



## RF Exposure Evaluation Declaration

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**FCC ID:** FHO-F1720  
**APPLICANT:** IKEA of Sweden AB  
**Application Type:** Certification  
**Product:** FREKVENS Speaker  
**Model No.:** F1720  
**Brand Name:** IKEA  
**FCC Classification:** FCC Part 15 Spread Spectrum Transmitter(DSS)  
**Test Procedure(s):** KDB 447498 D01v06  
**Test Date:** October 30, 2018

Reviewed By:



( Kevin Guo )

Approved By:



( Robin Wu )



The test results relate only to the samples tested.

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

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

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## Revision History

| Report No.    | Version | Description    | Issue Date | Note  |
|---------------|---------|----------------|------------|-------|
| 1809WSU002-U2 | Rev. 01 | Initial report | 05-21-2019 | Valid |
|               |         |                |            |       |

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**§2.1033 General Information**

|                                |   |
|--------------------------------|---|
| <b>Applicant:</b>              | IKEA of Sweden AB   |
| <b>Applicant Address:</b>      | SE-343 81, Almhult, Sweden  |
| <b>Manufacturer:</b>           | IKEA of Sweden AB   |
| <b>Manufacturer Address:</b>   | SE-343 81, Almhult, Sweden  |
| <b>Test Site:</b>              | MRT Technology (Suzhou) Co., Ltd  |
| <b>Test Site Address:</b>      | D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China  |
| <b>FCC Registration No.:</b>   | 893164  |
| <b>IC Registration No.:</b>    | 11384A-1  |
| <b>Test Device Serial No.:</b> | N/A <input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production <input type="checkbox"/> Engineering |

**Test Facility / Accreditations**

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- MRT facility is a FCC registered (MRT Reg. No. 893164) test facility with the site description report on file and has met all the requirements specified in ANSI C63.4-2014.
- MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.
- MRT facility is a VCCI registered (R-20025, G-20034, C-20020, T-20020) test laboratory with the site description on file at VCCI Council.
- MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications, Radio and SAR testing.



# 1. INTRODUCTION

## 1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

## 1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The measurement facility compliant with the test site requirements specified in ANSI C63.4-2014.



## 2. PRODUCT INFORMATION

### 2.1. Equipment Description

|                    |                                       |
|--------------------|---------------------------------------|
| Product Name:      | FREKVENNS Speaker                     |
| Model No.:         | F1720                                 |
| Brand Name:        | IKEA                                  |
| Bluetooth Version: | V4.2 (Only support Bluetooth v3.0+HS) |

### 2.2. Product Specification Subjective to this Standard

|                      |   |
|----------------------|---|
| Operating Frequency: | 2402~2480MHz                                  |
| Channel Number:      | 79  |
| Type of modulation:  | GFSK, Pi/4 DQPSK, 8DPSK                       |
| Data Rate:           | 1Mbps(GFSK), 2Mbps(Pi/4 DQPSK), 3Mbps (8DPSK) |
| Antenna Type:        | FPC Antenna                                   |
| Antenna Gain:        | 2.93 dBi                                      |

### 3. RF Exposure Evaluation

#### 3.1. Limits

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

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

| MHz  | 5  | 10 | 15  | 20  | 25  | mm                                |
|------|----|----|-----|-----|-----|-----------------------------------|
| 150  | 39 | 77 | 116 | 155 | 194 | SAR Test Exclusion Threshold (mW) |
| 300  | 27 | 55 | 82  | 110 | 137 |                                   |
| 450  | 22 | 45 | 67  | 89  | 112 |                                   |
| 835  | 16 | 33 | 49  | 66  | 82  |                                   |
| 900  | 16 | 32 | 47  | 63  | 79  |                                   |
| 1500 | 12 | 24 | 37  | 49  | 61  |                                   |
| 1900 | 11 | 22 | 33  | 44  | 54  |                                   |
| 2450 | 10 | 19 | 29  | 38  | 48  |                                   |
| 3600 | 8  | 16 | 24  | 32  | 40  |                                   |
| 5200 | 7  | 13 | 20  | 26  | 33  |                                   |
| 5400 | 6  | 13 | 19  | 26  | 32  |                                   |
| 5800 | 6  | 12 | 19  | 25  | 31  |                                   |

  

| MHz  | 30  | 35  | 40  | 45  | 50  | mm                                |
|------|-----|-----|-----|-----|-----|-----------------------------------|
| 150  | 232 | 271 | 310 | 349 | 387 | SAR Test Exclusion Threshold (mW) |
| 300  | 164 | 192 | 219 | 246 | 274 |                                   |
| 450  | 134 | 157 | 179 | 201 | 224 |                                   |
| 835  | 98  | 115 | 131 | 148 | 164 |                                   |
| 900  | 95  | 111 | 126 | 142 | 158 |                                   |
| 1500 | 73  | 86  | 98  | 110 | 122 |                                   |
| 1900 | 65  | 76  | 87  | 98  | 109 |                                   |
| 2450 | 57  | 67  | 77  | 86  | 96  |                                   |
| 3600 | 47  | 55  | 63  | 71  | 79  |                                   |
| 5200 | 39  | 46  | 53  | 59  | 66  |                                   |
| 5400 | 39  | 45  | 52  | 58  | 65  |                                   |
| 5800 | 37  | 44  | 50  | 56  | 62  |                                   |

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

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})]^*$$

$[\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR and  $\leq 7.5$  for 10-g extremity SAR, where

- $f(\text{GHz})$  is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is  $\leq 50$  mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is  $< 5$  mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

### **3.2. Test Procedure**

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

The temperature and related humidity: 20°C and 75% RH.

### 3.3. Test Result of RF Exposure Evaluation

|           |                        |
|-----------|------------------------|
| Product   | FREKVENS Speaker       |
| Test Item | RF Exposure Evaluation |

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.93dBi for Bluetooth in logarithm scale.

#### Output Power into Antenna:

| Test Mode | Frequency Band (MHz) | Maximum output power to antenna (dBm) | Maximum output power to antenna (mW) | SAR Test Exclusion Threshold (mW) |
|-----------|----------------------|---------------------------------------|--------------------------------------|-----------------------------------|
| Bluetooth | 2402 ~ 2480          | 4.82                                  | 3.03                                 | 19                                |

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

$$\frac{\text{Max Power of Channel (mW)}}{\text{Test Separation Dist (mm)}} * \sqrt{\text{Frequency (GHz)}} \leq 3.0$$

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

$$[(3.03\text{mW}/10) * \sqrt{2.480}] = 0.4772 < 3.0$$

The Max  $P_d = 0.4772 < 3.0$

Note: Separation distance declared by manufacturer is 20cm, but we evaluate it with a more rigorous distance of 10mm and the result complies with the requirement of 10mm determine SAR test exclusion.

### **3.4. FINAL CONCLUSION**

The device is excluded for SAR test and complies with the FCC exposure requirements since the maximum conducted peak output power is lower than the SAR test exclusion thresholds.

\_\_\_\_\_ The End \_\_\_\_\_

## **Appendix A – EUT Photograph**

Refer to “1809WSU002-UE” file.