 channel (Bluetooth), 11 channel (11b/g/n_HT20)
Antenna Type	PCB Type (Bluetooth), PCB Type (11b/g/n_HT20)
Antenna Gain	2 402 ㎒ ~ 2 480 ㎒: -3.26 ㏈i, 2 412 ㎒ ~ 2 462 ㎒: -2.37 ㏈i

1.4. Test report revision

Revision	Report number	Date of Issue	Description
0	F690501/RF-RTL009834	2016.05.18	Initial

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 (㎒)	Electric Field Strength(V/m)	Magnetic Field Strength (A/m)	Power Density (㎽/㎠)	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
1 500 – 100 000	-	-	**1.0**	**30**

2.1.1. Friis transmission formula: Pd = (Pout*G)/(4*pi*R^2)

Where Pd = power density in ㎽/㎠

Pout = output power to antenna in ㎽

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in ㎝

Pd the limit of MPE, 1 ㎽/㎠. 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.

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

Frequency (㎒)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
2 402 – 2 480	4	-3.26	0.000 236	1

WLAN (2.4G)
- Maximum tune up tolerance

Frequency (㎒)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
2 412 – 2 462	18	-2.37	0.007 273	1

Note :
1. The power density Pd (5th column) at a distance of 20 ㎝ calculated from the friis transmission formula is far below the limit of 1 ㎽/㎠.

Simultaneous transmission MPE test exclusion

BT: the ratio is 0.000 236 / 1

WLAN: the ratio is 0.007 273 / 1

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

(0.000 236 / 1) + (0.007 273 / 1) = 0.007 509 ≤ 1.0

So this device meets the KDB447498 D01 v06 section 7.2 requirement of “Simultaneous transmission MPE test exclusion”.