Maximum Permissible Exposure Report

1. Product Information

FCC ID:	2AVEM-H6
Product name	Diagnosis System
Model number	H6 Elite, NITRO LT
Model Declaration	PCB board, structure and internal of these model(s) are the same, So no additional models were tested
Test Model	H6 Elite
Power supply	DC 7.4V By lithium ion polymer battery(10000mAh) Recharged by DC 12V/3A adapter
Operation frequency	79 Channels for Bluetooth V4.2 (DSS) IEEE 802.11b: DSSS(CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM,QPSK, BPSK) 4 Channels for 802.11a, 802.11n(HT20), 802.11ac(VHT20) 2 Channels for 802.11n(HT40), 802.11ac(VHT40) 1 Channels for 802.11ac(VHT80) 5 channels for 20MHz bandwidth(5745-5825MHz) 2 channels for 40MHz bandwidth(5755~5795MHz) 1 channels for 80MHz bandwidth(5775MHz)
Antenna Type	Internal Antenna
Antenna Gain	2dBi
Hardware version	V1.03
Software version	/
Channel Number	79 Channels for Bluetooth V4.2 (DSS) 11 Channels for 20MHz bandwidth(2412~2462MHz) 7 Channels for 40MHz bandwidth(2422~2452MHz) 4 Channels for 802.11a, 802.11n(HT20), 802.11ac(VHT20) 2 Channels for 802.11n(HT40), 802.11ac(VHT40) 1 Channels for 802.11ac(VHT80) 5 channels for 20MHz bandwidth(5745-5825MHz) 2 channels for 40MHz bandwidth(5755~5795MHz) 1 channels for 80MHz bandwidth(5775MHz)
Channel Spacing	5MHz
Exposure category	General population/uncontrolled environment
EUT Type	Production Unit
Device Type	Portable Device

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

ES-D4 can only use antennas certificated as follows provided by manufacturer;

Internal Identification	Antenna type and antenna number	Operate frequency band	Maximum antenna gain	Notes
Antenna 0	Internal Antenna	2000 MHz – 2500 MHz	2 dBi	WiFi Antenna

6. Conducted Power

[BT Max Conducted Power]

Mode	Channel	Frequency (MHz)	Peak Conducted Output Power (dBm)
GFSK	0	2402	4.749
	39	2441	4.784
	78	2480	1.070
π/4DQPSK	0	2402	1.227
	39	2441	1.153
	78	2480	0.683
8DPSK	0	2402	1.607
	19	2440	1.445
	78	2480	1.023

[2.4GWIFI Max Conducted Power]

Mode	Channel	Frequency(MHz)	Max Conducted Power (dBm)
11B	1	2412	8.59
	6	2437	8.44
	11	2462	8.64
11G	1	2412	8.66
	6	2437	8.14
	11	2462	8.49
11N20SISO	3	2412	8.70
	6	2437	8.29
	9	2462	8.63

[5.2GWIFI Max Conducted Power]

Mode	Channel	Frequency(MHz)	Max Conducted Power (dBm)
11A	36	5180	7.95
	40	5200	7.38
	48	5240	7.25
11N20 SISO	36	5180	7.68
	40	5200	7.25
	48	5240	6.03
11N40 SISO	38	5190	7.22
	46	5230	5.96
11AC20 SISO	36	5180	7.69
	40	5200	7.29
	48	5240	7.00
11AC40 SISO	38	5190	7.55
	46	5230	7.25
11AC80 SISO	42	5210	7.12

[5.8WIFI Max Conducted Power]

Mode	Channel	Frequency(MHz)	Max Conducted Power (dBm)
11A	149	5745	6.67
	157	5785	6.69
	165	5825	6.06
11N20 SISO	149	5745	6.71
	157	5785	6.36
	165	5825	6.64
11N40 SISO	151	5755	6.53
	159	5795	6.75
11AC20 SISO	149	5745	6.88
	157	5785	6.65
	165	5825	6.26
11AC40 SISO	151	5755	6.81
	159	5795	6.36
11AC80 SISO	155	5775	6.73

7. Measurement Results

BT

GFSK (Peak)			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	4.0	4.0	1.0
Tolerance ±(dB)	1.0	1.0	1.0
π/4DQPSK (Peak)			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	1.0	1.0	0.5
Tolerance ±(dB)	1.0	1.0	1.0
8DPSK (Peak)			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	1.0	1.0	1.0
Tolerance ±(dB)	1.0	1.0	1.0

2.4GWIFI

11B (Peak)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	8.0	8.0	8.0
Tolerance ±(dB)	1.0	1.0	1.0
11G (Peak)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	8.0	8.0	8.0
Tolerance ±(dB)	1.0	1.0	1.0
11N20SISO (Peak)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	8.0	8.0	8.0
Tolerance ±(dB)	1.0	1.0	1.0
11N40SISO (Peak)			
Channel	Channel 3	Channel 6	Channel 9
Target (dBm)	8.0	8.0	8.0
Tolerance ±(dB)	1.0	1.0	1.0

5.2GWIFI

11A (Peak)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	8.0	8.0	8.0
Tolerance ±(dB)	1.0	1.0	1.0
11N20 SISO (Peak)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	7.0	7.0	6.0
Tolerance ±(dB)	1.0	1.0	1.0
11N40 SISO (Peak)			
Channel	Channel 38		Channel 46
Target (dBm)	7.0		5.0
Tolerance ±(dB)	1.0		1.0
11AC20 SISO (Peak)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	8.0	8.0	8.0
Tolerance ±(dB)	1.0	1.0	1.0
11AC40 SISO (Peak)			
Channel	Channe38		Channel 46
Target (dBm)	7.0		7.0
Tolerance ±(dB)	1.0		1.0
11AC80 SISO (Peak)			
Channel	Channel 42		
Target (dBm)	7.0		
Tolerance ±(dB)	1.0		

5.8GWIFI

11A (Peak)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	7.0	7.0	7.0
Tolerance ±(dB)	1.0	1.0	1.0
11N20 SISO (Peak)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	7.0	7.0	7.0
Tolerance ±(dB)	1.0	1.0	1.0
11N40 SISO (Peak)			
Channel	Channel 151		Channel 159
Target (dBm)	7.0		7.0
Tolerance ±(dB)	1.0		1.0
11AC20 SISO (Peak)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	7.0	7.0	7.0
Tolerance ±(dB)	1.0	1.0	1.0
11AC40 SISO (Peak)			
Channel	Channe151		Channel 159
Target (dBm)	7.0		7.0
Tolerance ±(dB)	1.0		1.0
11AC80 SISO (Peak)			
Channel	Channel 155		
Target (dBm)	7.0		
Tolerance ±(dB)	1.0		

8. Evaluation Results

BT

Band/Mode	f (GHz)	Antenna Distance (mm)	RF output power		SAR Test Exclusion Threshold	SAR Test Exclusion
			dBm	mW		
GFSK	2.441	5	5	3.1623	0.99 < 3.0	Yes
π/4DQPSK	2.402	5	2	1.5849	0.48< 3.0	Yes
8DPSK	2.402	5	2	1.5849	0.49< 3.0	Yes

2.4GWIFI

Band/Mode	f (GHz)	Antenna Distance (mm)	RF output power		SAR Test Exclusion Threshold	SAR Test Exclusion
			dBm	mW		
IEEE 802.11b	2.462	5	9	7.9433	2.49< 3.0	Yes
IEEE 802.11g	2.462	5	9	7.9433	2.49< 3.0	Yes
IEEE 802.11n HT20	2.462	5	9	7.9433	2.49< 3.0	Yes

5.2GWIFI

Band/Mode	f (GHz)	Antenna Distance (mm)	RF output power		SAR Test Exclusion Threshold	SAR Test Exclusion
			dBm	mW		
11A	5.240	5	8	6.3096	2.89< 3.0	Yes
11N20 SISO	5.240	5	8	6.3096	2.89< 3.0	Yes
11N40 SISO	5.230	5	8	6.3096	2.89< 3.0	Yes
11AC20 SISO	5.240	5	8	6.3096	2.89< 3.0	Yes
11AC40 SISO	5.230	5	8	6.3096	2.89< 3.0	Yes
11AC80 SISO	5.210	5	8	6.3096	2.88< 3.0	Yes

5.8GWIFI

Band/Mode	f (GHz)	Antenna Distance (mm)	RF output power		SAR Test Exclusion Threshold	SAR Test Exclusion
			dBm	mW		
11A	5.825	5	7	5.0119	2.42< 3.0	Yes
11N20 SISO	5.825	5	7	5.0119	2.42< 3.0	Yes
11N40 SISO	5.795	5	7	5.0119	2.41< 3.0	Yes
11AC20 SISO	5.825	5	7	5.0119	2.42< 3.0	Yes
11AC40 SISO	5.795	5	7	5.0119	2.41< 3.0	Yes
11AC80 SISO	5.775	5	7	5.0119	2.41< 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 of KDB447498 is applied to determine SAR test exclusion.

9. 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----------