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TEST REPORT

FCC MPE Test for ADC10DWAU&ATC41DWKN

Certification

APPLICANT
HYUNDAI MOBIS CO., LTD.

REPORT NO.
HCT-RF-1907-FI016

DATE OF ISSUE
July 24, 2019

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FCC MPE Test for ADC10DWAU& ATC41DWKN

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Other Model
FCC: ATC41DWAN

Applicant	**HYUNDAI MOBIS CO., LTD.** 203, Teheran-ro, Gangnam-gu, Seoul, 135-977, South Korea
Eut Type FCC Model Name	Car Audio System ADC10DWAU
FCC ID	TQ8-ADC10DWAU
Date of Receipt	May 28, 2019
Frequency range	2402 MHz - 2480 MHz (Bluetooth) 2 412 MHz ~ 2 462 MHz (WLAN) 5180 MHz - 5825 MHz (UNII)

This test results were applied only to the test methods required by the standard.

Tested by
Se Wook Park (signature)

Technical Manager
Kwon Jeong (signature)

HCT CO., LTD.
Soo Chan Lee
SooChan Lee / CEO

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	July 24, 2019	Initial Release

The measurements shown in this report were made in accordance with the procedures specified in § 2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)

According to the Evaluation report, all of the data contained herein is reused from the reference FCC ID : TQ8-ADB10DWAN report.

RF Exposure Statement

1. Limit

According to § 1.1310, § 2.1091 RF exposure is calculated.

(B) Limits for General Population/Uncontrolled Exposures

Frequency range (MHz)	Electric field Strength (V/m)	Magnetic field Strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
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 - 1500	.....	.....	f/1500	30
1500 - 100.000	.....	.....	1.0	30

F = frequency in MHz

* = Plane-wave equivalent power density

2. Maximum Permissible Exposure Prediction

Prediction of MPE limit at a given distance

$$S = PG/4\pi R^2$$

S = Power density

P = Power input to antenna

G = Power gain to the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

3. RESULTS

3-1. Bluetooth

Average output Power at antenna input terminal	4.00	dBm
Average output Power at antenna input terminal	2.51	mW
Prediction distance	20.00	cm
Prediction frequency	2402 – 2480	MHz
Antenna Gain(typical)	-0.18	dBi
Antenna Gain(numeric)	0.959	-
Power density at prediction frequency(S)	0.00048	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	1.000	mW/cm^2

2.1091

EIRP	3.82	(dBm)
ERP	1.67	(dBm)
ERP	0.00	(W)
ERP Limit	1.50	(W)
MARGIN	30.09	(dB)

3-1. DTS

Average output Power at antenna input terminal	12.00	dBm
Average output Power at antenna input terminal	15.85	mW
Prediction distance	20.00	cm
Prediction frequency	2412 – 2462	MHz
Antenna Gain(typical)	-0.01	dBi
Antenna Gain(numeric)	0.998	-
Power density at prediction frequency(S)	0.003	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	1.000	mW/cm^2

2.1091

EIRP	11.99	(dBm)
ERP	9.84	(dBm)
ERP	0.01	(W)
ERP Limit	1.50	(W)
MARGIN	21.92	(dB)

3-1. UNII

Average output Power at antenna input terminal	10.00	dBm
Average output Power at antenna input terminal	10.00	mW
Prediction distance	20.00	cm
Prediction frequency	5180 - 5825	MHz
Antenna Gain(typical)	-0.18	dBi
Antenna Gain(numeric)	0.959	-
Power density at prediction frequency(S)	0.002	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	1.000	mW/cm^2

2.1091

EIRP	9.82	(dBm)
ERP	7.67	(dBm)
ERP	0.01	(W)
ERP Limit	1.50	(W)
MARGIN	24.09	(dB)

3-4. CDMA BC0

Average output Power at antenna input terminal	25.00	dBm
Average output Power at antenna input terminal	316.23	mW
Prediction distance	20.000	cm
Prediction frequency	824-849	MHz
Cable Loss	-1.71	dB
Antenna Gain(typical)	2.800	dBi
Antenna Gain(numeric)	1.905	-
Power density at prediction frequency(S)	0.120	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	0.549	mW/cm^2

2.1091

EIRP	27.8	(dBm)
ERP	25.65	(dBm)
ERP	0.37	(W)
ERP Limit	1.50	(W)
MARGIN	6.11	(dB)

3-5. CDMA BC1

Average output Power at antenna input terminal	25.00	dBm
Average output Power at antenna input terminal	316.23	mW
Prediction distance	20.000	cm
Prediction frequency	1850-1910	MHz
Cable Loss	-3.300	dB
Antenna Gain(typical)	5.230	dBi
Antenna Gain(numeric)	3.334	-
Power density at prediction frequency(S)	0.210	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	1.000	mW/cm^2

2.1091

EIRP	30.23	(dBm)
ERP	28.08	(dBm)
ERP	0.643	(W)
ERP Limit	3.00	(W)
MARGIN	6.69	(dB)

3-6. LTE B4

Average output Power at antenna input terminal	24.00	dBm
Average output Power at antenna input terminal	251.19	mW
Prediction distance	20.000	cm
Prediction frequency	1710-1755	MHz
Cable Loss	-3.300	dB
Antenna Gain(typical)	3.960	dBi
Antenna Gain(numeric)	2.489	-
Power density at prediction frequency(S)	0.124	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	1.000	mW/cm^2

2.1091

EIRP	27.96	(dBm)
ERP	25.81	(dBm)
ERP	0.38	(W)
ERP Limit	3.00	(W)
MARGIN	8.96	(dB)

3-7. LTE B13

Average output Power at antenna input terminal	24.00	dBm
Average output Power at antenna input terminal	251.19	mW
Prediction distance	20.000	cm
Prediction frequency	777-787	MHz
Cable Loss	-1.710	dB
Antenna Gain(typical)	1.380	dBi
Antenna Gain(numeric)	1.374	-
Power density at prediction frequency(S)	0.069	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	0.518	mW/cm^2

2.1091

EIRP	25.38	(dBm)
ERP	23.23	(dBm)
ERP	0.21	(W)
ERP Limit	1.50	(W)
MARGIN	8.53	(dB)

3-8. LTE B5

Average output Power at antenna input terminal	24.00	dBm
Average output Power at antenna input terminal	251.19	mW
Prediction distance	20.000	cm
Prediction frequency	824-849	MHz
Cable Loss	-1.71	dB
Antenna Gain(typical)	2.800	dBi
Antenna Gain(numeric)	1.905	-
Power density at prediction frequency(S)	0.095	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	0.549	mW/cm^2

2.1091

EIRP	26.80	(dBm)
ERP	24.65	(dBm)
ERP	0.29	(W)
ERP Limit	1.50	(W)
MARGIN	7.11	(dB)

3-9. LTE B2

Average output Power at antenna input terminal	24.00	dBm
Average output Power at antenna input terminal	251.19	mW
Prediction distance	20.000	cm
Prediction frequency	1850-1910	MHz
Cable Loss	-3.300	dB
Antenna Gain(typical)	5.23	dBi
Antenna Gain(numeric)	3.334	-
Power density at prediction frequency(S)	0.167	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	1.000	mW/cm^2

2.1091

EIRP	29.23	(dBm)
ERP	27.08	(dBm)
ERP	0.51	(W)
ERP Limit	3.00	(W)
MARGIN	7.69	(dB)

Worst Case: Simultaneous MPE 20cm is

5G WLAN (0.00191) +BT (0.00048) + CDMA BC0 (0.11988/0.549) + LTE B5 (0.09522/0.549) = 0.39369 < 1