

MRT Technology (Suzhou) Co., Ltd Phone: +86-512-66308358 Web: www.mrt-cert.com Report No.: 1809RSU017-U2 Report Version: V01 Issue Date: 09-25-2018

# **RF Exposure Evaluation Declaration**

FCC ID: R5DPIRCWK

**APPLICANT:** 4MOD Technology

**Application Type:** Certification

**Product:** PIR Board

Model No.: PIRCWK

**Serial No.:** 4MOD9122A, 4MOD9122B

Brand Name: Coworkr

FCC Classification: Digital Transmission System (DTS)

Reviewed By : Sur

Sunny Sun )

Approved By : Robin Wu

(Robin Wu)



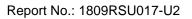


The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

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# **Revision History**

Report No.	Version	Description	Issue Date	Note
1809RSU017-U2	Rev. 01	Initial Report	09-25-2018	Valid

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## 1. Equipment Description

Product Name	PIR Board
Model No.	PIRCWK
Serial Model No.	4MOD9122A, 4MOD9122B
Brand Name	Coworkr
Bluetooth Version	v4.0 (BLE Only)
Bluetooth Frequency	2402~2480MHz
Data Rate	250kbps
Modulation	GFSK
Antenna Type	PIFA Antenna
Antenna Gain	3.3dBi
Power Tune-up Tolerance	1.75dBm ± 0.5dBm

NOTE: The different models are only for marketing different clients. The PCBA configuration and software are the same for all models. All the materials used in different models are the same as well.

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## 2. RF Exposure Evaluation

#### 2.1. Limits

#### SAR Test Exclusion Thresholds for 100 MHz - 6 GHz and ≤ 50 mm

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table. The equation and threshold in Note 1 must be applied to determine SAR test exclusion.

MHz     5     10     15     20     25     mm       150     39     77     116     155     194     SAR Test       300     27     55     82     110     137     Exclusion       450     22     45     67     89     112     Threshold       835     16     33     49     66     82     19     66     82     19     66     82     19     66     82     19     61     19     11     10     19     29     38     48     48     48     48     48     48     48     48     3600     8     16     24     32     40     40     5200     7     13     20     26     33     5400     6     13     19     26     32     5800     6     12     19     25     31     54     50     mm     54     50     mm     54     50     mm     54     50     54							
Seculation	MHz	5	10	15	20	25	mm
A50	150	39	77	116	155	194	SAR Test
Sas   16	300	27	55	82	110	137	Exclusion
900	450	22	45	67	89	112	Threshold
1500	835	16	33	49	66	82	(mW)
1900   11   22   33   44   54     2450   10   19   29   38   48     3600   8   16   24   32   40     5200   7   13   20   26   33     5400   6   13   19   26   32     5800   6   12   19   25   31     MHz   30   35   40   45   50   mm     150   232   271   310   349   387   SAR Test     300   164   192   219   246   274   Exclusion     450   134   157   179   201   224   Threshold     835   98   115   131   148   164   (mW)     900   95   111   126   142   158   150   73   86   98   110   122   1900   65   76   87   98   109   2450   57   67   77   86   96   96 <td< th=""><th>900</th><th>16</th><th>32</th><th>47</th><th>63</th><th>79</th><th></th></td<>	900	16	32	47	63	79	
2450   10   19   29   38   48     3600   8   16   24   32   40     5200   7   13   20   26   33     5400   6   13   19   26   32     5800   6   12   19   25   31     MHz   30   35   40   45   50   mm     150   232   271   310   349   387   SAR Test   Exclusion     300   164   192   219   246   274   Exclusion   Threshold     450   134   157   179   201   224   Threshold   (mW)     900   95   111   126   142   158   158   1500   73   86   98   110   122   1900   65   76   87   98   109   2450   57   67   77   86   96   96   3600   47   55   63   71   79   5200   39   46   53   59 <th>1500</th> <th>12</th> <th>24</th> <th>37</th> <th>49</th> <th>61</th> <th></th>	1500	12	24	37	49	61	
3600   8   16   24   32   40     5200   7   13   20   26   33     5400   6   13   19   26   32     5800   6   12   19   25   31     MHz   30   35   40   45   50   mm     150   232   271   310   349   387   SAR Test     300   164   192   219   246   274   Exclusion     450   134   157   179   201   224   Threshold     835   98   115   131   148   164   (mW)     900   95   111   126   142   158     1500   73   86   98   110   122     1900   65   76   87   98   109     2450   57   67   77   86   96     3600   47   55   63   71   79     5200   39   46   53	1900	11	22	33	44	54	
5200     7     13     20     26     33       5400     6     13     19     26     32       5800     6     12     19     25     31       MHz     30     35     40     45     50     mm       150     232     271     310     349     387     SAR Test       300     164     192     219     246     274     Exclusion       450     134     157     179     201     224     Threshold       835     98     115     131     148     164     (mW)       900     95     111     126     142     158     (mW)       1900     65     76     87     98     109     109     109     109     109     109     109     109     109     109     109     109     109     109     109     109     109     109     109     109     109     109     109 <td< th=""><th>2450</th><th>10</th><th>19</th><th>29</th><th>38</th><th>48</th><th></th></td<>	2450	10	19	29	38	48	
5400     6     13     19     26     32       5800     6     12     19     25     31       MHz     30     35     40     45     50     mm       150     232     271     310     349     387     SAR Test       300     164     192     219     246     274     Exclusion       450     134     157     179     201     224     Exclusion       835     98     115     131     148     164     (mW)       900     95     111     126     142     158     (mW)       1500     73     86     98     110     122     1900     65     76     87     98     109     2450     57     67     77     86     96     3600     47     55     63     71     79     5200     39     46     53     59     66     65       5400     39     45     52     58	3600	8	16	24	32	40	
MHz     30     35     40     45     50     mm       150     232     271     310     349     387     SAR Test       300     164     192     219     246     274     Exclusion       450     134     157     179     201     224     Threshold       835     98     115     131     148     164     (mW)       900     95     111     126     142     158       1500     73     86     98     110     122       1900     65     76     87     98     109       2450     57     67     77     86     96       3600     47     55     63     71     79       5200     39     46     53     59     66       5400     39     45     52     58     65	5200	7	13	20	26	33	
MHz     30     35     40     45     50     mm       150     232     271     310     349     387     SAR Test       300     164     192     219     246     274     Exclusion       450     134     157     179     201     224     Threshold       835     98     115     131     148     164     (mW)       900     95     111     126     142     158     158       1500     73     86     98     110     122       1900     65     76     87     98     109       2450     57     67     77     86     96       3600     47     55     63     71     79       5200     39     46     53     59     66       5400     39     45     52     58     65	5400	6	13	19	26	32	
150   232   271   310   349   387   SAR Test     300   164   192   219   246   274   Exclusion     450   134   157   179   201   224   Threshold     835   98   115   131   148   164   (mW)     900   95   111   126   142   158     1500   73   86   98   110   122     1900   65   76   87   98   109     2450   57   67   77   86   96     3600   47   55   63   71   79     5200   39   46   53   59   66     5400   39   45   52   58   65	5800	6	12	19	25	31	
150   232   271   310   349   387   SAR Test     300   164   192   219   246   274   Exclusion     450   134   157   179   201   224   Threshold     835   98   115   131   148   164   (mW)     900   95   111   126   142   158     1500   73   86   98   110   122     1900   65   76   87   98   109     2450   57   67   77   86   96     3600   47   55   63   71   79     5200   39   46   53   59   66     5400   39   45   52   58   65							
300   164   192   219   246   274   Exclusion     450   134   157   179   201   224   Threshold     835   98   115   131   148   164   (mW)     900   95   111   126   142   158     1500   73   86   98   110   122     1900   65   76   87   98   109     2450   57   67   77   86   96     3600   47   55   63   71   79     5200   39   46   53   59   66     5400   39   45   52   58   65	MHz	30	35	40	45	50	mm
450   134   157   179   201   224   Threshold     835   98   115   131   148   164   (mW)     900   95   111   126   142   158     1500   73   86   98   110   122     1900   65   76   87   98   109     2450   57   67   77   86   96     3600   47   55   63   71   79     5200   39   46   53   59   66     5400   39   45   52   58   65	150	232	271	310	349	387	SAR Test
835   98   115   131   148   164   (mW)     900   95   111   126   142   158     1500   73   86   98   110   122     1900   65   76   87   98   109     2450   57   67   77   86   96     3600   47   55   63   71   79     5200   39   46   53   59   66     5400   39   45   52   58   65	300	164	192	219	246	274	Exclusion
900 95 111 126 142 158   1500 73 86 98 110 122   1900 65 76 87 98 109   2450 57 67 77 86 96   3600 47 55 63 71 79   5200 39 46 53 59 66   5400 39 45 52 58 65	450	134	157	179	201	224	Threshold
1500   73   86   98   110   122     1900   65   76   87   98   109     2450   57   67   77   86   96     3600   47   55   63   71   79     5200   39   46   53   59   66     5400   39   45   52   58   65	835	98	115	131	148	164	(mW)
1900 65 76 87 98 109   2450 57 67 77 86 96   3600 47 55 63 71 79   5200 39 46 53 59 66   5400 39 45 52 58 65	900	95	111	126	142	158	
2450 57 67 77 86 96   3600 47 55 63 71 79   5200 39 46 53 59 66   5400 39 45 52 58 65	1500	73	86	98	110	122	
3600 47 55 63 71 79   5200 39 46 53 59 66   5400 39 45 52 58 65	1900	65	76	87	98	109	
5200 39 46 53 59 66   5400 39 45 52 58 65	2450	57	67	77	86	96	
5400 39 45 52 58 65	3600	47	55	63	71	79	
	5200	39	46	53	59	66	
F900 27 44 F0 FC C2	5400	39	45	52	58	65	
3000 31 44 50 50 62	5800	37	44	50	56	62	

Note: The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

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[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] \*  $[\sqrt{f(GHz)}] \le 3.0$  for 1-g SAR and  $\le 7.5$  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  $\leq$  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 5) in section 4.1 is applied to determine SAR test exclusion.

#### 2.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 18°C and 78% RH.

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### 2.3. Test Result of RF Exposure Evaluation

Product	PIR Board
Test Item	RF Exposure Evaluation

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.3dBi for 2.4GHz in logarithm scale.

### **Output Power into Antenna:**

Test Mode	Frequency Band (MHz)	Maximum output power to antenna (mW)	SAR Test Exclusion Threshold (mW)
Bluetooth	2402 ~ 2480	1.68	10

Per FCC KDB 447498 D01v06, the SAR exclusion threshold for distances<50mm is defined by the following equation:

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] \*  $[\sqrt{f(GHz)}] \le 3.0$ 

Based on the maximum conducted power of Bluetooth and the antenna to use separation distance, Bluetooth SAR was not required;

 $[(1.68 \text{mW/5})^* \sqrt{2.402}] = 0.52 < 3.0$ 

Note: When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

The End