

## Maximum Permissible Exposure (MPE) & Exposure evaluation

Report identification number: 1-8503/19-01-01

| Certification numbers and labeling requirements |                                                             |
|-------------------------------------------------|-------------------------------------------------------------|
| FCC ID                                          | XKB-XTRAWIBTC                                               |
| ISED number                                     | 2586D-XTRAWIBTC                                             |
| HVIN (Hardware Version Identification Number)   | MODU/7003 WiFi/BT<br>MODU/7005 WiFi/BT<br>MODU/8005 WiFi/BT |
| PMN (Product Marketing Name)                    | XTRA module                                                 |
| FVIN (Firmware Version Identification Number)   | -/-                                                         |
| HMN (Host Marketing Name)                       | Lane/7000<br>Lane/8000                                      |

This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

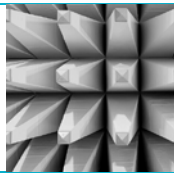
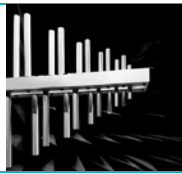
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### EUT technologies:

| Technologies:     | Max. power conducted: (AVG) | Max. antenna gain: |
|-------------------|-----------------------------|--------------------|
| WLAN 5 GHz        | Declared 10 dBm             | Measured : 7.2 dBi |
| WLAN 2.4 GHz      | Declared 20 dBm             | Measured : 6.6 dBi |
| Bluetooth 2.4 GHz | Declared 3 dBm              | Measured : 6.5 dBi |

### Prediction of MPE limit at given distance - FCC

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 the antenna

G = Antenna gain

R = Distance to the center of radiation of the antenna

The table below is excerpted from Table 1B of 47 CFR 1.1310 titled "Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure"

| Frequency Range (MHz) | Power Density (mW/cm <sup>2</sup> ) | Averaging Time (minutes) |
|-----------------------|-------------------------------------|--------------------------|
| 300 -1500             | f/1500                              | 30                       |
| 1500 - 100000         | 1.0                                 | 30                       |

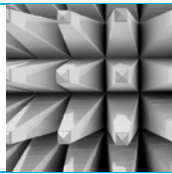
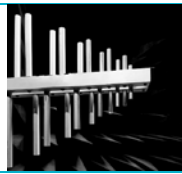
where f = Frequency (MHz)

### Prediction: worst case

|   |                                      | > 1500 MHz                | > 1500 MHz                | > 1500 MHz                |
|---|--------------------------------------|---------------------------|---------------------------|---------------------------|
|   | Technology                           | BT @ 2450 MHz             | WLAN @ 2450 MHz           | WLAN @ 5 GHz              |
| P | Max power input to the antenna       | 3 dBm                     | 20 dBm                    | 10 dBm                    |
| R | Distance                             | 20 cm                     | 20 cm                     | 20 cm                     |
| G | Antenna gain                         | 6.5 dBi                   | 6.6 dBi                   | 7.2 dBi                   |
| S | MPE limit for uncontrolled exposure  | 1 mW/cm <sup>2</sup>      | 1 mW/cm <sup>2</sup>      | 1 mW/cm <sup>2</sup>      |
|   | <b>Calculated Power density:</b>     | 0.0018 mW/cm <sup>2</sup> | 0.0910 mW/cm <sup>2</sup> | 0.0104 mW/cm <sup>2</sup> |
|   | <b>Collocation BT + WLAN 2.4 GHz</b> | 0.0928 mW/cm <sup>2</sup> |                           |                           |
|   | <b>Collocation BT + WLAN 5.8 GHz</b> | 0.0122 mW/cm <sup>2</sup> |                           |                           |

This prediction demonstrates the following:

The power density levels for FCC at a distance of 20 cm are below the maximum levels allowed by regulations.



### Prediction of MPE limit at given distance - ISED

RSS-102, Issue 5, 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).

### Prediction: worst case

|   |                                      | 0.3 - 6 GHz | 0.3 - 6 GHz  | 0.3 - 6 GHz |
|---|--------------------------------------|-------------|--------------|-------------|
|   | Technology                           | BT 2.4 GHz  | WLAN 2.4 GHz | WLAN 5 GHz  |
|   | Frequency                            | 2450 MHz    | 2450 MHz     | 5180 MHz    |
| P | Max power input to the antenna       | 3 dBm       | 20 dBm       | 10 dBm      |
| R | Distance                             | 20 cm       | 20 cm        | 20 cm       |
| G | Antenna gain                         | 6.5 dBi     | 6.6 dBi      | 7.2 dBi     |
|   | <b>Maximum EIRP</b>                  | 8.9 mW      | 457.1 mW     | 52.5 mW     |
|   | <b>Collocation BT + WLAN 2.4 GHz</b> | 466 mW      |              |             |
|   | <b>Collocation BT + WLAN 5 GHz</b>   | 61.4 mW     |              |             |
|   | <b>Exclusion Limit from above:</b>   | 2.71 W      | 2.71 W       | 4.53 W      |

**Conclusion:** RF exposure evaluation is not required.

For applications where minimum distance to radiating element is 20cm Annex C of RSS-102 should be filled out.