

***MS221***

***8-bit USB + 2.4GRF***

***EMI test mode***

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**Operation Manual**

**V1.3**

**MosArt**

**SEMICONDUCTOR CORP.**

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## 1. Introduction

MosArt design 2.4G EMI mode, via 2.4G device Keys of the operation, simple control Mouse, Keyboard, Dongle end of EMI testing different models.

MosArt design EMI mode, applicable to CE, FCC, TELEC (Japan), KCC (Korea), NCC (Taiwan).... and other relevant provisions of the test.

## 2. Simple operation instructions

2.4G KB, MS, Dongle, etc. into the EMI mode device the way, KB, MS by the appearance of the existing access key for operation, and a Dongle is required by another welding ID key, only through this ID key operation (nano dongle General No ID key)

### 2.1 2.4G Mouse EMI mode operation Methods

- (1). Power on while holding down the **(L) + (M) + (R)** keys for 5 seconds after release, Battery LOW LED will be turned on, into the EMI mode success.
- (2). Scan Mode to enter test mode is the range of 2408 ~ 2474MHz (34ch) transmission frequency.

**note :** In the Scan Mode press **the button (M)** is a single channel into the **2408MHz** frequency hopping, time hopping time 500ms

- (3). Click the right (R), skip to the Modulation Frequency 2408MHz ( $\pm 500K$ ), continuous transmission.
- (4). Click the right (R), skip to the Modulation Frequency 2440MHz ( $\pm 500K$ ), continuous transmission.
- (5). Click the right (R), skip to the Modulation Frequency 2474MHz ( $\pm 500K$ ), continuous transmission.

**note :** In the Modulation transmission mode, slide the wheel to do fine-tune the frequency 2408MHz ~ 2474MHz ( $\pm 500K$ )

**note:** In the Modulation transmit mode, press the button (M) may be circulating 2408MHz  $\pm 500K$ , 2440MHz  $\pm 500K$ , 2474MHz  $\pm 500K$  three frequency

- (6). Click the right (R), skip to the Modulation Frequency 2408MHz ( $\pm 500K$ ), continues to receive.
- (7). Click the right (R), skip to the Modulation Frequency 2440MHz ( $\pm 500K$ ), continues to receive.
- (8). Click the right (R), skip to the Modulation Frequency 2474MHz ( $\pm 500K$ ), continues to receive.
- (9). Click the right (R), skip to the Non-Modulation Frequency 2408MHz (+500 K), continuous transmission.
- (10). Click the right (R), skip to the Non-Modulation Frequency 2440MHz (+500 K), continuous transmission.

- (11). Click the right (R), skip to the Non-Modulation Frequency 2474MHz (+500 K), continuous transmission.
- (12). Click the right (R), skip to the Non-Modulation Frequency 2408MHz (+500 K), continuous to receive.
- (13). Click the right (R), skip to the Non-Modulation Frequency 2440MHz (+500 K), continuous to receive.
- (14). Click the right (R), skip to the Non-Modulation Frequency 2474MHz (+500 K), continuous to receive.
- (15). Click the right (R), skip to the Non-Modulation frequency of 2408MHz, continuous transmission.
- (16). Click the right (R), skip to the Non-Modulation frequency of 2440MHz, continuous transmission.
- (17). Click the right (R), skip to the Non-Modulation frequency of 2474MHz, continuous transmission.
- (18). Click the right (R), skip to the Non-Modulation frequency of 2408MHz, continuous to receive.
- (19). Click the right (R), skip to the Non-Modulation frequency of 2440MHz, continuous to receive.
- (20). Click the right (R), skip to the Non-Modulation frequency of 2474MHz, continuous to receive.
- (21). And then click right-click (R) back to Scan Mode, the second step, starting again from here, a loop, as long as there is no exit test mode, it will have a loop down. Press the button(L) for the exit, exit back to normal state after the normal operation of the mouse.

## 2.2 2.4G Keyboard EMI mode operation Methods

- (1) Power on while holding down the **ESC+Y** keys for 5 seconds after release, Battery LOW LED will be turned on, into the EMI mode success。
- (2). Enter the test mode Scan Mode is the range of 2408 ~ 2474MHz (34ch), frequency of transmission.

**note :** In the Scan Mode press the ~ key then enter the 2408MHz single-channel frequency hopping, time hopping time 500ms

- (3). Click the Tab key skip Modulation Frequency 2408MHz ( $\pm 250K$ ), continuous transmission.
- (4). Click the Tab key skip Modulation Frequency 2440MHz ( $\pm 250K$ ), continuous transmission.
- (5). Click the Tab key skip Modulation Frequency 2474MHz ( $\pm 250K$ ), continuous transmission.

**note :** In the Modulation transmit mode, press the + key or-key (non-numeric keys) to do fine-tune frequency 2408MHz ~ 2474MHz ( $\pm 250K$ )

**note :** In the Modulation transmission mode, press the ~ key can cycle 2408MHz  $\pm 250K$ , 2440MHz  $\pm 250K$ , 2474MHz  $\pm 250K$  three frequency

- (6). Click the Tab key skip Modulation Frequency 2408MHz ( $\pm 250K$ ), continues to receive.
- (7). Click the Tab key skip Modulation Frequency 2440MHz ( $\pm 250K$ ), continues to receive.
- (8). Click the Tab key skip Modulation Frequency 2474MHz ( $\pm 250K$ ), continues to receive.
- (9). Click the Tab key, skip to the Non-Modulation Frequency 2408MHz (+250 K), continuous transmission.
- (10). Click the Tab key, skip to the Non-Modulation Frequency 2440MHz (+250 K), continuous transmission.
- (11). Click the Tab key, skip to the Non-Modulation Frequency 2474MHz (+250 K), continuous transmission.
- (12). Click the Tab key, skip to the Non-Modulation Frequency 2408MHz (+250 K), continuous to receive.
- (13). Click the Tab key, skip to the Non-Modulation Frequency 2440MHz (+250 K), continuous to receive.
- (14). Click the Tab key, skip to the Non-Modulation Frequency 2474MHz (+250 K), continuous to receive.
- (15). Click the Tab key, skip to the Non-Modulation frequency of 2408MHz, continuous transmission.
- (16). Click the Tab key, skip to the Non-Modulation frequency of 2440MHz, continuous transmission.
- (17). Click the Tab key, skip to the Non-Modulation frequency of 2474MHz, continuous transmission.
- (18). Click the Tab key, skip to the Non-Modulation frequency of 2408MHz, continuous to receive.
- (19). Click the Tab key, skip to the Non-Modulation frequency of 2440MHz, continuous to receive.
- (20). Click the Tab key, skip to the Non-Modulation frequency of 2474MHz, continuous to receive.
- (21). And then continue to click Tab key is another jump Scan Mode, the second step, starting again from here, a loop, as long as there is no exit test mode, it will have a loop down. Press ESC to exit, exit back to normal state after the normal operation of the Keyboard.

### **2.3 2.4G USB dongle EMI mode operation Methods**

- 1). Power on while holding down the ID key for 30 seconds after release, Battery LOW LED will be turned on, into the EMI mode success °
- (2). Enter the test mode Scan Mode is the range of 2408 ~ 2474MHz (34ch), frequency of transmission.

**note :** In the Scan Mode while holding down the ID key for 1 after release,into a second single-channel 2408MHz frequency hopping, time hopping time 250ms

(3). Click the ID key is to jump Modulation Frequency 2408MHz ( $\pm 500K$ ), continuous transmission.

(4). Click the ID key is to jump Modulation Frequency 2440MHz ( $\pm 500K$ ), continuous transmission.

(5). Click the ID key is to jump Modulation Frequency 2474MHz ( $\pm 500K$ ), continuous transmission.

**note :** In the Modulation transmission mode, press the ID key long to do a second frequency tuning 2408MHz ~ 2474MHz ( $\pm 250K$ )

(6). Click the ID key is to jump Modulation Frequency 2408MHz ( $\pm 500K$ ), continues to receive.

(7). Click the ID key is to jump Modulation Frequency 2440MHz ( $\pm 500K$ ), continues to receive.

(8). Click the ID key is to jump Modulation Frequency 2474MHz ( $\pm 500K$ ), continues to receive.

(9). Click the ID key, skip to the Non-Modulation Frequency 2408MHz (+500 K), continuous transmission.

(10). Click the ID key, skip to the Non-Modulation Frequency 2440MHz (+500 K), continuous transmission.

(11). Click the ID key, skip to the Non-Modulation Frequency 2474MHz (+500 K), continuous transmission.

(12). Click the ID key, skip to the Non-Modulation Frequency 2408MHz (+500 K), continuous to receive.

(13). Click the ID key, skip to the Non-Modulation Frequency 2440MHz (+500 K), continuous to receive.

(14). Click the ID key, skip to the Non-Modulation Frequency 2474MHz (+500 K), continuous to receive.

(15). Click the ID key, skip to the Non-Modulation frequency of 2408MHz, continuous transmission.

(16). Click the ID key, skip to the Non-Modulation frequency of 2440MHz, continuous transmission.

(17). Click the ID key, skip to the Non-Modulation frequency of 2474MHz, continuous transmission.

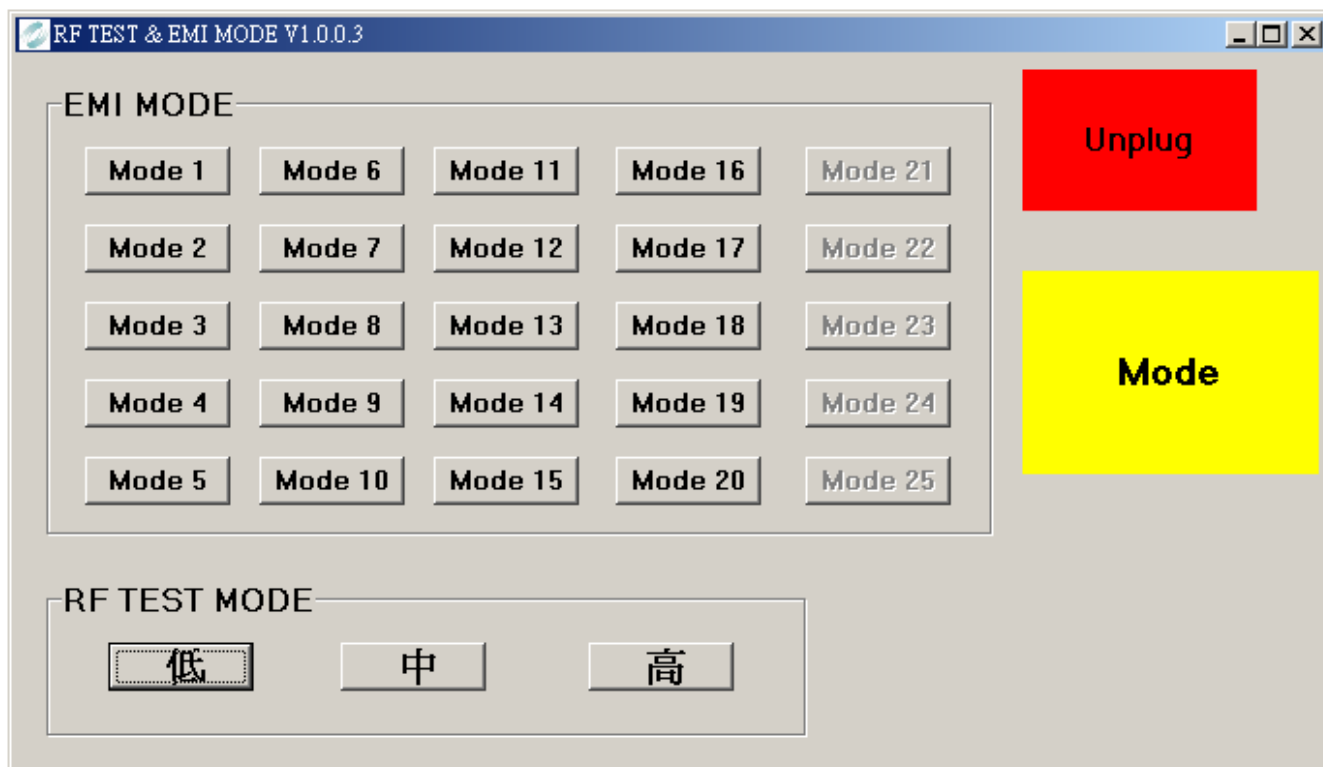
(18). Click the ID key, skip to the Non-Modulation frequency of 2408MHz, continuous to receive.

(19). Click the ID key, skip to the Non-Modulation frequency of 2440MHz, continuous to receive.

(20). Click the ID key, skip to the Non-Modulation frequency of 2474MHz, continuous to receive.

(21). And then continue by clicking ID key in turn to jump Scan Mode, the second step, starting again from here, a loop, as long as there is no exit test mode, it will have a loop down under the power can only leave EMI mode.

## 2.4 2.4G USB dongle EMI mode For AP



- (1). **Mode1** Scan Mode is the range of 2408 ~ 2474MHz (32ch), frequency of transmission.
- (2). **Mode2** Modulation Frequency 2408MHz ( $\pm 500K$ ), continuous transmission.
- (4). **Mode3** Modulation Frequency 2440MHz ( $\pm 500K$ ), continuous transmission.
- (5). **Mode4** Modulation Frequency 2474MHz ( $\pm 500K$ ), continuous transmission.
- (6). **Mode5** Modulation Frequency 2408MHz ( $\pm 500K$ ), continues to receive.
- (7). **Mode6** Modulation Frequency 2440MHz ( $\pm 500K$ ), continues to receive.
- (8). **Mode7** Modulation Frequency 2474MHz ( $\pm 500K$ ), continues to receive.
- (9). **Mode8** Non-Modulation Frequency 2408MHz (+500 K), continuous transmission.
- (10). **Mode9** Non-Modulation Frequency 2440MHz (+500 K), continuous transmission.
- (11). **Mode10** Non-Modulation Frequency 2474MHz (+500 K), continuous transmission.
- (12). **Mode11** Non-Modulation Frequency 2408MHz (+500 K), continuous to receive.
- (13). **Mode12** Non-Modulation Frequency 2440MHz (+500 K), continuous to receive.
- (14). **Mode13** Non-Modulation Frequency 2474MHz (+500 K), continuous to receive.
- (15). **Mode14** Non-Modulation frequency of 2408MHz, continuous transmission.
- (16). **Mode15** Non-Modulation frequency of 2440MHz, continuous transmission.
- (17). **Mode16** Non-Modulation frequency of 2474MHz, continuous transmission.
- (18). **Mode17** Non-Modulation frequency of 2408MHz, continuous to receive.
- (19). **Mode18** Non-Modulation frequency of 2440MHz, continuous to receive.
- (20). **Mode19** Non-Modulation frequency of 2474MHz, continuous to receive.
- (21). **Mode20** single-channel 2408MHz frequency hopping, time hopping time 250ms

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction