



RF EXPOSURE Test Report

Report No.: MTi241107025-01E3
Date of issue: 2025-01-02
Applicant: HJ Automotive Electronics Co., Ltd.
Product: DA BT CP AA Wireless
Model(s): HDA301
FCC ID: 2BOHJ-HDA301

Shenzhen Microtest Co., Ltd.
<http://www.mtitest.com>



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Test Result Certification	
Applicant:	HJ Automotive Electronics Co., Ltd.
Address:	#1209, 53, Gasan Digital 2-ro, Guemcheon-gu, Seoul, Korea (ZIP : 08588)
Manufacturer:	HJ Automotive Electronics Co., Ltd.
Address:	#1209, 53, Gasan Digital 2-ro, Guemcheon-gu, Seoul, Korea (ZIP : 08588)
Product description	
Product name:	DA BT CP AA Wireless
Trademark:	N/A
Model name:	HDA301
Serial Model:	N/A
Standards:	Part 2.1091.
Test procedure:	KDB 447498 D01 v06
Date of Test	
Date of test:	2024-12-25 to 2025-01-02
Test result:	Pass

Test Engineer :

Letter. Lan.

(Letter Lan)

Reviewed By :

David. Lee

(David Lee)

Approved By :

Leon Chen

(Leon Chen)



RF EXPOSURE EVALUATION

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)	Averaging time (minutes)
(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

f = frequency in MHz * = Plane-wave equivalent power density

MPE Calculation Method

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 = Numeric gain of the antenna relative to isotropic antenna

π = 3.1415926

R = distance between observation point and center of the radiator in cm(20cm)

P_d the limit of MPE, 1mW/cm². If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

Measurement Result

BT:

Operation Frequency: 2402-2480MHz,

Power density limited: 1mW/ cm²

R=20cm

$mW=10^{(dBm/10)}$

antenna gain Numeric= $10^{(dBi/10)}=10^{(2.01/10)}=1.59$

BR+EDR:

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits (mW/cm ²)
		(dBm)		tune-up power		Gain		(mW/cm ²)	
				(dBm)	(mW)	(dBi)	Numeric		
2402	GFSK	3.92	3±1	4	2.512	2.01	1.59	0.0008	1
2441		5.23	5±1	6	3.981	2.01	1.59	0.0013	1
2480		4.65	4±1	5	3.162	2.01	1.59	0.0010	1
2402	π/4-DQPSK	3.99	3±1	4	2.512	2.01	1.59	0.0008	1
2441		5.37	5±1	6	3.981	2.01	1.59	0.0013	1
2480		4.70	4±1	5	3.162	2.01	1.59	0.0010	1
2402	8DPSK	4.43	4±1	5	3.162	2.01	1.59	0.0010	1
2441		5.69	5±1	6	3.981	2.01	1.59	0.0013	1
2480		5.00	5±1	6	3.981	2.01	1.59	0.0013	1

802.11a/n(HT20)/ac(HT20):

U-NII Band 1: 5180MHz to 5240MHz;

U-NII Band 3: 5745MHz to 5825MHz;

802.11n(HT40)/ac(HT40):

U-NII Band 1: 5190MHz to 5230MHz;

U-NII Band 3: 5755MHz to 5795MHz;

802.11ac(HT80):

U-NII Band 1: 5210MHz;

U-NII Band 3: 5775MHz

U-NII Band 3: antenna gain Numeric= $10^{(dBi/10)} = 10^{(4.12/10)} = 2.58$

U-NII Band 1: antenna gain Numeric= $10^{(dBi/10)} = 10^{(4.47/10)} = 2.80$

5G WIFI

Channel Freq. (MHz)	modulation	conducted power	Tune-up power	Max		Antenna	Evaluation result at 20cm	Power density Limits
		(dBm)	(dBm)	tune-up power		Gain	Power density(mW/cm ²)	(mW/cm ²)
				(dBm)	(mW)	Numeric		
5180	11a	11.19	11±1	12	15.849	2.58	0.00814	1
5200	11a	11.55	11±1	12	15.849	2.58	0.00814	1
5240	11a	11.66	11±1	12	15.849	2.58	0.00814	1
5745	11a	10.16	10±1	11	12.589	2.80	0.00701	1
5785	11a	9.85	9±1	10	10.000	2.80	0.00557	1
5825	11a	10.82	10±1	11	12.589	2.80	0.00701	1
5180	11n (HT20)	11.22	11±1	12	15.849	2.58	0.00814	1
5200	11n (HT20)	13.97	13±1	14	25.119	2.58	0.01290	1
5240	11n (HT20)	12.12	12±1	13	19.953	2.58	0.01025	1
5745	11n (HT20)	9.66	9±1	10	10.000	2.80	0.00557	1
5785	11n (HT20)	10.28	10±1	11	12.589	2.80	0.00701	1
5825	11n (HT20)	11.15	11±1	12	15.849	2.80	0.00883	1
5190	11n (HT40)	12.52	12±1	13	19.953	2.58	0.01025	1
5230	11n (HT40)	13.36	13±1	14	25.119	2.58	0.01290	1
5755	11n (HT40)	11.11	11±1	12	15.849	2.80	0.00883	1
5795	11n (HT40)	11.16	11±1	12	15.849	2.80	0.00883	1
5180	11ac (HT20)	11.72	11±1	12	15.849	2.58	0.00814	1
5200	11ac (HT20)	11.46	11±1	12	15.849	2.58	0.00814	1
5240	11ac (HT20)	12.15	12±1	13	19.953	2.58	0.01025	1
5745	11ac (HT20)	9.75	9±1	10	10.000	2.80	0.00557	1



5785	11ac (HT20)	10.34	10±1	11	12.589	2.80	0.00701	1
5825	11ac (HT20)	11.14	11±1	12	15.849	2.80	0.00883	1
5190	11ac (HT40)	12.07	12±1	13	19.953	2.58	0.01025	1
5230	11ac (HT40)	12.30	12±1	13	19.953	2.58	0.00814	1
5755	11ac (HT40)	11.18	11±1	12	15.849	2.80	0.00883	1
5795	11ac (HT40)	11.22	11±1	12	15.849	2.80	0.00883	1
5210	11ac (HT80)	12.72	12±1	13	19.953	2.58	0.01025	1
5775	11ac (HT80)	11.63	11±1	12	15.849	2.80	0.00883	1

Conclusion:

SIMULTANEOUS TRANSMISSIONS

When a number of sources at different frequencies, and/or broadband sources, contribute to the total exposure, it becomes necessary to weigh each contribution relative to the MPE. To comply with the MPE, the fraction of the MPE in terms of E2, H2 (or power density) incurred within each frequency interval should be determined and the sum of all such fractions should not exceed unity. In order to ensure compliance with the MPE for a controlled environment, the sum of the ratios of the power density to the corresponding MPE should not exceed unity. That is

$$\sum_{i=1}^n \frac{S_i}{MPE_i} \leq 1$$

Simultaneous transmit:

Operating Band	The MPE ratio
BR&EDR	0.0013
5G WIFI	0.01290

So the simultaneous transmitting antenna pairs as below:

$$BR\&EDR + 5G\ WIFI = 0.0013 + 0.01290 = 0.0142$$

For the max result: $0.0142 \leq 1.0$, No SAR is required.

----END OF REPORT----