FCC RF Exposure Evaluation

1. Product Information

FCC ID	: 2AVTH-LB131N
EUT	: 13.3 notebook
Test Model	: HTLB131NA58Z1EG
Power Supply	: DC 7.6V by Rechargeable Li-ion Battery, 4800mAh For Adapter Input: AC 100-240V, 50/60Hz, 1.0A Max Adapter Output: DC 19.0V, 2.1A
Hardware Version	: /
Software Version	: WINDOWS 10 Home
Bluetooth	
Frequency Range	: 2402MHz-2480MHz
Bluetooth Channel Number	: 79 Channels for Bluetooth V5.0(BDR/EDR) 40 channels for Bluetooth V5.0(BT LE/ BT 2LE)
Bluetooth Channel Spacing	: 1MHz for Bluetooth V5.0(BDR/EDR) 2MHz for Bluetooth V5.0(BT LE/ BT 2LE)
Bluetooth Modulation Type	: GFSK, π/4-DQPSK, 8-DPSK for Bluetooth V5.0(BDR/EDR) GFSK for Bluetooth V5.0(BT LE/ BT 2LE)
Bluetooth Version	: V5.0
Antenna Description	: FIFA Antenna, 1.38dBi(Max.)
2.4G WLAN	
Frequency Range	: 2412MHz-2462MHz
Channel Number	: 11 Channels for 20MHz bandwidth (2412~2462MHz) 7 Channels for 40MHz bandwidth (2422~2452MHz)
Channel Spacing	: 5MHz
Modulation Type	: IEEE 802.11b: DSSS(CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM,QPSK,BPSK)
Antenna Description	: FIFA Antenna, 1.38dBi(Max.)
5.2G WLAN	
Frequency Range	: 5180MHz-5240MHz
Channel Number	: 4 channels for 20MHz bandwidth(5180MHz-5240MHz) 2 channels for 40MHz bandwidth(5190MHz~5230MHz) 1 channels for 80MHz bandwidth(5210MHz)
Modulation Type	: IEEE 802.11a/n/ac: OFDM(64QAM, 16QAM, QPSK, BPSK)
Antenna Description	: FIFA Antenna, 1.21dBi(Max.)

5.8G WLAN	
Frequency Range	: 5745MHz-5825MHz
Channel Number	: 5 channels for 20MHz bandwidth(5745MHz-5825MHz) 2 channels for 40MHz bandwidth(5755MHz~5795MHz) 1 channels for 80MHz bandwidth(5775MHz)
Modulation Type	: IEEE 802.11a/n/ac: OFDM(64QAM, 16QAM, QPSK, BPSK)
Antenna Description	: FIFA Antenna, 1.21dBi(Max.)
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 Conducted Power]

Mode	Channel	Frequency (MHz)	Peak Conducted Output Power (dBm)
GFSK	0	2402	5.406
	39	2441	5.913
	78	2480	6.144
π/4DQPSK	0	2402	8.164
	39	2441	8.440
	78	2480	8.824
8-DPSK	0	2402	8.167
	39	2441	8.455
	78	2480	8.863

[BLE Max Conducted Power]

Mode	Channel	Frequency (MHz)	Peak Conducted Output Power (dBm)
BT LE	0	2402	5.581
	19	2440	6.133
	39	2480	6.448
BT 2LE	0	2402	5.614
	19	2440	6.136
	39	2480	6.479

[2.4GWLAN Max Peak Conducted Power]

Mode	Channel	Frequency(MHz)	Max Conducted Power (dBm)
IEEE 802.11b	1	2412	13.98
	6	2437	14.14
	11	2462	13.91
IEEE 802.11g	1	2412	13.75
	6	2437	13.84
	11	2462	13.58
IEEE 802.11n HT20	1	2412	13.71
	6	2437	13.83
	11	2462	13.64
IEEE 802.11n HT40	3	2422	13.94
	6	2437	13.85
	9	2452	13.92

[5.2GWLAN Max Peak Conducted Power]

Mode	Channel	Frequency(MHz)	Max Conducted Power (dBm)
IEEE 802.11A	36	5180	13.15
	40	5200	13.16
	48	5240	13.16
IEEE 802.11N20	36	5180	13.1
	40	5200	13.11
	48	5240	13.17
IEEE 802.11N40	38	5190	13.64
	46	5230	13.84
IEEE 802.11N20	36	5180	13.29
	40	5200	13.43
	48	5240	13.46
IEEE 802.11AC40	38	5190	13.74
	46	5230	13.83
IEEE 802.11AC80	42	5210	13.75

[5.8GWLAN Max Peak Conducted Power]

Mode	Channel	Frequency(MHz)	Max Conducted Power (dBm)
IEEE 802.11A	149	5745	13.20
	157	5785	13.27
	165	5825	13.15
IEEE 802.11N20	149	5745	13.18
	157	5785	13.15
	165	5825	13.07
IEEE 802.11N40	151	5755	13.75
	159	5795	13.77
IEEE 802.11N20	149	5745	13.29
	157	5785	13.43
	165	5825	13.46
IEEE 802.11AC40	151	5755	13.74
	159	5795	13.83
IEEE 802.11AC80	155	5775	13.66

5. Manufacturing tolerance

BT

GFSK			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	6	6	6
Tolerance ±(dB)	1	1	1
π/4DQPSK			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	8	8	8
Tolerance ±(dB)	1	1	1
8DPSK			
Channel	Channel 0	Channel 19	Channel 39
Target (dBm)	8	8	8
Tolerance ±(dB)	1	1	1

BT LE (Peak)			
Channel	Channel 0	Channel 19	Channel 39
Target (dBm)	6	6	6
Tolerance ±(dB)	1.0	1.0	1.0
BT 2LE (Peak)			
Channel	Channel 0	Channel 19	Channel 39
Target (dBm)	6	6	6
Tolerance ±(dB)	1.0	1.0	1.0

[2.4GWLAN Max Peak Conducted Power]

Mode	Channel	Frequency(MHz)	Target (dBm)	Tolerance ±(dB)
IEEE 802.11b	1	2412	14	1.0
	6	2437	14	1.0
	11	2462	14	1.0
IEEE 802.11g	1	2412	14	1.0
	6	2437	14	1.0
	11	2462	14	1.0
IEEE 802.11n HT20	1	2412	14	1.0
	6	2437	14	1.0
	11	2462	14	1.0
IEEE 802.11n HT40	3	2422	14	1.0
	6	2437	14	1.0
	9	2452	14	1.0

[5.2GWLAN Max Conducted Power]

Mode	Channel	Frequency(MHz)	Target (dBm)	Tolerance ±(dB)
IEEE 802.11A	36	5180	13	1.0
	40	5200	13	1.0
	48	5240	13	1.0
IEEE 802.11N20	36	5180	13	1.0
	40	5200	13	1.0
	48	5240	13	1.0
IEEE 802.11N40	38	5190	13	1.0
	46	5230	13	1.0
IEEE 802.11N20	36	5180	13	1.0
	40	5200	13	1.0
	48	5240	13	1.0
IEEE 802.11AC40	38	5190	13	1.0
	46	5230	13	1.0
IEEE 802.11AC80	42	5210	13	1.0

[5.8GWLAN Max Conducted Power]

Mode	Channel	Frequency(MHz)	Target (dBm)	Tolerance ±(dB)
IEEE 802.11A	149	5745	13	1.0
	157	5785	13	1.0
	165	5825	13	1.0
IEEE 802.11N20	149	5745	13	1.0
	157	5785	13	1.0
	165	5825	13	1.0
IEEE 802.11N40	151	5755	13	1.0
	159	5795	13	1.0
IEEE 802.11N20	149	5745	13	1.0
	157	5785	13	1.0
	165	5825	13	1.0
IEEE 802.11AC40	151	5755	13	1.0
	159	5795	13	1.0
IEEE 802.11AC80	155	5775	13	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	25	9	7.9433	0.4973 < 3.0	Yes
BLE	2.450	25	7	5.0119	0.3138 < 3.0	Yes
2.4G WIFI_SISO	2.450	25	15	31.6228	1.9799 < 3.0	Yes
5.2G WIFI_SISO	5.250	25	14	25.1189	2.3022< 3.0	Yes
5.8G WIFI_SISO	5.850	25	14	25.1189	2.4302< 3.0	Yes

Remark:

1. Output power including tune up tolerance;

2. When the SAR Test Exclusion Threshold in KDB Publication 447498 D01 applies, a minimum test separation distance of 25 mm is required to determine test exclusion for the display, and 5 mm for the keyboard compartment.

3. WLAN and BT share same modular and same antenna, no need consider simultaneous transmit.

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.....