



RF Exposure Evaluation Report

Report Reference No. : MTEB24020077-H

FCC ID : 2ATYP-HD220E

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Representative Laboratory Name : Shenzhen Most Technology Service Co., Ltd.

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Applicant's name : Shiji (US) Inc.

Address : 730 Peachtree Street NE, Suite 375, Atlanta, Georgia, United States, 30319

Test specification/ Standard : 47 CFR Part 1.1307; 47 CFR Part 1.1310
 KDB447498D01 General RF Exposure Guidance v06

TRF Originator : Shenzhen Most Technology Service Co., Ltd.

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Test item description : POS COMPUTER

Trade Mark : Shiji

Model/Type reference : HD220E

Listed Models : HD220

Modulation Type : GFSK; b: DSSS, CCK, g/n: BPSK, QPSK, QAM; OFDM

Operation Frequency : From 2402MHz to 2480MHz; 2412MHz~2462MHz
 5180MHz-5240MHz ; 5745MHz-5825MHz

Hardware Version : SV1a- 345

Software Version : S589A00

Adapter : Input: 100-240V~, 50/60Hz, 2.0A

Rating : Output: 12.0V=5A

Pos computer: 12.0V=5 A

Result : **PASS**

TEST REPORT

Equipment under Test : POS COMPUTER

Model /Type : HD220E

Listed Models : HD220

Remark : All models are identical to each other, except model name.

Applicant : **Shiji (US) Inc.**

Address : 730 Peachtree Street NE, Suite 375, Atlanta, Georgia, United States, 30319

Manufacturer(1) : **Shiji (US) Inc.**

Address : 730 Peachtree Street NE, Suite 375, Atlanta, Georgia, United States, 30319

Test Result:	PASS
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The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

1. Revision History

Revision	Issue Date	Revisions	Revised By
00	2024.03.07	Initial Issue	Alisa Luo

2. SAR Evaluation

2.1 RF Exposure Compliance Requirement

2.1.1 Standard Requirement

According to KDB447498D01 General RF Exposure Guidance v06

4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

2.1.2 Limits

According to FCC Part1.1310: 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 part1.1307(b)

TABLE 1—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 Exposures				
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
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	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
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$ Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d is 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 r where the MPE limit is reached.

2.1.3 EUT RF Exposure

BLE

GFSK			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2402MHz)	4.006	4.006 ± 1	5.006
Middle(2440MHz)	4.585	4.585 ± 1	5.585
Highest(2480MHz)	3.989	3.989 ± 1	4.989

BLE

Worst case: GFSK						
Channel	Maximum tune-up Power (dBm)	Maximum tune-up Power (MW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
Middle(2440MHz)	5.585	3.62	3	0.0014	1.0	Pass

Note: 1) Refer to report MTEB24020077-R1 for EUT test Max Conducted average Output Power value.

Note: 2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = (3.62 * 2) / (4 * 3.1416 * 20^2) = 0.0014$

WIFI 2.4G Antenna A:

802.11b			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2412MHz)	21.06	21.06 ± 1	22.06
Middle(2437MHz)	20.61	20.61 ± 1	21.61
Highest(2462MHz)	21.68	21.68 ± 1	22.68

802.11g			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2412MHz)	20.86	20.86 ± 1	21.86
Middle(2437MHz)	21.49	21.49 ± 1	22.49
Highest(2462MHz)	20.16	20.16 ± 1	21.16

802.11n(H20)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2412MHz)	20.67	20.67 ± 1	21.67
Middle(2437MHz)	21.23	21.23 ± 1	22.23
Highest(2462MHz)	19.61	19.61 ± 1	20.61

802.11n(H40)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2422MHz)	20.31	20.31 ± 1	21.31
Middle(2437MHz)	20.88	20.88 ± 1	21.88
Highest(2452MHz)	19.15	19.15 ± 1	20.15

WIFI 2.4G

Worst case: 802.11b						
Channel	Maximum tune-up Power (dBm)	Maximum tune-up Power (MW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
Highest(2462MHz)	22.68	185.35	3	0.074	1.0	Pass

Note: 1) Refer to report MTEB24020077-R3 for EUT test Max Conducted average Output Power value.

Note: 2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = (185.35 * 2) / (4 * 3.1416 * 20^2) = 0.074$

WIFI 2.4G Antenna B:

802.11b			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2412MHz)	20.93	20.93 ± 1	21.93
Middle(2437MHz)	20.87	20.87 ± 1	21.87
Highest(2462MHz)	21.69	21.69 ± 1	22.69

802.11g			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2412MHz)	20.99	20.99 ± 1	21.99
Middle(2437MHz)	21.52	21.52 ± 1	22.52
Highest(2462MHz)	20.31	20.31 ± 1	21.31

802.11n(H20)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2412MHz)	20.80	20.80 ± 1	21.8
Middle(2437MHz)	20.80	20.80 ± 1	21.8
Highest(2462MHz)	19.48	19.48 ± 1	20.48

802.11n(H40)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2422MHz)	20.35	20.35 ± 1	21.35
Middle(2437MHz)	21.39	21.39 ± 1	22.39
Highest(2452MHz)	19.55	19.55 ± 1	20.55

WIFI 2.4G

Worst case: 802.11b						
Channel	Maximum tune-up Power (dBm)	Maximum tune-up Power (MW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
Highest(2462MHz)	22.69	185.78	3	0.074	1.0	Pass

Note: 1) Refer to report MTEB24020077-R3 for EUT test Max Conducted average Output Power value.

Note: 2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = (185.78 * 2) / (4 * 3.1416 * 20^2) = 0.074$

WIFI 2.4G Antenna A+B:

802.11n(H20)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2412MHz)	23.75	23.75 ± 1	24.75
Middle(2437MHz)	24.03	24.03 ± 1	25.03
Highest(2462MHz)	22.56	22.56 ± 1	23.56

802.11n(H40)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2422MHz)	23.34	23.34 ± 1	24.34
Middle(2437MHz)	24.15	24.15 ± 1	25.15
Highest(2452MHz)	22.36	22.36 ± 1	23.36

WIFI 2.4G

Worst case: 802.11n(H40)						
Channel	Maximum tune-up Power (dBm)	Maximum tune-up Power (MW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
Middle(2437MHz)	25.15	327.34	3	0.13	1.0	Pass

Note: 1) Refer to report MTEB24020077-R3 for EUT test Max Conducted average Output Power value.

Note: 2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = (327.34 * 2) / (4 * 3.1416 * 20^2) = 0.13$

WIFI 5.1G Antenna Gain A

IEEE for 802.11a			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5180	13.217	13.217±1	14.217
5200	14.588	14.588±1	15.588
5240	15.489	15.489±1	16.489

IEEE for 802.11n(HT20)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5180	13.237	13.237±1	14.237
5200	14.316	14.316±1	15.316
5240	15.128	15.128±1	16.128

IEEE for 802.11n(HT40)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5190	11.125	11.125±1	12.125
5230	14.853	14.853±1	15.853

IEEE for 802.11ac(HT20)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5180	12.344	12.344±1	13.344
5200	12.945	12.945±1	13.945
5240	13.767	13.767± 1	14.767

IEEE for 802.11 ac(HT40)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5190	9.885	9.885±1	10.885
5230	11.535	11.535±1	12.535

IEEE for 802.11ac(HT80)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5210	9.256	9.256±1	10.256

Worst case: IEEE for 802.11a						
Channel	Maximum Peak Conducted	Maximum Peak Conducted Output Power	Antenna Gain	Power Density at R = 20 cm	Limit	Result
	(dB)	(MW)	(dBi)	(mW/cm ²)		
Highest (5240MHz)	16.489	44.56	3	0.018	1.0	Pass

Note: 1) Refer to report MTEB24020077-R2 for EUT test Max Conducted average Output Power value.

Note: 2) $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2) = (44.56 \cdot 2) / (4 \cdot 3.1416 \cdot 20^2) = 0.018$

WIFI 5.1G Antenna Gain B

IEEE for 802.11a			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5180	12.964	12.964±1	13.964
5200	14.798	14.798±1	15.798
5240	15.538	15.538± 1	16.538

IEEE for 802.11n(HT20)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5180	12.794	12.794±1	13.794
5200	13.721	13.721±1	14.721
5240	14.947	14.947 ± 1	15.947

IEEE for 802.11n(HT40)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5190	10.431	10.431±1	11.431
5230	14.181	14.181 ± 1	15.181

IEEE for 802.11ac(HT20)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5180	11.657	11.657±1	12.657
5200	12.695	12.695±1	13.695
5240	12.991	12.991± 1	13.991

IEEE for 802.11 ac(HT40)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5190	9.798	9.798±1	10.798
5230	10.823	10.823±1	11.823

IEEE for 802.11ac(HT80)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5210	8.944	8.944±1	9.944

Worst case: IEEE for 802.11a						
Channel	Maximum Peak Conducted	Maximum Peak Conducted Output Power	Antenna Gain	Power Density at R = 20 cm	Limit	Result
	(dB)	(MW)	(dBi)	(mW/cm ²)		
Highest (5240MHz)	16.538	45.06	3	0.018	1.0	Pass

Note: 1) Refer to report MTEB24020077-R2 for EUT test Max Conducted average Output Power value.

Note: 2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = (45.06 * 2) / (4 * 3.1416 * 20^2) = 0.018$

WIFI 5.1G Antenna Gain A+B

IEEE for 802.11n(HT20)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5180	16.52	16.52±1	17.52
5200	17.53	17.53±1	18.53
5240	18.53	18.53±1	19.53

IEEE for 802.11n(HT40)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5190	14.60	14.60±1	15.6
5230	18.34	18.34±1	19.34

IEEE for 802.11ac(HT20)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5180	15.55	15.55±1	16.55
5200	16.36	16.36±1	17.36
5240	16.94	16.94± 1	17.94

IEEE for 802.11 ac(HT40)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5190	13.77	13.77±1	14.77
5230	15.13	15.13±1	16.13

IEEE for 802.11ac(HT80)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5210	13.41	13.41±1	14.41

Worst case: IEEE for 802.11n(HT20)						
Channel	Maximum Peak Conducted	Maximum Peak Conducted Output Power	Antenna Gain	Power Density at R = 20 cm	Limit	Result
	(dBm)	(MW)	(dBi)	(mW/cm ²)		
Highest (5240MHz)	19.53	89.74	3	0.036	1.0	Pass

Note: 1) Refer to report MTEB24020077-R2 for EUT test Max Conducted average Output Power value.
 Note: 2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = (89.74 * 2) / (4 * 3.1416 * 20^2) = 0.036$

WIFI 5.8G Antenna Gain A

IEEE for 802.11a			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5745.0	15.320	15.320±1	16.32
5785.0	14.677	14.677±1	15.677
5825.0	14.770	14.770±1	15.77

IEEE for 802.11n(HT20)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5745.0	13.744	13.744±1	14.744
5785.0	13.065	13.065±1	14.065
5825.0	13.306	13.306 ± 1	14.306

IEEE for 802.11n(HT40)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5755.0	10.068	10.068±1	11.068
5795.0	10.167	10.167 ± 1	11.167

IEEE for 802.11ac(HT20)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5745.0	13.694	13.694±1	14.694
5785.0	13.096	13.096±1	14.096
5825.0	13.243	13.243±1	14.243

IEEE for 802.11 ac(HT40)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5755.0	13.454	13.454±1	14.454
5795.0	13.066	13.066±1	14.066

IEEE for 802.11ac(HT80)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5775.0	12.090	12.090±1	13.09

Worst case: IEEE for 802.11a						
Channel	Maximum Peak Conducted	Maximum Peak Conducted Output Power	Antenna Gain	Power Density at R = 20 cm	Limit	Result
	(dBm)	(MW)	(dBi)	(mW/cm ²)		
Lowest (5745MHz)	16.32	42.85	3	0.017	1.0	Pass

Note: 1) Refer to report MTEB24020077-R for EUT test Max Conducted average Output Power value.

Note: 2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = (42.85 * 2) / (4 * 3.1416 * 20^2) = 0.017$

WIFI 5.8G Antenna Gain B

IEEE for 802.11a			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5745.0	15.119	15.119±1	16.119
5785.0	15.024	15.024±1	16.024
5825.0	14.609	14.609±1	15.609

IEEE for 802.11n(HT20)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5745.0	13.577	13.577±1	14.577
5785.0	13.010	13.010±1	14.01
5825.0	13.116	13.116±1	14.116

IEEE for 802.11n(HT40)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5755.0	13.349	13.349±1	14.349
5795.0	12.944	12.944±1	13.944

IEEE for 802.11ac(HT20)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5745.0	13.611	13.611±1	14.611
5785.0	13.060	13.060±1	14.06
5825.0	13.261	13.261±1	14.261

IEEE for 802.11 ac(HT40)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5755.0	13.256	13.256±1	14.256
5795.0	12.945	12.945±1	13.945

IEEE for 802.11ac(HT80)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5775.0	11.400	11.400±1	12.4

Worst case: IEEE for 802.11a						
Channel	Maximum Peak Conducted	Maximum Peak Conducted Output Power	Antenna Gain	Power Density at R = 20 cm	Limit	Result
	(dBm)	(MW)	(dBi)	(mW/cm ²)		
Lowest (5745MHz)	16.119	40.92	3	0.016	1.0	Pass

Note: 1) Refer to report MTEB24020077-R for EUT test Max Conducted average Output Power value.

Note: 2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = (40.92 * 2) / (4 * 3.1416 * 20^2) = 0.016$

WIFI 5.8G Antenna Gain A+B

IEEE for 802.11n(HT20)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5745.0	17.15	17.15±1	18.15
5785.0	16.53	16.53±1	17.53
5825.0	16.70	16.70±1	17.7

IEEE for 802.11n(HT40)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5755.0	15.88	15.88±1	16.88
5795.0	15.65	15.65±1	16.65

IEEE for 802.11ac(HT20)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5745.0	17.11	17.11±1	18.11
5785.0	16.54	16.54±1	17.54
5825.0	16.71	16.71±1	17.71

IEEE for 802.11 ac(HT40)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5755.0	17.14	17.14±1	18.14
5795.0	16.79	16.79±1	17.79

IEEE for 802.11ac(HT80)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
5775.0	16.22	16.22±1	17.22

Worst case: IEEE for 802.11ac(HT20)						
Channel	Maximum Peak Conducted	Maximum Peak Conducted Output Power	Antenna Gain	Power Density at R = 20 cm	Limit	Result
	(dBm)	(MW)	(dBi)	(mW/cm ²)		
Lowest (5745MHz)	18.15	65.31	3	0.026	1.0	Pass

Note: 1) Refer to report MTEB24020077-R for EUT test Max Conducted average Output Power value.
 Note: 2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = (65.31 * 2) / (4 * 3.1416 * 20^2) = 0.026$

.....THE END OF REPORT.....