

MPE TEST REPORT

of

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

FCC ID: TQ8-AC211DFGG

Equipment Under Test : DIGITAL CAR AUDIO SYSTEM
Model Name : AC211DFGG (Alt.: AC211DFGN, AC211DFGE, AC211DFGL, AC211DFUG)
Applicant : Hyundai MOBIS Co., Ltd.
Manufacturer : Hyundai MOBIS Co., Ltd.
Date of Test(s) : 2014. 08. 25 ~ 2014. 08. 29
Date of Issue : 2014. 09. 01

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

Tested By:




Alvin Kim

Date:

2014.09.01

Approved By:



Hyunchoe You

Date:

2014.09.01

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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>.

Telephone : +82 31 428 5700

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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-Hun

Phone No. : +82 31 260 0098

1.3. Description of EUT

Kind of Product	DIGITAL CAR AUDIO SYSTEM
Model Name	AC211DFGG (Alt. : AC211DFGN, AC211DFGE, AC211DFGL, AC211DFUG)
Power Supply	DC 14.4 V (Vehicle Battery)
Frequency Range	2 402 MHz ~ 2 480 MHz (BT)
Modulation Technique	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channels	79
Antenna Type	Internal type
Antenna Gain	3.5 dBi

1.4. Test report revision

Revision	Report number	Date of Issue	Description
0	F690501/RF-RTL007984	2014.09.01	Initial

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1.5. Alternative models

Model name		Specification
Basic model	AC211DFGG	R+CD+MP3+BT+EXT AMP H/W: General KNOB, B/T spec (9552A1), NAND 1G S/W: General & Middle East region, Frequency 9615A1
Alternative model	AC211DFGN	R+CD+MP3+BT+EXT AMP H/W: General KNOB, B/T spec (9552A1), NAND 1G S/W: General & Middle East region, Frequency 9615A2
	AC211DFGE	R+CD+MP3+BT+EXT AMP H/W: Europe KNOB, B/T spec (9552A1), NAND 1G S/W: General region, Frequency 9615A3
	AC211DFGL	R+CD+MP3+BT+EXT AMP H/W: General KNOB, B/T spec (9552A1), NAND 1G S/W: General(Colombia) region, Frequency 9615A5
	AC211DFUG	R+CD+MP3+BT+EXT AMP H/W: Europe KNOB, B/T spec (9552A1), NAND 1G S/W: Australia region, Frequency 9615A1

* 9552A1 : Not support B/T Voice recognition

* 9552A2 : Support B/T Voice recognition

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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	30
<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 = 3.141 6

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.

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

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	-0.95	3.50	77	0.000 465	1
Middle	2 441	0.55	3.50	77	0.000 657	1
High	2 480	0.50	3.50	77	0.000 649	1

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 ²)	Limits (mW/cm ²)
Low	2 402	-1.27	3.50	77	0.000 432	1
Middle	2 441	-0.10	3.50	77	0.000 565	1
High	2 480	-0.67	3.50	77	0.000 496	1

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	-1.27	3.50	77	0.000 432	1
Middle	2 441	-0.09	3.50	77	0.000 567	1
High	2 480	-0.70	3.50	77	0.000 492	1

Channel	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)
Maximum tune up tolerance	4.00	3.50	77	0.001 119	1

Note :

- 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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