

**1 Cover Page**

# RF MPE REPORT

**Application No.:** SHEM2102001465CR  
**FCC ID:** 2AY4E-DVM  
**IC :** 27001-DVM  
**Applicant:** Hunan Vathin Medical Instrument Co., Ltd.  
**Address of Applicant:** 1/F,Building 12,Innovation and Entrepreneurship ServiceCenter, No 9 Chuanqi west road, Jiuhua Economic Development Zone, Xiangtan, Hunan, China  
**Manufacturer:** Hunan Vathin Medical Instrument Co., Ltd.  
**Address of Manufacturer:** 1/F,Building 12,Innovation and Entrepreneurship ServiceCenter, No 9 Chuanqi west road, Jiuhua Economic Development Zone, Xiangtan, Hunan, China  
**Factory:** Hunan Vathin Medical Instrument Co., Ltd.  
**Address of Factory:** 1/F,Building 12,Innovation and Entrepreneurship ServiceCenter, No 9 Chuanqi west road, Jiuhua Economic Development Zone, Xiangtan, Hunan, China  
**Equipment Under Test (EUT):**  
**EUT Name:** Digital Video Monitor  
**Model No.:** DVM-A1  
**Add Model No.:** DVM-A2  
**Standard(s) :** FCC Rules 47 CFR §2.1091  
 KDB447498 D01 General RF Exposure Guidance v06  
 RSS-102 Issue 5 Amendment 1 (February 2, 2021)  
**Date of Receipt:** 2021-02-23  
**Date of Test:** 2021-03-02 to 2021-03-16  
**Date of Issue:** 2021-03-17

<b>Test Result:</b>	<b>Pass*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.

*Parlam Zhan*

Parlam Zhan  
E&E Section Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

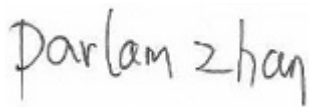


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Revision Record			
Version	Description	Date	Remark
00	Original	2021-03-17	/

<b>Authorized for issue by:</b>			
			
		<hr/>	
		<b>Bill Wu / Project Engineer</b>	
			
		<hr/>	
		<b>Parlam Zhan / Reviewer</b>	



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### 3 General Information

#### 3.1 General Description of E.U.T.

Power supply:	DC 10.8V 9000mAh rechargeable battery Charging adapter: Model:HPU63A-106 Input:100-240VAC,47- 63Hz Outputt15V 4.2A
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#### 3.2 Technical Specifications

##### 2.4G WiFi

Antenna Gain:	2dBi (Provided by manufacturer)
Antenna Type:	PIFA Antenna
Channel Spacing:	5MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11 802.11n(HT40):7
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz 802.11n(HT40): 2422MHz to 2452MHz

##### 5G WiFi

Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	Band 1	802.11a/n(HT20)/ac(HT20)	5180-5240	4
		802.11n(HT40)/ac(HT40)	5190-5230	2
		802.11ac(HT80)	5210	1
	Band 2A	802.11a/n(HT20)/ac(HT20)	5260-5320	4
		802.11n(HT40)/ac(HT40)	5270-5310	2
		802.11ac(HT80)	5290	1
	Band 2C	802.11a/n(HT20)/ac(HT20)	5500-5700	11
		802.11n(HT40)/ac(HT40)	5510-5670	5
		802.11ac(HT80)	5530	1
Band 3	802.11a/n(HT20)/ac(HT20)	5745-5825	5	
	802.11n(HT40)/ac(HT40)	5755-5795	2	
	802.11ac(HT80)	5775	1	
Modulation Type:	802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)			
Date Rate:	802.11a:6/9/12/18/24/36/48/54Mbps 802.11n:MCS0-MCS7 802.11ac:VHT MCS0-MCS7			
Channel Spacing:	802.11a/n(HT20)/ac(HT20): 20MHz			



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	802.11n(HT40)/ac(HT40): 40MHz 802.11ac(HT80): 80MHz
Antenna Gain:	2dBi (Provided by manufacturer)
Antenna Type:	PIFA Antenna
DFS Function:	Slave without Radar detection

### 3.3 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shanghai Branch

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China.

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

No tests were sub-contracted.

### 3.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• **NVLAP (LAB CODE: 201034-0)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

• **FCC (Designation Number: CN5033)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory. Test Firm Registration Number: 479755.

• **ISED (CAB Identifier: CN0020)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. ISED#: 8617A.

• **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.



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## 4 Test Standards and Limits

### 4.1 FCC Radiofrequency radiation exposure limits:

According to §1.1310, the limit for general population/uncontrolled exposures

Frequency	Power density(mW/cm <sup>2</sup> )	Averaging time(minutes)
300MHz~1.5GHz	f/1500	30
1.5GHz~100GHz	1.0	30

### 4.2 IC Radiofrequency radiation exposure limits:

According to RSS-102 section 2.5.2, RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);

- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $4.49/f^{0.5}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $1.31 \times 10^{-2} f^{0.6834}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

For 2.4G device, the limit of worse case is 2.68 W

For 5G device, the limit of worse case is 4.53W



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## 5 Measurement and Calculation

### 5.1 Maximum transmit power

2.4GHz for FCC

The Power Data is based on the RF Test Report SHEM210200146501-2.4GHz

Test Mode	Test Channel	Ant	Power [dBm]	Power [mW]
11B	2412	Ant1	14.95	31.26
11B	2437	Ant1	15.12	<b>32.51</b>
11B	2462	Ant1	14.89	30.83
11G	2412	Ant1	11.20	13.18
11G	2437	Ant1	11.39	13.77
11G	2462	Ant1	11.14	13.00
11N20SISO	2412	Ant1	10.84	12.13
11N20SISO	2437	Ant1	11.05	12.74
11N20SISO	2462	Ant1	10.69	11.72





5GHz for FCC:

The Power Data is based on the RF Test Report SHEM210200146502-5GHz

Test Mode	Test Channel	Ant	Power [dBm]	Power [mW]
11A	5180	Ant1	10.58	11.43
11A	5220	Ant1	10.95	12.45
11A	5240	Ant1	11.35	13.65
11A	5260	Ant1	10.69	11.72
11A	5280	Ant1	10.08	10.19
11A	5320	Ant1	11.52	14.19
11A	5500	Ant1	9.41	8.73
11A	5580	Ant1	8.03	6.35
11A	5700	Ant1	7.75	5.96
11A	5745	Ant1	10.48	11.17
11A	5785	Ant1	11.13	12.97
11A	5825	Ant1	11.75	14.96
11N20	5180	Ant1	10.4	10.96
11N20	5220	Ant1	10.52	11.27
11N20	5240	Ant1	10.76	11.91
11N20	5260	Ant1	9.94	9.86
11N20	5280	Ant1	9.64	9.20
11N20	5320	Ant1	10.99	12.56
11N20	5500	Ant1	8.94	7.83
11N20	5580	Ant1	7.53	5.66
11N20	5700	Ant1	7.34	5.42
11N20	5745	Ant1	8.24	6.67
11N20	5785	Ant1	8.74	7.48
11N20	5825	Ant1	9.3	8.51
11N40	5190	Ant1	10.33	10.79
11N40	5230	Ant1	10.74	11.86
11N40	5270	Ant1	8.64	7.31
11N40	5310	Ant1	10.41	10.99
11N40	5510	Ant1	8.07	6.41
11N40	5590	Ant1	7.99	6.30
11N40	5670	Ant1	7.2	5.25



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11N40	5755	Ant1	8.67	7.36
11N40	5795	Ant1	9.37	8.65
11AC20	5180	Ant1	10.28	10.67
11AC20	5220	Ant1	10.69	11.72
11AC20	5240	Ant1	10.8	12.02
11AC20	5260	Ant1	10.37	10.89
11AC20	5280	Ant1	9.87	9.71
11AC20	5320	Ant1	11.11	12.91
11AC20	5500	Ant1	8.93	7.82
11AC20	5580	Ant1	7.59	5.74
11AC20	5700	Ant1	7.32	5.40
11AC20	5745	Ant1	8.03	6.35
11AC20	5785	Ant1	8.55	7.16
11AC20	5825	Ant1	9.12	8.17
11AC40	5190	Ant1	10.25	10.59
11AC40	5230	Ant1	10.78	11.97
11AC40	5270	Ant1	9.91	9.79
11AC40	5310	Ant1	11.46	14.00
11AC40	5510	Ant1	9.02	7.98
11AC40	5590	Ant1	7.76	5.97
11AC40	5670	Ant1	7.5	5.62
11AC40	5755	Ant1	8.56	7.18
11AC40	5795	Ant1	9.17	8.26
11AC80	5210	Ant1	10.12	10.28
11AC80	5290	Ant1	11.52	14.19
11AC80	5530	Ant1	8.76	7.52
11AC80	5775	Ant1	7.42	5.52

5GHz EIRP for IC:

Test Mode	Test Channel	Ant	Measured Output Power (dBm)	EIRP (dBm)	Power [mW]
11A	5180	Ant1	10.58	12.58	18.11
11A	5220	Ant1	10.95	12.95	19.72
11A	5240	Ant1	11.35	13.35	21.63
11A	5260	Ant1	10.69	/	/



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11A	5280	Ant1	10.08	/	/
11A	5320	Ant1	11.52	/	/
11A	5500	Ant1	9.41	/	/
11A	5580	Ant1	8.03	/	/
11A	5700	Ant1	7.75	/	/
11A	5745	Ant1	10.48	/	/
11A	5785	Ant1	11.13	/	/
11A	5825	Ant1	11.75	/	/
11N20	5180	Ant1	10.4	12.40	17.38
11N20	5220	Ant1	10.52	12.52	17.86
11N20	5240	Ant1	10.76	12.76	18.88
11N20	5260	Ant1	9.94	/	/
11N20	5280	Ant1	9.64	/	/
11N20	5320	Ant1	10.99	/	/
11N20	5500	Ant1	8.94	/	/
11N20	5580	Ant1	7.53	/	/
11N20	5700	Ant1	7.34	/	/
11N20	5745	Ant1	8.24	/	/
11N20	5785	Ant1	8.74	/	/
11N20	5825	Ant1	9.3	/	/
11N40	5190	Ant1	10.33	12.33	17.10
11N40	5230	Ant1	10.74	12.74	18.79
11N40	5270	Ant1	8.64	/	/
11N40	5310	Ant1	10.41	/	/
11N40	5510	Ant1	8.07	/	/
11N40	5590	Ant1	7.99	/	/
11N40	5670	Ant1	7.2	/	/
11N40	5755	Ant1	8.67	/	/
11N40	5795	Ant1	9.37	/	/
11AC20	5180	Ant1	10.28	12.28	16.90
11AC20	5220	Ant1	10.69	12.69	18.58
11AC20	5240	Ant1	10.8	12.80	19.05
11AC20	5260	Ant1	10.37	/	/
11AC20	5280	Ant1	9.87	/	/



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11AC20	5320	Ant1	11.11	/	/
11AC20	5500	Ant1	8.93	/	/
11AC20	5580	Ant1	7.59	/	/
11AC20	5700	Ant1	7.32	/	/
11AC20	5745	Ant1	8.03	/	/
11AC20	5785	Ant1	8.55	/	/
11AC20	5825	Ant1	9.12	/	/
11AC40	5190	Ant1	10.25	12.25	16.79
11AC40	5230	Ant1	10.78	12.78	18.97
11AC40	5270	Ant1	9.91	/	/
11AC40	5310	Ant1	11.46	/	/
11AC40	5510	Ant1	9.02	/	/
11AC40	5590	Ant1	7.76	/	/
11AC40	5670	Ant1	7.5	/	/
11AC40	5755	Ant1	8.56	/	/
11AC40	5795	Ant1	9.17	/	/
11AC80	5210	Ant1	10.12	12.12	16.29
11AC80	5290	Ant1	11.52	/	/
11AC80	5530	Ant1	8.76	/	/
11AC80	5775	Ant1	7.42	/	/



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## 5.2 MPE Calculation

For FCC:

According to the formula  $S=P/4\pi R^2$ , we can calculate S which is MPE.

Note:

- 1) P (mW)
- 2) R = distance to the center of radiation of antenna (in meter) = 20cm
- 3) MPE limit = 1mW/cm<sup>2</sup>

For 2.4G WiFi

The max. antenna gain is 2 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
32.51	1.585	20	0.01025	1	Pass

For 5G WiFi

The max. antenna gain is 2 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
14.96	1.585	20	0.00472	1	Pass

2.4G WiFi and 5G WiFi modules can simultaneous transmitting, so the maximum rate of MPE is  $0.01025/2.68+0.00472/4.53=0.005\leq 1.0$ . according to the KDB447498 section 7.2 determine the device is exclusion from SAR test

For IC:

For 2.4GHz WiFi SISO mode:

$$E.I.R.P.= P \cdot G = 0.03251 \times 1.58 = 0.051W < 2.68W$$

For 5GHz WiFi SISO mode:

$$E.I.R.P.= P \cdot G = 0.01496 \times 1.58 = 0.024W < 4.53W$$

2.4G WiFi and 5G WiFi modules can simultaneous transmitting, so the maximum rate of MPE is  $0.051/2.68+0.024/4.53=0.024\leq 1$ .

So the device is exclusion from SAR test

**--End of the Report--**

