FCC RF Exposure Evaluation

1. Product Information

FCC ID:	2AVTH-HT14CCIC
Product name	14.1" Windows Laptop
Test Model	HT14CCIC81ES
Additional Model No	HT14CCIC81EG
Model Declaration	PCB board, structure and internal of these model(s) are the same, So no additional models were tested
Power supply	Input: 12V⎓2500mA For AC Adapter: Input: 100-240V~, 50/60Hz, 0.8A Output: 12V⎓2500mA DC 7.4V by Rechargeable Li-ion Battery, 5000mAh
Modulation Type	GFSK, π/4-DQPSK, 8-DPSK for Bluetooth V4.2 (DSS) GFSK for Bluetooth V4.2 (DTS) IEEE 802.11b: DSSS (CCK,DQPSK,DBPSK); IEEE 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11a/n/ac: OFDM (64QAM, 16QAM, QPSK, BPSK)
Antenna Type	PIFA Antenna
Antenna Gain	Bluetooth: 1.61dBi(Max.) WIFI: 1.69dBi(Max.) for 2.4G WIFI 0.74dBi(Max.) for 5.2G WIFI 0.72dBi(Max.) for 5.2G WIFI
Hardware version	G116X-1 REV02 2020.10.29
Software version	OS build:19041.685 /BIOS Version/Date: American Megatrends inc. E.G116X_3.D8.E1.036 01/22/2021 19:35:41
Operation frequency	Bluetooth: 2402MHz-2480MHz 2.4G WIFI: 2412MHz-2462MHz 5.2G WIFI: 5180MHz-5240MHz 5.8G WIFI: 5745MHz-5825MHz
Exposure category	General population/uncontrolled environment
EUT Type	Production Unit
Device Type	Portable Device

2. Evaluation method and Limit

According to KDB447498 D01 General RF Exposure Guidance v06 Section 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 Test Exclusion Threshold condition, listed below, is satisfied. These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.22 The minimum test separation distance is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander (see 5) of section 4.1). To qualify for SAR test exclusion, the test separation distances applied must be fully explained and justified by the operating configurations and exposure conditions of the transmitter and applicable host platform requirements, typically in the SAR measurement or SAR analysis report, according to the required published RF exposure KDB procedures. When no other RF exposure testing or reporting is required, a statement of justification and compliance must be included in the equipment approval, in lieu of the SAR report, to qualify for the SAR test exclusion. When required, the device specific conditions described in the other published RF exposure KDB procedures must be satisfied before applying these SAR test exclusion provisions; for example, handheld PTT two-way radios, handsets, laptops & tablets etc.23 "
[(max. power of channel, including tune-up tolerance, mW)/ (min. test separation distance, mm)] · [√f (GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where:

- f (GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below
  The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to f) in section 4.1 is applied to determine SAR test exclusion.

3. 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 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 2.1093: Radiofrequency radiation exposure evaluation: portable devices

4. Conducted Power Results

[BT Max Peak Conducted Power]

Mode	Channel	Frequency (MHz)	Peak Conducted Output Power (dBm)
GFSK	0	2402	2.582
	39	2441	2.163
	78	2480	1.000
π/4DQPSK	0	2402	3.318
	39	2441	2.851
	78	2480	1.721
8-DPSK	0	2402	3.653
	39	2441	3.207
	78	2480	2.158

[BLE Max Peak Conducted Power]

Mode	Channel	Frequency (MHz)	Peak Conducted Output Power (dBm)
BLE	0	2402	0.385
	19	2441	1.901
	40	2480	0.39

[2.4GWLAN Max Peak Conducted Power]

Mode	Channel	Frequency(MHz)	Max Conducted Power (dBm)
IEEE 802.11b	1	2412	9.12
	6	2437	9.63
	11	2462	9.07
IEEE 802.11g	1	2412	9.23
	6	2437	9.42
	11	2462	9.03
IEEE 802.11n HT20	1	2412	9.17
	6	2437	9.54
	11	2462	9.04
IEEE 802.11n HT40	3	2422	9.37
	6	2437	9.51
	9	2452	9.43

[5.2GWLAN Max Average Conducted Power]

Mode	Channel	Frequency(MHz)	Max Conducted Power (dBm)
IEEE 802.11A	36	5180	7.76
	40	5200	7.72
	48	5240	7.57
IEEE 802.11N20	36	5180	7.81
	40	5200	7.63
	48	5240	7.44
IEEE 802.11N40	38	5190	7.20
	46	5230	7.24
IEEE 802.11N20	36	5180	7.92
	40	5200	7.73
	48	5240	7.46
IEEE 802.11AC40	38	5190	7.95
	46	5230	7.97
IEEE 802.11AC80	42	5210	7.85

[5.8GWLAN Max Average Conducted Power]

Mode	Channel	Frequency(MHz)	Max Conducted Power (dBm)
IEEE 802.11A	149	5745	7.20
	157	5785	6.89
	165	5825	6.94
IEEE 802.11N20	149	5745	7.32
	157	5785	6.74
	165	5825	6.78
IEEE 802.11N40	151	5755	7.12
	159	5795	6.68
IEEE 802.11N20	149	5745	7.15
	157	5785	7.04
	165	5825	7.07
IEEE 802.11AC40	151	5755	7.12
	159	5795	7.16
IEEE 802.11AC80	155	5775	6.97

5. Manufacturing tolerance

BT

GFSK			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	2	2	1
Tolerance ±(dB)	1	1	1
π/4DQPSK			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	3	2	2
Tolerance ±(dB)	1	1	1
8DPSK			
Channel	Channel 0	Channel 19	Channel 39
Target (dBm)	3	3	2
Tolerance ±(dB)	1	1	1

BLE

GFSK			
Channel	Channel 0	Channel 19	Channel 40
Target (dBm)	1	1	1
Tolerance ±(dB)	1	1	1

[2.4GWLAN Max Peak Conducted Power]

Mode	Channel	Frequency(MHz)	Target (dBm)	Tolerance ±(dB)
IEEE 802.11b	1	2412	8.7	1.0
	6	2437	8.7	1.0
	11	2462	8.7	1.0
IEEE 802.11g	1	2412	8.7	1.0
	6	2437	8.7	1.0
	11	2462	8.7	1.0
IEEE 802.11n HT20	1	2412	8.7	1.0
	6	2437	8.7	1.0
	11	2462	8.7	1.0
IEEE 802.11n HT40	3	2422	8.7	1.0
	6	2437	8.7	1.0
	9	2452	8.7	1.0

[5.2GWLAN Max Conducted Power]

Mode	Channel	Frequency(MHz)	Target (dBm)	Tolerance ±(dB)
IEEE 802.11A	36	5180	7	1.0
	40	5200	7	1.0
	48	5240	7	1.0
IEEE 802.11N20	36	5180	7	1.0
	40	5200	7	1.0
	48	5240	7	1.0
IEEE 802.11N40	38	5190	7	1.0
	46	5230	7	1.0
IEEE 802.11N20	36	5180	7	1.0
	40	5200	7	1.0
	48	5240	7	1.0
IEEE 802.11AC40	38	5190	7	1.0
	46	5230	7	1.0
IEEE 802.11AC80	42	5210	7	1.0

[5.8GWLAN Max Conducted Power]

Mode	Channel	Frequency(MHz)	Target (dBm)	Tolerance ±(dB)
IEEE 802.11A	149	5745	6.5	1.0
	157	5785	6.5	1.0
	165	5825	6.5	1.0
IEEE 802.11N20	149	5745	6.5	1.0
	157	5785	6.5	1.0
	165	5825	6.5	1.0
IEEE 802.11N40	151	5755	6.5	1.0
	159	5795	6.5	1.0
IEEE 802.11N20	149	5745	6.5	1.0
	157	5785	6.5	1.0
	165	5825	6.5	1.0
IEEE 802.11AC40	151	5755	6.5	1.0
	159	5795	6.5	1.0
IEEE 802.11AC80	155	5775	6.5	1.0

6. Evaluation Results

Band/Mode	f (GHz)	Antenna Distance (mm)	RF output power		SAR Test Exclusion Threshold	SAR Test Exclusion
			dBm	mW		
BT	2.450	5.0	4.0	2.51	0.786 < 3.0	Yes
BLE	2.450	5.0	2.0	1.58	0.495 < 3.0	Yes
2.4G WIFI	2.450	5.0	9.7	9.33	2.921 < 3.0	Yes
5.2G WIFI	5.250	5.0	8.0	6.31	2.892 < 3.0	Yes
5.8G WIFI	5.850	5.0	7.5	5.62	2.719 < 3.0	Yes

Remark:

1. Output power including tune up tolerance;

2. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to f) in section 4.1 is applied to determine SAR test exclusion.

3. The sample supports one modular, WLAN and BT share same antenna.

7. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1093 for the uncontrolled RF Exposure and SAR Exclusion Threshold per KDB 447498 v06.

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