

Maximum Permissible Exposure Report

Product Information

EUT	:Motorcycle DVR Dash Camera
Model Number	:HM201
Model Declaration	:N/A
Test Model	:HM201
Power Supply	:DC 12V,2A
Hardware version	:HFK_M2_M17_MAIN_V0.3
Software version	:HFK_M2_9963_1080P60_8821cs_20240306_V1.0.1_FW96670A

2. Evaluation Method

Systems operating under the provisions of FCC 47 CFR 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. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as mobile device whereby a distance of 0.2m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.

In accordance with KDB447498D01 for Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modelled or measured field strengths or power density, is ≤ 1.0 . The MPE ratio of each antenna is determined at the minimum test separation distance required by the operating configurations and exposure conditions of the host device, according to the ratio of field strengths or power density to MPE limit, at the test frequency. Either the maximum peak or spatially averaged results from measurements or numerical simulations may be used to determine the MPE ratios. Spatial averaging does not apply when MPE is estimated using simple calculations based on far-field plane-wave equivalent conditions. The antenna installation and operating requirements for the host device must meet the minimum test separation distances required by all antennas, in both standalone and simultaneous transmission operations, to satisfy compliance.

3. Limit

3.1 Refer evaluation method

ANSI C95.1-1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

FCC KDB publication 447498 D01 General 1 RF Exposure Guidance v06: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

FCC CFR 47 part1 1.1310: Radiofrequency radiation exposure limits.

FCC CFR 47 part2 2.1091: Radiofrequency radiation exposure evaluation: mobile devices

3.2 Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
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 – 1500	/	/	f/300	6
1500 – 100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 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

4. MPE Calculation Method

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

Where: S=power density

P=power input to antenna

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

R=distance to the center of radiation of the antenna

5. Antenna Information

Antenna Gain and type refer to Antenna specification

6. Conducted Power

WiFi 2.4GHz Band

TestMode	Antenna	Channel	Result[dBm]
11B	Ant1	2412	16.04
11B	Ant1	2437	13.04
11B	Ant1	2462	13.78
11G	Ant1	2412	16.28
11G	Ant1	2437	15.59
11G	Ant1	2462	15.63
11N20MIMO	Ant1	2412	18.63
11N20MIMO	Ant1	2437	18.33
11N20MIMO	Ant1	2462	18.54
11N40MIMO	Ant1	2422	16.51
11N40MIMO	Ant1	2437	15.94
11N40MIMO	Ant1	2452	18.55

5G Band
UNII-1 Band

TestMode	Antenna	Channel	Result[dBm]
11A	Ant1	5180	13.49
11A	Ant1	5200	8.64
11A	Ant1	5240	14.18
11N20MIMO	Ant1	5180	13.19
11N20MIMO	Ant1	5200	12.89
11N20MIMO	Ant1	5240	11.97
11N40MIMO	Ant1	5190	10.97
11N40MIMO	Ant1	5230	11.32
11AC20MIMO	Ant1	5180	13.42
11AC20MIMO	Ant1	5200	14.06
11AC20MIMO	Ant1	5240	10.17
11AC40MIMO	Ant1	5190	11.07
11AC40MIMO	Ant1	5230	11.77
11AC80MIMO	Ant1	5210	11.69

UNII-3 Band

TestMode	Antenna	Channel	Result[dBm]
11A	Ant1	5745	16.07
	Ant1	5785	14.8
	Ant1	5825	13.77
11N20MIMO	Ant1	5745	9.25
	Ant1	5785	10.5
	Ant1	5825	9.24
11N40MIMO	Ant1	5755	11.34
	Ant1	5795	10.61
11AC20MIMO	Ant1	5745	9.87
	Ant1	5785	9.36
	Ant1	5825	13.09
11AC40MIMO	Ant1	5755	15.74
	Ant1	5795	12.37
11AC80MIMO	Ant1	5775	15.27

7. Manufacturing Tolerance

WiFi 2.4GHz Band – Antenna 1

IEEE 802.11b(Average)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	15.5	12.5	13.5
Tolerance \pm (dB)	1.0	1.0	1.0
IEEE 802.11g (Average)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	16.0	15.0	15.0
Tolerance \pm (dB)	1.0	1.0	1.0
IEEE 802.11n HT20 (Average)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	18.0	18.0	18.0
Tolerance \pm (dB)	1.0	1.0	1.0
IEEE 802.11n hT40 (Average)			
Channel	Channel 3	Channel 6	Channel 9
Target (dBm)	16.0	15.5	18.0
Tolerance \pm (dB)	1.0	1.0	1.0

UNII-1 Band – Antenna 1

IEEE 802.11a (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	13.0	8.0	13.5
Tolerance \pm (dB)	1.0	1.0	1.0
IEEE 802.11n HT20 (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	12.5	12.5	11.5
Tolerance \pm (dB)	1.0	1.0	1.0
IEEE 802.11ac VHT20 (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	13.0	13.5	9.5
Tolerance \pm (dB)	1.0	1.0	1.0
IEEE 802.11n HT40 (Average)			
Channel	Channel 38	Channel 46	--
Target (dBm)	10.5	11.0	--
Tolerance \pm (dB)	1.0	1.0	--
IEEE 802.11ac VHT40 (Average)			
Channel	Channel 38	Channel 46	--
Target (dBm)	10.5	11.5	--
Tolerance \pm (dB)	1.0	1.0	--
IEEE 802.11ac VHT80 (Average)			
Channel	Channel 42	--	--
Target (dBm)	11.0	--	--
Tolerance \pm (dB)	1.0	--	--

UNII-3 Band – Antenna 1

IEEE 802.11a (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	15.5	14.5	13.5
Tolerance \pm (dB)	1.0	1.0	1.0
IEEE 802.11n HT20 (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	9.0	10.0	8.5
Tolerance \pm (dB)	1.0	1.0	1.0
IEEE 802.11ac VHT20 (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	9.5	9.0	12.5
Tolerance \pm (dB)	1.0	1.0	1.0
IEEE 802.11n HT40 (Average)			
Channel	Channel 151	Channel 159	--
Target (dBm)	11.0	10.0	--
Tolerance \pm (dB)	1.0	1.0	--
IEEE 802.11ac VHT40 (Average)			
Channel	Channel 151	Channel 159	--
Target (dBm)	15.0	12.0	--
Tolerance \pm (dB)	1.0	1.0	--
IEEE 802.11ac VHT80 (Average)			
Channel	Channel 155	--	--
Target (dBm)	15.0	--	--
Tolerance \pm (dB)	1.0	--	--
Tolerance \pm (dB)	1.0		

8. Measurement Results

8.1 Standalone MPE

As declared by the Applicant, the EUT is a wireless device used in a fix application, at least 20 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum separation distance, $r = 20\text{cm}$, as well as the gain of the used antenna refer to antenna information, the RF power density can be obtained.

WiFi 2.4GHz Band – Ant 1

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW				
IEEE 802.11b	16.5	44.6684	0.28	1.0666	0.0095	1.0000
IEEE 802.11g	17.0	50.1187	0.28	1.0666	0.0106	1.0000
IEEE 802.11n HT20	19.0	79.4328	0.28	1.0666	0.0169	1.0000
IEEE 802.11n HT40	19.0	79.4328	0.28	1.0666	0.0169	1.0000

UNII-1 Band – Ant 1

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW				
IEEE 802.11a	14.5	28.1838	1.82	1.5205	0.0085	1.0000
IEEE 802.11n HT20	13.5	22.3872	1.82	1.5205	0.0068	1.0000
IEEE 802.11ac VHT20	14.5	28.1838	1.82	1.5205	0.0085	1.0000
IEEE 802.11n HT40	12.0	15.8489	1.82	1.5205	0.0048	1.0000
IEEE 802.11ac VHT40	12.5	17.7828	1.82	1.5205	0.0054	1.0000
IEEE 802.11ac VHT80	12.0	15.8489	1.82	1.5205	0.0048	1.0000

UNII-3 Band – Ant 1

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW				
IEEE 802.11a	16.5	44.6684	0.49	1.1194	0.0100	1.0000
IEEE 802.11n HT20	11.0	12.5893	0.49	1.1194	0.0028	1.0000
IEEE 802.11ac VHT20	13.5	22.3872	0.49	1.1194	0.0050	1.0000
IEEE 802.11n HT40	12.0	15.8489	0.49	1.1194	0.0035	1.0000
IEEE 802.11ac VHT40	16.0	39.8107	0.49	1.1194	0.0089	1.0000
IEEE 802.11ac VHT80	16.0	39.8107	0.49	1.1194	0.0089	1.0000

Remark:

1. Output power including tune-up tolerance;
2. MPE evaluate distance is 20cm from user manual provide by manufacturer;

9. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

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