



# RF EXPOSURE Test Report

**Report No.:** MTi231019022-04E3

**Date of issue:** 2023-11-25

**Applicant:** Guangzhou FiiO Electronic Technology Co., Ltd.

**Product:** HiFi Desktop Active Speaker

**Model(s):** F3231S, F3051S, F3241S, F3242S, F3251S, F3252S, F3253S, F3261S, F3262S, F3271S, F3272S, F3281S, F3282S, F3291S, F3292S, F3301S, F3302S, F3311S, F3312S, F3321S, F3322S, F3401S, F3411S, F3421S, F3431S, F3441S, F3451S, F3461S, F3471S, F3481S, F3491S

**FCC ID:** R56-F32311

Shenzhen Microtest Co., Ltd.

<http://www.mtitest.com>

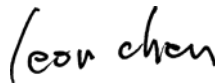


## Instructions

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| Test Result Certification  |                                                                                                                                                                                                                                                |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Applicant:</b>          | Guangzhou FiiO Electronic Technology Co., Ltd.                                                                                                                                                                                                 |
| Address:                   | 2/F, F Building, Hougang Industrial Zone, Shigang Huangshi West Road, Baiyun District, Guangzhou City, China.                                                                                                                                  |
| <b>Manufacturer:</b>       | Guangzhou FiiO Electronic Technology Co., Ltd.                                                                                                                                                                                                 |
| Address:                   | 2/F, F Building, Hougang Industrial Zone, Shigang Huangshi West Road, Baiyun District, Guangzhou City, China.                                                                                                                                  |
| <b>Product description</b> |                                                                                                                                                                                                                                                |
| Product name:              | HiFi Desktop Active Speaker                                                                                                                                                                                                                    |
| Trademark:                 | FIIO                                                                                                                                                                                                                                           |
| Model name:                | F3231S                                                                                                                                                                                                                                         |
| Serial Model:              | F3051S, F3241S, F3242S, F3251S, F3252S, F3253S, F3261S, F3262S, F3271S, F3272S, F3281S, F3282S, F3291S, F3292S, F3301S, F3302S, F3311S, F3312S, F3321S, F3322S, F3401S, F3411S, F3421S, F3431S, F3441S, F3451S, F3461S, F3471S, F3481S, F3491S |
| Standards:                 | N/A                                                                                                                                                                                                                                            |
| Test procedure:            | KDB 447498 D01 v06                                                                                                                                                                                                                             |
| <b>Date of Test</b>        |                                                                                                                                                                                                                                                |
| Date of test:              | 2023-11-01 to 2023-11-21                                                                                                                                                                                                                       |
| Test result:               | Pass                                                                                                                                                                                                                                           |

|                      |   |                                                                                       |
|----------------------|---|---------------------------------------------------------------------------------------|
| <b>Test Engineer</b> | : |  |
|                      |   | (Maleah Deng)                                                                         |
| <b>Reviewed By</b>   | : |  |
|                      |   | (Leon Chen)                                                                           |
| <b>Approved By</b>   | : |  |
|                      |   | (Tom Xue)                                                                             |



## RF EXPOSURE EVALUATION

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) Radiation as specified in §1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

| Frequency range (MHz)                                          | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm <sup>2</sup> ) | Averaging time (minutes) |
|----------------------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| <b>(A) Limits for Occupational/Controlled Exposure</b>         |                               |                               |                                     |                          |
| 0.3-3.0                                                        | 614                           | 1.63                          | *100                                | 6                        |
| 3.0-30                                                         | 1842/f                        | 4.89/f                        | *900/f <sup>2</sup>                 | 6                        |
| 30-300                                                         | 61.4                          | 0.163                         | 1.0                                 | 6                        |
| 300-1,500                                                      |                               |                               | f/300                               | 6                        |
| 1,500-100,000                                                  |                               |                               | 5                                   | 6                        |
| <b>(B) Limits for General Population/Uncontrolled Exposure</b> |                               |                               |                                     |                          |
| 0.3-1.34                                                       | 614                           | 1.63                          | *100                                | 30                       |
| 1.34-30                                                        | 824/f                         | 2.19/f                        | *180/f <sup>2</sup>                 | 30                       |
| 30-300                                                         | 27.5                          | 0.073                         | 0.2                                 | 30                       |
| 300-1,500                                                      |                               |                               | f/1500                              | 30                       |
| 1,500-100,000                                                  |                               |                               | 1.0                                 | 30                       |

f = frequency in MHz \* = Plane-wave equivalent power density

### MPE Calculation Method

Friis transmission formula:  $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where

$P_d$  = Power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

$G$  = Numeric gain of the antenna relative to isotropic antenna

$\pi$  = 3.1415926

$R$  = distance between observation point and center of the radiator in cm(20cm)

$P_d$  the limit of MPE, 1mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.



## Measurement Result

### BT/BLE:

Operation Frequency: 2402-2480MHz,

Power density limited: 1mW/ cm<sup>2</sup>

Antenna gain: 7.25dBi

R=20cm

$mW=10^{(dBm/10)}$

Antenna gain Numeric= $10^{(dBi/10)}=10^{(7.25/10)}=5.31$

### BT:

| Channel Freq.<br>(MHz) | modulation | conducted power | Tune-up power<br>(dBm) | Max           |       | Antenna |         | Evaluation result     | Power density Limits   |
|------------------------|------------|-----------------|------------------------|---------------|-------|---------|---------|-----------------------|------------------------|
|                        |            | (dBm)           |                        | tune-up power |       | Gain    |         | (mW/cm <sup>2</sup> ) | (mW/c m <sup>2</sup> ) |
|                        |            |                 |                        | (dBm)         | (mW)  | (dBi)   | Numeric |                       |                        |
| 2402                   | GFSK       | -2.08           | (-2)±1                 | -1            | 0.794 | 7.25    | 5.31    | 0.0008                | 1                      |
| 2441                   |            | -3.07           | (-3)±1                 | -2            | 0.631 | 7.25    | 5.31    | 0.0007                | 1                      |
| 2480                   |            | -2.9            | (-3)±1                 | -2            | 0.631 | 7.25    | 5.31    | 0.0007                | 1                      |
| 2402                   | π/4-DQPSK  | -0.22           | 0±1                    | 1             | 1.259 | 7.25    | 5.31    | 0.0013                | 1                      |
| 2441                   |            | -1.26           | (-1)±1                 | 0             | 1.000 | 7.25    | 5.31    | 0.0011                | 1                      |
| 2480                   |            | -1              | (-1)±1                 | 0             | 1.000 | 7.25    | 5.31    | 0.0011                | 1                      |
| 2402                   | 8DPSK      | 0.43            | 0±1                    | 1             | 1.259 | 7.25    | 5.31    | 0.0013                | 1                      |
| 2441                   |            | -0.65           | 0±1                    | 1             | 1.259 | 7.25    | 5.31    | 0.0013                | 1                      |
| 2480                   |            | -0.59           | 0±1                    | 1             | 1.259 | 7.25    | 5.31    | 0.0013                | 1                      |

### BLE:

| Channel Freq.<br>(MHz) | modulation | conducted power | Tune-up power<br>(dBm) | Max           |       | Antenna |         | Evaluation result     | Power density Limits  |
|------------------------|------------|-----------------|------------------------|---------------|-------|---------|---------|-----------------------|-----------------------|
|                        |            | (dBm)           |                        | tune-up power |       | Gain    |         | (mW/cm <sup>2</sup> ) | (mW/cm <sup>2</sup> ) |
|                        |            |                 |                        | (dBm)         | (mW)  | (dBi)   | Numeric |                       |                       |
| 2402                   | BLE-1M     | 5.16            | 5±1                    | 6             | 3.981 | 7.25    | 5.31    | 0.0042                | 1                     |
| 2440                   |            | 4.33            | 4±1                    | 5             | 3.162 | 7.25    | 5.31    | 0.0033                | 1                     |
| 2480                   |            | 3.8             | 3±1                    | 4             | 2.512 | 7.25    | 5.31    | 0.0027                | 1                     |
| 2402                   | BLE-2M     | 5.14            | 5±1                    | 6             | 3.981 | 7.25    | 5.31    | 0.0042                | 1                     |
| 2440                   |            | 4.3             | 4±1                    | 5             | 3.162 | 7.25    | 5.31    | 0.0033                | 1                     |
| 2480                   |            | 3.81            | 3±1                    | 4             | 2.512 | 7.25    | 5.31    | 0.0027                | 1                     |

### Conclusion:

For the max result: 0.0042≤ 1.0 test exclusion threshold, No SAR is required.

----END OF REPORT----