

RF EXPOSURE Test Report

Report No. : MTi241217015-08E5

Date of Issue : 2025-02-18

Applicant : Hamilton Rotax, LLC

Product : Car Multimedia Player

Model(s) : 16GX-HMC-L1, 07LC-HMC-L1, 09LC-HMC-L1,
12LC-HMC-L1, 16LC-HMC-L1, 16LX-HMC-L1,
16GSH-HMC-L1, 16RX-HMC-L1, 16RXH-HMC-L1,
16RCH-HMC-L1, 19ISH-HMC-L1, 09GX-HMC-L1,
13LX-HMC-L1, 20ES-HMC-L1, 184R-HMC-L1,
16TCM-HMC-L1, 16CMR-HMC-L1, 16TD-HMC-L1,
16HLD-HMC-L1, 16SQ-HMC-L1, 16SN-HMC-L1,
14PRD-HMC-L1, 18PRD-HMC-L1, 16AVA-HMC-
L1, 16GR86-HMC-L1, 15CR-HMC-L1, 15CRH-
HMC-L1

FCC ID : 2BNAW-CP-MODULE

Shenzhen Microtest Co., Ltd.

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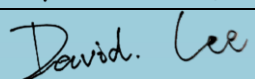
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Test Result Certification		
Applicant	Hamilton Rotax, LLC	
Applicant Address	3434 Edwards Mill Rd Suite 112-132 Raleigh, NC 27612, United States	
Manufacturer	Shenzhen Binary Technology Co., Ltd.	
Manufacturer Address	Third Floor No.C, Second Floor B209 and B211, HANG TIAN KE GONG YUAN, NO.8 Min Huan road, Fu Kang community, Longhua district, shenzhen city, Guangdong Province, China	
Product description		
Product name	Car Multimedia Player	
Trademark	Hamilton Motor Company	
Model name	16GX-HMC-L1	
Series Model(s)	07LC-HMC-L1, 09LC-HMC-L1, 12LC-HMC-L1, 16LC-HMC-L1, 16LX-HMC-L1, 16GSH-HMC-L1, 16RX-HMC-L1, 16RXH-HMC-L1, 16RCH-HMC-L1, 19ISH-HMC-L1, 09GX-HMC-L1, 13LX-HMC-L1, 20ES-HMC-L1, 184R-HMC-L1, 16TCM-HMC-L1, 16CMR-HMC-L1, 16TD-HMC-L1, 16HLD-HMC-L1, 16SQ-HMC-L1, 16SN-HMC-L1, 14PRD-HMC-L1, 18PRD-HMC-L1, 16AVA-HMC-L1, 16GR86-HMC-L1, 15CR-HMC-L1, 15CRH-HMC-L1	
Standards	47 CFR Part 2.1091	
Test method	KDB 447498 D01 v06	
Testing Information		
Date of test	2025-01-17 to 2025-02-11	
Test Result	Pass	
Prepared by	Maleah Deng	
Reviewed by	David Lee	
Approved by	Leon Chen	

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1 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.

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2 Measurement Result

BT:

Operation Frequency: 2402-2480MHz,
Power density limited: 1mW/ cm²

2.4GWiFi:

Operation Frequency: WIFI 802.11b/g/n HT20: 2412-2462MHz, n HT40: 2422-2452
Power density limited: 1mW/ cm²

5GWiFi:

802.11a: 20 MHz
802.11n: 20 MHz, 40 MHz
802.11ac: 20 MHz, 40 MHz, 80MHz
Antenna Type: External antenna

Antenna gain:

Bluetooth&2.4G&: 1.21dBi

5G: U-NII 1: 2.43dBi; U-NII 3: 2.43dBi

R=20cm

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

BT: antenna gain Numeric= $10^{(dBi/10)}=10^{(1.21/10)}=1.32$

2.4G: antenna gain Numeric= $10^{(dBi/10)}=10^{(1.21/10)}=1.32$

5G WIFI U-NII 1: antenna gain Numeric= $10^{(dBi/10)}=10^{(2.43/10)}=1.75$

5G WIFI U-NII 3: antenna gain Numeric= $10^{(dBi/10)}=10^{(2.43/10)}=1.75$

BR&EDR:

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain			
				(dBm)	(dBm)	(mW)	(dBi)	Numeric	(mW/cm ²)
2402	GFSK	9.56	9±1	10	10.000	1.21	1.32	0.0026	1
2441		10.42	10±1	11	12.589	1.21	1.32	0.0033	1
2480		10.39	10±1	11	12.589	1.21	1.32	0.0033	1
2402	π/4-DQPSK	9.54	9±1	10	10.000	1.21	1.32	0.0026	1
2441		10.41	10±1	11	12.589	1.21	1.32	0.0033	1
2480		10.45	10±1	11	12.589	1.21	1.32	0.0033	1
2402	8DPSK	9.92	9±1	10	10.000	1.21	1.32	0.0026	1
2441		10.80	10±1	11	12.589	1.21	1.32	0.0033	1
2480		10.78	10±1	11	12.589	1.21	1.32	0.0033	1

BLE:

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric	(mW/cm ²)	(mW/cm ²)
2402	GFSK	7.84	7±1	8	6.310	1.21	1.32	0.0017	1
2440		9.81	9±1	10	10.000	1.21	1.32	0.0026	1
2480		9.96	10±1	11	12.589	1.21	1.32	0.0033	1

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2.4GWiFi:

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		
2412	802.11b	17.48	17±1	18	63.096	1.32	0.01659	1
2437		17.34	17±1	18	63.096	1.32	0.01659	1
2462		16.83	16±1	17	50.119	1.32	0.01317	1
2412	802.11g	15.91	16±1	17	50.119	1.32	0.01317	1
2437		15.80	15±1	16	39.811	1.32	0.01046	1
2462		15.00	15±1	16	39.811	1.32	0.01046	1
2412	802.11n H20	15.73	15±1	16	39.811	1.32	0.01046	1
2437		15.68	15±1	16	39.811	1.32	0.01046	1
2462		14.96	15±1	16	39.811	1.32	0.01046	1
2422	802.11n H40	15.78	15±1	16	39.811	1.32	0.01046	1
2437		15.81	15±1	16	39.811	1.32	0.01046	1
2452		15.44	15±1	16	39.811	1.32	0.01046	1

5G WIFI: UNII-1

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	14.71	14±1	15	31.623	1.75	0.01101	1
5200	11a	14.34	14±1	15	31.623	1.75	0.01101	1
5240	11a	11.91	12±1	13	19.953	1.75	0.00695	1
5180	11n (VHT20)	14.41	14±1	15	31.623	1.75	0.01101	1
5200	11n (VHT20)	14.35	14±1	15	31.623	1.75	0.01101	1
5240	11n (VHT20)	13.88	13±1	14	25.119	1.75	0.00874	1
5190	11n (VHT40)	11.55	12±1	13	19.953	1.75	0.00695	1
5230	11n (VHT40)	10.69	11±1	12	15.849	1.75	0.00552	1
5180	11ac (VHT20)	14.49	14±1	15	31.623	1.75	0.01101	1
5200	11ac (VHT20)	14.25	14±1	15	31.623	1.75	0.01101	1
5240	11ac (VHT20)	13.85	13±1	14	25.119	1.75	0.00874	1
5190	11ac (VHT40)	11.05	11±1	12	15.849	1.75	0.00552	1
5230	11ac (VHT40)	10.17	10±1	11	12.589	1.75	0.00438	1
5210	11ac (VHT80)	10.81	10±1	11	12.589	1.75	0.00438	1

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5G WIFI: UNII-3

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		
5745	11a	7.18	7±1	8	6.310	1.75	0.00220	1
5785	11a	4.34	4±1	5	3.162	1.75	0.00110	1
5825	11a	4.97	5±1	6	3.981	1.75	0.00139	1
5745	11n (VHT20)	3.96	4±1	5	3.162	1.75	0.00110	1
5785	11n (VHT20)	3.06	3±1	4	2.512	1.75	0.00087	1
5825	11n (VHT20)	3.85	3±1	4	2.512	1.75	0.00087	1
5755	11n (VHT40)	3.30	3±1	4	2.512	1.75	0.00087	1
5795	11n (VHT40)	3.59	3±1	4	2.512	1.75	0.00087	1
5745	11ac (VHT20)	3.01	3±1	4	2.512	1.75	0.00087	1
5785	11ac (VHT20)	2.96	3±1	4	2.512	1.75	0.00087	1
5825	11ac (VHT20)	3.84	3±1	4	2.512	1.75	0.00087	1
5755	11ac (VHT40)	3.22	3±1	4	2.512	1.75	0.00087	1
5795	11ac (VHT40)	3.52	3±1	4	2.512	1.75	0.00087	1
5775	11ac (VHT80)	3.97	4±1	5	3.162	1.75	0.00110	1

Conclusion:

Note: Bluetooth, 2.4GWIFI and 5GWIFI cannot work at the same time

For the max result: $0.01659 \leq 1.0$ test exclusion threshold, No SAR is required.

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***** END OF REPORT *****