

RF Exposure Evaluation Report

Report Reference No......: **MTWC21110906-H**

FCC ID.....: **2A33W-D22**

IC.....: **N/A**

Compiled by

(position+printed name+signature)..: File administrators Alisa Luo

Supervised by

(position+printed name+signature)..: Test Engineer Sunny Deng

Approved by

(position+printed name+signature)..: Manager Yvette Zhou

Date of issue.....: December.28,2021

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

Address.....: No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park,
Nanshan, Shenzhen, Guangdong, China.

Applicant's name.....: **Shenzhen Fude Innovation Technology Co., Ltd**

Address: 702,Bldg.11,NanshanYungu Pioneer Park II, Taoyuan St.
NanshanDistrict,Shenzhen,China.

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.

Shenzhen Most Technology Service Co., Ltd. All rights reserved.

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen Most Technology Service Co., Ltd. is acknowledged as copyright owner and source of the material. Shenzhen Most Technology Service Co., Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Test item description: DASH CAM

Trade Mark: 

Manufacturer: **Shenzhen Samoon Technology Co., Ltd**

Model/Type reference.....: D22

Listed Models: D21,CHE93LOD-F

Modulation Type.....: CCK/DSSS/ OFDM

Operation Frequency.....: From 2412 - 2462MHz for wifi 2.4G

From 5180-5240MHz for wifi 5.2G

Hardware Version.....: A2

Software Version: R1.7

Rating: DC5.5V(by Battery)

DC 5V (by Car charger)

Result.....: **PASS**

TEST REPORT

Equipment under Test : DASH CAM

Model /Type : D22

Listed Models : D21,CHE93LOD-F

Remark : Only the model name is different.

Applicant : **Shenzhen Fude Innovation Technology Co., Ltd.**

Address : 702,Bldg.11,NanshanYungu Pioneer Park II, Taoyuan St.
NanshanDistrict,Shenzhen,China.

Manufacturer : **Shenzhen Fude Innovation Technology Co., Ltd.**

Address : 702,Bldg.11,NanshanYungu Pioneer Park II,No.2 No.1 Pingshan
Rd.Pingshan community,Taoyuan St.,Nanshan District, Shenzhen,
China.

Test Result:	PASS
---------------------	-------------

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	2021.12.28	Initial Issue	Alisa Luo

2. SAR Evaluation

2.1 RF Exposure Compliance Requirement

2.1.1 Standard Requirement

According to §1.1307(e)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

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

KDB447498 D01: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

2.1.2 Limits

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

Antenna Gain: 1dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.4 in linear scale. Output Power Into Antenna & RF Exposure Evaluation Distance:

IEEE for 802.11b mode			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2412MHz)	13.459	13.459 ± 1	14.459
Middle(2437MHz)	13.435	13.435 ± 1	14.435
Highest(2462MHz)	13.429	13.429 ± 1	14.429

IEEE for 802.11g mode			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2412MHz)	8.899	8.899 ± 1	9.899
Middle(2437MHz)	10.265	10.265 ± 1	11.265
Highest(2462MHz)	9.220	9.220 ± 1	10.220

IEEE for 802.11n(HT20) mode			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2412MHz)	8.824	8.824 ± 1	9.824
Middle(2437MHz)	9.572	9.572 ± 1	10.572
Highest(2462MHz)	8.998	8.998 ± 1	9.998

IEEE for 802.11n(HT40) mode			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2412MHz)	3.883	3.883 ± 1	4.883
Middle(2437MHz)	6.869	6.869 ± 1	7.869
Highest(2462MHz)	4.162	4.162 ± 1	5.162

IEEE for 802.11a			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
36	13.54	13.54 ± 1	14.54
40	13.22	13.22 ± 1	14.22
48	13.38	13.38 ± 1	14.38

IEEE for 802.11n(HT20)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
36	11.26	11.26 ± 1	12.26
40	11.25	11.25 ± 1	12.25
48	11.54	11.54 ± 1	12.54

IEEE for 802.11n(HT40)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
38	10.95	10.95 ± 1	11.95
46	10.86	10.86 ± 1	11.86

IEEE for 802.11ac(HT20)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
36	10.46	10.46 ± 1	11.46
40	10.26	10.26 ± 1	11.26
48	9.87	9.87 ± 1	10.87

IEEE for 802.11ac(HT40)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
38	9.56	9.56 ± 1	10.56
46	9.66	9.66 ± 1	10.66

IEEE for 802.11ac(HT80)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
42	9.54	9.54 ± 1	10.54

Worst case: IEEE for 802.11b mode						
Channel	Maximum Peak Conducted Output Power	Maximum Peak Conducted Output Power	Antenna Gain	Power Density at R = 20 cm	Limit	Result
	(dBm)	(MW)	(dBi)	(mW/cm ²)		
Lowest (2412MHz)	14.459	27.92	1	0.0070	1.0	Pass

Note: 1) Refer to report MTWC21100788 for EUT test Max Conducted average Output Power value.

Note: 2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = (27.92 * 1.26) / (4 * 3.1416 * 20^2) = 0.0084$

Worst case: IEEE for 802.11a						
Channel	Maximum Peak Conducted Output Power	Maximum Peak Conducted Output Power	Antenna Gain	Power Density at R = 20 cm	Limit	Result
	(dBm)	(MW)	(dBi)	(mW/cm ²)		
Lowest (5180MHz)	14.54	28.44	1	0.0071	1.0	Pass

Note: 1) Refer to report MTWC21100788 for EUT test Max Conducted average Output Power value.

Note: 2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = (28.44 * 1.26) / (4 * 3.1416 * 20^2) = 0.0084$

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