

**FCC - TEST REPORT**

Report Number : **4842024420600D** Date of Issue: 2025.04.07

Model : THP23-ZB-X, THP23-ZB-P, THP23-ZB-X-Vx, THP23-ZB-Vx,  
THP23-M-X, THP23-M-Vx ("x" represents 1, 2, 3.....)

Product Type : Smart M Gateway

Applicant : Zhejiang Lingzhu Technology Co., Ltd.

Address : Room 302, No 1 Building Huace Center, Xihu District 310000,  
Hangzhou City, Zhejiang Province, PEOPLE'S REPUBLIC OF  
CHINA

Manufacturer : Zhejiang Lingzhu Technology Co., Ltd.

Address : Room 302, No 1 Building Huace Center, Xihu District 310000,  
Hangzhou City, Zhejiang Province, PEOPLE'S REPUBLIC OF  
CHINA

Test Result : ☒ Positive ☐ Negative

Total pages including  
Appendices : 177



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## 2 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

| Issue | Description of Change | Date of Issue |
|-------|-----------------------|---------------|
| 1     | First Issue           | 2025.04.03    |

## 3 Details about the Test Laboratory

### Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd.

Floor 1-4, Building B, No.37, Tuanjie Road(Middle), Xishan Economic and Technological Development Zone, Wuxi, Jiangsu. China

Test Firm FCC  
Registration  
Number: 571980

Designation  
number: CN1405

Telephone: +86 510 8820 3737  
Fax: +86 510 8820 3636



## 4 Description of the Equipment under Test

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product:                   | Smart M Gateway                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Model no.:                 | THP23-ZB-X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| FCC ID:                    | 2BEWXTHP23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Rating:                    | Gateway Input: DC 5V, 2A (Type C Port); DC 48V, 0.35A (PoE Port)<br>Adapter Input: 100-240V~, 50/60Hz, 0.4A (for model KA12H-0502000US);<br>100-240V~, 50/60Hz, 0.3A (for model TPA-10D050200UU01)<br>Adapter Output: DC 5.0V, 2.0A, 10W                                                                                                                                                                                                                                                                                                                                                                                          |
| RF Transmission Frequency: | 5G Wi-Fi: 5180~5240 MHz (U-NII-1), 5260~5320 MHz (U-NII-2A)<br>5500~5700 MHz (U-NII-2C), 5745~5825 MHz (U-NII-3)<br>Note: The device shall not be capable of transmitting in the 5600-5650 MHz band. This restriction is for the protection of Terminal Doppler Weather Radar (TDWR) operating in this band.                                                                                                                                                                                                                                                                                                                      |
| No. of Operated Channel:   | 22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Modulation:                | 802.11a: BPSK, QPSK, 16QAM, 64QAM<br>802.11n: BPSK, QPSK, 16QAM, 64QAM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Hardware Version:          | V1.3.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Software Version:          | V1.0.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Antenna Type:              | Built-in Antenna                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Antenna Gain:              | 5.15-5.25GHz: 1.64dBi, 5.25-5.35GHz: 1.89dBi,<br>5.47-5.725GHz: 2.35dBi, 5.725-5.85GHz: 2.44dBi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Description of the EUT:    | <p>The Equipment Under Test (EUT) is a Smart M Gateway which support 2.4GHz &amp; 5GHz Wi-Fi, Low Energy Bluetooth (1Mbps data rate) and Zigbee function. We tested it and listed the worst data in this report.</p> <p>The gateway can normally be powered by two different models of adapters: KA12H-0502000US and TPA-10D050200UU01. Additionally, the gateway can also be powered via its PoE (Power over Ethernet) port. According to the client's declaration, all models of the gateway have the same wireless parameters and electrical structures. In this report, only model THP23-ZB-X was chosen to perform test.</p> |

Test sample no.: WUX-0877560-006

Remark: This report is only for 5G Wi-Fi

The sample's mentioned in this report is/are submitted/ supplied/ manufactured by client. The laboratory therefore assumes no responsibility for accuracy of information on the brand name, model number, origin of manufacture, consignment, antenna gain, or any information supplied.



5 Summary of Test Standards

| Test Standards                      |                                                                                                         |
|-------------------------------------|---------------------------------------------------------------------------------------------------------|
| FCC Part 15 Subpart E, 2023 Edition | PART 15 - RADIO FREQUENCY DEVICES<br>Subpart E - Unlicensed National Information Infrastructure Devices |

Test Method:  
KDB 789033 D02 General UNII Test Procedures New Rules v02r01  
KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02  
KDB 905462 D03 Client Without DFS New Rules v01r02  
ANSI C63.10-2020, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

## 6 Summary of Test Results

| Technical Requirements                                                                                                      |                                  |            |           |                                     |                          |                          |
|-----------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------|-----------|-------------------------------------|--------------------------|--------------------------|
| FCC Part 15 Subpart C & E                                                                                                   |                                  |            |           |                                     |                          |                          |
| Test Condition                                                                                                              |                                  | Pages      | Test Site | Test Result                         |                          |                          |
|                                                                                                                             |                                  |            |           | Pass                                | Fail                     | N/A                      |
| §15.207                                                                                                                     | Conducted emission AC power port | 13-19      | Site 1    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §15.407(e)                                                                                                                  | Emission bandwidth               | 20-21      | Site 1    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15.407(a)(i)                                                                                                                | Maximum Conducted Output Power   | 22-23      | Site 1    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15.407(a)(i)                                                                                                                | Maximum Power Spectral Density   | 24         | Site 1    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §15.407(g)                                                                                                                  | Frequencies Stability            | 25-29      | Site 1    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §15.407(b)(1),<br>15.407(b)(2),<br>15.407(b)(3),<br>15.407(b)(4),<br>15.407(b)(5),<br>15.407(b)(6),<br>15.407(b)(7), 15.209 | Unwanted Emissions               | 30-113     | Site 1    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §15.203                                                                                                                     | Antenna requirement              | See note 1 |           | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Remark 1: The EUT operation at 5G Wi-Fi UNII (5180MHz-5240MHz, 5260MHz-5320MHz, 5500MHz-5700MHz, 5745MHz-5825MHz). The EUT is Clients Device without Radar Detection.

Remark 2: The EUT does not support the TPC (Transmit Power Control) functionality.

Remark 3: N/A – Not Applicable.

Note 1: The EUT uses a Built-in Antenna, which gain is 1.64dBi for 5.15-5.25GHz, 1.89dBi for 5.25-5.35GHz, 2.35dBi for 5.47-5.725GHz, 2.44dBi for 5.725-5.85GHz. According to §15.203, it is considered sufficiently to comply with the provisions of this section.

15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.



## 7 General Remarks

### Remarks

This submittal(s) (test report) is intended for FCC ID: 2BEWXTHP23 complies with Section 15.203, 15.207, 15.209, 15.407 of the FCC Part 15, Subpart E Rules.

This report is only for 5GHz Wi-Fi. The TX and RX range is 5180MHz-5240MHz, 5260MHz-5320MHz, 5500MHz-5700MHz, 5745MHz-5825MHz.

### SUMMARY:

All tests according to the regulations cited on page 6 were

■ - Performed

□ - **Not** Performed

The Equipment under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Sample Received Date: 2025.01.02

Testing Start Date: 2025.01.06

Testing End Date: 2025.03.07

- TÜV SÜD Certification and Testing (China) Co., Ltd.

Reviewed by:

Zhilan Xue  
Review Engineer

Prepared by:

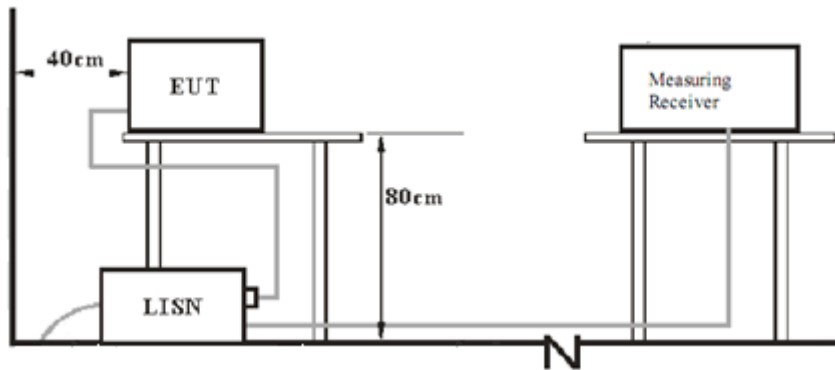
Xin Feng  
Project Engineer

Tested by:

Xu Zheng  
Test Engineer

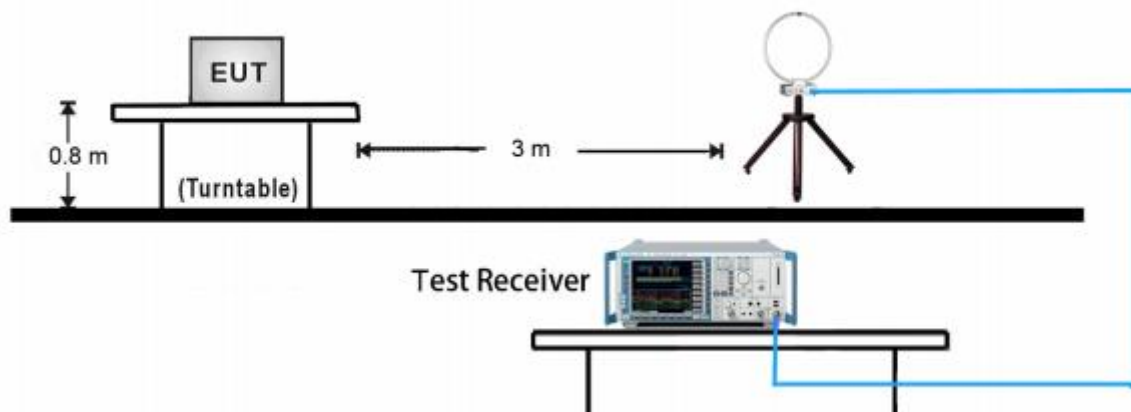
## 8 Test Setups

### 7.1 AC Power Line Conducted Emission test setups

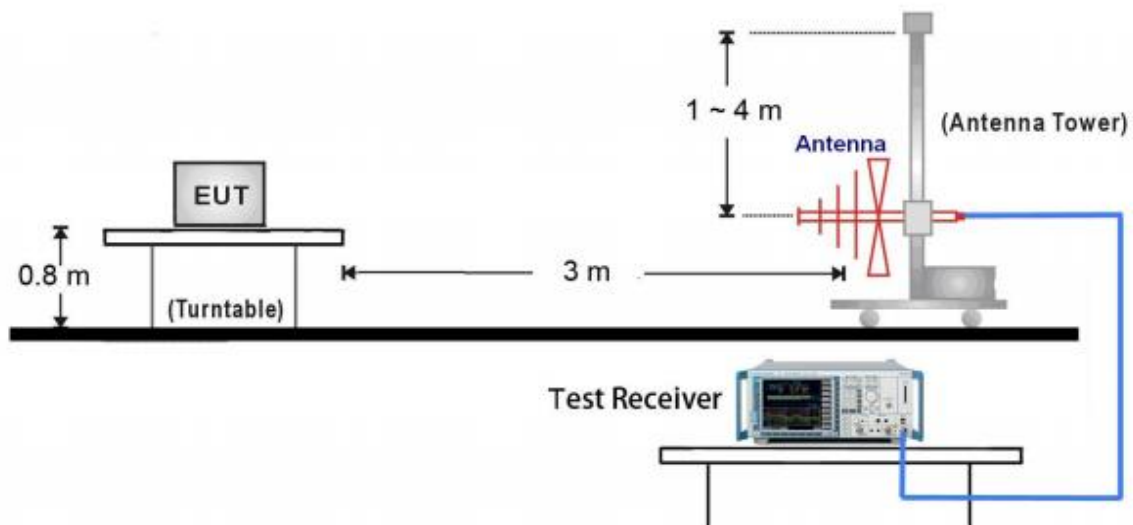


### 7.2 Radiated test setups

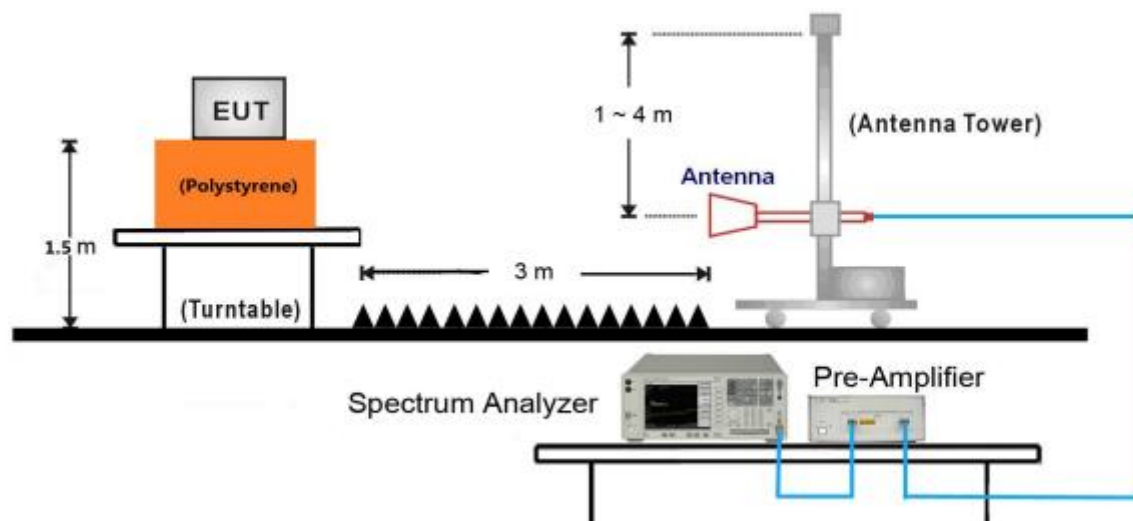
#### 9kHz ~ 30MHz Test Setup:



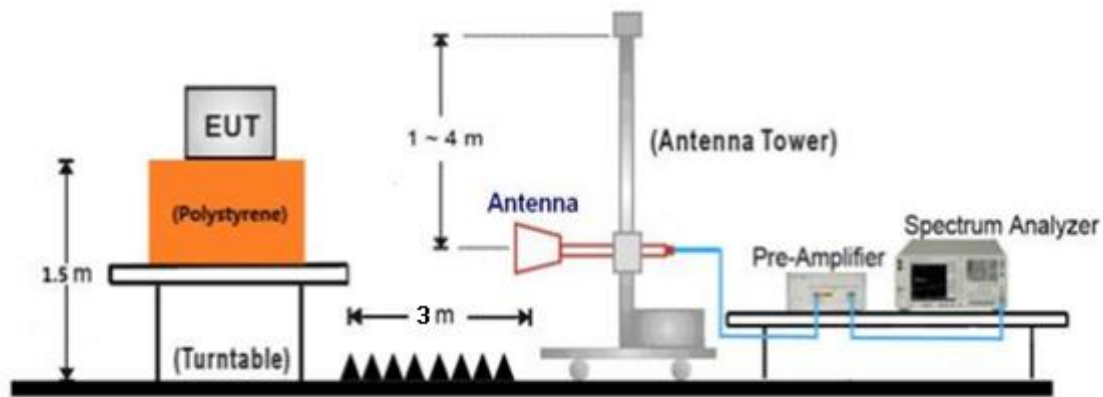
### 30MHz ~ 1GHz Test Setup:



### 1GHz ~ 18GHz Test Setup:

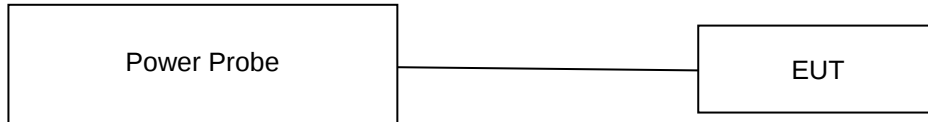


## 18GHz ~ 40GHz Test Setup:

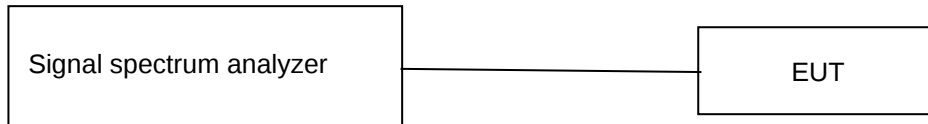


### 7.3 Conducted RF test setups

For Conducted peak output power



For other test items



## 9 Systems test configuration

Auxiliary Equipment Used during Test:

| DESCRIPTION | MANUFACTURER | MODEL NO.(SHIELD) | S/N(LENGTH) |
|-------------|--------------|-------------------|-------------|
| Notebook    | Huawei       | VLT-W50           | 2018AP1231  |

Test software: sscom5.13.1

The system was configured to channel:

| Test Mode    | Channel | Setting TX Power<br>(Index value) | Frequency (MHz) |
|--------------|---------|-----------------------------------|-----------------|
| 802.11a      | 36      | 15                                | 5180            |
|              | 40      | 15                                | 5200            |
|              | 48      | 15                                | 5240            |
|              | 52      | 15                                | 5260            |
|              | 60      | 15                                | 5300            |
|              | 64      | 15                                | 5320            |
|              | 100     | 15                                | 5500            |
|              | 116     | 15                                | 5580            |
|              | 140     | 14                                | 5700            |
|              | 149     | 14                                | 5745            |
|              | 157     | 14                                | 5785            |
|              | 165     | 14                                | 5825            |
| 802.11n HT20 | 36      | 15                                | 5180            |
|              | 40      | 15                                | 5200            |
|              | 48      | 15                                | 5240            |
|              | 52      | 15                                | 5260            |
|              | 60      | 15                                | 5300            |
|              | 64      | 15                                | 5320            |
|              | 100     | 15                                | 5500            |
|              | 116     | 15                                | 5580            |
|              | 140     | 14                                | 5700            |
|              | 149     | 14                                | 5745            |
|              | 157     | 14                                | 5785            |
|              | 165     | 14                                | 5825            |

The pre-test has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates.

**Test Mode**  
802.11a  
802.11n (HT20)

**Data Rate**  
6Mbps  
MCS0 (6.5Mbps)

## 10 Technical Requirement

### 10.1 Conducted Emission

#### Test Method

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. Both sides of AC line were checked for maximum conducted interference.
6. The frequency range from 150 kHz to 30 MHz was searched.
7. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively

#### Limit

According to §15.207, conducted emissions limit as below:

| Frequency<br>MHz | QP Limit<br>dB $\mu$ V | AV Limit<br>dB $\mu$ V |
|------------------|------------------------|------------------------|
| 0.150-0.500      | 66-56*                 | 56-46*                 |
| 0.500-5          | 56                     | 46                     |
| 5-30             | 60                     | 50                     |

Remark: “\*” Decreasing linearly with logarithm of the frequency

## Conducted Emission

# 150k-30MHz Conducted Emission Test

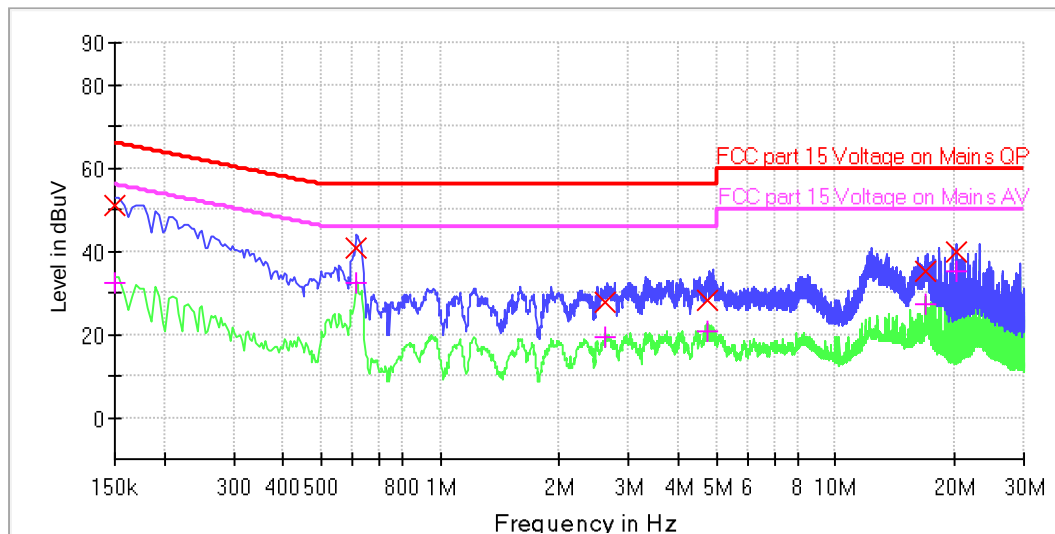
## EUT Information

EUT: Smart M Gateway  
 Model: THP23-ZB-X  
 Client: Zhejiang Lingzhu Technology Co., Ltd  
 Operating Conditions: Power on, 5G Wi-Fi transmitting, 802.11A 5745MHz  
 Operator Name: Xu Zheng  
 Input: AC 120V 60Hz  
 Test Standard: FCC Part 15.207(a)  
 Comment: Phase L, Adapter Model: TPA-10D050200UU01  
 Sample No.: WUX-0877560-006

## Scan Setup: Mains Voltage LISN 2 Lines 150kHz-30MHz Pre Fcc [EMI conducted]

Hardware Setup: Mains Voltage LISN 2 Lines 150kHz-30MHz\_Fcc  
 Receiver: [ESW 8]  
 Level Unit: dBuV

| Subrange         | Step Size | Detectors | IF BW | Meas. Time | Preamp |
|------------------|-----------|-----------|-------|------------|--------|
| 150 kHz - 30 MHz | 4 kHz     | PK+ ; AVG | 9 kHz | 0.01 s     | 0 dB   |



## Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Meas. Time (ms) | Bandwidth (kHz) | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBuV) | Margin - CAV (dB) | Limit - CAV (dBuV) |
|-----------------|------------------|-----------------|-----------------|-----------------|------------|-------------------|--------------------|-------------------|--------------------|
| 0.150000        | 51.0             | 32.5            | 1000.0          | 9.000           | 10.6       | 15.0              | 66.0               | 23.5              | 56.0               |
| 0.614000        | 40.8             | 32.4            | 1000.0          | 9.000           | 10.5       | 15.2              | 56.0               | 13.6              | 46.0               |
| 2.618000        | 27.8             | 19.4            | 1000.0          | 9.000           | 10.6       | 28.2              | 56.0               | 26.6              | 46.0               |
| 4.762000        | 28.1             | 20.7            | 1000.0          | 9.000           | 10.6       | 27.9              | 56.0               | 25.3              | 46.0               |
| 16.898000       | 35.2             | 27.2            | 1000.0          | 9.000           | 11.0       | 24.8              | 60.0               | 22.9              | 50.0               |
| 20.258000       | 39.5             | 35.0            | 1000.0          | 9.000           | 11.0       | 20.5              | 60.0               | 15.0              | 50.0               |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)  
 Factor (dB) = Cable Loss (dB) + LISN Factor (dB) + 10dB Attenuator

# 150k-30MHz Conducted Emission Test

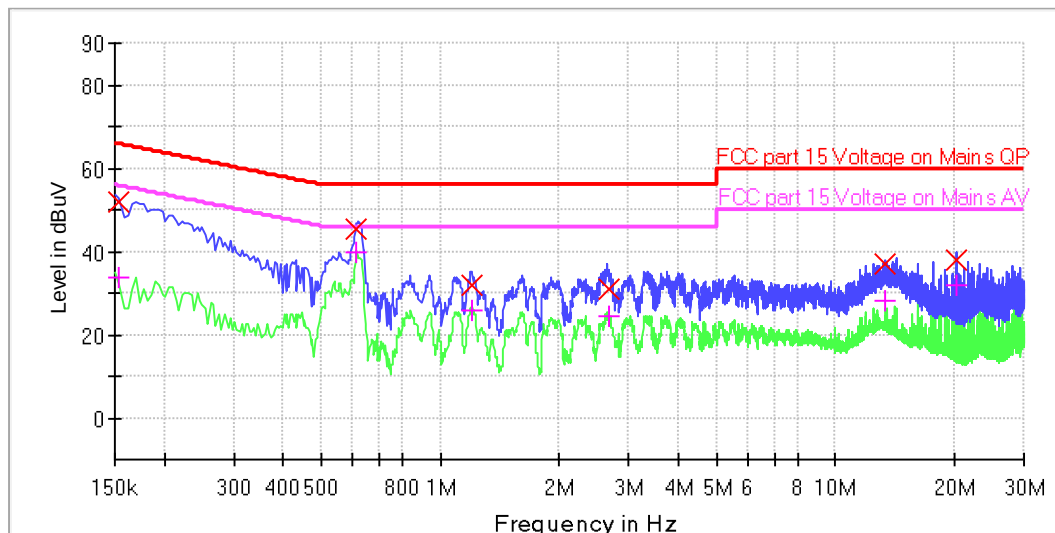
## EUT Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating Conditions: Power on, 5G Wi-Fi transmitting, 802.11A 5745MHz  
Operator Name: Xu Zheng  
Input: AC 120V 60Hz  
Test Standard: FCC Part 15.207(a)  
Comment: Phase N, Adapter Model: TPA-10D050200UU01  
Sample No.: WUX-0877560-006

## Scan Setup: Mains Voltage LISN 2 Lines 150kHz-30MHz Pre Fcc [EMI conducted]

Hardware Setup: Mains Voltage LISN 2 Lines 150kHz-30MHz\_Fcc  
Receiver: [ESW 8]  
Level Unit: dBuV

| Subrange         | Step Size | Detectors | IF BW | Meas. Time | Preamp |
|------------------|-----------|-----------|-------|------------|--------|
| 150 kHz - 30 MHz | 4 kHz     | PK+ ; AVG | 9 kHz | 0.01 s     | 0 dB   |



## Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Meas. Time (ms) | Bandwidth (kHz) | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBuV) | Margin - CAV (dB) | Limit - CAV (dBuV) |
|-----------------|------------------|-----------------|-----------------|-----------------|------------|-------------------|--------------------|-------------------|--------------------|
| 0.154000        | 51.7             | 33.9            | 1000.0          | 9.000           | 10.6       | 14.1              | 65.8               | 21.9              | 55.8               |
| 0.614000        | 45.5             | 39.8            | 1000.0          | 9.000           | 10.5       | 10.5              | 56.0               | 6.2               | 46.0               |
| 1.206000        | 32.1             | 25.7            | 1000.0          | 9.000           | 10.5       | 23.9              | 56.0               | 20.3              | 46.0               |
| 2.670000        | 31.1             | 24.4            | 1000.0          | 9.000           | 10.6       | 24.9              | 56.0               | 21.6              | 46.0               |
| 13.418000       | 37.0             | 28.3            | 1000.0          | 9.000           | 10.9       | 23.0              | 60.0               | 21.7              | 50.0               |
| 20.258000       | 37.8             | 31.8            | 1000.0          | 9.000           | 11.0       | 22.2              | 60.0               | 18.2              | 50.0               |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)  
Factor (dB) = Cable Loss (dB) + LISN Factor (dB) + 10dB Attenuator

# 150k-30MHz Conducted Emission Test

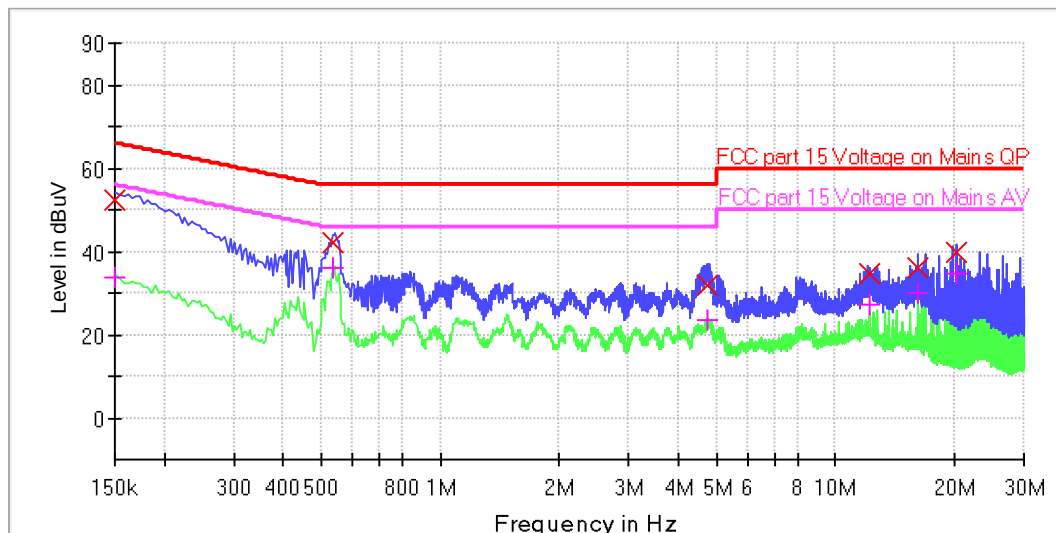
## EUT Information

EUT: Smart M Gateway  
 Model: THP23-ZB-X  
 Client: Zhejiang Lingzhu Technology Co., Ltd  
 Operating Conditions: Power on, 5G Wi-Fi transmitting, 802.11A 5745MHz  
 Operator Name: Xu Zheng  
 Input: AC 120V 60Hz  
 Test Standard: FCC Part 15.207(a)  
 Comment: Phase L, Adapter Model: KA12H-0502000US  
 Sample No.: WUX-0877560-006

## Scan Setup: Mains Voltage LISN 2 Lines 150kHz-30MHz Pre Fcc [EMI conducted]

Hardware Setup: Mains Voltage LISN 2 Lines 150kHz-30MHz\_Fcc  
 Receiver: [ESW 8]  
 Level Unit: dBuV

| Subrange         | Step Size | Detectors | IF BW | Meas. Time | Preamp |
|------------------|-----------|-----------|-------|------------|--------|
| 150 kHz - 30 MHz | 4 kHz     | PK+ ; AVG | 9 kHz | 0.01 s     | 0 dB   |



## Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Meas. Time (ms) | Bandwidth (kHz) | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBuV) | Margin - CAV (dB) | Limit - CAV (dBuV) |
|-----------------|------------------|-----------------|-----------------|-----------------|------------|-------------------|--------------------|-------------------|--------------------|
| 0.150000        | 52.3             | 33.8            | 1000.0          | 9.000           | 10.6       | 13.7              | 66.0               | 22.2              | 56.0               |
| 0.534000        | 41.9             | 36.0            | 1000.0          | 9.000           | 10.5       | 14.1              | 56.0               | 10.0              | 46.0               |
| 4.766000        | 31.6             | 23.4            | 1000.0          | 9.000           | 10.6       | 24.4              | 56.0               | 22.6              | 46.0               |
| 12.138000       | 34.4             | 27.2            | 1000.0          | 9.000           | 10.9       | 25.6              | 60.0               | 22.8              | 50.0               |
| 16.226000       | 36.1             | 30.0            | 1000.0          | 9.000           | 11.0       | 23.9              | 60.0               | 20.0              | 50.0               |
| 20.258000       | 39.7             | 34.7            | 1000.0          | 9.000           | 11.0       | 20.3              | 60.0               | 15.4              | 50.0               |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB) + 10dB Attenuator

# 150k-30MHz Conducted Emission Test

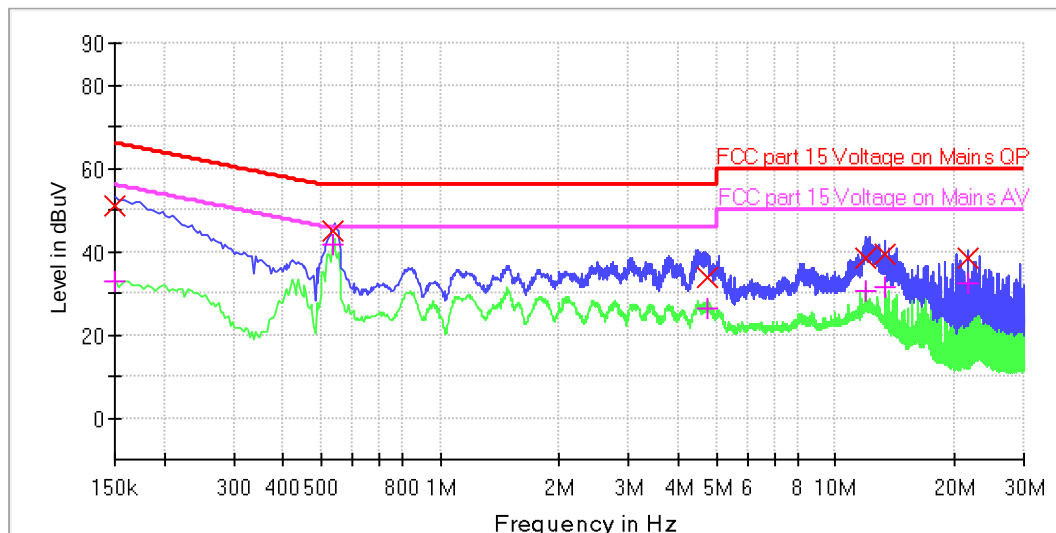
## EUT Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating Conditions: Power on, 5G Wi-Fi transmitting, 802.11A 5745MHz  
Operator Name: Xu Zheng  
Input: AC 120V 60Hz  
Test Standard: FCC Part 15.207(a)  
Comment: Phase N, Adapter Model: KA12H-0502000US  
Sample No.: WUX-0877560-006

## Scan Setup: Mains Voltage LISN 2 Lines 150kHz-30MHz Pre Fcc [EMI conducted]

Hardware Setup: Mains Voltage LISN 2 Lines 150kHz-30MHz\_Fcc  
Receiver: [ESW 8]  
Level Unit: dBuV

| Subrange         | Step Size | Detectors | IF BW | Meas. Time | Preamp |
|------------------|-----------|-----------|-------|------------|--------|
| 150 kHz - 30 MHz | 4 kHz     | PK+ ; AVG | 9 kHz | 0.01 s     | 0 dB   |



## Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Meas. Time (ms) | Bandwidth (kHz) | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBuV) | Margin - CAV (dB) | Limit - CAV (dBuV) |
|-----------------|------------------|-----------------|-----------------|-----------------|------------|-------------------|--------------------|-------------------|--------------------|
| 0.150000        | 50.7             | 32.6            | 1000.0          | 9.000           | 10.6       | 15.3              | 66.0               | 23.4              | 56.0               |
| 0.534000        | 45.1             | 41.9            | 1000.0          | 9.000           | 10.5       | 10.9              | 56.0               | 4.1               | 46.0               |
| 4.730000        | 33.9             | 26.2            | 1000.0          | 9.000           | 10.6       | 22.1              | 56.0               | 19.8              | 46.0               |
| 11.954000       | 38.6             | 30.2            | 1000.0          | 9.000           | 10.9       | 21.4              | 60.0               | 19.8              | 50.0               |
| 13.358000       | 39.3             | 31.3            | 1000.0          | 9.000           | 10.9       | 20.7              | 60.0               | 18.7              | 50.0               |
| 21.662000       | 38.2             | 32.5            | 1000.0          | 9.000           | 11.1       | 21.8              | 60.0               | 17.5              | 50.0               |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)  
Factor (dB) = Cable Loss (dB) + LISN Factor (dB) + 10dB Attenuator

# 150k-30MHz Conducted Emission Test

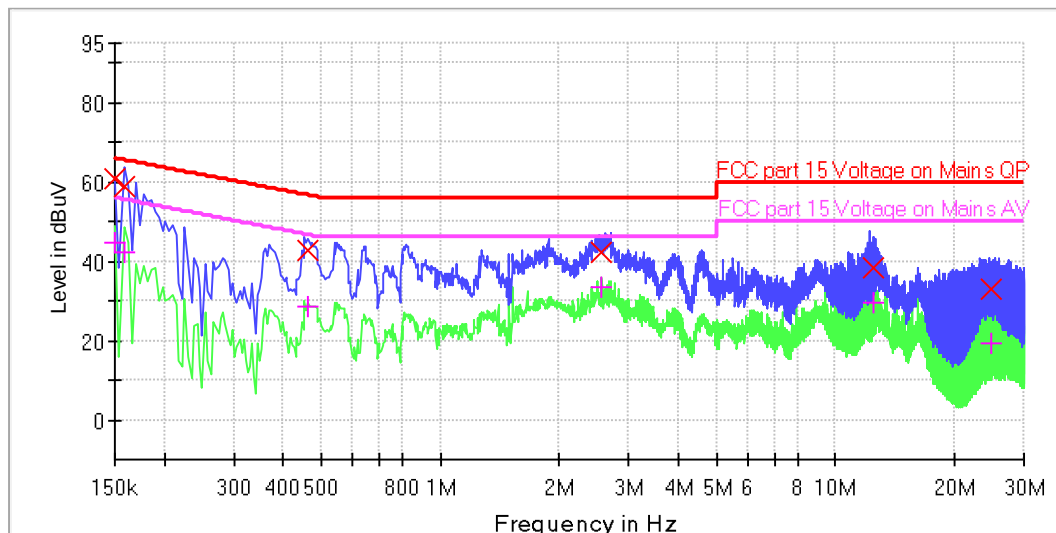
## EUT Information

EUT: Smart M Gateway  
 Model: THP23-ZB-X  
 Client: Zhejiang Lingzhu Technology Co., Ltd  
 Operating Conditions: Power on, 5G Wi-Fi transmitting, 802.11A 5745MHz  
 Operator Name: Xu Zheng  
 Input: AC 120V 60Hz (for a network switch that provides PoE power supply)  
 Test Standard: FCC Part 15.207(a)  
 Comment: Phase L  
 Sample No.: WUX-0877560-006

## Scan Setup: Mains Voltage LISN 2 Lines 150kHz-30MHz Pre Fcc [EMI conducted]

Hardware Setup: Mains Voltage LISN 2 Lines 150kHz-30MHz\_Fcc  
 Receiver: [ESW 8]  
 Level Unit: dBuV

| Subrange         | Step Size | Detectors | IF BW | Meas. Time | Preamp |
|------------------|-----------|-----------|-------|------------|--------|
| 150 kHz - 30 MHz | 4 kHz     | PK+ ; AVG | 9 kHz | 0.01 s     | 0 dB   |



## Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Meas. Time (ms) | Bandwidth (kHz) | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBuV) | Margin - CAV (dB) | Limit - CAV (dBuV) |
|-----------------|------------------|-----------------|-----------------|-----------------|------------|-------------------|--------------------|-------------------|--------------------|
| 0.150000        | 61.1             | 44.9            | 1000.0          | 9.000           | 10.1       | 5.0               | 66.0               | 11.1              | 56.0               |
| 0.158000        | 58.9             | 42.1            | 1000.0          | 9.000           | 10.1       | 6.7               | 65.6               | 13.5              | 55.6               |
| 0.462000        | 42.8             | 28.8            | 1000.0          | 9.000           | 10.1       | 13.9              | 56.7               | 17.9              | 46.7               |
| 2.566000        | 42.3             | 33.3            | 1000.0          | 9.000           | 10.2       | 13.7              | 56.0               | 12.7              | 46.0               |
| 12.542000       | 38.2             | 29.6            | 1000.0          | 9.000           | 10.5       | 21.8              | 60.0               | 20.4              | 50.0               |
| 24.770000       | 32.8             | 19.3            | 1000.0          | 9.000           | 10.7       | 27.2              | 60.0               | 30.7              | 50.0               |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB) + 10dB Attenuator

# 150k-30MHz Conducted Emission Test

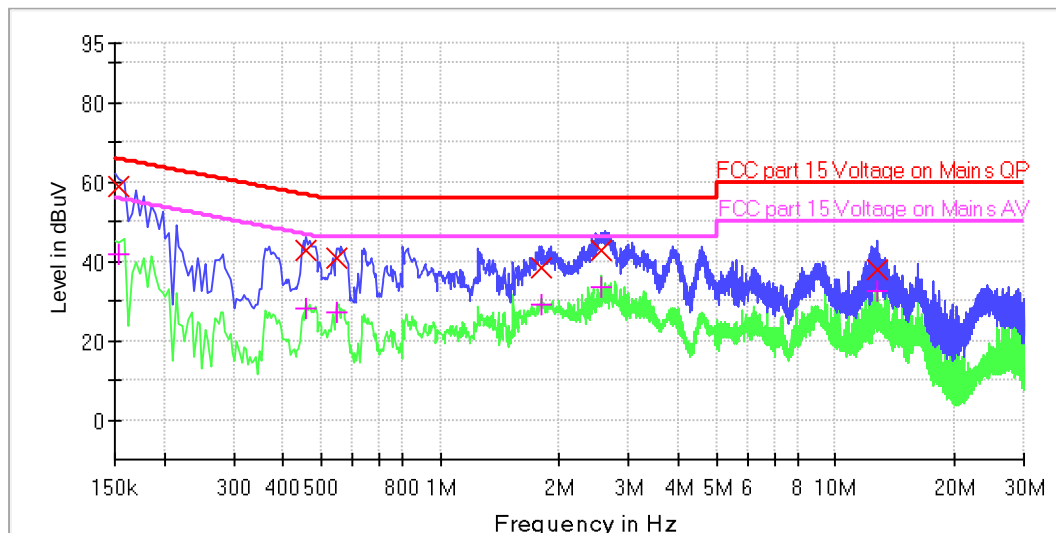
## EUT Information

EUT: Smart M Gateway  
 Model: THP23-ZB-X  
 Client: Zhejiang Lingzhu Technology Co., Ltd  
 Operating Conditions: Power on, 5G Wi-Fi transmitting, 802.11A 5745MHz  
 Operator Name: Xu Zheng  
 Input: AC 120V 60Hz (for a network switch that provides PoE power supply)  
 Test Standard: FCC Part 15.207(a)  
 Comment: Phase N  
 Sample No.: WUX-0877560-006

## Scan Setup: Mains Voltage LISN 2 Lines 150kHz-30MHz Pre Fcc [EMI conducted]

Hardware Setup: Mains Voltage LISN 2 Lines 150kHz-30MHz\_Fcc  
 Receiver: [ESW 8]  
 Level Unit: dBuV

| Subrange         | Step Size | Detectors | IF BW | Meas. Time | Preamp |
|------------------|-----------|-----------|-------|------------|--------|
| 150 kHz - 30 MHz | 4 kHz     | PK+ ; AVG | 9 kHz | 0.01 s     | 0 dB   |



## Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Meas. Time (ms) | Bandwidth (kHz) | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBuV) | Margin - CAV (dB) | Limit - CAV (dBuV) |
|-----------------|------------------|-----------------|-----------------|-----------------|------------|-------------------|--------------------|-------------------|--------------------|
| 0.154000        | 59.0             | 42.0            | 1000.0          | 9.000           | 10.1       | 6.8               | 65.8               | 13.8              | 55.8               |
| 0.458000        | 42.6             | 27.9            | 1000.0          | 9.000           | 10.1       | 14.1              | 56.7               | 18.9              | 46.7               |
| 0.546000        | 40.7             | 27.3            | 1000.0          | 9.000           | 10.1       | 15.3              | 56.0               | 18.7              | 46.0               |
| 1.806000        | 38.3             | 29.1            | 1000.0          | 9.000           | 10.2       | 17.7              | 56.0               | 16.9              | 46.0               |
| 2.550000        | 42.7             | 33.5            | 1000.0          | 9.000           | 10.2       | 13.3              | 56.0               | 12.5              | 46.0               |
| 12.810000       | 37.7             | 32.4            | 1000.0          | 9.000           | 10.5       | 22.3              | 60.0               | 17.6              | 50.0               |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)  
 Factor (dB) = Cable Loss (dB) + LISN Factor (dB) + 10dB Attenuator

## 10.2 Emission bandwidth

The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.

### 1. Test Method of 26dB Bandwidth

According to KDB789033 D02

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

**Limit:** No limit

### 2. Test Method of 6dB Bandwidth

According to KDB789033 D02

- a) Set RBW = 100KHz
- b) Set the video bandwidth (VBW)  $\geq 3 \times$  RBW
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

**Limit:**  $\geq 500\text{KHz}$

### 3. Test Method of 99% Bandwidth

According to KDB789033 D02

- a) Set center frequency to the nominal EUT channel center frequency
- b) Set span = 1.5 times to 5.0 times the OBW.
- c) Set RBW = 1 % to 5 % of the OBW
- d) Set VBW  $\geq 3 \cdot$  RBW
- e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
- f) Use the 99 % power bandwidth function of the instrument (if available).
- g) If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

**Limit:** No limit

## Test result as below table:

| Test Mode | Frequency [MHz] | 26dB EBW [MHz] | 6dB EBW [MHz] | OBW [MHz] | 6dB EBW Limit [MHz] | 26dB EBW & OBW Limit [MHz] | Verdict |
|-----------|-----------------|----------------|---------------|-----------|---------------------|----------------------------|---------|
| 11a       | 5180            | 20.814         | N/A           | 16.474    | ---                 | ---                        | PASS    |
|           | 5200            | 20.772         | N/A           | 16.477    | ---                 | ---                        | PASS    |
|           | 5240            | 20.820         | N/A           | 16.465    | ---                 | ---                        | PASS    |
|           | 5260            | 20.934         | N/A           | 16.471    | ---                 | ---                        | PASS    |
|           | 5300            | 20.910         | N/A           | 16.474    | ---                 | ---                        | PASS    |
|           | 5320            | 21.099         | N/A           | 16.462    | ---                 | ---                        | PASS    |
|           | 5500            | 20.895         | N/A           | 16.492    | ---                 | ---                        | PASS    |
|           | 5580            | 20.841         | N/A           | 16.486    | ---                 | ---                        | PASS    |
|           | 5700            | 20.937         | N/A           | 16.492    | ---                 | ---                        | PASS    |
|           | 5745            | N/A            | 16.293        | 16.468    | 0.5                 | ---                        | PASS    |
|           | 5785            | N/A            | 16.296        | 16.474    | 0.5                 | ---                        | PASS    |
|           | 5825            | N/A            | 16.266        | 16.480    | 0.5                 | ---                        | PASS    |
| 11n HT20  | 5180            | 21.990         | N/A           | 17.635    | ---                 | ---                        | PASS    |
|           | 5200            | 22.113         | N/A           | 17.629    | ---                 | ---                        | PASS    |
|           | 5240            | 21.993         | N/A           | 17.614    | ---                 | ---                        | PASS    |
|           | 5260            | 22.311         | N/A           | 17.641    | ---                 | ---                        | PASS    |
|           | 5300            | 21.822         | N/A           | 17.617    | ---                 | ---                        | PASS    |
|           | 5320            | 22.044         | N/A           | 17.638    | ---                 | ---                        | PASS    |
|           | 5500            | 22.080         | N/A           | 17.629    | ---                 | ---                        | PASS    |
|           | 5580            | 22.149         | N/A           | 17.635    | ---                 | ---                        | PASS    |
|           | 5700            | 22.074         | N/A           | 17.635    | ---                 | ---                        | PASS    |
|           | 5745            | N/A            | 17.232        | 17.620    | 0.5                 | ---                        | PASS    |
|           | 5785            | N/A            | 17.256        | 17.620    | 0.5                 | ---                        | PASS    |
|           | 5825            | N/A            | 17.031        | 17.626    | 0.5                 | ---                        | PASS    |

For test graphs please refer to Appendix A.

## 10.3 Maximum conducted output power

### Test Method

According to C63.10, the EUT was placed on 0.8m height table, the RF output of EUT was connected to the test power meter by RF cable. The path loss was compensated to the results for each measurement.

1. Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the following conditions are satisfied:  
The EUT is configured to transmit continuously or to transmit with a consistent duty cycle. At all times when the EUT is transmitting, it must be transmitting at its maximum power control level. The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
2. If the transmitter does not transmit continuously, measure the duty cycle,  $x$ , of the transmitter output signal as described in 12.2 in C63.10-2020.
3. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
4. Adjust the measurement in dBm by adding  $10 \log (1/x)$  where  $x$  is the duty cycle (e.g.,  $10 \log (1/0.25)$  if the duty cycle is 25%).

### Limits:

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where  $B$  is the 26dB emission bandwidth in megahertz.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

**Test Result**

| Test Mode | Frequency (MHz) | Conducted Power (dBm) | Duty Factor (dB) | Maximum Conducted Output Power (dBm) | Power Limit (dBm) | Verdict |
|-----------|-----------------|-----------------------|------------------|--------------------------------------|-------------------|---------|
| 11a       | 5180            | 13.52                 | 0.96             | 14.48                                | 24                | PASS    |
|           | 5200            | 13.29                 | 0.96             | 14.25                                | 24                | PASS    |
|           | 5240            | 13.55                 | 0.96             | 14.51                                | 24                | PASS    |
|           | 5260            | 13.22                 | 0.96             | 14.18                                | 24                | PASS    |
|           | 5300            | 12.96                 | 0.96             | 13.92                                | 24                | PASS    |
|           | 5320            | 13.25                 | 0.96             | 14.21                                | 24                | PASS    |
|           | 5500            | 13.69                 | 0.96             | 14.65                                | 24                | PASS    |
|           | 5580            | 13.24                 | 0.96             | 14.20                                | 24                | PASS    |
|           | 5700            | 13.67                 | 0.96             | 14.63                                | 24                | PASS    |
|           | 5745            | 13.79                 | 0.96             | <b>14.75</b>                         | 30                | PASS    |
|           | 5785            | 13.10                 | 0.96             | 14.06                                | 30                | PASS    |
|           | 5825            | 13.32                 | 0.96             | 14.28                                | 30                | PASS    |
| 11n HT20  | 5180            | 13.30                 | 1.02             | 14.32                                | 24                | PASS    |
|           | 5200            | 13.02                 | 1.02             | 14.04                                | 24                | PASS    |
|           | 5240            | 13.26                 | 1.02             | 14.28                                | 24                | PASS    |
|           | 5260            | 12.90                 | 1.02             | 13.92                                | 24                | PASS    |
|           | 5300            | 12.83                 | 1.02             | 13.85                                | 24                | PASS    |
|           | 5320            | 12.98                 | 1.02             | 14.00                                | 24                | PASS    |
|           | 5500            | 13.44                 | 1.02             | 14.46                                | 24                | PASS    |
|           | 5580            | 13.12                 | 1.02             | 14.14                                | 24                | PASS    |
|           | 5700            | 13.46                 | 1.02             | 14.48                                | 24                | PASS    |
|           | 5745            | 13.56                 | 1.02             | 14.58                                | 30                | PASS    |
|           | 5785            | 12.90                 | 1.02             | 13.92                                | 30                | PASS    |
|           | 5825            | 13.08                 | 1.02             | 14.10                                | 30                | PASS    |

## 10.4 Maximum power spectral density

### Test Method (Method SA-2 in C63.10-2020)

The EUT was placed on 0.8m height table, the RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement. (trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

1. Measure the duty cycle.
2. Set span to encompass the entire emission bandwidth (EBW) of the signal.
3. Set RBW = 1 MHz.
4. Set VBW  $\geq$  3 MHz.
5. Number of points in sweep  $\geq$  2 Span / RBW.
6. Sweep time = auto.
7. Detector = RMS
8. Trace average at least 100 traces in power averaging mode.
9. Add  $10 \log(1/x)$ , where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add  $10 \log(1/0.25) = 6$  dB if the duty cycle is 25 percent.

### Limit:

The maximum power spectral density shall not exceed 11dBm for the 5.15-5.25GHz, 5.25-5.35GHz, 5.47-5.725 GHz Band in any 1 megahertz band.

For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500kHz band.

### Test Result: Pass

For test result and graphs please refer to Appendix B.



## 10.5 Frequencies Stability

### Test Method

1. Connect the UUT to the spectrum analyzer
2. Set Centre Frequency of the channel under test.
3. Set Detector PEAK
4. Set RBW: 10KHz, VBW: 3RBW
5. Set Span: Encompass the entire emissions bandwidth (EBW) of the signal.
6. Allow the trace to stabilize, find the peak value of the power envelope and record the frequency, then calculated the frequency drift.

The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value.

User manual temperature is 0°C to 40°C, normal Temperature is +25°C.

Limit: 20ppm

Test Results (All conditions and all modes were performed, only list Worst-Case in the report)

Remark: NV is normal Voltage: 120V~, HV is High Voltage: 138V~, LV is Low Voltage: 102V~, NT is normal Temperature: +25 °C.

| Test Mode | Frequency (MHz) | Voltage [V~] | Temp (°C) | Deviation (Hz) | Deviation (ppm) | Limit (ppm) | Verdict |
|-----------|-----------------|--------------|-----------|----------------|-----------------|-------------|---------|
| 11a       | 5180            | 120          | NT        | -60000         | -11.58          | ± 20ppm     | PASS    |
|           |                 | 138          | NT        | -60000         | -11.58          | ± 20ppm     | PASS    |
|           |                 | 102          | NT        | -40000         | -7.72           | ± 20ppm     | PASS    |
|           |                 | NV           | 0         | -40000         | -7.72           | ± 20ppm     | PASS    |
|           |                 | NV           | 10        | -60000         | -11.58          | ± 20ppm     | PASS    |
|           |                 | NV           | 30        | -60000         | -11.58          | ± 20ppm     | PASS    |
|           |                 | NV           | 40        | -60000         | -11.58          | ± 20ppm     | PASS    |
|           | 5200            | 120          | NT        | -40000         | -7.69           | ± 20ppm     | PASS    |
|           |                 | 138          | NT        | -20000         | -3.85           | ± 20ppm     | PASS    |
|           |                 | 102          | NT        | -40000         | -7.69           | ± 20ppm     | PASS    |
|           |                 | NV           | 0         | -40000         | -7.69           | ± 20ppm     | PASS    |
|           |                 | NV           | 10        | -40000         | -7.69           | ± 20ppm     | PASS    |
|           |                 | NV           | 30        | -40000         | -7.69           | ± 20ppm     | PASS    |
|           |                 | NV           | 40        | -60000         | -11.54          | ± 20ppm     | PASS    |
|           | 5240            | 120          | NT        | -40000         | -7.63           | ± 20ppm     | PASS    |
|           |                 | 138          | NT        | -40000         | -7.63           | ± 20ppm     | PASS    |
|           |                 | 102          | NT        | -40000         | -7.63           | ± 20ppm     | PASS    |
|           |                 | NV           | 0         | -40000         | -7.63           | ± 20ppm     | PASS    |
|           |                 | NV           | 10        | -60000         | -11.45          | ± 20ppm     | PASS    |
|           |                 | NV           | 30        | -40000         | -7.63           | ± 20ppm     | PASS    |
|           |                 | NV           | 40        | -60000         | -11.45          | ± 20ppm     | PASS    |
|           | 5260            | 120          | NT        | -60000         | -11.41          | ± 20ppm     | PASS    |
|           |                 | 138          | NT        | -40000         | -7.60           | ± 20ppm     | PASS    |
|           |                 | 102          | NT        | -40000         | -7.60           | ± 20ppm     | PASS    |
|           |                 | NV           | 0         | -40000         | -7.60           | ± 20ppm     | PASS    |
|           |                 | NV           | 10        | -40000         | -7.60           | ± 20ppm     | PASS    |
|           |                 | NV           | 30        | -60000         | -11.41          | ± 20ppm     | PASS    |
|           |                 | NV           | 40        | -60000         | -11.41          | ± 20ppm     | PASS    |
|           | 5300            | 120          | NT        | -60000         | -11.32          | ± 20ppm     | PASS    |
|           |                 | 138          | NT        | -60000         | -11.32          | ± 20ppm     | PASS    |
|           |                 | 102          | NT        | -60000         | -11.32          | ± 20ppm     | PASS    |
|           |                 | NV           | 0         | -40000         | -7.55           | ± 20ppm     | PASS    |
|           |                 | NV           | 10        | -40000         | -7.55           | ± 20ppm     | PASS    |
|           |                 | NV           | 30        | -60000         | -11.32          | ± 20ppm     | PASS    |
|           |                 | NV           | 40        | -40000         | -7.55           | ± 20ppm     | PASS    |
|           | 5320            | 120          | NT        | -60000         | -11.28          | ± 20ppm     | PASS    |
|           |                 | 138          | NT        | -40000         | -7.52           | ± 20ppm     | PASS    |
|           |                 | 102          | NT        | -40000         | -7.52           | ± 20ppm     | PASS    |
|           |                 | NV           | 0         | -60000         | -11.28          | ± 20ppm     | PASS    |
|           |                 | NV           | 10        | -60000         | -11.28          | ± 20ppm     | PASS    |
|           |                 | NV           | 30        | -60000         | -11.28          | ± 20ppm     | PASS    |
|           |                 | NV           | 40        | -60000         | -11.28          | ± 20ppm     | PASS    |
|           | 5500            | 120          | NT        | -40000         | -7.27           | ± 20ppm     | PASS    |
|           |                 | 138          | NT        | -40000         | -7.27           | ± 20ppm     | PASS    |
|           |                 | 102          | NT        | -40000         | -7.27           | ± 20ppm     | PASS    |
|           |                 | NV           | 0         | -40000         | -7.27           | ± 20ppm     | PASS    |
|           |                 | NV           | 10        | -40000         | -7.27           | ± 20ppm     | PASS    |
|           |                 | NV           | 30        | -20000         | -3.64           | ± 20ppm     | PASS    |

|          |      |     |    |        |        |         |      |
|----------|------|-----|----|--------|--------|---------|------|
| 11n HT20 | 5580 | NV  | 40 | -40000 | -7.27  | ± 20ppm | PASS |
|          |      | 120 | NT | -40000 | -7.17  | ± 20ppm | PASS |
|          |      | 138 | NT | -40000 | -7.17  | ± 20ppm | PASS |
|          |      | 102 | NT | -40000 | -7.17  | ± 20ppm | PASS |
|          |      | NV  | 0  | -40000 | -7.17  | ± 20ppm | PASS |
|          |      | NV  | 10 | -40000 | -7.17  | ± 20ppm | PASS |
|          |      | NV  | 30 | -40000 | -7.17  | ± 20ppm | PASS |
|          |      | NV  | 40 | -40000 | -7.17  | ± 20ppm | PASS |
|          | 5700 | 120 | NT | -60000 | -10.53 | ± 20ppm | PASS |
|          |      | 138 | NT | -60000 | -10.53 | ± 20ppm | PASS |
|          |      | 102 | NT | -60000 | -10.53 | ± 20ppm | PASS |
|          |      | NV  | 0  | -60000 | -10.53 | ± 20ppm | PASS |
|          |      | NV  | 10 | -40000 | -7.02  | ± 20ppm | PASS |
|          |      | NV  | 30 | -40000 | -7.02  | ± 20ppm | PASS |
|          |      | NV  | 40 | -60000 | -10.53 | ± 20ppm | PASS |
|          |      | 120 | NT | -60000 | -10.44 | ± 20ppm | PASS |
|          | 5745 | 138 | NT | -60000 | -10.44 | ± 20ppm | PASS |
|          |      | 102 | NT | -60000 | -10.44 | ± 20ppm | PASS |
|          |      | NV  | 0  | -40000 | -6.96  | ± 20ppm | PASS |
|          |      | NV  | 10 | -40000 | -6.96  | ± 20ppm | PASS |
|          |      | NV  | 30 | -40000 | -6.96  | ± 20ppm | PASS |
|          |      | NV  | 40 | -40000 | -6.96  | ± 20ppm | PASS |
|          |      | 120 | NT | -60000 | -10.37 | ± 20ppm | PASS |
|          |      | 138 | NT | -60000 | -10.37 | ± 20ppm | PASS |
|          | 5785 | 102 | NT | -60000 | -10.37 | ± 20ppm | PASS |
|          |      | NV  | 0  | -60000 | -10.37 | ± 20ppm | PASS |
|          |      | NV  | 10 | -60000 | -10.37 | ± 20ppm | PASS |
|          |      | NV  | 30 | -40000 | -6.91  | ± 20ppm | PASS |
|          |      | NV  | 40 | -40000 | -6.91  | ± 20ppm | PASS |
|          |      | 120 | NT | -60000 | -10.30 | ± 20ppm | PASS |
|          |      | 138 | NT | -60000 | -10.30 | ± 20ppm | PASS |
|          |      | 102 | NT | -60000 | -10.30 | ± 20ppm | PASS |
|          | 5825 | NV  | 0  | -60000 | -10.30 | ± 20ppm | PASS |
|          |      | NV  | 10 | -40000 | -6.87  | ± 20ppm | PASS |
|          |      | NV  | 30 | -60000 | -10.30 | ± 20ppm | PASS |
|          |      | NV  | 40 | -60000 | -10.30 | ± 20ppm | PASS |
|          | 5180 | 120 | NT | -40000 | -7.72  | ± 20ppm | PASS |
|          |      | 138 | NT | -40000 | -7.72  | ± 20ppm | PASS |
|          |      | 102 | NT | -60000 | -11.58 | ± 20ppm | PASS |
|          |      | NV  | 0  | -40000 | -7.72  | ± 20ppm | PASS |
|          |      | NV  | 10 | -40000 | -7.72  | ± 20ppm | PASS |
|          |      | NV  | 30 | -40000 | -7.72  | ± 20ppm | PASS |
|          |      | NV  | 40 | -60000 | -11.58 | ± 20ppm | PASS |
|          |      | 120 | NT | -40000 | -7.69  | ± 20ppm | PASS |
|          | 5200 | 138 | NT | -40000 | -7.69  | ± 20ppm | PASS |
|          |      | 102 | NT | -20000 | -3.85  | ± 20ppm | PASS |
|          |      | NV  | 0  | -40000 | -7.69  | ± 20ppm | PASS |
|          |      | NV  | 10 | -20000 | -3.85  | ± 20ppm | PASS |
|          |      | NV  | 30 | -40000 | -7.69  | ± 20ppm | PASS |
|          |      | NV  | 30 | -40000 | -7.69  | ± 20ppm | PASS |



|  |      |     |    |        |        |         |      |
|--|------|-----|----|--------|--------|---------|------|
|  | 5240 | NV  | 40 | -40000 | -7.69  | ± 20ppm | PASS |
|  |      | 120 | NT | -60000 | -11.45 | ± 20ppm | PASS |
|  |      | 138 | NT | -60000 | -11.45 | ± 20ppm | PASS |
|  |      | 102 | NT | -60000 | -11.45 | ± 20ppm | PASS |
|  |      | NV  | 0  | -60000 | -11.45 | ± 20ppm | PASS |
|  |      | NV  | 10 | -40000 | -7.63  | ± 20ppm | PASS |
|  |      | NV  | 30 | -40000 | -7.63  | ± 20ppm | PASS |
|  |      | NV  | 40 | -40000 | -7.63  | ± 20ppm | PASS |
|  | 5260 | 120 | NT | -40000 | -7.60  | ± 20ppm | PASS |
|  |      | 138 | NT | -40000 | -7.60  | ± 20ppm | PASS |
|  |      | 102 | NT | -40000 | -7.60  | ± 20ppm | PASS |
|  |      | NV  | 0  | -40000 | -7.60  | ± 20ppm | PASS |
|  |      | NV  | 10 | -40000 | -7.60  | ± 20ppm | PASS |
|  |      | NV  | 30 | -20000 | -3.80  | ± 20ppm | PASS |
|  |      | NV  | 40 | -20000 | -3.80  | ± 20ppm | PASS |
|  | 5300 | 120 | NT | -40000 | -7.55  | ± 20ppm | PASS |
|  |      | 138 | NT | -40000 | -7.55  | ± 20ppm | PASS |
|  |      | 102 | NT | -40000 | -7.55  | ± 20ppm | PASS |
|  |      | NV  | 0  | -40000 | -7.55  | ± 20ppm | PASS |
|  |      | NV  | 10 | -40000 | -7.55  | ± 20ppm | PASS |
|  |      | NV  | 30 | -40000 | -7.55  | ± 20ppm | PASS |
|  |      | NV  | 40 | -40000 | -7.55  | ± 20ppm | PASS |
|  | 5320 | 120 | NT | -60000 | -11.28 | ± 20ppm | PASS |
|  |      | 138 | NT | -60000 | -11.28 | ± 20ppm | PASS |
|  |      | 102 | NT | -40000 | -7.52  | ± 20ppm | PASS |
|  |      | NV  | 0  | -40000 | -7.52  | ± 20ppm | PASS |
|  |      | NV  | 10 | -60000 | -11.28 | ± 20ppm | PASS |
|  |      | NV  | 30 | -40000 | -7.52  | ± 20ppm | PASS |
|  |      | NV  | 40 | -60000 | -11.28 | ± 20ppm | PASS |
|  | 5500 | 120 | NT | -60000 | -10.91 | ± 20ppm | PASS |
|  |      | 138 | NT | -60000 | -10.91 | ± 20ppm | PASS |
|  |      | 102 | NT | -60000 | -10.91 | ± 20ppm | PASS |
|  |      | NV  | 0  | -40000 | -7.27  | ± 20ppm | PASS |
|  |      | NV  | 10 | -40000 | -7.27  | ± 20ppm | PASS |
|  |      | NV  | 30 | -40000 | -7.27  | ± 20ppm | PASS |
|  |      | NV  | 40 | -60000 | -10.91 | ± 20ppm | PASS |
|  | 5580 | 120 | NT | -60000 | -10.75 | ± 20ppm | PASS |
|  |      | 138 | NT | -40000 | -7.17  | ± 20ppm | PASS |
|  |      | 102 | NT | -40000 | -7.17  | ± 20ppm | PASS |
|  |      | NV  | 0  | -60000 | -10.75 | ± 20ppm | PASS |
|  |      | NV  | 10 | -60000 | -10.75 | ± 20ppm | PASS |
|  |      | NV  | 30 | -60000 | -10.75 | ± 20ppm | PASS |
|  |      | NV  | 40 | -40000 | -7.17  | ± 20ppm | PASS |
|  | 5700 | 120 | NT | -60000 | -10.53 | ± 20ppm | PASS |
|  |      | 138 | NT | -60000 | -10.53 | ± 20ppm | PASS |
|  |      | 102 | NT | -60000 | -10.53 | ± 20ppm | PASS |
|  |      | NV  | 0  | -60000 | -10.53 | ± 20ppm | PASS |
|  |      | NV  | 10 | -40000 | -7.02  | ± 20ppm | PASS |
|  |      | NV  | 30 | -40000 | -7.02  | ± 20ppm | PASS |

|  |      |     |    |        |        |         |      |
|--|------|-----|----|--------|--------|---------|------|
|  | 5745 | NV  | 40 | -40000 | -7.02  | ± 20ppm | PASS |
|  |      | 120 | NT | -80000 | -13.93 | ± 20ppm | PASS |
|  |      | 138 | NT | -80000 | -13.93 | ± 20ppm | PASS |
|  |      | 102 | NT | -80000 | -13.93 | ± 20ppm | PASS |
|  |      | NV  | 0  | -80000 | -13.93 | ± 20ppm | PASS |
|  |      | NV  | 10 | -60000 | -10.44 | ± 20ppm | PASS |
|  |      | NV  | 30 | -60000 | -10.44 | ± 20ppm | PASS |
|  |      | NV  | 40 | -80000 | -13.93 | ± 20ppm | PASS |
|  | 5785 | 120 | NT | -20000 | -3.46  | ± 20ppm | PASS |
|  |      | 138 | NT | -20000 | -3.46  | ± 20ppm | PASS |
|  |      | 102 | NT | -20000 | -3.46  | ± 20ppm | PASS |
|  |      | NV  | 0  | 0      | 0      | ± 20ppm | PASS |
|  |      | NV  | 10 | 0      | 0      | ± 20ppm | PASS |
|  |      | NV  | 30 | -20000 | -3.46  | ± 20ppm | PASS |
|  |      | NV  | 40 | -20000 | -3.46  | ± 20ppm | PASS |
|  |      | NV  | 40 | -20000 | -3.46  | ± 20ppm | PASS |
|  | 5825 | 120 | NT | -60000 | -10.30 | ± 20ppm | PASS |
|  |      | 138 | NT | -60000 | -10.30 | ± 20ppm | PASS |
|  |      | 102 | NT | -60000 | -10.30 | ± 20ppm | PASS |
|  |      | NV  | 0  | -60000 | -10.30 | ± 20ppm | PASS |
|  |      | NV  | 10 | -40000 | -6.87  | ± 20ppm | PASS |
|  |      | NV  | 30 | -60000 | -10.30 | ± 20ppm | PASS |
|  |      | NV  | 40 | -60000 | -10.30 | ± 20ppm | PASS |
|  |      | NV  | 40 | -60000 | -11.58 | ± 20ppm | PASS |

## 10.6 Unwanted emissions

**Transmitting spurious emission test result as below:**

### **Radiated Spurious Emission Test Method:**

1. The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
3. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned
5. Use the following spectrum analyzer settings According to C63.10:
  - 1) Procedure for Unwanted Emissions Measurements Below 1000 MHz
    - RBW = 120 kHz
    - VBW = 300 kHz
    - Detector = Peak
    - Trace mode = max hold
  - 2) For Above 1GHz:  
Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
    - RBW = 1 MHz
    - VBW  $\geq$  3 MHz
    - Detector = Peak
    - Sweep time = auto
    - Trace mode = max hold
  - 3) Procedures for Average Unwanted Emissions Measurements above 1000 MHz
    - a) RBW = 1 MHz.
    - b) VBW  $\geq$  [3  $\times$  RBW].
    - c) Detector = Power averaging (rms), if [span / (# of points in sweep)]  $\leq$  RBW / 2. Satisfying this condition can require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, then the detector mode shall be set to peak.
    - d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.)
    - e) Sweep time = auto.
    - f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of 1 / D, where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)
    - g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the

emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:

(1) If power averaging (rms) mode was used in the preceding step e), then the correction factor is  $[10 \log (1 / D)]$ , where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.

(2) If linear voltage averaging mode was used in the preceding step e), then the correction factor is  $[20 \log (1 / D)]$ , where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB shall be added to the measured emission levels. If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

## Limit

The radio emission outside the operating frequency band shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Radiated emissions which fall in the restricted bands, as defined in section 15.205, must comply with the radiated emission limits specified in section 15.209.

| Frequency<br>MHz | Field Strength<br>uV/m | Field Strength<br>dBμV/m | Detector |
|------------------|------------------------|--------------------------|----------|
| 30-88            | 100                    | 40                       | QP       |
| 88-216           | 150                    | 43.5                     | QP       |
| 216-960          | 200                    | 46                       | QP       |
| 960-1000         | 500                    | 54                       | QP       |
| Above 1000       | 500                    | 54                       | AV       |
| Above 1000       | 5000                   | 74                       | PK       |

According to part 15.407b (1) (2) (3) (4)

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

According to part 15.407b (9), Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

According to part 15.407b (10), The provisions of §15.205 apply to intentional radiators operating under this section.

Note: According to C63.10, the Conversion Factors between E[dBμV/m] and EIRP[dBm] as below:  $E[dBμV/m] = EIRP[dBm] + 95.2$ , for d = 3 meters.

## Spurious radiated emissions for transmitter

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Data of measurement within frequency ranges 9kHz-30MHz are the noise floor or attenuated more than 20dB below the permissible limit or the field strength is too small to be measured, so test data does not present in this report.

Radiated Mode:

Transmitting spurious emission test result as below:

The worst case of Radiated Emission below 1GHz:

## 30-1000MHz Radiated Emission

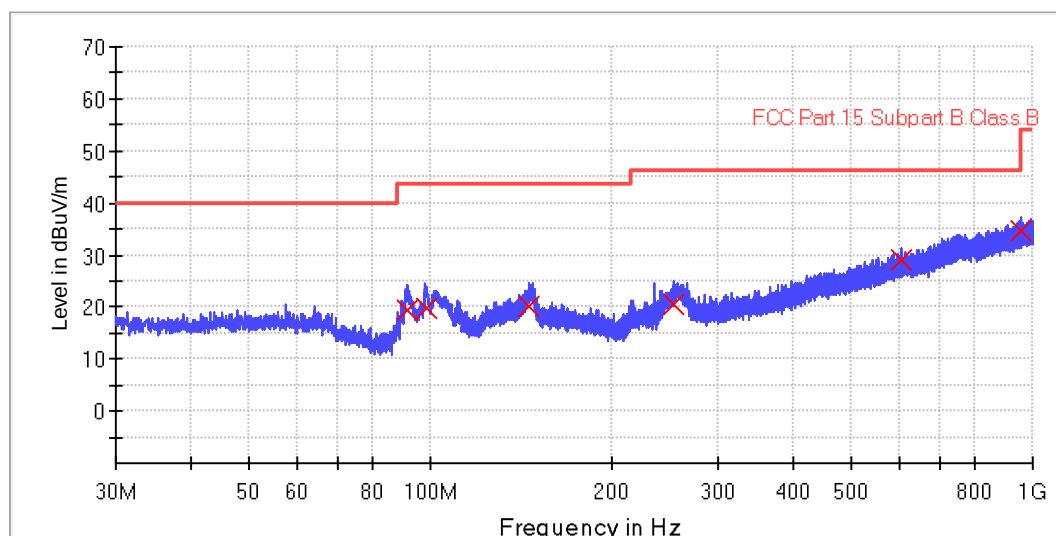
### Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11A 5500MHz  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.209(a)  
Comment: Horizontal, Adapter Model: TPA-10D050200UU01

### Sweep Setup: RE\_30M-1G\_Sweep\_3m [EMI radiated]

Hardware Setup: Radiated E Field 30MHz-1GHz\_3m  
Receiver: [ESR 7]  
Level Unit: dBuV/m

| Subrange       | Step Size  | Detectors | Bandwidth | Sweep Time | Preamp |
|----------------|------------|-----------|-----------|------------|--------|
| 30 MHz - 1 GHz | 40.417 kHz | PK+       | 120 kHz   | 1.5 s      | 20 dB  |



### Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV/m) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - QPK (dB) | Limit - QPK (dBuV/m) |
|-----------------|--------------------|-----------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 91.200000       | 19.4               | 120.000         | 220.0       | H   | 98.0          | 15.3         | 24.1              | 43.5                 |
| 98.120000       | 19.7               | 120.000         | 200.0       | H   | 119.0         | 16.2         | 23.8              | 43.5                 |
| 145.880000      | 20.2               | 120.000         | 200.0       | H   | 281.0         | 21.3         | 23.3              | 43.5                 |
| 253.920000      | 20.5               | 120.000         | 190.0       | H   | 199.0         | 20.7         | 25.6              | 46.0                 |
| 606.640000      | 29.1               | 120.000         | 200.0       | H   | 124.0         | 30.5         | 16.9              | 46.0                 |
| 953.840000      | 34.8               | 120.000         | 210.0       | H   | 205.0         | 35.7         | 11.2              | 46.0                 |

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

# 30-1000MHz Radiated Emission

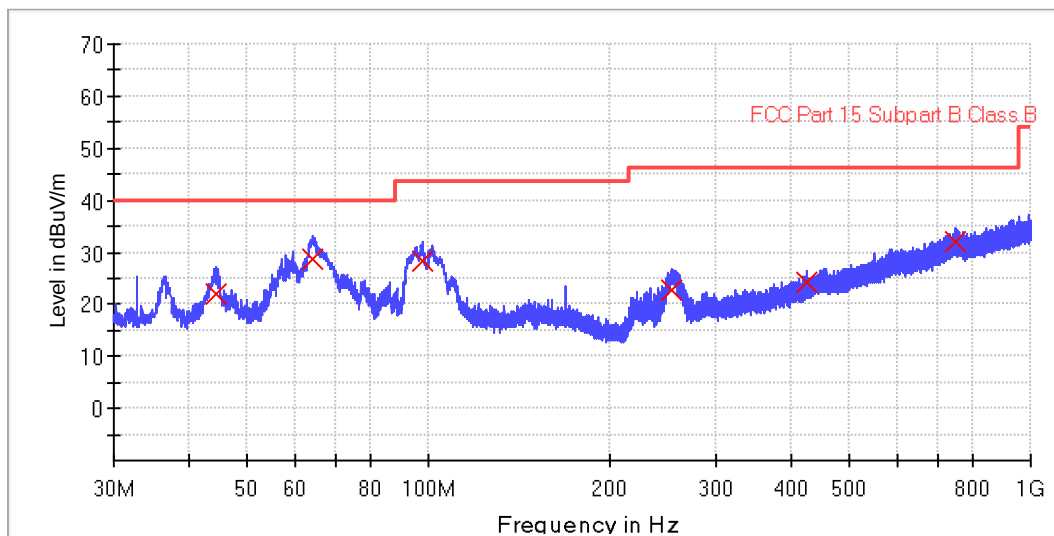
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11A 5500MHz  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.209(a)  
Comment: Vertical, Adapter Model: TPA-10D050200UU01

## Sweep Setup: RE\_30M-1G\_Sweep\_3m [EMI radiated]

Hardware Setup: Radiated E Field 30MHz-1GHz\_3m  
Receiver: [ESR 7]  
Level Unit: dBuV/m

| Subrange       | Step Size  | Detectors | Bandwidth | Sweep Time | Preamp |
|----------------|------------|-----------|-----------|------------|--------|
| 30 MHz - 1 GHz | 40.417 kHz | PK+       | 120 kHz   | 1.5 s      | 20 dB  |



## Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV/m) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - QPK (dB) | Limit - QPK (dBuV/m) |
|-----------------|--------------------|-----------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 44.480000       | 21.9               | 120.000         | 100.0       | V   | 145.0         | 20.7         | 18.2              | 40.0                 |
| 64.280000       | 28.6               | 120.000         | 120.0       | V   | 71.0          | 20.3         | 11.4              | 40.0                 |
| 97.520000       | 28.4               | 120.000         | 110.0       | V   | 182.0         | 16.1         | 15.1              | 43.5                 |
| 254.240000      | 22.9               | 120.000         | 115.0       | V   | 232.0         | 20.7         | 23.1              | 46.0                 |
| 423.440000      | 24.3               | 120.000         | 100.0       | V   | 204.0         | 26.0         | 21.8              | 46.0                 |
| 748.840000      | 32.0               | 120.000         | 110.0       | V   | 174.0         | 32.9         | 14.1              | 46.0                 |

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

# 30-1000MHz Radiated Emission

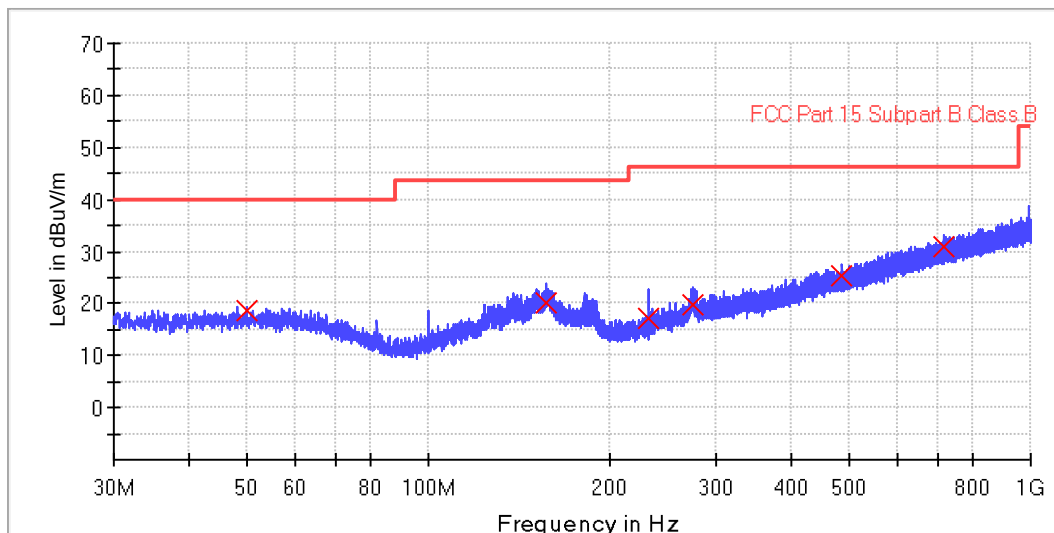
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11A 5500MHz  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.209(a)  
Comment: Horizontal, Adapter Model: KA12H-0502000US

## Sweep Setup: RE\_30M-1G\_Sweep\_3m [EMI radiated]

Hardware Setup: Radiated E Field 30MHz-1GHz\_3m  
Receiver: [ESR 7]  
Level Unit: dBuV/m

| Subrange       | Step Size  | Detectors | Bandwidth | Sweep Time | Preamp |
|----------------|------------|-----------|-----------|------------|--------|
| 30 MHz - 1 GHz | 40.417 kHz | PK+       | 120 kHz   | 1.5 s      | 20 dB  |



## Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - QPK (dB) | Limit - QPK (dBuV/m) |
|-----------------|--------------------|-----------------|-----------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 49.760000       | 18.7               | 1000.0          | 120.000         | 200.0       | H   | 141.0         | 21.0         | 21.3              | 40.0                 |
| 157.040000      | 20.1               | 1000.0          | 120.000         | 220.0       | H   | 225.0         | 21.6         | 23.4              | 43.5                 |
| 231.040000      | 17.3               | 1000.0          | 120.000         | 180.0       | H   | 151.0         | 19.4         | 28.7              | 46.0                 |
| 275.440000      | 19.9               | 1000.0          | 120.000         | 195.0       | H   | 31.0          | 21.7         | 26.1              | 46.0                 |
| 486.840000      | 25.5               | 1000.0          | 120.000         | 200.0       | H   | 145.0         | 27.4         | 20.6              | 46.0                 |
| 717.320000      | 30.9               | 1000.0          | 120.000         | 200.0       | H   | 311.0         | 32.1         | 15.2              | 46.0                 |

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)  
Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

## 30-1000MHz Radiated Emission

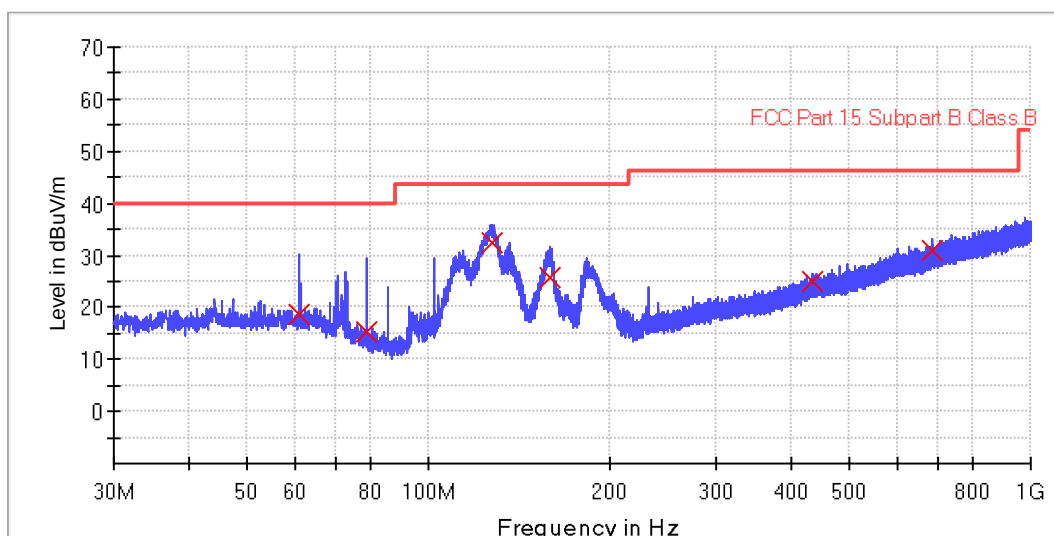
### Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11A 5500MHz  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.209(a)  
Comment: Vertical, Adapter Model: KA12H-0502000US

### Sweep Setup: RE\_30M-1G\_Sweep\_3m [EMI radiated]

Hardware Setup: Radiated E Field 30MHz-1GHz\_3m  
Receiver: [ESR 7]  
Level Unit: dBuV/m

| Subrange       | Step Size  | Detectors | Bandwidth | Sweep Time | Preamp |
|----------------|------------|-----------|-----------|------------|--------|
| 30 MHz - 1 GHz | 40.417 kHz | PK+       | 120 kHz   | 1.5 s      | 20 dB  |



### Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - QPK (dB) | Limit - QPK (dBuV/m) |
|-----------------|--------------------|-----------------|-----------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 60.880000       | 18.5               | 1000.0          | 120.000         | 100.0       | V   | 239.0         | 20.5         | 21.5              | 40.0                 |
| 78.800000       | 15.2               | 1000.0          | 120.000         | 110.0       | V   | 221.0         | 16.8         | 24.8              | 40.0                 |
| 127.640000      | 32.5               | 1000.0          | 120.000         | 120.0       | V   | 90.0          | 19.8         | 11.0              | 43.5                 |
| 158.840000      | 25.9               | 1000.0          | 120.000         | 100.0       | V   | 125.0         | 21.6         | 17.6              | 43.5                 |
| 433.480000      | 24.9               | 1000.0          | 120.000         | 125.0       | V   | 148.0         | 26.3         | 21.1              | 46.0                 |
| 688.200000      | 30.8               | 1000.0          | 120.000         | 100.0       | V   | 259.0         | 31.7         | 15.2              | 46.0                 |

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

## 30-1000MHz Radiated Emission

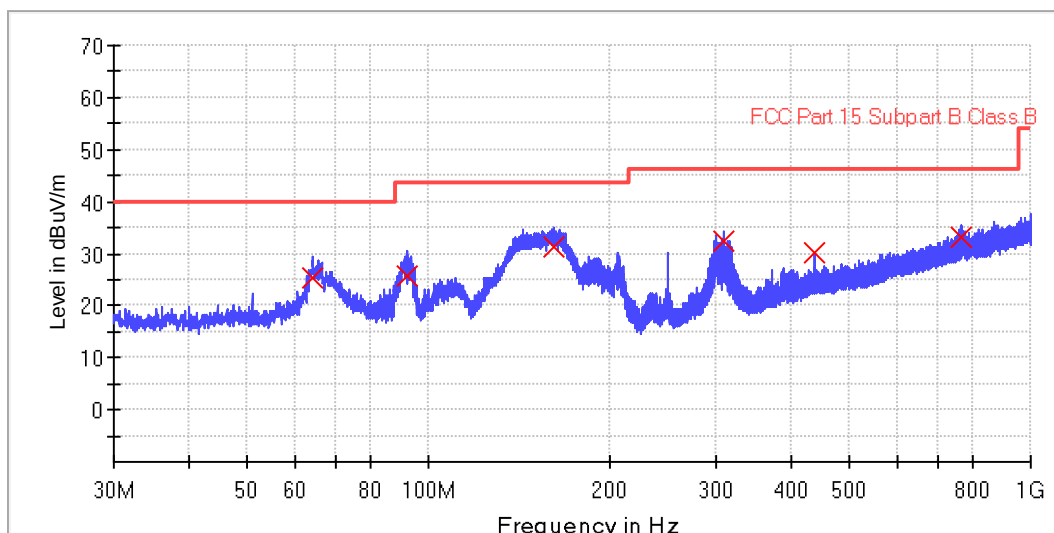
### Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11A 5500MHz  
Operator name: Xu Zheng  
Input: AC 120V 60Hz (for a network switch that provides PoE power supply)  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.209(a)  
Comment: Horizontal

### Sweep Setup: RE\_30M-1G\_Sweep\_3m [EMI radiated]

Hardware Setup: Radiated E Field 30MHz-1GHz\_3m  
Receiver: [ESR 7]  
Level Unit: dBuV/m

| Subrange       | Step Size  | Detectors | Bandwidth | Sweep Time | Preamp |
|----------------|------------|-----------|-----------|------------|--------|
| 30 MHz - 1 GHz | 40.417 kHz | PK+       | 120 kHz   | 1.5 s      | 20 dB  |



### Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - QPK (dB) | Limit - QPK (dBuV/m) |
|-----------------|--------------------|-----------------|-----------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 64.200000       | 25.2               | 1000.0          | 120.000         | 210.0       | H   | 229.0         | 20.3         | 14.8              | 40.0                 |
| 92.080000       | 25.6               | 1000.0          | 120.000         | 215.0       | H   | 60.0          | 15.4         | 17.9              | 43.5                 |
| 161.560000      | 31.3               | 1000.0          | 120.000         | 220.0       | H   | 298.0         | 21.5         | 12.2              | 43.5                 |
| 308.720000      | 32.4               | 1000.0          | 120.000         | 200.0       | H   | 101.0         | 22.8         | 13.6              | 46.0                 |
| 437.520000      | 30.1               | 1000.0          | 120.000         | 185.0       | H   | 170.0         | 26.5         | 15.9              | 46.0                 |
| 764.560000      | 33.0               | 1000.0          | 120.000         | 200.0       | H   | 305.0         | 33.3         | 13.0              | 46.0                 |

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

## 30-1000MHz Radiated Emission

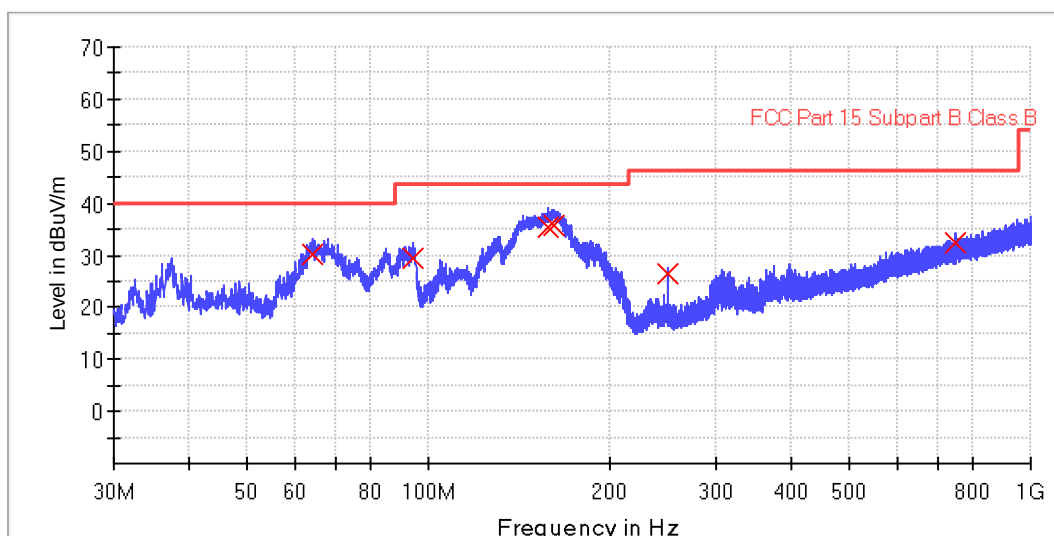
### Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11A 5500MHz  
Operator name: Xu Zheng  
Input: AC 120V 60Hz (for a network switch that provides PoE power supply)  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.209(a)  
Comment: Vertical

### Sweep Setup: RE\_30M-1G\_Sweep\_3m [EMI radiated]

Hardware Setup: Radiated E Field 30MHz-1GHz\_3m  
Receiver: [ESR 7]  
Level Unit: dBuV/m

| Subrange       | Step Size  | Detectors | Bandwidth | Sweep Time | Preamp |
|----------------|------------|-----------|-----------|------------|--------|
| 30 MHz - 1 GHz | 40.417 kHz | PK+       | 120 kHz   | 1.5 s      | 20 dB  |



### Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - QPK (dB) | Limit - QPK (dBuV/m) |
|-----------------|--------------------|-----------------|-----------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 64.160000       | 30.2               | 1000.0          | 120.000         | 120.0       | V   | 190.0         | 20.3         | 9.8               | 40.0                 |
| 94.400000       | 29.3               | 1000.0          | 120.000         | 120.0       | V   | 83.0          | 15.6         | 14.2              | 43.5                 |
| 158.160000      | 35.4               | 1000.0          | 120.000         | 100.0       | V   | 309.0         | 21.6         | 8.1               | 43.5                 |
| 162.000000      | 35.9               | 1000.0          | 120.000         | 110.0       | V   | 195.0         | 21.5         | 7.6               | 43.5                 |
| 250.040000      | 26.4               | 1000.0          | 120.000         | 115.0       | V   | 286.0         | 20.6         | 19.6              | 46.0                 |
| 750.040000      | 32.5               | 1000.0          | 120.000         | 110.0       | V   | 203.0         | 32.9         | 13.6              | 46.0                 |

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

The worst case of Radiated Emission 1GHz-18GHz:

# 1-18G Radiated Emission Test

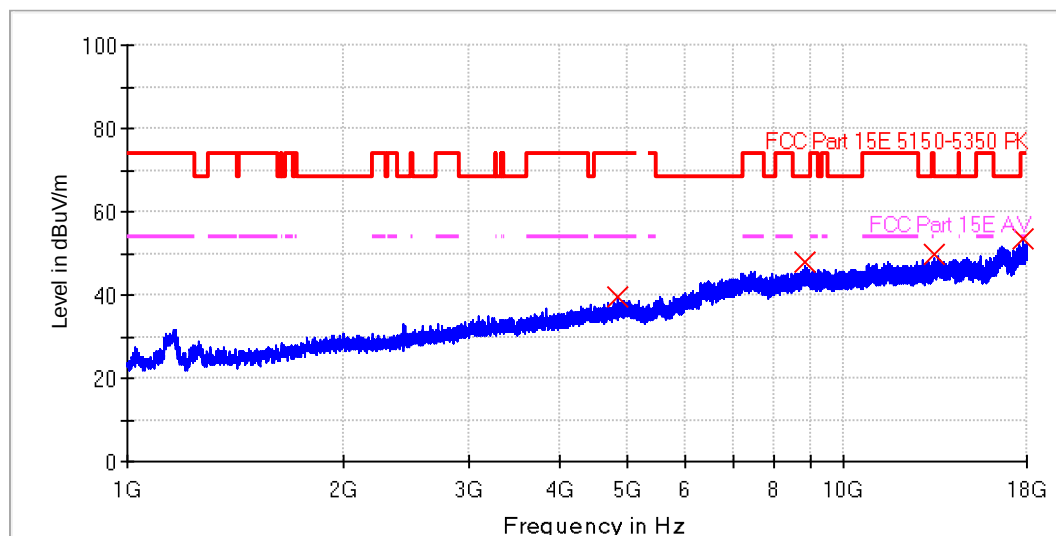
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5180M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Horizontal, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-------------|-----------|-----------|------------|--------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB   |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

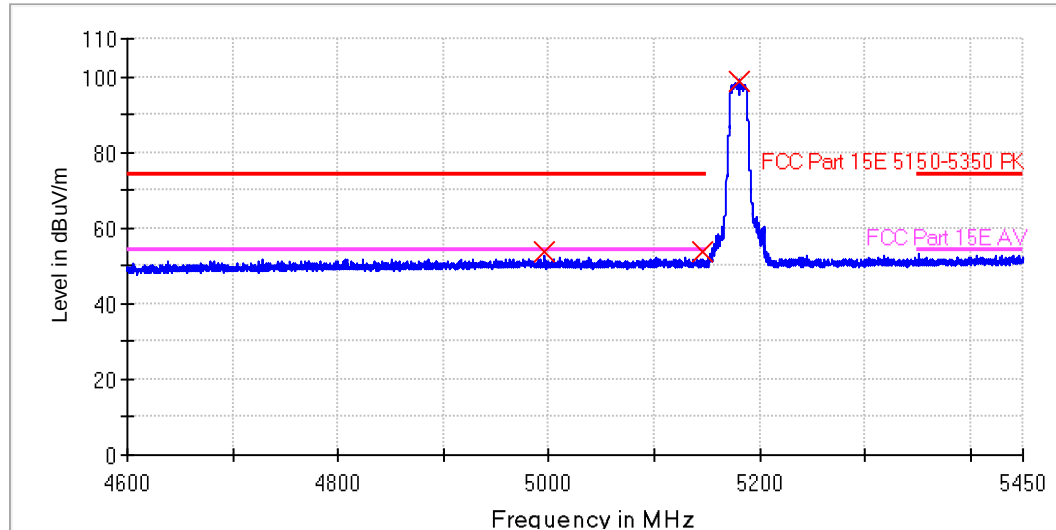
| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4820.500000     | 39.4             | 200.0       | H   | 156.0         | -0.8         | 34.6              | 74.0                 |
| 8813.500000     | 48.1             | 190.0       | H   | 111.0         | 11.9         | 20.2              | 68.2                 |
| 13330.500000    | 49.7             | 195.0       | H   | 236.0         | 17.0         | 24.3              | 74.0                 |
| 17794.000000    | 53.3             | 210.0       | H   | 173.0         | 22.1         | 20.7              | 74.0                 |

Note: Emission level= Original Receiver Reading + Correct Factor  
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

## Sweep Setup: FCC\_Band edge-4600-5400 Sweep 3m\_agilent [EMI radiated]

Hardware Setup: FCC part15E Radiated E Field 1GHz-18GHz\_3m\_Agilent  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange           | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--------------------|-----------|-----------|-----------|------------|--------|
| 4.6 GHz - 5.45 GHz | 170 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4995.500000     | 53.8             | 210.0       | H   | 158.0         | 9.4          | 20.2              | 74.0                 |
| 5145.500000     | 53.5             | 195.0       | H   | 81.0          | 9.6          | 20.5              | 74.0                 |
| 5180.000000     | 98.7             | 205.0       | H   | 201.0         | 9.6          | ---               | ---                  |

Note: Emission level= Original Receiver Reading + Correct Factor

Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

# 1-18G Radiated Emission Test

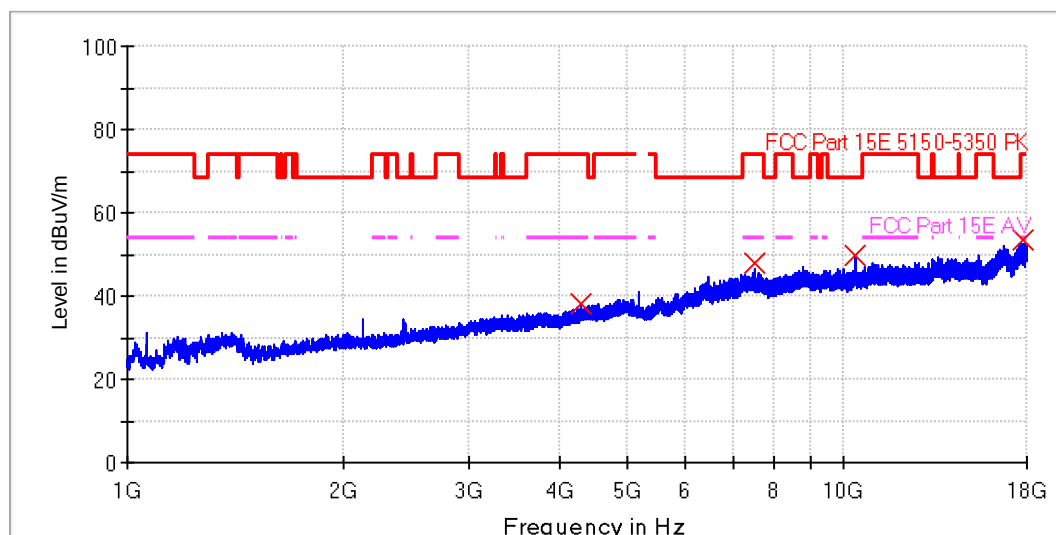
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5180M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Vertical, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-------------|-----------|-----------|------------|--------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB   |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

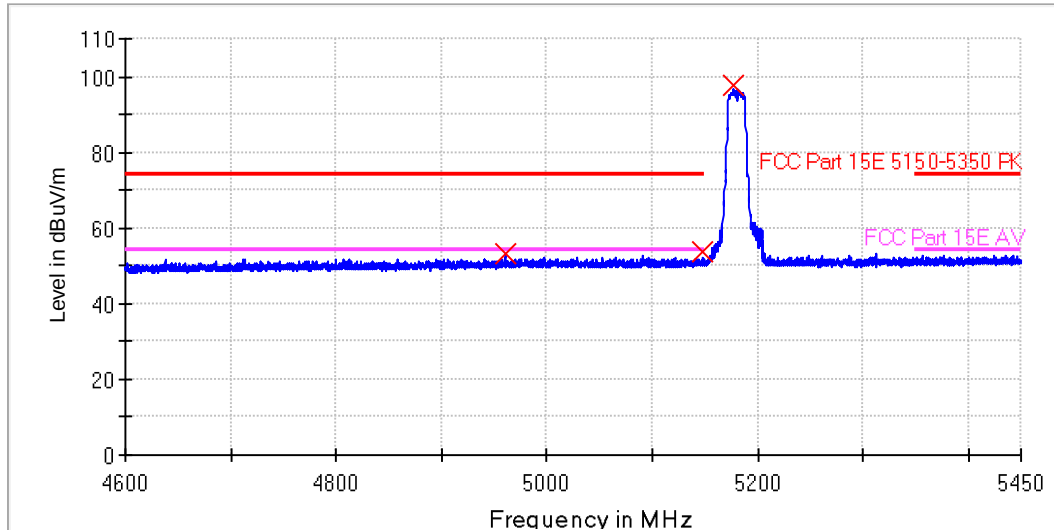
| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4305.500000     | 38.0             | 135.0       | V   | 240.0         | -2.6         | 36.0              | 74.0                 |
| 7494.500000     | 47.8             | 140.0       | V   | 143.0         | 9.3          | 26.2              | 74.0                 |
| 10355.500000    | 49.9             | 155.0       | V   | 139.0         | 12.4         | 18.3              | 68.2                 |
| 17795.500000    | 53.4             | 140.0       | V   | 114.0         | 22.1         | 20.7              | 74.0                 |

Note: Emission level= Original Receiver Reading + Correct Factor  
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

## Sweep Setup: FCC\_Band edge-4600-5400 Sweep 3m\_agilent [EMI radiated]

Hardware Setup: FCC part15E Radiated E Field 1GHz-18GHz\_3m\_Agilent  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange           | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--------------------|-----------|-----------|-----------|------------|--------|
| 4.6 GHz - 5.45 GHz | 170 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4960.000000     | 53.4             | 150.0       | V   | 237.0         | 9.3          | 20.6              | 74.0                 |
| 5148.500000     | 53.8             | 135.0       | V   | 76.0          | 9.6          | 20.2              | 74.0                 |
| 5176.500000     | 97.7             | 145.0       | V   | 162.0         | 9.6          | ---               | ---                  |

Note: Emission level= Original Receiver Reading + Correct Factor

Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

# 1-18G Radiated Emission Test

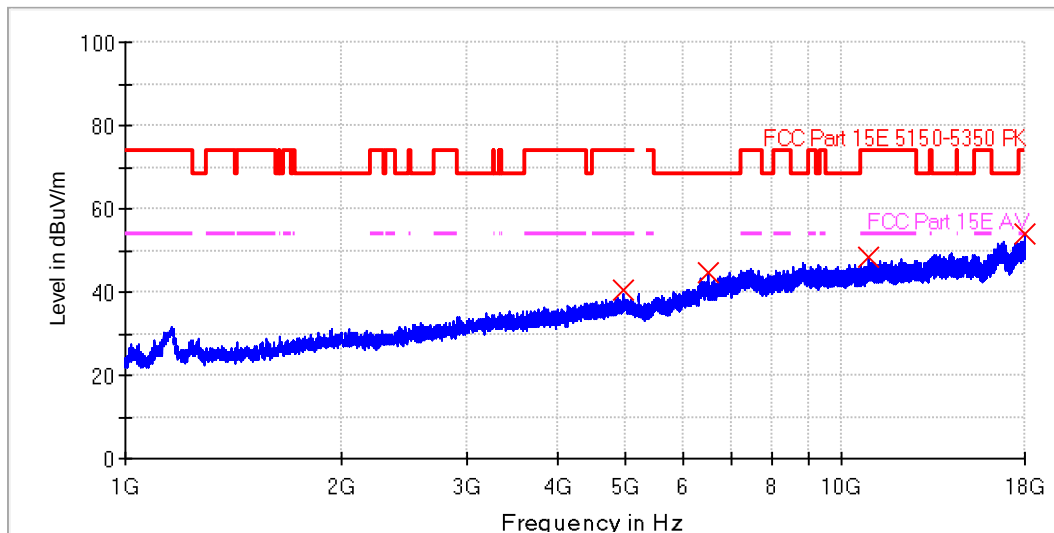
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5200M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Horizontal, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-------------|-----------|-----------|------------|--------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB   |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4950.500000     | 40.3             | 175.0       | H   | 180.0         | 0.0          | 33.7              | 74.0                 |
| 6507.500000     | 44.6             | 180.0       | H   | 151.0         | 7.0          | 23.6              | 68.2                 |
| 10922.000000    | 48.5             | 200.0       | H   | 284.0         | 13.5         | 25.5              | 74.0                 |
| 17973.500000    | 53.8             | 190.0       | H   | 101.0         | 22.1         | 20.2              | 74.0                 |

Note: Emission level= Original Receiver Reading + Correct Factor

Correct Factor = Antenna Factor + Cable Loss - Amplifier gain

# 1-18G Radiated Emission Test

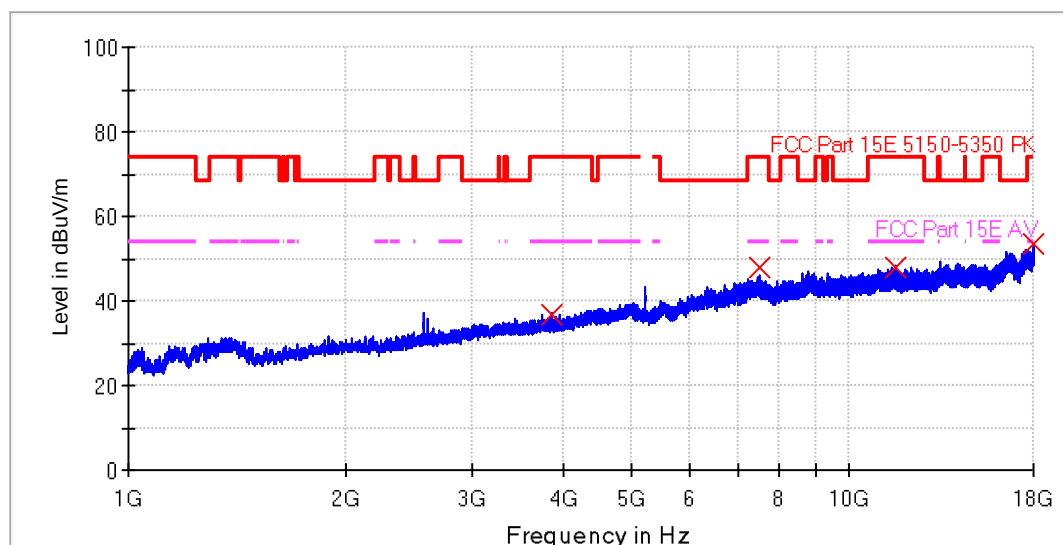
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5200M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Vertical, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-------------|-----------|-----------|------------|--------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB   |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 3856.500000     | 37.0             | 120.0       | V   | 121.0         | -3.9         | 37.0              | 74.0                 |
| 7495.000000     | 48.0             | 130.0       | V   | 205.0         | 9.3          | 26.0              | 74.0                 |
| 11598.000000    | 48.1             | 120.0       | V   | 198.0         | 14.1         | 25.9              | 74.0                 |
| 17953.000000    | 53.7             | 145.0       | V   | 81.0          | 22.1         | 20.3              | 74.0                 |

Note: Emission level= Original Receiver Reading + Correct Factor  
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

# 1-18G Radiated Emission Test

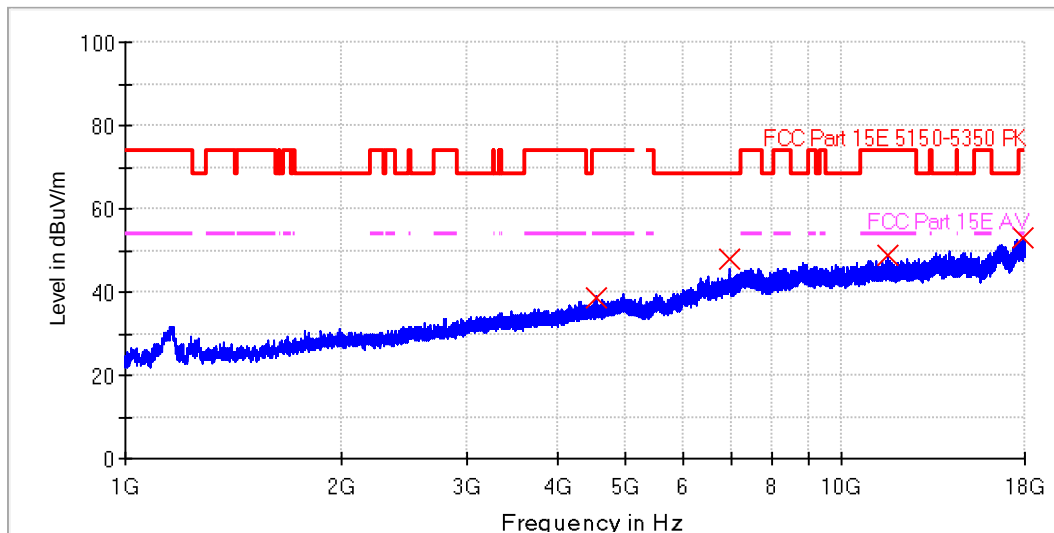
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5240M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Horizontal, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-------------|-----------|-----------|------------|--------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB   |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4546.500000     | 38.5             | 190.0       | H   | 197.0         | -1.9         | 35.6              | 74.0                 |
| 6986.500000     | 48.0             | 185.0       | H   | 176.0         | 7.3          | 20.3              | 68.2                 |
| 11556.500000    | 48.9             | 200.0       | H   | 70.0          | 14.1         | 25.1              | 74.0                 |
| 17912.000000    | 53.1             | 170.0       | H   | 305.0         | 22.1         | 20.9              | 74.0                 |

Note: Emission level= Original Receiver Reading + Correct Factor

Correct Factor = Antenna Factor + Cable Loss - Amplifier gain

# 1-18G Radiated Emission Test

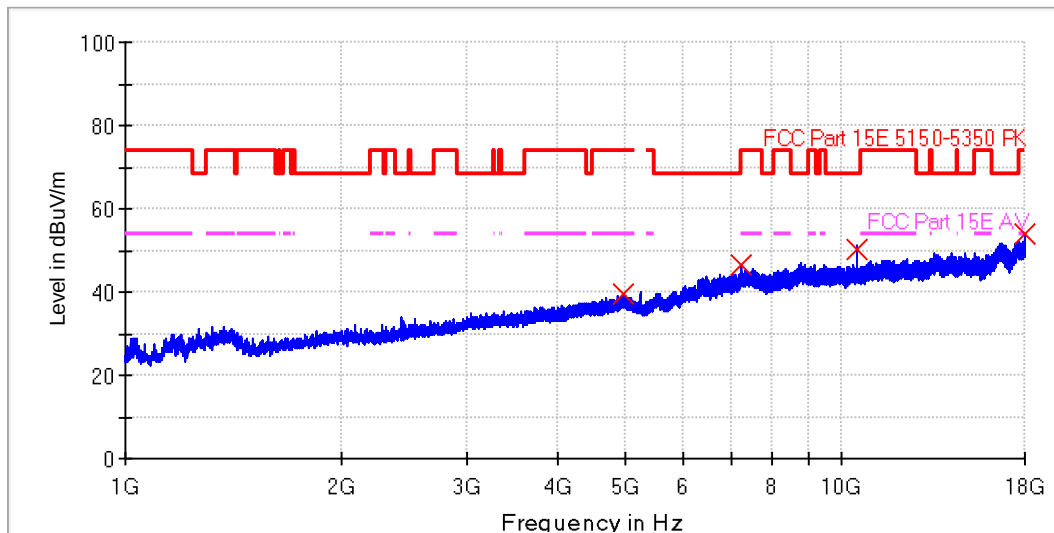
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5240M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Vertical, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-------------|-----------|-----------|------------|--------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB   |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4942.000000     | 39.6             | 145.0       | V   | 181.0         | 0.1          | 34.4              | 74.0                 |
| 7230.500000     | 46.3             | 130.0       | V   | 143.0         | 8.7          | 21.9              | 68.2                 |
| 10474.500000    | 50.2             | 150.0       | V   | 219.0         | 12.9         | 18.0              | 68.2                 |
| 17981.500000    | 53.7             | 135.0       | V   | 138.0         | 22.1         | 20.3              | 74.0                 |

Note: Emission level= Original Receiver Reading + Correct Factor  
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

# 1-18G Radiated Emission Test

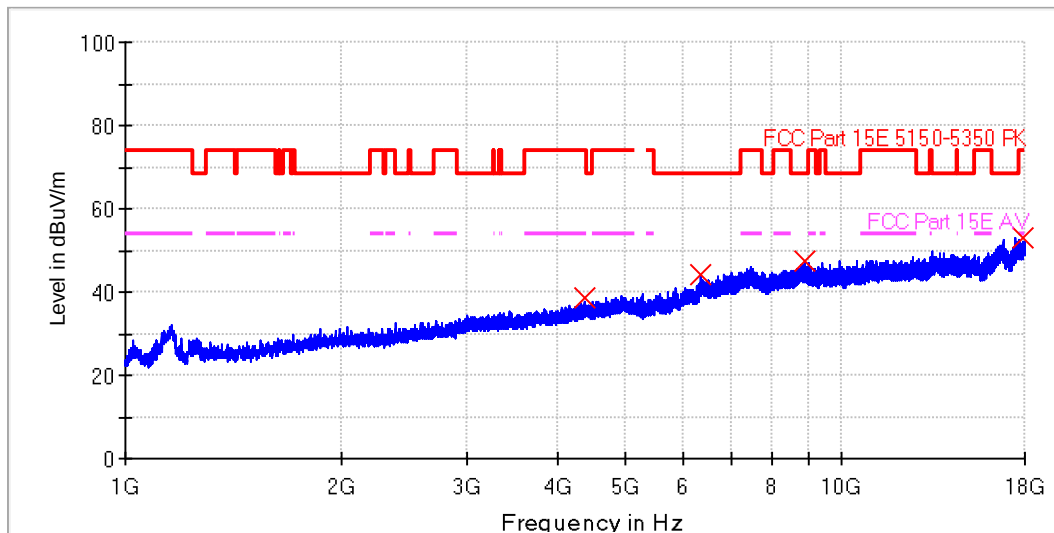
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5260M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Horizontal, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-------------|-----------|-----------|------------|--------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB   |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4374.000000     | 38.5             | 200.0       | H   | 108.0         | -2.5         | 35.5              | 74.0                 |
| 6358.000000     | 44.0             | 175.0       | H   | 217.0         | 7.0          | 24.2              | 68.2                 |
| 8854.000000     | 47.4             | 180.0       | H   | 238.0         | 11.9         | 20.8              | 68.2                 |
| 17939.500000    | 53.2             | 170.0       | H   | 113.0         | 22.1         | 20.8              | 74.0                 |

Note: Emission level= Original Receiver Reading + Correct Factor  
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

# 1-18G Radiated Emission Test

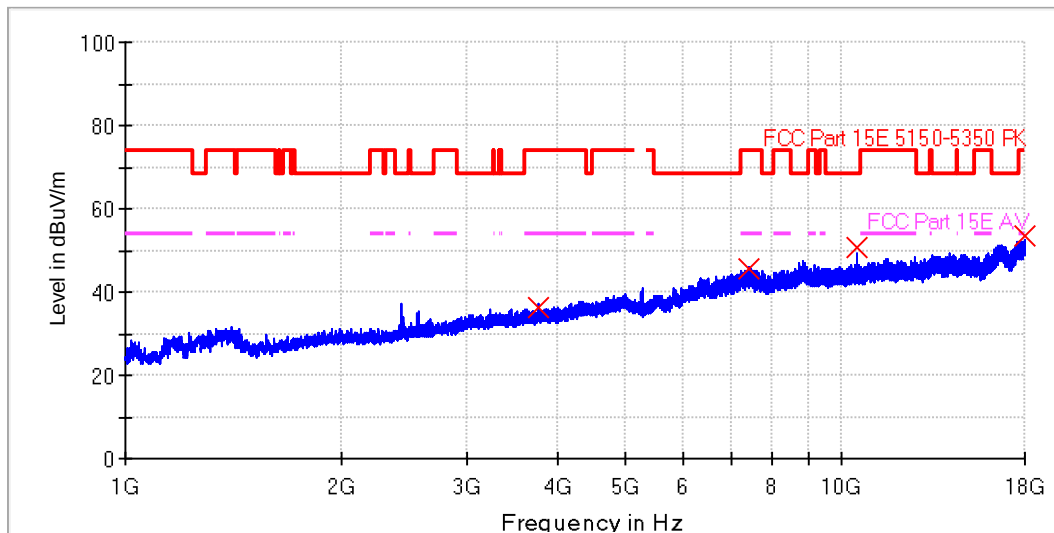
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5260M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Vertical, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamplifier |
|------------------|-------------|-----------|-----------|------------|--------------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB         |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB         |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 3765.500000     | 36.1             | 125.0       | V   | 303.0         | -4.4         | 37.9              | 74.0                 |
| 7393.000000     | 45.8             | 140.0       | V   | 88.0          | 8.6          | 28.2              | 74.0                 |
| 10521.500000    | 50.8             | 135.0       | V   | 155.0         | 13.1         | 17.4              | 68.2                 |
| 17981.000000    | 53.5             | 150.0       | V   | 106.0         | 22.1         | 20.5              | 74.0                 |

Note: Emission level= Original Receiver Reading + Correct Factor  
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

# 1-18G Radiated Emission Test

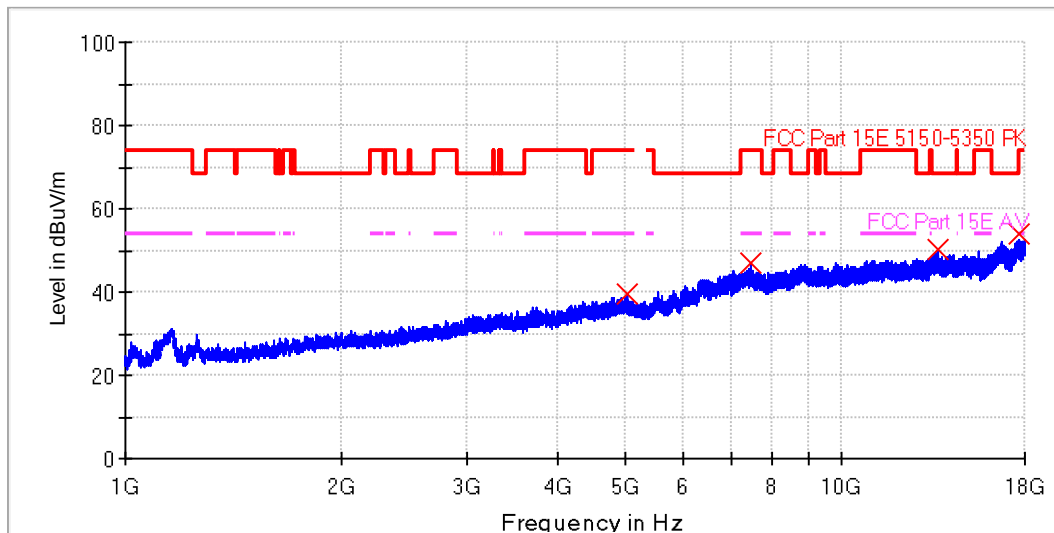
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5300M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Horizontal, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-------------|-----------|-----------|------------|--------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB   |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 5001.000000     | 39.5             | 185.0       | H   | 205.0         | 0.2          | 34.5              | 74.0                 |
| 7468.500000     | 47.0             | 180.0       | H   | 156.0         | 9.1          | 27.0              | 74.0                 |
| 13575.500000    | 50.2             | 195.0       | H   | 52.0          | 17.1         | 18.0              | 68.2                 |
| 17696.000000    | 53.9             | 170.0       | H   | 142.0         | 22.0         | 14.3              | 68.2                 |

Note: Emission level= Original Receiver Reading + Correct Factor  
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

# 1-18G Radiated Emission Test

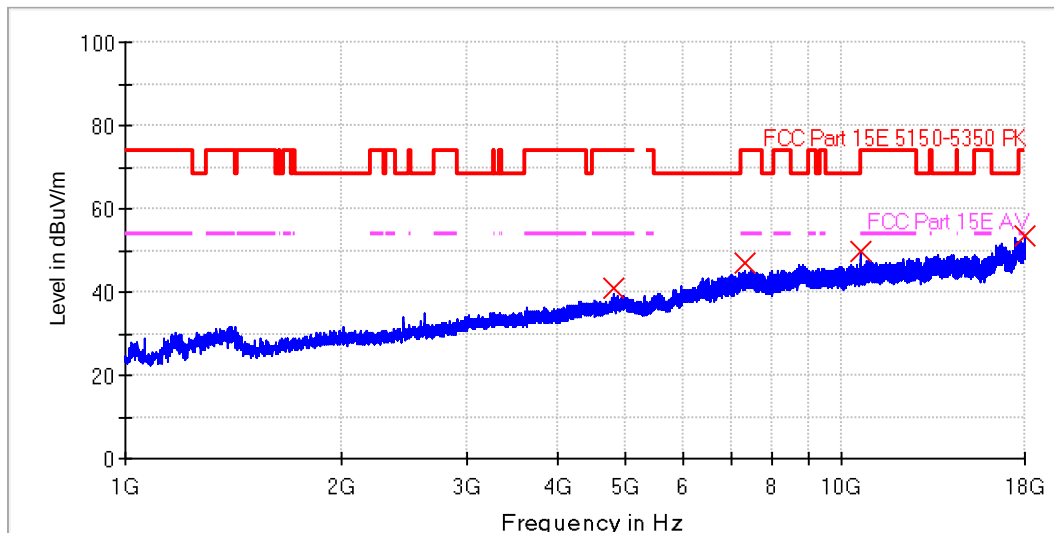
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5300M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Vertical, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamplifier |
|------------------|-------------|-----------|-----------|------------|--------------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB         |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB         |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4806.500000     | 40.9             | 120.0       | V   | 36.0          | -0.8         | 33.2              | 74.0                 |
| 7320.500000     | 46.8             | 130.0       | V   | 117.0         | 8.7          | 27.2              | 74.0                 |
| 10602.500000    | 49.6             | 145.0       | V   | 97.0          | 13.2         | 24.4              | 74.0                 |
| 17980.500000    | 53.6             | 135.0       | V   | 292.0         | 22.1         | 20.4              | 74.0                 |

Note: Emission level= Original Receiver Reading + Correct Factor  
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

# 1-18G Radiated Emission Test

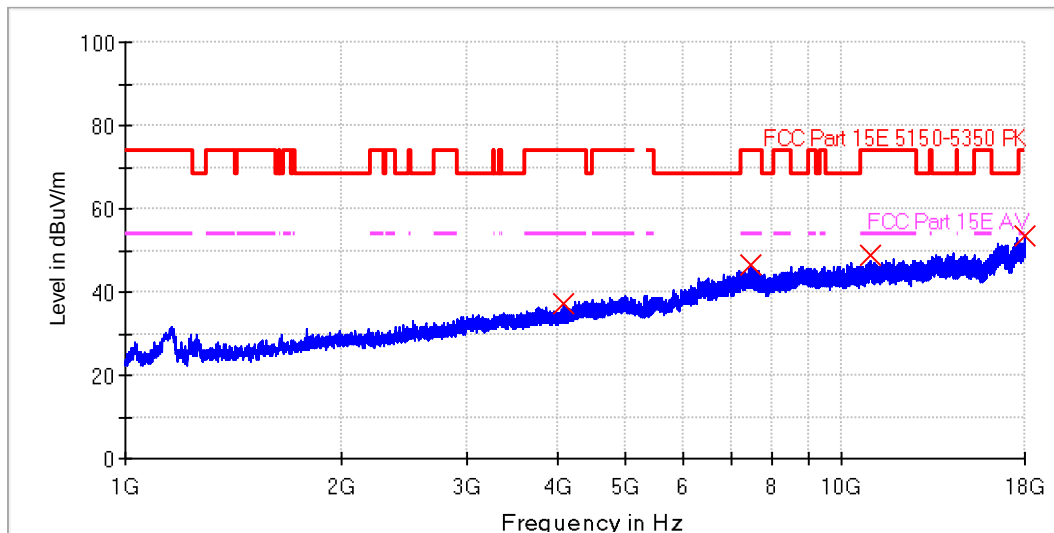
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5320M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Horizontal, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-------------|-----------|-----------|------------|--------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB   |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

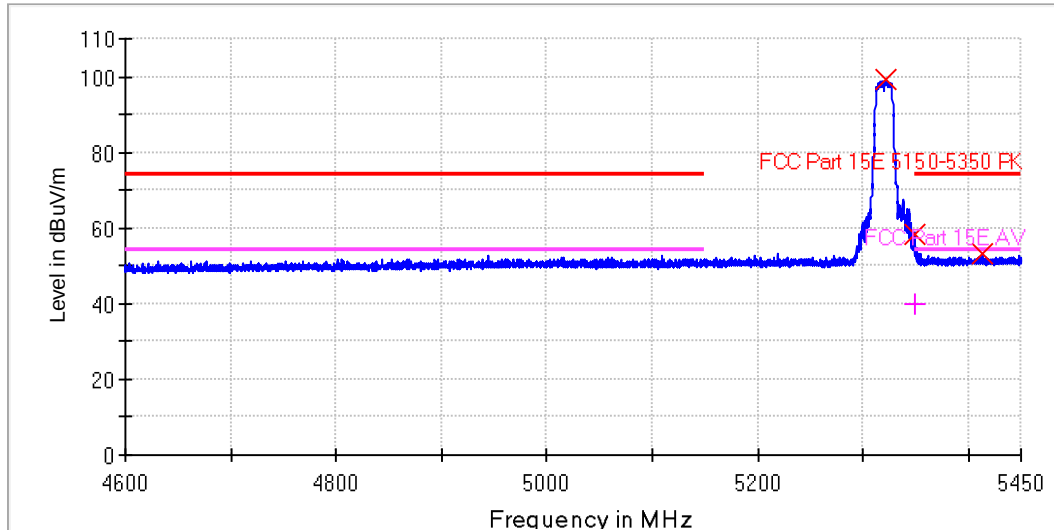
| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4077.000000     | 37.4             | 195.0       | H   | 144.0         | -3.3         | 36.6              | 74.0                 |
| 7438.500000     | 46.4             | 180.0       | H   | 106.0         | 8.9          | 27.6              | 74.0                 |
| 10969.500000    | 48.9             | 165.0       | H   | 296.0         | 13.6         | 25.1              | 74.0                 |
| 17960.000000    | 53.7             | 190.0       | H   | 132.0         | 22.1         | 20.3              | 74.0                 |

Note: Emission level= Original Receiver Reading + Correct Factor  
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

## Sweep Setup: FCC\_Band edge-4600-5400 Sweep 3m\_agilent [EMI radiated]

Hardware Setup: FCC part15E Radiated E Field 1GHz-18GHz\_3m\_Agilent  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange           | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--------------------|-----------|-----------|-----------|------------|--------|
| 4.6 GHz - 5.45 GHz | 170 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Average (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) | Margin - AVG (dB) | Limit - AVG (dBuV/m) |
|-----------------|------------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|-------------------|----------------------|
| 5321.500000     | 99.2             | ---              | 190.0       | H   | 263.0         | 9.8          | ---               | ---                  | ---               | ---                  |
| 5350.000000     | 58.2             | 39.9             | 200.0       | H   | 94.0          | 9.8          | 15.8              | 74.0                 | 14.1              | 54.0                 |
| 5414.000000     | 53.3             | ---              | 180.0       | H   | 139.0         | 10.0         | 20.7              | 74.0                 | ---               | ---                  |

Note: Emission level= Original Receiver Reading + Correct Factor

Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

# 1-18G Radiated Emission Test

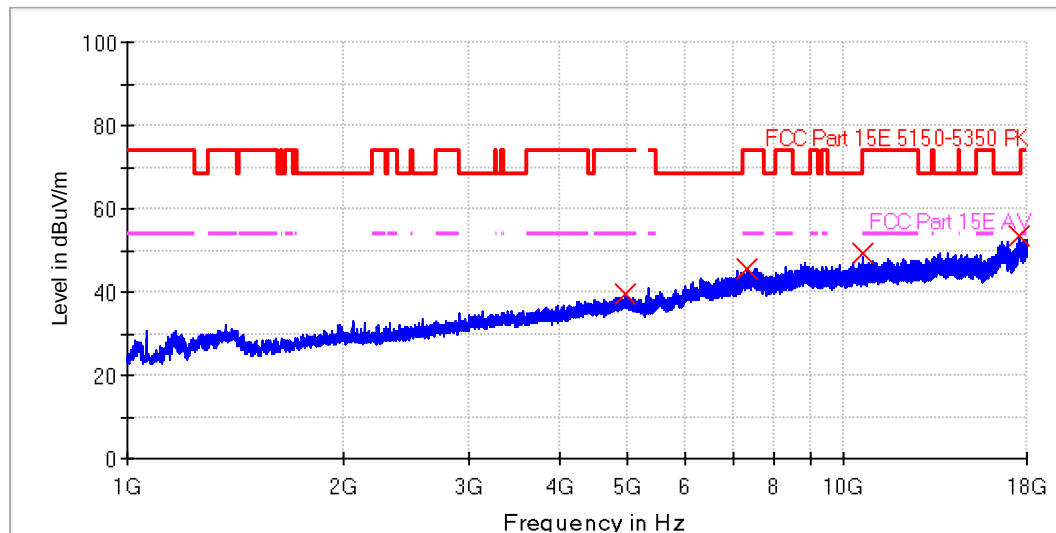
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5320M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Vertical, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-------------|-----------|-----------|------------|--------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB   |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

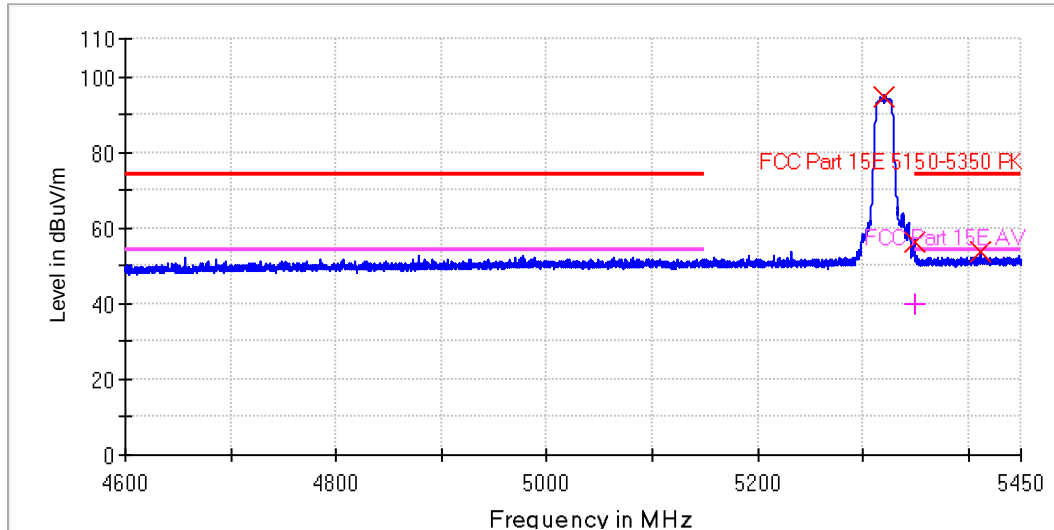
| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4944.000000     | 39.6             | 135.0       | V   | 222.0         | 0.1          | 34.4              | 74.0                 |
| 7344.000000     | 45.7             | 120.0       | V   | 126.0         | 8.7          | 28.3              | 74.0                 |
| 10633.500000    | 49.3             | 140.0       | V   | 210.0         | 13.2         | 24.7              | 74.0                 |
| 17560.500000    | 53.4             | 145.0       | V   | 279.0         | 21.9         | 14.8              | 68.2                 |

Note: Emission level= Original Receiver Reading + Correct Factor  
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

## Sweep Setup: FCC\_Band edge-4600-5400 Sweep 3m\_agilent [EMI radiated]

Hardware Setup: FCC part15E Radiated E Field 1GHz-18GHz\_3m\_Agilent  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange           | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--------------------|-----------|-----------|-----------|------------|--------|
| 4.6 GHz - 5.45 GHz | 170 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Average (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) | Margin - AVG (dB) | Limit - AVG (dBuV/m) |
|-----------------|------------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|-------------------|----------------------|
| 5320.000000     | 94.8             | ---              | 145.0       | V   | 141.0         | 9.8          | ---               | ---                  | ---               | ---                  |
| 5350.000000     | 56.1             | 39.7             | 140.0       | V   | 84.0          | 9.8          | 17.9              | 74.0                 | 14.3              | 54.0                 |
| 5411.000000     | 53.7             | ---              | 130.0       | V   | 314.0         | 10.0         | 20.3              | 74.0                 | ---               | ---                  |

Note: Emission level= Original Receiver Reading + Correct Factor

Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

# 1-18G Radiated Emission Test

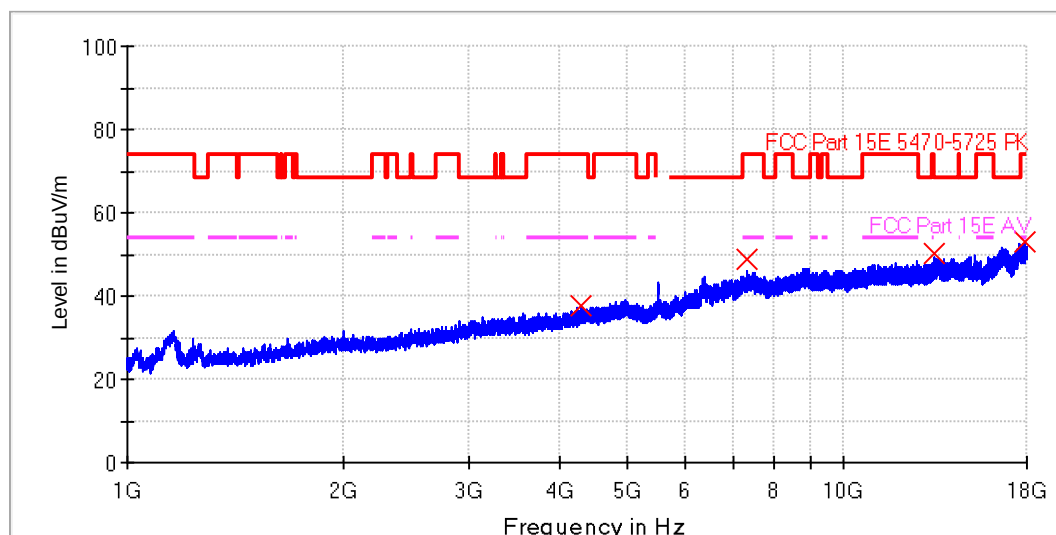
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5500M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Horizontal, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-------------|-----------|-----------|------------|--------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB   |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4301.500000     | 37.8             | 170.0       | H   | 151.0         | -2.6         | 36.2              | 74.0                 |
| 7333.000000     | 48.9             | 195.0       | H   | 117.0         | 8.7          | 25.1              | 74.0                 |
| 13352.500000    | 50.3             | 200.0       | H   | 224.0         | 17.1         | 23.7              | 74.0                 |
| 17906.500000    | 52.8             | 180.0       | H   | 95.0          | 22.1         | 21.2              | 74.0                 |

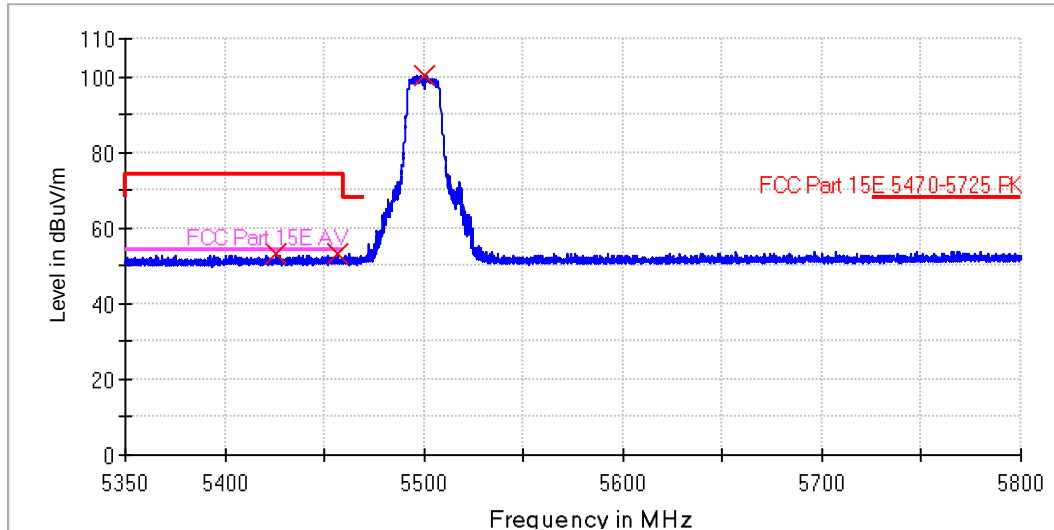
Note: Emission level= Original Receiver Reading + Correct Factor

Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

## Sweep Setup: FCC\_Band edge-5350-5750 Sweep 3m\_agilent [EMI radiated]

Hardware Setup: FCC part15E Radiated E Field 1GHz-18GHz\_3m\_Agilent  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange           | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--------------------|-----------|-----------|-----------|------------|--------|
| 5.35 GHz - 5.8 GHz | 90 kHz    | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 5426.000000     | 53.3             | 175.0       | H   | 149.0         | 10.1         | 20.7              | 74.0                 |
| 5456.500000     | 53.4             | 180.0       | H   | 208.0         | 10.2         | 20.6              | 74.0                 |
| 5500.000000     | 100.1            | 185.0       | H   | 158.0         | 10.3         | ---               | ---                  |

Note: Emission level= Original Receiver Reading + Correct Factor

Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

# 1-18G Radiated Emission Test

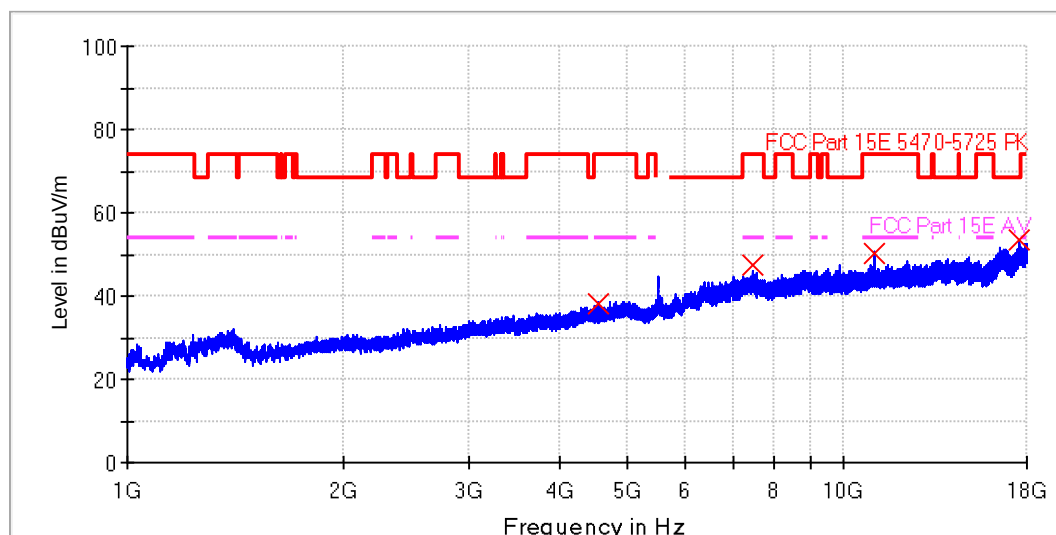
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5500M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Vertical, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-------------|-----------|-----------|------------|--------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB   |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

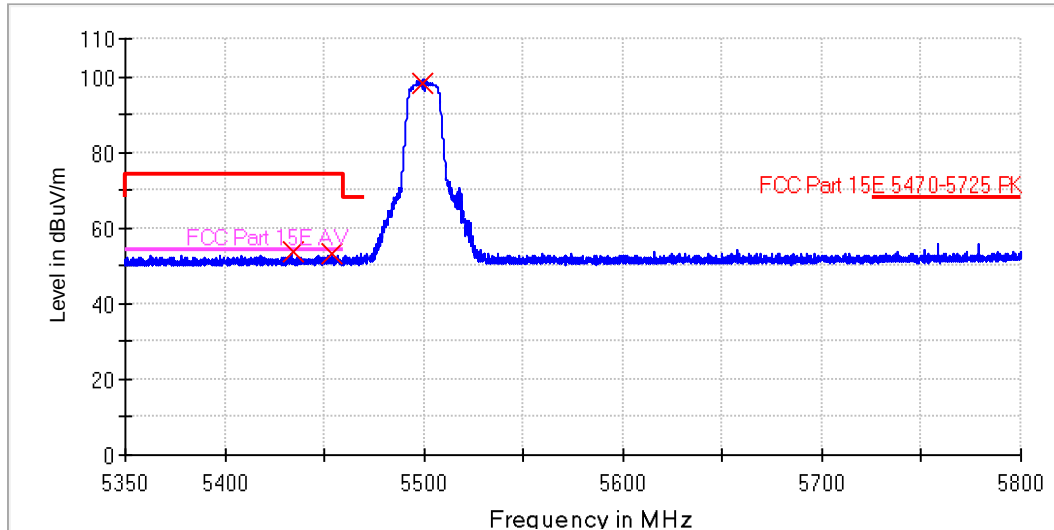
| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4539.000000     | 38.2             | 145.0       | V   | 273.0         | -2.0         | 35.8              | 74.0                 |
| 7469.500000     | 47.4             | 130.0       | V   | 208.0         | 9.1          | 26.6              | 74.0                 |
| 11002.000000    | 50.1             | 125.0       | V   | 127.0         | 13.6         | 23.9              | 74.0                 |
| 17609.000000    | 53.6             | 150.0       | V   | 142.0         | 22.0         | 14.6              | 68.2                 |

Note: Emission level= Original Receiver Reading + Correct Factor  
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

## Sweep Setup: FCC\_Band edge-5350-5750 Sweep 3m\_agilent [EMI radiated]

Hardware Setup: FCC part15E Radiated E Field 1GHz-18GHz\_3m\_Agilent  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange           | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--------------------|-----------|-----------|-----------|------------|--------|
| 5.35 GHz - 5.8 GHz | 90 kHz    | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 5434.000000     | 53.5             | 130.0       | V   | 195.0         | 10.1         | 20.5              | 74.0                 |
| 5454.000000     | 53.3             | 150.0       | V   | 217.0         | 10.2         | 20.7              | 74.0                 |
| 5499.500000     | 98.5             | 145.0       | V   | 70.0          | 10.3         | ---               | ---                  |

Note: Emission level= Original Receiver Reading + Correct Factor

Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

# 1-18G Radiated Emission Test

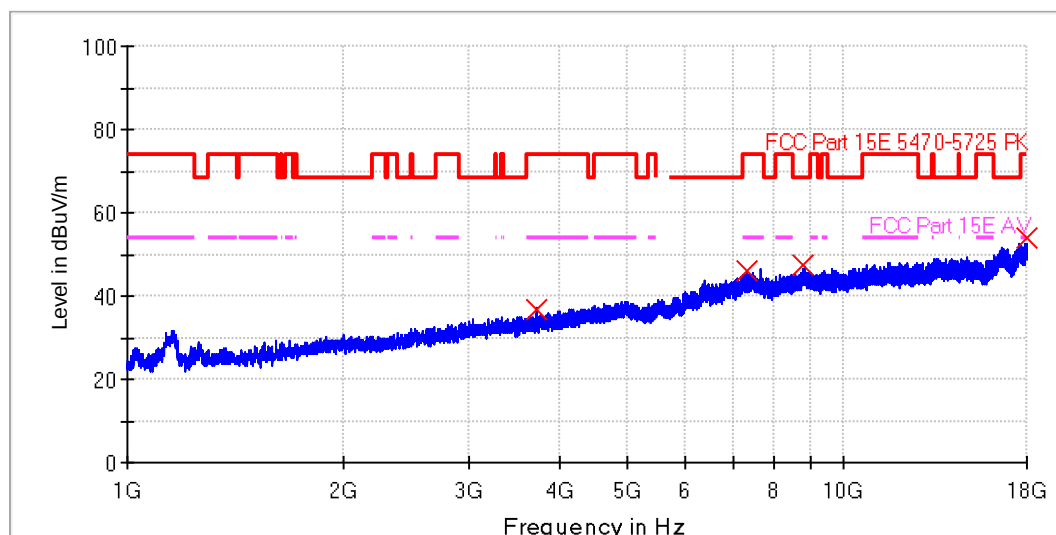
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5580M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Horizontal, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-------------|-----------|-----------|------------|--------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB   |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 3729.500000     | 36.5             | 180.0       | H   | 151.0         | -4.5         | 37.5              | 74.0                 |
| 7315.500000     | 45.9             | 165.0       | H   | 131.0         | 8.7          | 28.1              | 74.0                 |
| 8764.500000     | 47.6             | 190.0       | H   | 267.0         | 11.6         | 20.6              | 68.2                 |
| 17960.500000    | 53.8             | 185.0       | H   | 124.0         | 22.1         | 20.2              | 74.0                 |

Note: Emission level= Original Receiver Reading + Correct Factor

Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

# 1-18G Radiated Emission Test

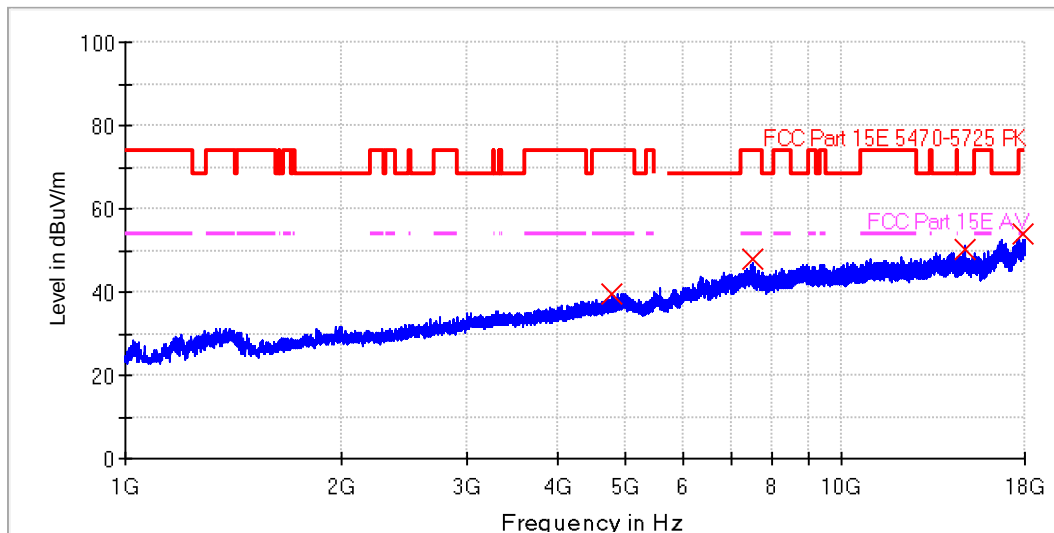
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5580M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Vertical, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamplifier |
|------------------|-------------|-----------|-----------|------------|--------------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB         |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB         |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4787.500000     | 39.4             | 130.0       | V   | 55.0          | -0.8         | 34.6              | 74.0                 |
| 7495.000000     | 47.7             | 140.0       | V   | 249.0         | 9.3          | 26.3              | 74.0                 |
| 14879.500000    | 50.1             | 135.0       | V   | 132.0         | 15.8         | 18.1              | 68.2                 |
| 17943.500000    | 53.8             | 140.0       | V   | 124.0         | 22.1         | 20.2              | 74.0                 |

Note: Emission level= Original Receiver Reading + Correct Factor  
Correct Factor = Antenna Factor + Cable Loss - Amplifier gain

# 1-18G Radiated Emission Test

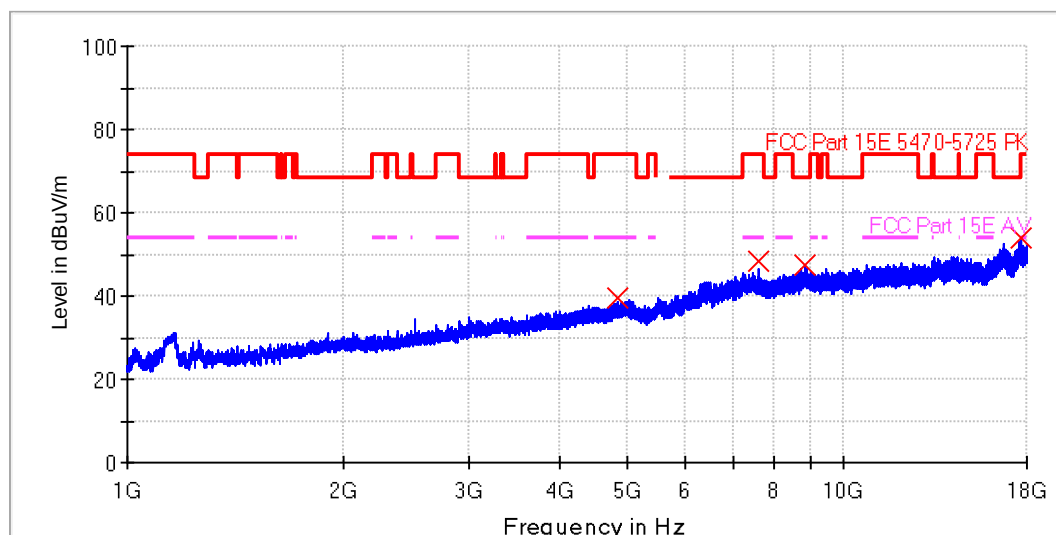
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5700M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Horizontal, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-------------|-----------|-----------|------------|--------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB   |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4821.000000     | 39.6             | 180.0       | H   | 156.0         | -0.8         | 34.4              | 74.0                 |
| 7599.500000     | 48.4             | 170.0       | H   | 231.0         | 9.3          | 25.7              | 74.0                 |
| 8801.500000     | 47.6             | 165.0       | H   | 110.0         | 11.8         | 20.6              | 68.2                 |
| 17623.000000    | 53.7             | 190.0       | H   | 71.0          | 22.0         | 14.5              | 68.2                 |

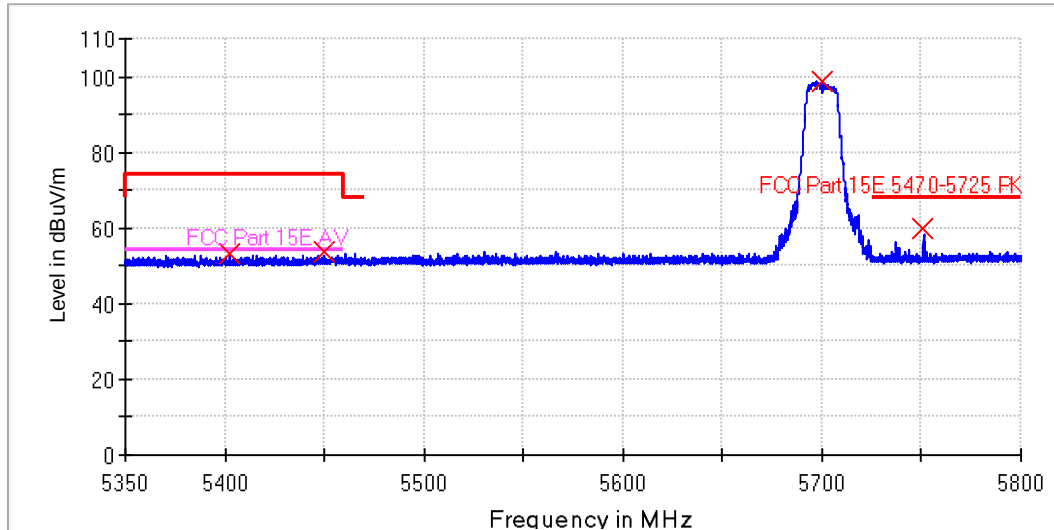
Note: Emission level= Original Receiver Reading + Correct Factor

Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

## Sweep Setup: FCC\_Band edge-5350-5750 Sweep 3m\_agilent [EMI radiated]

Hardware Setup: FCC part15E Radiated E Field 1GHz-18GHz\_3m\_Agilent  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange           | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--------------------|-----------|-----------|-----------|------------|--------|
| 5.35 GHz - 5.8 GHz | 90 kHz    | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 5402.000000     | 53.3             | 175.0       | H   | 281.0         | 10.0         | 20.7              | 74.0                 |
| 5450.000000     | 53.6             | 190.0       | H   | 175.0         | 10.2         | 20.4              | 74.0                 |
| 5700.000000     | 98.7             | 185.0       | H   | 132.0         | 10.6         | ---               | ---                  |
| 5751.000000     | 60.0             | 200.0       | H   | 87.0          | 10.8         | 8.2               | 68.2                 |

Note: Emission level= Original Receiver Reading + Correct Factor  
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

# 1-18G Radiated Emission Test

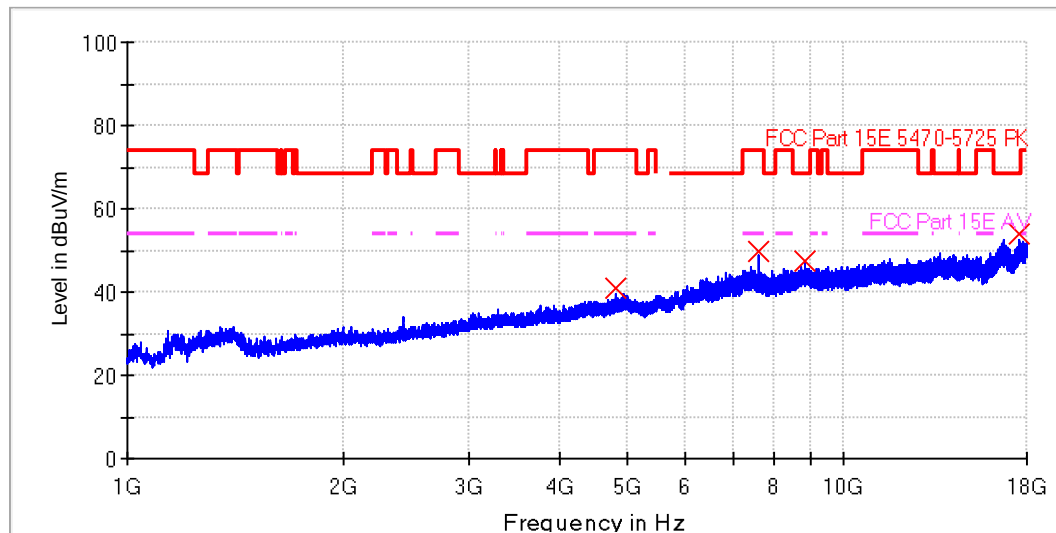
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5700M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Vertical, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-------------|-----------|-----------|------------|--------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB   |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

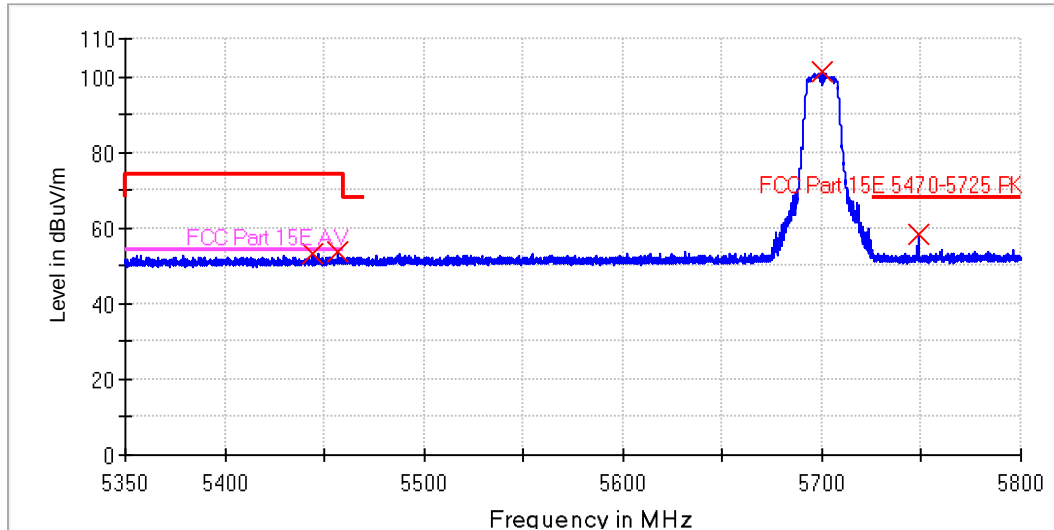
| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4806.500000     | 40.8             | 125.0       | V   | 152.0         | -0.8         | 33.2              | 74.0                 |
| 7599.500000     | 49.8             | 145.0       | V   | 131.0         | 9.3          | 24.2              | 74.0                 |
| 8831.000000     | 47.3             | 150.0       | V   | 146.0         | 12.0         | 20.9              | 68.2                 |
| 17580.500000    | 54.2             | 130.0       | V   | 311.0         | 21.9         | 14.1              | 68.2                 |

Note: Emission level= Original Receiver Reading + Correct Factor  
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

## Sweep Setup: FCC\_Band edge-5350-5750 Sweep 3m\_agilent [EMI radiated]

Hardware Setup: FCC part15E Radiated E Field 1GHz-18GHz\_3m\_Agilent  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange           | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--------------------|-----------|-----------|-----------|------------|--------|
| 5.35 GHz - 5.8 GHz | 90 kHz    | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 5444.500000     | 53.4             | 130.0       | V   | 306.0         | 10.1         | 20.6              | 74.0                 |
| 5456.500000     | 53.5             | 125.0       | V   | 236.0         | 10.2         | 20.5              | 74.0                 |
| 5700.000000     | 101.1            | 145.0       | V   | 73.0          | 10.6         | ---               | ---                  |
| 5748.500000     | 58.2             | 135.0       | V   | 126.0         | 10.8         | 10.0              | 68.2                 |

Note: Emission level= Original Receiver Reading + Correct Factor  
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

# 1-18G Radiated Emission Test

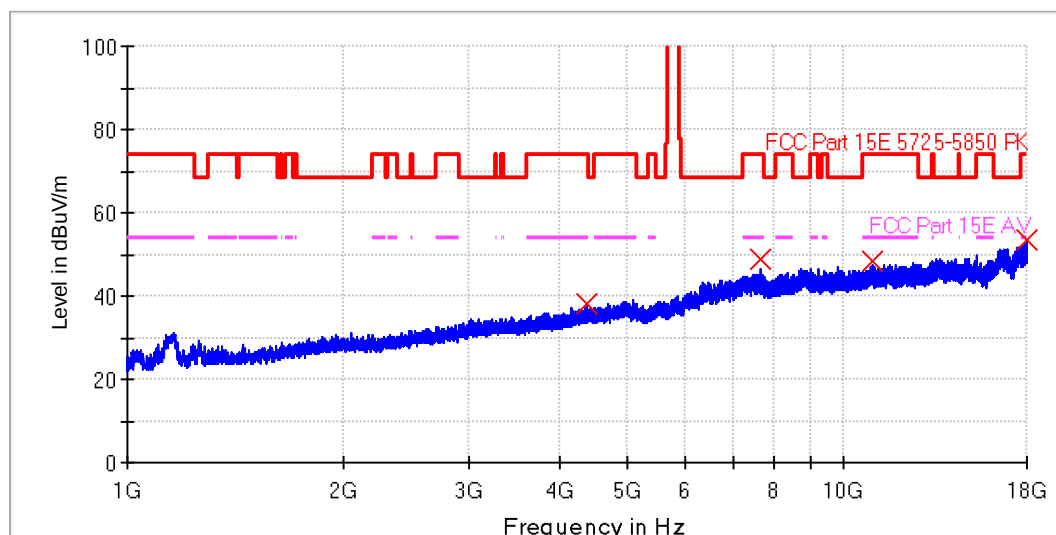
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5745M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Horizontal, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-------------|-----------|-----------|------------|--------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB   |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4364.000000     | 38.0             | 180.0       | H   | 132.0         | -2.5         | 36.0              | 74.0                 |
| 7660.000000     | 48.8             | 175.0       | H   | 258.0         | 9.2          | 25.2              | 74.0                 |
| 10933.000000    | 48.2             | 190.0       | H   | 206.0         | 13.5         | 25.8              | 74.0                 |
| 17975.500000    | 53.4             | 185.0       | H   | 65.0          | 22.1         | 20.6              | 74.0                 |

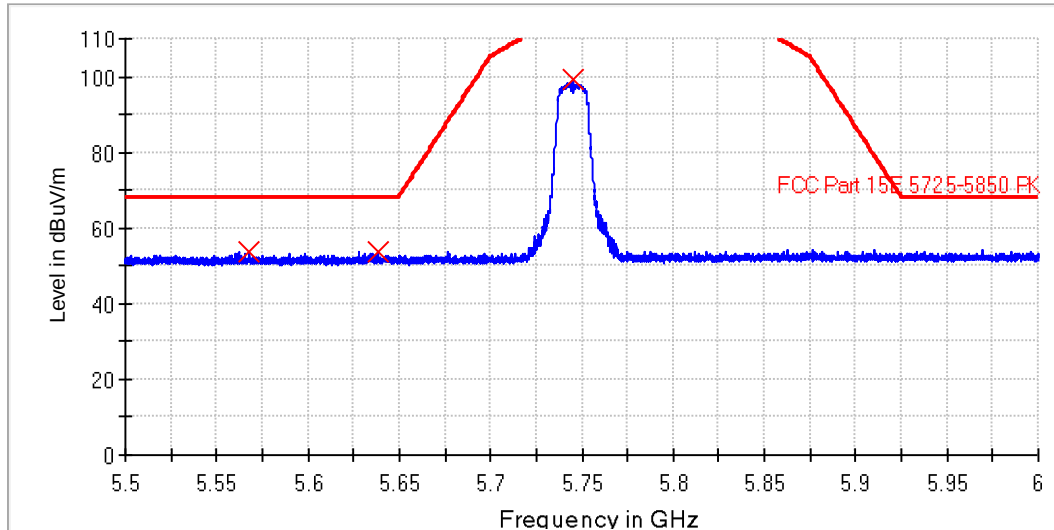
Note: Emission level= Original Receiver Reading + Correct Factor

Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

## Sweep Setup: FCC\_Band edge-5500-6000 Sweep 3m\_agilent [EMI radiated]

Hardware Setup: FCC part15E Radiated E Field 1GHz-18GHz\_3m\_Agilent  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange        | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|-----------------|-----------|-----------|-----------|------------|--------|
| 5.5 GHz - 6 GHz | 100 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 5568.000000     | 53.7             | 185.0       | H   | 169.0         | 10.4         | 14.5              | 68.2                 |
| 5638.000000     | 53.7             | 175.0       | H   | 210.0         | 10.5         | 14.5              | 68.2                 |
| 5745.000000     | 99.2             | 195.0       | H   | 278.0         | 10.8         | ---               | ---                  |

Note: Emission level= Original Receiver Reading + Correct Factor

Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

# 1-18G Radiated Emission Test

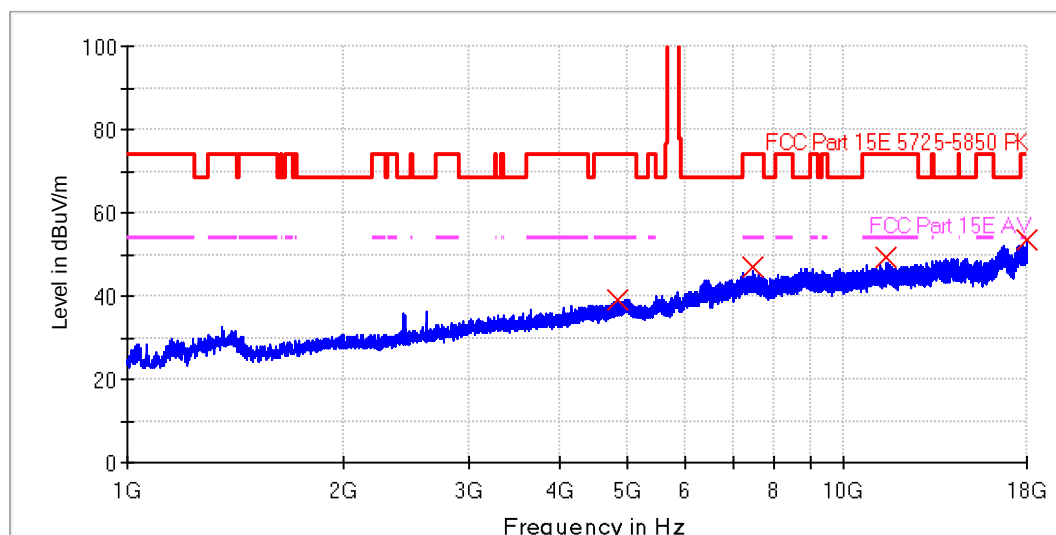
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5745M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Vertical, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-------------|-----------|-----------|------------|--------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB   |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

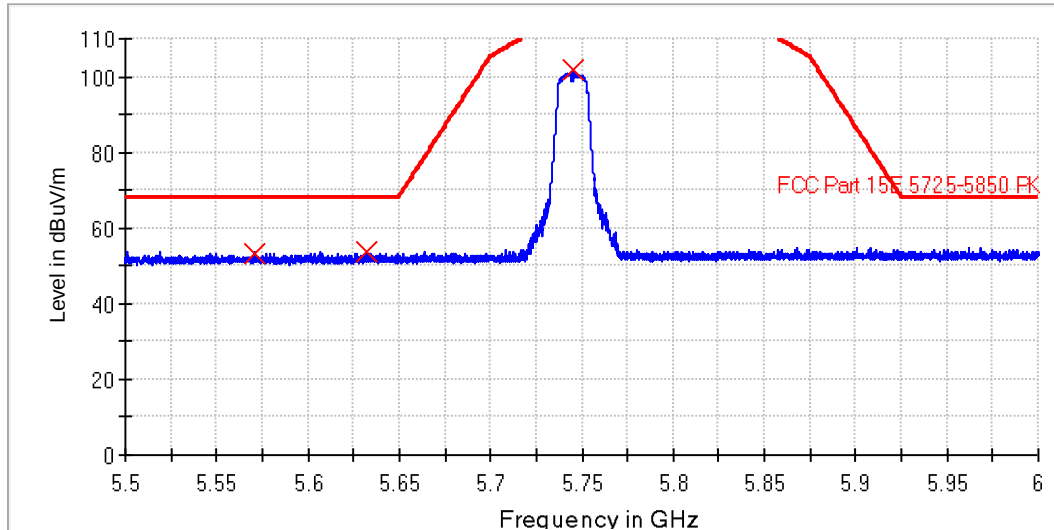
| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4819.500000     | 39.3             | 140.0       | V   | 209.0         | -0.8         | 34.7              | 74.0                 |
| 7454.000000     | 47.1             | 135.0       | V   | 113.0         | 9.0          | 26.9              | 74.0                 |
| 11480.000000    | 49.5             | 150.0       | V   | 181.0         | 14.0         | 24.5              | 74.0                 |
| 17969.500000    | 53.6             | 140.0       | V   | 174.0         | 22.1         | 20.5              | 74.0                 |

Note: Emission level= Original Receiver Reading + Correct Factor  
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

## Sweep Setup: FCC\_Band edge-5500-6000 Sweep 3m\_agilent [EMI radiated]

Hardware Setup: FCC part15E Radiated E Field 1GHz-18GHz\_3m\_Agilent  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange        | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|-----------------|-----------|-----------|-----------|------------|--------|
| 5.5 GHz - 6 GHz | 100 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 5570.500000     | 53.3             | 125.0       | V   | 204.0         | 10.4         | 14.9              | 68.2                 |
| 5632.000000     | 53.8             | 130.0       | V   | 114.0         | 10.4         | 14.5              | 68.2                 |
| 5745.000000     | 101.6            | 145.0       | V   | 127.0         | 10.8         | ---               | ---                  |

Note: Emission level= Original Receiver Reading + Correct Factor

Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

# 1-18G Radiated Emission Test

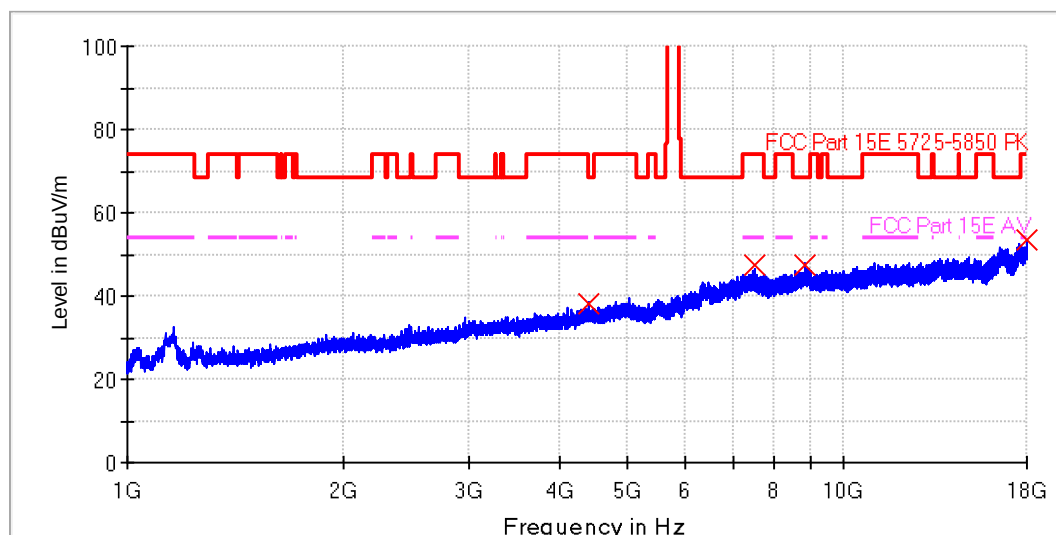
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5785M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Horizontal, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-------------|-----------|-----------|------------|--------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB   |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4397.500000     | 38.2             | 185.0       | H   | 92.0          | -2.4         | 35.8              | 74.0                 |
| 7499.000000     | 47.5             | 170.0       | H   | 135.0         | 9.3          | 26.6              | 74.0                 |
| 8818.500000     | 47.3             | 190.0       | H   | 195.0         | 11.9         | 20.9              | 68.2                 |
| 17989.000000    | 53.7             | 180.0       | H   | 188.0         | 22.1         | 20.3              | 74.0                 |

Note: Emission level= Original Receiver Reading + Correct Factor

Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

# 1-18G Radiated Emission Test

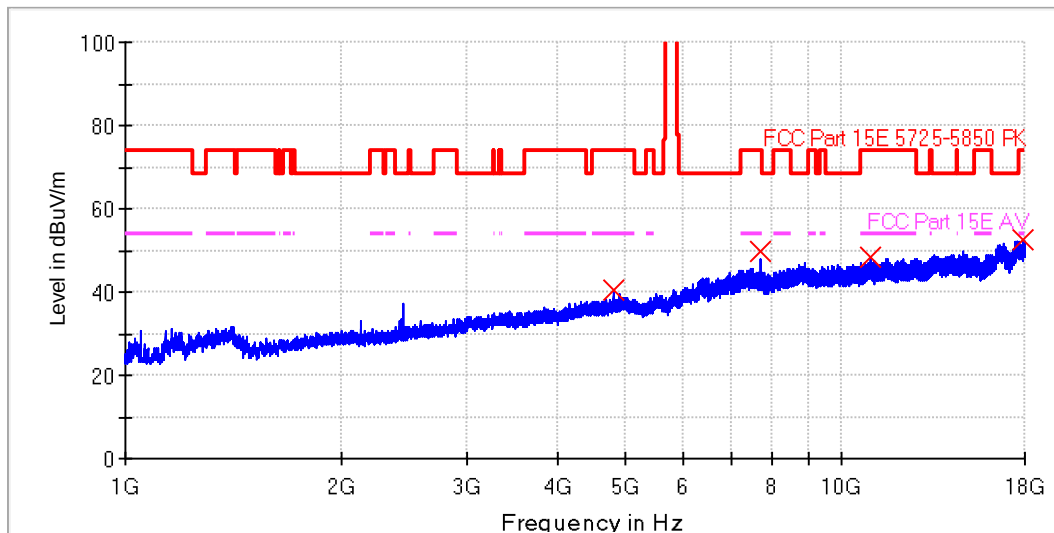
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5785M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Vertical, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamplifier |
|------------------|-------------|-----------|-----------|------------|--------------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB         |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB         |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4806.500000     | 40.6             | 140.0       | V   | 197.0         | -0.8         | 33.4              | 74.0                 |
| 7713.000000     | 49.6             | 135.0       | V   | 208.0         | 9.2          | 24.4              | 74.0                 |
| 10979.500000    | 48.5             | 145.0       | V   | 69.0          | 13.6         | 25.5              | 74.0                 |
| 17868.500000    | 52.7             | 150.0       | V   | 120.0         | 22.1         | 21.3              | 74.0                 |

Note: Emission level= Original Receiver Reading + Correct Factor  
Correct Factor = Antenna Factor + Cable Loss - Amplifier gain

# 1-18G Radiated Emission Test

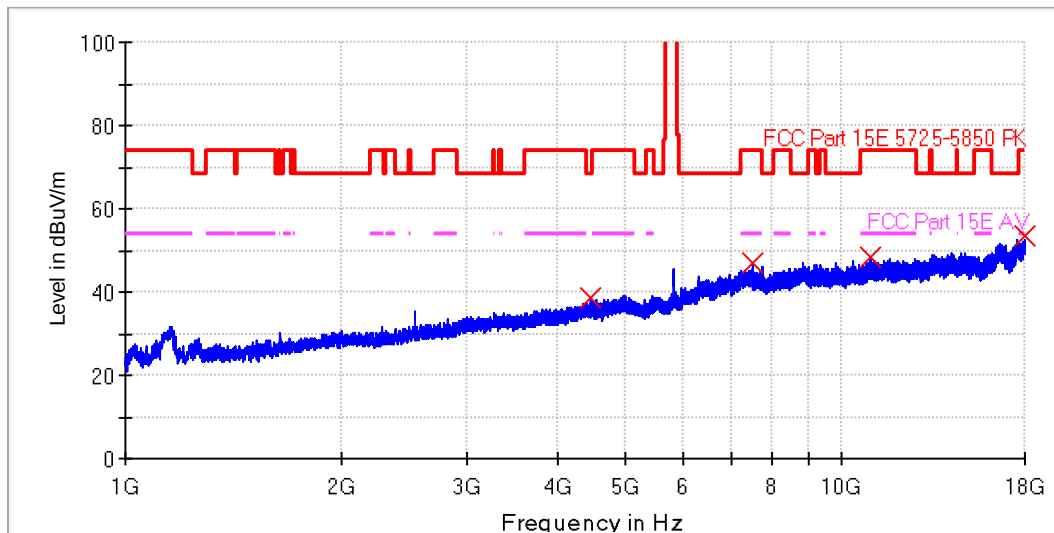
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5825M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Horizontal, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-------------|-----------|-----------|------------|--------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB   |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4464.000000     | 38.4             | 195.0       | H   | 69.0          | -2.4         | 29.8              | 68.2                 |
| 7486.500000     | 47.0             | 210.0       | H   | 124.0         | 9.2          | 27.0              | 74.0                 |
| 10975.000000    | 48.3             | 200.0       | H   | 145.0         | 13.6         | 25.7              | 74.0                 |
| 17975.000000    | 53.7             | 180.0       | H   | 218.0         | 22.1         | 20.3              | 74.0                 |

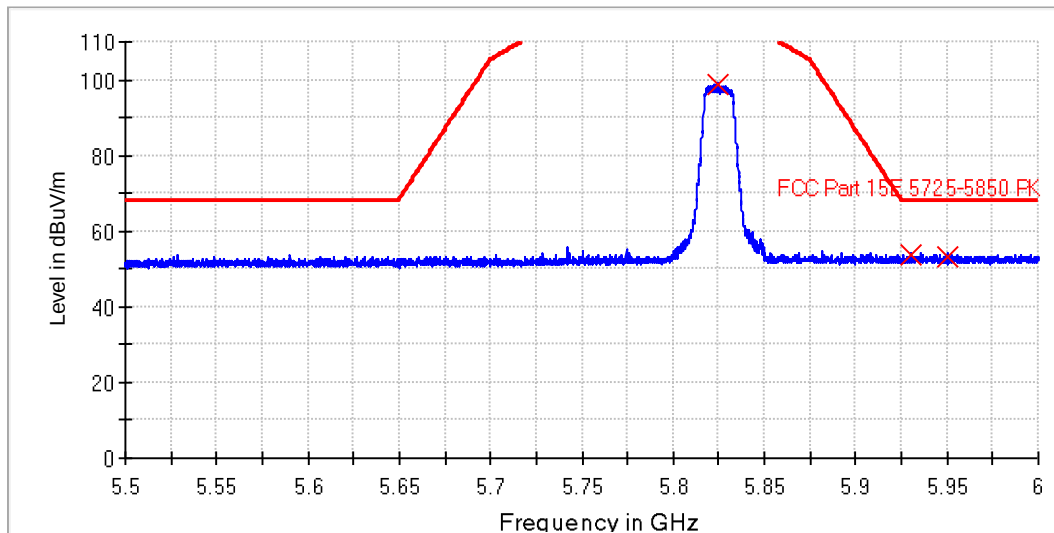
Note: Emission level= Original Receiver Reading + Correct Factor

Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

## Sweep Setup: FCC\_Band edge-5500-6000 Sweep 3m\_agilent [EMI radiated]

Hardware Setup: FCC part15E Radiated E Field 1GHz-18GHz\_3m\_Agilent  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange        | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|-----------------|-----------|-----------|-----------|------------|--------|
| 5.5 GHz - 6 GHz | 100 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 5825.000000     | 98.9             | 195.0       | H   | 178.0         | 11.1         | ---               | ---                  |
| 5930.500000     | 53.6             | 180.0       | H   | 207.0         | 11.1         | 14.6              | 68.2                 |
| 5950.500000     | 53.3             | 185.0       | H   | 258.0         | 11.1         | 14.9              | 68.2                 |

Note: Emission level= Original Receiver Reading + Correct Factor  
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

# 1-18G Radiated Emission Test

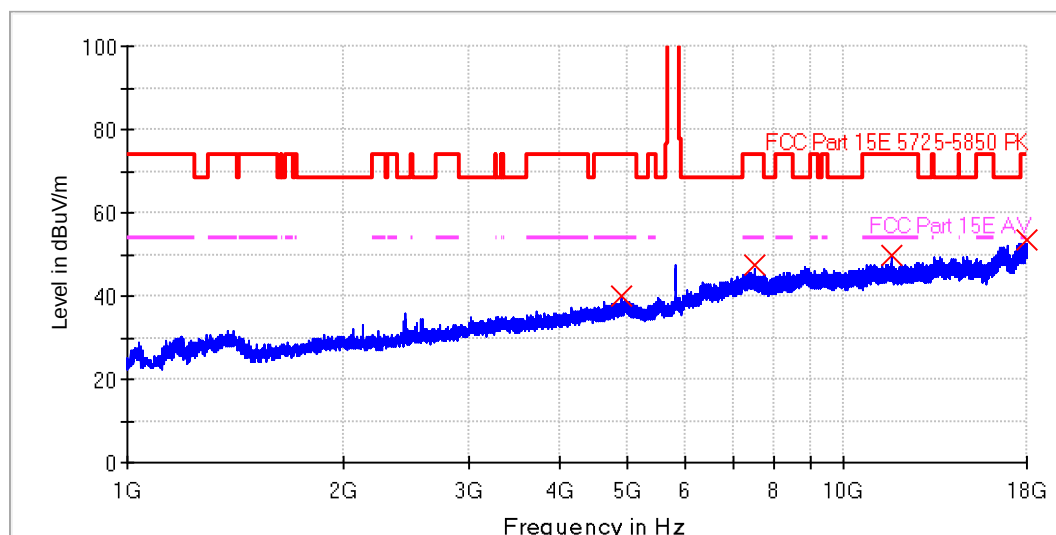
## Common Information

EUT: Smart M Gateway  
Model: THP23-ZB-X  
Client: Zhejiang Lingzhu Technology Co., Ltd  
Operating conditions: Power on, 5G Wi-Fi transmitting, 802.11a: 5825M  
Operator name: Xu Zheng  
Input: AC 120V 60Hz  
Sample No: WUX-0877560-006  
Test standard: FCC Part 15.407(b)  
Comment: Vertical, Adapter Model: TPA-10D050200UU01

## Sweep Setup: FCC\_RE\_1-18G Sweep 3m\_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz\_3m\_BONN  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange         | Step Size   | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-------------|-----------|-----------|------------|--------|
| 1 GHz - 6.3 GHz  | 441.667 kHz | PK+       | 1 MHz     | 1 s        | 0 dB   |
| 6.3 GHz - 18 GHz | 487.5 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

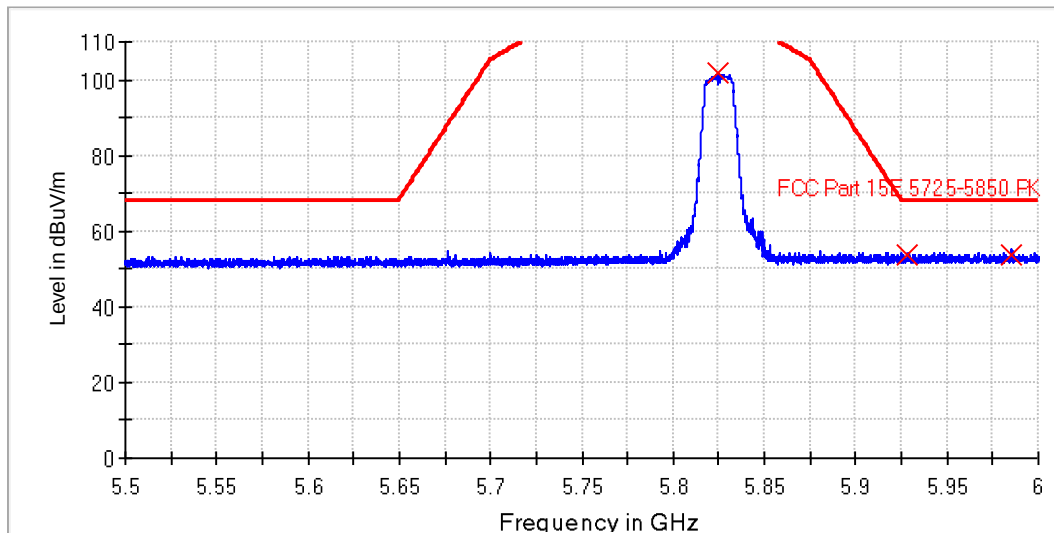
| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 4907.000000     | 39.9             | 140.0       | V   | 199.0         | -0.3         | 34.1              | 74.0                 |
| 7497.500000     | 47.4             | 135.0       | V   | 205.0         | 9.3          | 26.6              | 74.0                 |
| 11648.500000    | 49.6             | 145.0       | V   | 264.0         | 14.1         | 24.4              | 74.0                 |
| 17962.500000    | 53.7             | 140.0       | V   | 160.0         | 22.1         | 20.3              | 74.0                 |

Note: Emission level= Original Receiver Reading + Correct Factor  
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

## Sweep Setup: FCC\_Band edge-5500-6000 Sweep 3m\_agilent [EMI radiated]

Hardware Setup: FCC part15E Radiated E Field 1GHz-18GHz\_3m\_Agilent  
Receiver: [FSV 40]  
Level Unit: dBuV/m

| Subrange        | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|-----------------|-----------|-----------|-----------|------------|--------|
| 5.5 GHz - 6 GHz | 100 kHz   | PK+       | 1 MHz     | 1 s        | 0 dB   |



## Limit and Margin

| Frequency (MHz) | MaxPeak (dBuV/m) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBuV/m) |
|-----------------|------------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 5825.000000     | 101.7            | 135.0       | V   | 117.0         | 11.1         | ---               | ---                  |
| 5928.500000     | 53.8             | 140.0       | V   | 211.0         | 11.1         | 14.4              | 68.2                 |
| 5985.000000     | 53.6             | 125.0       | V   | 178.0         | 11.1         | 14.6              | 68.2                 |

Note: Emission level= Original Receiver Reading + Correct Factor  
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain