

Report No.: KSCR220100003204

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# TEST REPORT

 Application No.:
 KSCR2201000032AT

 FCC ID:
 2ADTD-DS-D5B75

 IC:
 20199-DSD5B75

Applicant: Hangzhou Hikvision Digital Technology Co., Ltd.

Address of Applicant: No.555 Qianmo Road, Binjiang District Hangzhou 310052, China

Manufacturer: Hangzhou Hikvision Digital Technology Co., Ltd.

Address of Manufacturer: No.555 Qianmo Road, Binjiang District Hangzhou 310052, China

**Factory:** 1.Hangzhou Hikvision Technology Co., Ltd.

2. Hangzhou Hikvision Electronics Co., Ltd.

3. Hangzhou Hikvision Digital Technology Co., Ltd.

4. Chongqing Hikvision technology Co., LTD

Address of Factory: 1.No.700, Dongliu Road, Binjiang District, Hangzhou Ctiy, Zhejiang,

310052, China;

2.No.299, Qiushi Road, Tonglu Economic Development Zone, Tonglu

County, Hangzhou, Zhejiang, 310052, China

3.No.555 Qianmo Road, Binjiang District, Hangzhou 310052, China 4.NO.118.Haikang Road, Area C. Jiangiao Industrial Park, Dadukou

District, Chongqing, 401325, China.

**Equipment Under Test (EUT):** 

**EUT Name:** Interactive Tablets **Model No.:** Refer to page 2~3¤¤

Please refer to section 2 of this report which indicates which model was

actually tested and which were electrically identical.

Trade mark: HIKVISION

Standard(s): 47 CFR Part 15, Subpart C 15.247

RSS-247 Issue 2, February 2017

RSS-Gen Issue 5 Amendment 2 (February 2021)

**Date of Receipt:** 2022-01-05

**Date of Test:** 2022-03-07 to 2022-03-10

**Date of Issue:** 2022-03-14

Test Result: Pass\*

Eric Lin Laboratory Manager

ma fr



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<sup>\*</sup> In the configuration tested, the EUT complied with the standards specified above.



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#### Model No:

DS-D5B75RB/A:DS-D5B75RB/B:DS-D5B75RB/C:DS-D5B75RD/A:DS-D5B75RD/B:DS-D5B75RD/C:DS-D5B75RO/A;DS-D5B75RO/B;DS-D5B75RO/C;DS-D5B75RG/A;DS-D5B75RG/B;DS-D5B75RG/C;DS-D5B75RM/A;DS-D5B75RM/B;DS-D5B75RM/C;DS-D5B75JRX;DS-D5B75JRY;DS-D5B75JRZ;DS-D5B75NYX;DS-D5B75NYY;DS-D5B75NYZ;DS-D5B75ZFX;DS-D5B75ZFY;DS-D5B75ZFZ;DS-D5B75GAX;DS-D5B75GAY;DS-D5B75GAZ;DS-D5B75DCX;DS-D5B75DCY;DS-D5B75DCZ;DS-D5B75RB/ZC;DS-D5B75RD/ZC;DS-D5B75XX/ZC;DS-D5B75RD/AO;DS-D5B75RD/AP;DS-D5B75RB/AO;DS-D5B75RB/AP;DS-D5B75RD/BO;DS-D5B75RD/BP;DS-D5B75RB/BO;DS-D5B75RB/BP;DS-D5B75MD/AO;DS-D5B75MD/AP;DS-D5B75MB/AO;DS-D5B75MB/AP;DS-D5B75MD/BO;DS-D5B75MD/BP;DS-D5B75MB/BO;DS-D5B75MB/BP;DS-D5B75CD/AO;DS-D5B75CD/AP;DS-D5B75CB/AO;DS-D5B75CB/AP;DS-D5B75CD/BO;DS-D5B75CD/BO;DS-D5B75CB/BO;DS-D5B75CB/BP;DS-D5B75FD/AO;DS-D5B75FD/AP;DS-D5B75FB/AO;DS-D5B75FB/AP;DS-D5B75FD/A;DS-D5B75FB/A;DS-D5B75FD/BO;DS-D5B75FD/BP;DS-D5B75FB/BO;DS-D5B75FB/BP;DS-D5B75FD/B;DS-D5B75FB/B;DS-D5C75RB/A;DS-D5C75RB/B;DS-D5C75RB/C;DS-D5C75RD/A;DS-D5C75RD/B;DS-D5C75RD/C;DS-D5C75RO/A;DS-D5C75RO/B;DS-D5C75RO/C;DS-D5C75RG/A;DS-D5C75RG/B;DS-D5C75RG/C;DS-D5C75RM/A;DS-D5C75RM/B;DS-D5C75RM/C;DS-D5C75JRX;DS-D5C75JRY;DS-D5C75JRZ;DS-D5C75NYX;DS-D5C75NYY;DS-D5C75NYZ;DS-D5C75ZFX;DS-D5C75ZFY;DS-D5C75ZFZ;DS-D5C75GAX;DS-D5C75GAY;DS-D5C75GAZ;DS-D5C75DCX;DS-D5C75DCY;DS-D5C75DCZ;DS-D5C75RB/ZC;DS-D5C75RD/ZC;DS-D5C75XX/ZC;DS-D5C75RD/AO;DS-D5C75RD/AP;DS-D5C75RB/AO;DS-D5C75RB/AP;DS-D5C75RD/BO;DS-D5C75RD/BP;DS-D5C75RB/BO;DS-D5C75RB/BP;DS-D5C75MD/AO;DS-D5C75MD/AP;DS-D5C75MB/AO;DS-D5C75MB/AP;DS-D5C75MD/BO;DS-D5C75MD/BP;DS-D5C75MB/BO;DS-D5C75MB/BP;DS-D5C75CD/AO;DS-D5C75CD/AP;DS-D5C75CB/AO;DS-D5C75CB/AP;DS-D5C75CD/BO;DS-D5C75CD/BP;DS-D5C75CB/BO;DS-D5C75CB/BP;DS-D5C75FD/AO;DS-D5C75FD/AP;DS-D5C75FB/AO;DS-D5C75FB/AP;DS-D5C75FD/A;DS-D5C75FB/A;DS-D5C75FD/BO;DS-D5C75FD/BP;DS-D5C75FB/BO;DS-D5C75FB/BP;DS-D5C75FD/B;DS-D5C75FB/B;DS-D5D75RB/A;DS-D5D75RB/B;DS-D5D75RB/C;DS-D5D75RD/A;DS-D5D75RD/B;DS-D5D75RD/C;DS-D5D75RO/A;DS-D5D75RO/B;DS-D5D75RO/C;DS-D5D75RG/A;DS-D5D75RG/B;DS-D5D75RG/C;DS-D5D75RM/A;DS-D5D75RM/B;DS-D5D75RM/C;DS-D5D75JRX;DS-D5D75JRY;DS-D5D75JRZ;DS-D5D75NYX;DS-D5D75NYY;DS-D5D75NYZ;DS-D5D75ZFX;DS-D5D75ZFY;DS-D5D75ZFZ;DS-D5D75GAX;DS-D5D75GAY;DS-D5D75GAZ;DS-D5D75DCX;DS-D5D75DCY;DS-D5D75DCZ;DS-D5D75RB/ZC;DS-D5D75RD/ZC;DS-D5D75XX/ZC;DS-D5D75RD/AO;DS-D5D75RD/AP;DS-D5D75RB/AO;DS-D5D75RB/AP;DS-D5D75RD/BO;DS-D5D75RD/BP;DS-D5D75RB/BO;DS-D5D75RB/BP;DS-D5D75MD/AO;DS-D5D75MD/AP;DS-D5D75MB/AO;DS-D5D75MB/AP;DS-D5D75MD/BO;DS-D5D75MD/BP;DS-D5D75MB/BO;DS-D5D75MB/BP;DS-D5D75CD/AO;DS-D5D75CD/AP;DS-D5D75CB/AO;DS-D5D75CB/AP;DS-D5D75CD/BO;DS-D5D75CD/BP;DS-D5D75CB/BO;DS-D5D75CB/BP;DS-D5D75FD/AO;DS-D5D75FD/AP;DS-D5D75FB/AO;DS-D5D75FB/AP;DS-D5D75FD/A;DS-D5D75FB/A;DS-D5D75FD/BO;DS-D5D75FD/BP;DS-D5D75FB/BO;DS-D5D75FB/BP;DS-D5D75FD/B;DS-D5D75FB/B;DS-D5F75RB/A;DS-D5F75RB/B;DS-D5F75RB/C;DS-D5F75RD/A;DS-D5F75RD/B;DS-D5F75RD/C;DS-D5F75RO/A;DS-D5F75RO/B;DS-D5F75RO/C;DS-D5F75RG/A;DS-D5F75RG/B;DS-D5F75RG/C;DS-D5F75RM/A;DS-D5F75RM/B;DS-D5F75RM/C;DS-D5F75JRX;DS-D5F75JRY;DS-D5F75JRZ;DS-D5F75NYX;DS-D5F75NYY;DS-D5F75NYZ;DS-D5F75ZFX;DS-D5F75ZFY;DS-D5F75ZFZ;DS-D5F75GAX;DS-D5F75GAY;DS-D5F75GAZ;DS-D5F75DCX;DS-D5F75DCY;DS-D5F75DCZ;DS-D5F75RB/ZC;DS-D5F75RD/ZC;DS-D5F75XX/ZC;DS-D5F75RD/AO;DS-D5F75RD/AP;DS-D5F75RB/AO;DS-D5F75RB/AP;DS-D5F75RD/BO;DS-D5F75RD/BP;DS-D5F75RB/BO;DS-D5F75RB/BP;DS-D5F75MD/AO;DS-D5F75MD/AP;DS-D5F75MB/AO;DS-D5F75MB/AP;DS-D5F75MD/BO;DS-D5F75MD/BP;DS-D5F75MB/BO;DS-D5F75MB/BP;DS-D5F75CD/AO;DS-D5F75CD/AP;DS-D5F75CB/AO;DS-D5F75CB/AP;DS-D5F75CD/BO;DS-D5F75CD/BP;DS-D5F75CB/BO;DS-D5F75CB/BP;DS-D5F75FD/AO;DS-D5F75FD/AP;DS-D5F75FB/AO;DS-D5F75FB/AP;DS-D5F75FD/A;DS-D5F75FB/A;DS-D5F75FD/BO;DS-D5F75FD/BP;DS-D5F75FB/BO;DS-D5F75FB/BP;DS-D5F75FD/B;DS-D5F75FB/B;DS-D5A75RB/A;DS-D5A75RB/B;DS-D5A75RB/C;DS-D5A75RD/A;DS-D5A75RD/B;DS-D5A75RD/C;DS-D5A75RO/A;DS-D5A75RO/B;DS-D5A75RO/C;DS-D5A75RG/A;DS-D5A75RG/B;DS-D5A75RG/C:DS-D5A75RM/A:DS-D5A75RM/B:DS-D5A75RM/C:DS-D5A75JRX:DS-D5A75JRY:DS-D5A75JRZ;DS-D5A75NYX;DS-D5A75NYY;DS-D5A75NYZ;DS-D5A75ZFX;DS-D5A75ZFY;DS-



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D5A75ZFZ;DS-D5A75GAX;DS-D5A75GAY;DS-D5A75GAZ;DS-D5A75DCX;DS-D5A75DCY;DS-D5A75DCZ;DS-D5A75RB/ZC;DS-D5A75RD/ZC;DS-D5A75RD/ZC;DS-D5A75RD/AO;DS-D5A75RD/AO;DS-D5A75RD/AP;DS-D5A75RB/AO;DS-D5A75RB/AP;DS-D5A75RD/BO;DS-D5A75RD/BP;DS-D5A75RB/BO;DS-D5A75RB/BP;DS-D5A75MD/AO;DS-D5A75MD/AP;DS-D5A75MD/AP;DS-D5A75MD/BP;DS-D5A75MD/BO;DS-D5A75MB/BO;DS-D5A75MD/BP;DS-D5A75CD/AP;DS-D5A75CD/AO;DS-D5A75CB/AP;DS-D5A75CD/BO;DS-D5A75CD/BO;DS-D5A75CB/BP;DS-D5A75CB/BP;DS-D5A75FD/AO;DS-D5A75FD/AP;DS-D5A75FD/AP;DS-D5A75FD/BP;DS-D5A75FD/BP;DS-D5A75FD/BP;DS-D5A75FD/BP;DS-D5A75FD/BP;DS-D5A75FB/B;DS-D5A75FD/BP;DS-D5A75FD/BP;DS-D5A75FB/B;DS-D5A75FD/BP;DS-D5A75FB/B;DS-D5A75FD/BP;DS-D5A75FD/BP;DS-D5A75FB/B;DS-D5A75FD/BP;DS-D5A75FB/B;DS-D5A75FD/BP;DS-D5A75FB/B;DS-D5A75FD/BP;DS-D5A75FB/B;DS-D5A75FD/BP;DS-D5A75FB/B;DS-D5A75FD/BP;DS-D5A75FB/B;DS-D5A75FD/BP;DS-D5A75FB/B;DS-D5A75FD/BP;DS-D5A75FB/B;DS-D5A75FD/BP;DS-D5A75FB/BP;DS

#### For IC Model No.:

DS-D5B75RB/A, DS-D5B75RB/B



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| Revision Record                 |          |            |   |  |  |  |  |  |  |  |
|---------------------------------|----------|------------|---|--|--|--|--|--|--|--|
| Version Description Date Remark |          |            |   |  |  |  |  |  |  |  |
| 00                              | Original | 2022-03-14 | 1 |  |  |  |  |  |  |  |
|                                 |          |            |   |  |  |  |  |  |  |  |
|                                 |          |            |   |  |  |  |  |  |  |  |

| Authorized for issue by: |                                |  |
|--------------------------|--------------------------------|--|
|                          | Tommie Tang                    |  |
|                          | Tommie.Tang / Project Engineer |  |
|                          | Esia fri                       |  |
|                          | Eric Lin / Reviewer            |  |



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# 2 Test Summary

| Radio Spectrum Technical Requirement   |  |                           |        |                         |  |  |  |
|--|--|---------------------------|--------|-------------------------|--|--|--|
| Item   | FCC Requirement                                      | IC Requirement            | Method | Result                  |  |  |  |
| Antenna Requirement  | 47 CFR Part 15,<br>Subpart C 15.203 &<br>15.247(c)   | RSS-Gen<br>Clause 6.8     | N/A    | Customer<br>Declaration |  |  |  |
| Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence | 47 CFR Part 15,<br>Subpart C<br>15.247(a)(1),(g),(h) | RSS-247 Section<br>5.1(a) | N/A    | Pass                    |  |  |  |

N/A: Not applicable

| Radio Spectrum Matt                                       |   | IC Beguirement                            | Mothod                                       | Decult |
|---|---|---|--|--------|
| Item  | FCC Requirement                                 | IC Requirement                            | Method                                       | Result |
| Conducted Emissions<br>at AC Power Line<br>(150kHz-30MHz) | 47 CFR Part 15,<br>Subpart C 15.207             | RSS-Gen Section 8.8                       | ANSI C63.10<br>(2013) Section 6.2            | Pass   |
| Conducted Peak<br>Output Power                            | 47 CFR Part 15,<br>Subpart C 15.247(b)(1)       | RSS-247 Section<br>5.4(b)                 | ANSI C63.10<br>(2013) Section<br>7.8.5       | Pass   |
| 20dB Bandwidth  | 47 CFR Part 15,<br>Subpart C 15.247(a)(1)       | RSS-247 Section<br>5.1(a)                 | ANSI C63.10<br>(2013) Section<br>7.8.7       | Pass   |
| Carrier Frequencies<br>Separation                         | 47 CFR Part 15,<br>Subpart C 15.247a(1)         | RSS-247 Section<br>5.1(b)                 | ANSI C63.10<br>(2013) Section<br>7.8.2       | Pass   |
| Hopping Channel<br>Number                                 | 47 CFR Part 15,<br>Subpart C<br>15.247a(1)(iii) | RSS-247 Section<br>5.1(d)                 | ANSI C63.10<br>(2013) Section<br>7.8.3       | Pass   |
| Dwell Time  | 47 CFR Part 15,<br>Subpart C<br>15.247a(1)(iii) | RSS-247 Section<br>5.1(d)                 | ANSI C63.10<br>(2013) Section<br>7.8.4       | Pass   |
| Conducted Band<br>Edges Measurement                       | 47 CFR Part 15,<br>Subpart C 15.247(d)          | RSS-247 Section 5.5                       | ANSI C63.10<br>(2013) Section<br>7.8.6       | Pass   |
| Conducted Spurious<br>Emissions                           | 47 CFR Part 15,<br>Subpart C 15.247(d)          | RSS-247 Section 5.5                       | ANSI C63.10<br>(2013) Section<br>7.8.8       | Pass   |
| Radiated Emissions which fall in the restricted bands     | 47 CFR Part 15,<br>Subpart C 15.205 &<br>15.209 | RSS-247 Section 3.3 & RSS-Gen Section 8.9 | ANSI C63.10<br>(2013) Section<br>6.10.5      | Pass   |
| Radiated Spurious<br>Emissions                            | 47 CFR Part 15,<br>Subpart C 15.205 &<br>15.209 | RSS-247 Section 3.3 & RSS-Gen Section 8.9 | ANSI C63.10<br>(2013) Section<br>6.4,6.5,6.6 | Pass   |
| 99% Bandwidth   | -   | RSS-Gen Section 6.7                       | ANSI C63.10<br>Section 6.9.3                 | Pass   |

#### **Declaration of EUT Family Grouping:**

Note: There are series models mentioned in this report, and they are the similar in electrical and electronic characters. Only the model DS-D5B75RB/A was tested since their differences were the model number and appearance.



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|   | 7.4        | Power Spectrum Density                                |                                       |
|   | 7.5        | CONDUCTED BAND EDGES MEASUREMENT                      |                                       |
|   | 7.6<br>7.7 | CONDUCTED SPURIOUS EMISSIONS                          |                                       |
|   | 7.7<br>7.8 | RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS |                                       |
|   | 7.9        | 99% BANDWIDTH   |                                       |
| 8 | _          | ST SETUP PHOTOGRAPHS                                  |                                       |
| 9 | EII        | IT CONSTRUCTIONAL DETAILS                             | 44                                    |
| J |            | '   | · · · · · · · · · · · · · · · · · · · |



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# 4 General Information

#### 4.1 Details of E.U.T.

Power supply: AC100-240V 50/60Hz

Test voltage: AC 120V/60Hz

Antenna Gain: 5.19dBi (Provided by the manufacturer)

Antenna Type: PCB Antenna
Bluetooth Version: V5.0 Dual mode

Data Rate: 1Mbps
Channel Spacing: 2MHz
Modulation Type: GFSK
Number of Channels: 40

Operation Frequency: 2402MHz to 2480MHz

S/N: G91585824

Firmware Version: V2.1.0 build210528

### 4.2 Power level setting using in test:

| Channel | BLE     |
|---------|---------|
| 0       | Default |
| 19      | Default |
| 39      | Default |

# 4.3 Description of Support Units

| Description               | Manufacturer | Model No.      | Serial No. |
|---------------------------|--------------|----------------|------------|
| Laptop                    | Lenovo       | ThinkPad X100e | 1          |
| SecureCRT                 | VanDyke      | V 6.2.0        | 1          |
| Serial port adapter plate | 1            | Test Plate 3   | 1          |



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# 4.4 Measurement Uncertainty

| No. | Item                             | Measurement Uncertainty |
|-----|----------------------------------|-------------------------|
| 1   | Radio Frequency                  | 8.4 x 10 <sup>-8</sup>  |
| 2   | Timeout                          | 2s                      |
| 3   | Duty Cycle                       | 0.37%                   |
| 4   | Occupied Bandwidth               | 3%                      |
| 5   | RF Conducted Power               | 0.6dB                   |
| 6   | RF Power Density                 | 2.9dB                   |
| 7   | Conducted Spurious Emissions     | 0.75dB                  |
| 8   | RF Radiated Power                | 5.2dB (Below 1GHz)      |
| 0   | RF Radiated Power                | 5.9dB (Above 1GHz)      |
|     |                                  | 4.2dB (Below 30MHz)     |
| 0   | Dadiated Chumieus Fraissian Test | 4.5dB (30MHz-1GHz)      |
| 9   | Radiated Spurious Emission Test  | 5.1dB (1GHz-18GHz)      |
|     |                                  | 5.4dB (Above 18GHz)     |
| 10  | Temperature Test                 | 1°C                     |
| 11  | Humidity Test                    | 3%                      |
| 12  | Supply Voltages                  | 1.5%                    |
| 13  | Time                             | 3%                      |

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



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#### 4.5 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

## 4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

#### • CNAS (No. CNAS L4354)

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

#### • A2LA (Certificate No. 2541.01)

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

#### • FCC (Designation Number: CN1172)

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory.

Designation Number: CN1172.ISED (CAB identifier: CN0072)

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

Company Number: 2324E
• VCCI (Member No.: 1938)

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

#### 4.7 Deviation from Standards

None

#### 4.8 Abnormalities from Standard Conditions

None



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# 5 Equipment List

| Item | Equipment                               | Manufacturer  | Model       | Serial Number | Cal Date   | Cal. Due Date |
|------|---|---------------|-------------|---------------|------------|---------------|
| Con  | ducted Emission at Mains Terminals (150 | kHz-30MHz)    |             |               |            |               |
| 1    | EMI Test Receive                        | R&S           | ESCI        | 100781        | 01/22/2022 | 01/21/2023    |
| 2    | LISN                                    | R&S           | ENV216      | 101604        | 10/12/2021 | 10/11/2022    |
| 3    | LISN                                    | Schwarzbeck   | NNLK 8129   | 8129-143      | 10/12/2021 | 10/11/2022    |
| 4    | Pulse Limiter                           | R&S           | ESH3-Z2     | 100609        | 01/22/2022 | 01/21/2023    |
| 5    | CE test Cable                           | Thermax       | 1           | 14            | 10/16/2021 | 10/15/2022    |
| 6    | Test Software                           | Faratronic    | EZ-EMC      | CCS-03A1      | N.C.R      | N.C.R         |
| RF ( | Conducted Test                          |               |             |               |            |               |
| 1    | Spectrum Analyzer                       | Agilent       | E4446A      | MY44020154    | 04/16/2021 | 04/15/2022    |
| 2    | Spectrum Analyzer                       | Keysight      | N9020A      | MY55370209    | 10/11/2021 | 10/10/2022    |
| 4    | Signal Generator                        | Agilent       | N5182A      | MY50142015    | 08/27/2021 | 08/26/2022    |
| 5    | Spectrum Analyzer                       | Keysight      | N9030B      | MY61330164    | 01/22/2022 | 01/21/2023    |
| 6    | Vector Signal Generator                 | R&S           | SMW200A     | 110074        | 10/12/2021 | 10/11/2022    |
| 7    | Radio Communication Test Station        | Anritsu       | MT8000A     | 6262012849    | 09/23/2021 | 09/22/2022    |
| 8    | Radio Communication Analyzer            | Anritsu       | MT8821C     | 6201692222    | 09/23/2021 | 09/22/2022    |
| 9    | Universal Radio Communication Tester    | R&S           | CMW500      | 159275        | 10/12/2021 | 10/11/2022    |
| 10   | Universal Radio Communication Tester    | R&S           | CMW500      | 167239        | 04/16/2021 | 04/15/2022    |
| 11   | Power Meter                             | Anritsu       | ML2495A     | 1445010       | 04/15/2021 | 04/14/2022    |
| 12   | Switcher                                | CCSRF         | FY562       | KUS2001M001-3 | 10/12/2021 | 10/11/2022    |
| 13   | AC Power Source                         | EXTECH        | 6605        | 1570106       | N.C.R      | N.C.R         |
| 14   | DC Power Supply                         | Aglient       | E3632A      | MY50340053    | N.C.R      | N.C.R         |
| 15   | 6dB Attenuator                          | Mini-Circuits | NAT-6-2W    | 15542-1       | N.C.R      | N.C.R         |
| 16   | Power Divider                           | AISI          | IOWOPE2068  | PE2068        | N.C.R      | N.C.R         |
| 17   | Filter                                  | MICRO-TRONICS | BRM50701    | 5             | N.C.R      | N.C.R         |
| 18   | Conducted Test Cable                    | 1             | RF01-RF04   | /             | 04/15/2021 | 04/14/2022    |
| 19   | Software                                | BST           | TST-PASS    | N/A           | N/A        | N/A           |
| 20   | Temp. / Humidity Chamber                | TERCHY        | MHK-120AK   | X30109        | 04/15/2021 | 04/14/2022    |
| 21   | Thermometer                             | Anymetre      | TH603       | CCS007        | 10/14/2021 | 10/13/2022    |
| RF R | adiated Test                            |               |             |               |            |               |
| 1    | Spectrum Analyzer                       | R&S           | FSV40       | 101493        | 10/11/2021 | 10/10/2022    |
| 2    | Signal Generator                        | Agilent       | E8257C      | MY43321570    | 10/18/2021 | 10/17/2022    |
| 3    | Loop Antenna                            | Com-Power     | AL-130R     | 10160008      | 04/13/2021 | 04/12/2023    |
| 4    | Bilog Antenna                           | TESEQ         | CBL 6112D   | 35403         | 06/21/2021 | 06/20/2023    |
| 5    | Bilog Antenna                           | SCHWARZBECK   | VULB9160    | 9160-3342     | 04/13/2021 | 04/12/2023    |
| 6    | Horn-antenna(1-18GHz)                   | Schwarzbeck   | BBHA9120D   | 267           | 10/26/2020 | 10/25/2022    |
| 7    | Horn-antenna(1-18GHz)                   | ETS-LINDGREN  | 3117        | 00143290      | 02/22/2021 | 02/21/2023    |
| 8    | Horn Antenna(18-40GHz)                  | Schwarzbeck   | BBHA9170    | BBHA9170171   | 02/20/2022 | 02/19/2023    |
| 9    | Pre-Amplifier(30MHz~18GHz)              | LNA           | /           | /             | 04/15/2021 | 04/14/2022    |
| 10   | Amplifier(18~40GHz)                     | COM-POWER     | PAM-840A    | 461332        | 10/18/2021 | 10/17/2022    |
| 11   | Low Pass Filter                         | MICRO-TRONICS | VLFX-950    | RV142900829   | N.C.R      | N.C.R         |
| 12   | High Pass Filter                        | Mini-Circuits | VHF-1200    | 15542         | N.C.R      | N.C.R         |
| 13   | Filter (5450MHz~5770 MHz)               | MICRO-TRONICS | BRC50704-01 | 2             | N.C.R      | N.C.R         |
| 14   | Filter (5690 MHz~5930 MHz)              | MICRO-TRONICS | BRC50705-01 | 4             | N.C.R      | N.C.R         |



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| 15 | Filter (5150 MHz~5350 MHz)        | MICRO-TRONICS | BRC50703-01 | 2   | N.C.R      | N.C.R      |
|----|-----------------------------------|---------------|-------------|-----|------------|------------|
| 16 | Filter (885 MHz~915 MHz)          | MICRO-TRONICS | BRM14698    | 1   | N.C.R      | N.C.R      |
| 17 | Filter (815 MHz~860 MHz)          | MICRO-TRONICS | BRM14697    | 1   | N.C.R      | N.C.R      |
| 18 | Filter (1745 MHz $\sim$ 1910 MHz) | MICRO-TRONICS | BRM14700    | 1   | N.C.R      | N.C.R      |
| 19 | Filter (1922 MHz $\sim$ 1977 MHz) | MICRO-TRONICS | BRM50715    | 1   | N.C.R      | N.C.R      |
| 20 | Filter (2550 MHz)                 | MICRO-TRONICS | HPM13362    | 5   | N.C.R      | N.C.R      |
| 21 | Filter (1532 MHz~1845 MHz)        | MICRO-TRONICS | BRM50713    | 1   | N.C.R      | N.C.R      |
| 22 | Filter (2.4GHz)                   | MICRO-TRONICS | BRM50701    | 5   | N.C.R      | N.C.R      |
| 23 | RE test cable                     | 1             | RE01-RE04   | 1   | 04/15/2021 | 04/14/2022 |
| 24 | Software                          | Faratronic    | EZ_EMC      | N/A | N/A        | N/A        |



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# 6 Radio Spectrum Technical Requirement

## 6.1 Antenna Requirement

#### 6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

#### 6.1.2 Conclusion

## Standard 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(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### **EUT Antenna:**

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 5.19dBi.

Antenna location: Refer to Appendix (Internal Photos)



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# 7 Radio Spectrum Matter Test Results

# 7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207 Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

| Everyone of emission (MH=)                      | Conducted  | limit(dBµV) |  |  |  |  |
|---|------------|-------------|--|--|--|--|
| Frequency of emission(MHz)                      | Quasi-peak | Average     |  |  |  |  |
| 0.15-0.5  | 66 to 56*  | 56 to 46*   |  |  |  |  |
| 0.5-5   | 56         | 46          |  |  |  |  |
| 5-30  | 60         | 50          |  |  |  |  |
| *Decreases with the logarithm of the frequency. |            |             |  |  |  |  |



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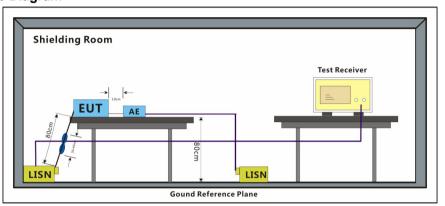
#### 7.1.1 E.U.T. Operation

**Operating Environment:** 

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar Test mode f:Module MT7668 TX mode Keep the EUT in continuously transmitting mode with

GFSK modulation.

#### 7.1.2 Test Setup Diagram



#### 7.1.3 Measurement Procedure and Data

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a  $50 \text{ohm}/50 \mu\text{H}$  + 5 ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor



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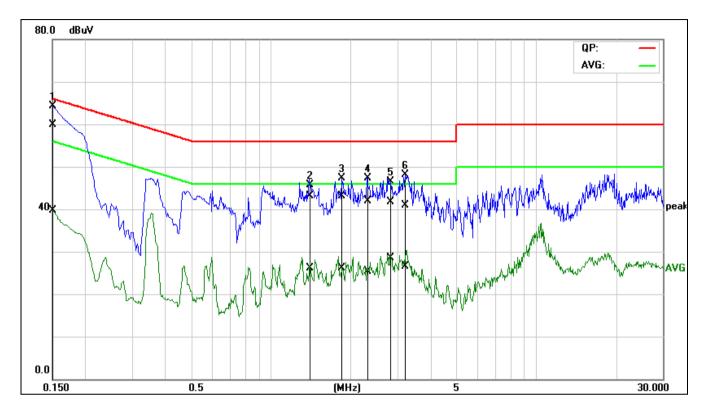
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#### Mode:f; Line:Live Line



| No. | Frequency | QuasiPeak | Average | Correction | QuasiPeak | Average | QuasiPeak | Average | QuasiPeak | Average | Remark |
|-----|-----------|-----------|---------|------------|-----------|---------|-----------|---------|-----------|---------|--------|
|     |           | reading   | reading | factor     | result    | result  | limit     | limit   | margin    | margin  |        |
|     | (MHz)     | (dBuV)    | (dBuV)  | (dB)       | (dBuV)    | (dBuV)  | (dBuV)    | (dBuV)  | (dB)      | (dB)    |        |
| 1*  | 0.1500    | 40.46     | 20.24   | 19.50      | 59.96     | 39.74   | 66.00     | 56.00   | -6.04     | -16.26  | Pass   |
| 2   | 1.4167    | 23.44     | 6.46    | 19.62      | 43.06     | 26.08   | 56.00     | 46.00   | -12.94    | -19.92  | Pass   |
| 3   | 1.8534    | 23.46     | 6.42    | 19.64      | 43.10     | 26.06   | 56.00     | 46.00   | -12.90    | -19.94  | Pass   |
| 4   | 2.3244    | 22.14     | 5.70    | 19.67      | 41.81     | 25.37   | 56.00     | 46.00   | -14.19    | -20.63  | Pass   |
| 5   | 2.8192    | 21.99     | 8.80    | 19.70      | 41.69     | 28.50   | 56.00     | 46.00   | -14.31    | -17.50  | Pass   |
| 6   | 3.2193    | 21.17     | 6.86    | 19.72      | 40.89     | 26.58   | 56.00     | 46.00   | -15.11    | -19.42  | Pass   |



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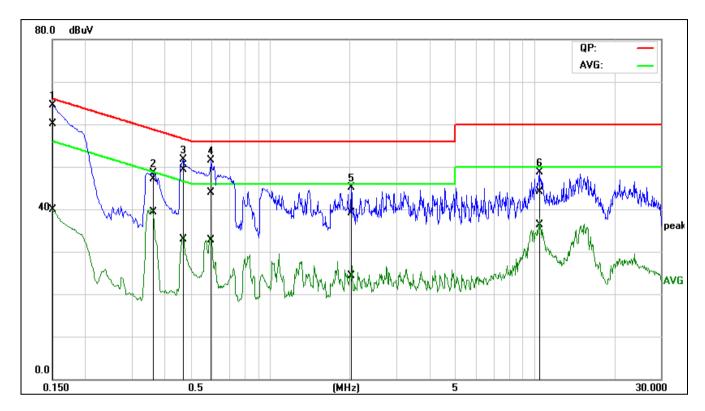
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#### Mode:f; Line:Neutral Line



| No. | Frequency | QuasiPeak | Average | Correction | QuasiPeak | Average | QuasiPeak | Average | QuasiPeak | Average | Remark |
|-----|-----------|-----------|---------|------------|-----------|---------|-----------|---------|-----------|---------|--------|
|     |           | reading   | reading | factor     | result    | result  | limit     | limit   | margin    | margin  |        |
|     | (MHz)     | (dBuV)    | (dBuV)  | (dB)       | (dBuV)    | (dBuV)  | (dBuV)    | (dBuV)  | (dB)      | (dB)    |        |
| 1*  | 0.1500    | 40.60     | 20.38   | 19.48      | 60.08     | 39.86   | 66.00     | 56.00   | -5.92     | -16.14  | Pass   |
| 2   | 0.3596    | 27.69     | 19.76   | 19.51      | 47.20     | 39.27   | 58.74     | 48.74   | -11.54    | -9.47   | Pass   |
| 3   | 0.4685    | 29.67     | 13.44   | 19.55      | 49.22     | 32.99   | 56.54     | 46.54   | -7.32     | -13.55  | Pass   |
| 4   | 0.5981    | 24.39     | 13.08   | 19.56      | 43.95     | 32.64   | 56.00     | 46.00   | -12.05    | -13.36  | Pass   |
| 5   | 2.0246    | 19.47     | 4.68    | 19.65      | 39.12     | 24.33   | 56.00     | 46.00   | -16.88    | -21.67  | Pass   |
| 6   | 10.4382   | 24.02     | 16.21   | 20.05      | 44.07     | 36.26   | 60.00     | 50.00   | -15.93    | -13.74  | Pass   |



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#### 7.2 Minimum 6dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247a(2)
Test Method: ANSI C63.10 (2013) Section 11.8.1

Limit: ≥500 kHz

#### 7.2.1 E.U.T. Operation

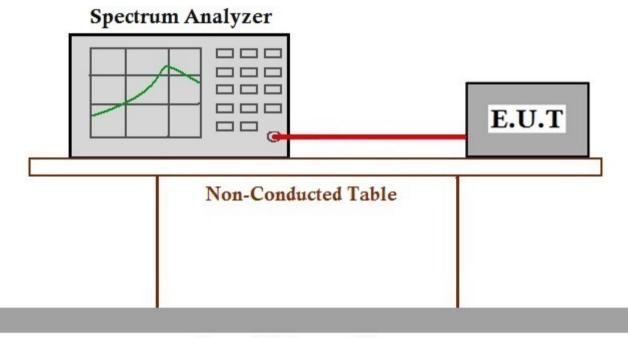
Operating Environment:

Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Test mode f:Module MT7668 TX mode\_Keep the EUT in continuously transmitting mode with

GFSK modulation.

#### 7.2.2 Test Setup Diagram



## Ground Reference Plane

#### 7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix D for KSCR220100003204AT-FCC-BLE-MT7668



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# 7.3 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)
Test Method: ANSI C63.10 (2013) Section 11.9.1

Limit:

| Frequency range(MHz) | Output power of the intentional radiator(watt)        |  |  |
|----------------------|---|--|--|
|                      | 1 for ≥50 hopping channels                            |  |  |
| 902-928              | 0.25 for 25≤ hopping channels <50                     |  |  |
|                      | 1 for digital modulation                              |  |  |
|                      | 1 for ≥75 non-overlapping hopping channels            |  |  |
| 2400-2483.5          | 0.125 for all other frequency hopping systems         |  |  |
|                      | 1 for digital modulation                              |  |  |
| 5725-5850            | 1 for frequency hopping systems and digital modulatio |  |  |



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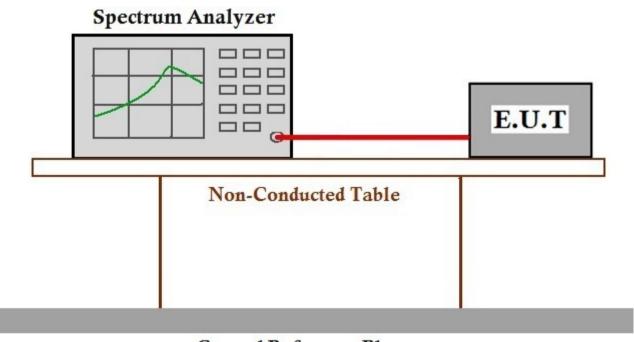
#### 7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar Test mode f:Module MT7668 TX mode Keep the EUT in continuously transmitting mode with

GFSK modulation.

#### 7.3.2 Test Setup Diagram



# Ground Reference Plane

#### 7.3.3 Measurement Procedure and Data

The detailed test data see: Appendix D for KSCR220100003204AT-FCC-BLE-MT7668



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# 7.4 Power Spectrum Density

Test Requirement 47 CFR Part 15, Subpart C 15.247(e)
Test Method: ANSI C63.10 (2013) Section 11.10.2

Limit: ≤8dBm in any 3 kHz band during any time interval of continuous

transmission

#### 7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar Test mode f:Module MT7668 TX mode Keep the EUT in continuously transmitting mode with

GFSK modulation.

#### 7.4.2 Test Setup Diagram

# Spectrum Analyzer E.U.T Non-Conducted Table

# Ground Reference Plane

#### 7.4.3 Measurement Procedure and Data

The detailed test data see: Appendix D for KSCR220100003204AT-FCC-BLE-MT7668



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# 7.5 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)
Test Method: ANSI C63.10 (2013) Section 11.13.3.2

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in

§15.209(a) (see §15.205(c)



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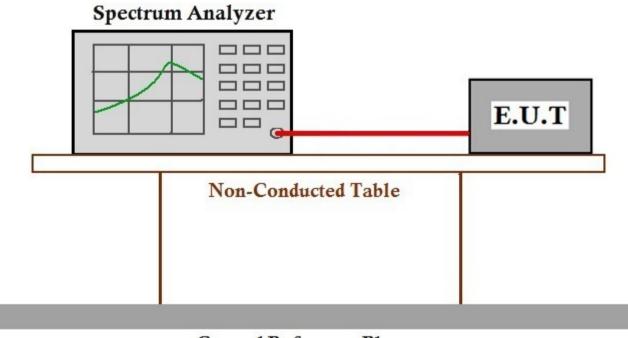
#### 7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar Test mode f:Module MT7668 TX mode Keep the EUT in continuously transmitting mode with

GFSK modulation.

#### 7.5.2 Test Setup Diagram



# Ground Reference Plane

#### 7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix D for KSCR220100003204AT-FCC-BLE-MT7668



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# 7.6 Conducted Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)
Test Method: ANSI C63.10 (2013) Section 11.11

§15.209(a) (see §15.205(c)

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in



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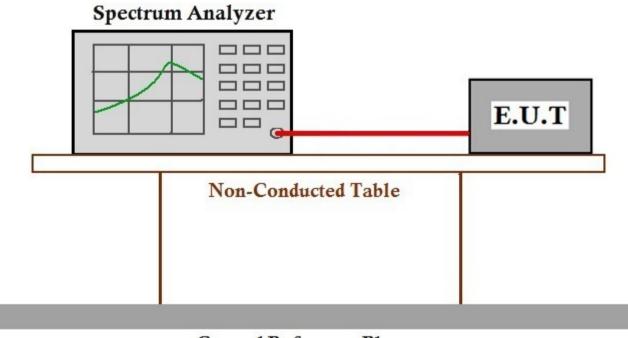
#### 7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar Test mode f:Module MT7668 TX mode Keep the EUT in continuously transmitting mode with

GFSK modulation.

#### 7.6.2 Test Setup Diagram



# Ground Reference Plane

#### 7.6.3 Measurement Procedure and Data

The detailed test data see: Appendix D for KSCR220100003204AT-FCC-BLE-MT7668



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## 7.7 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.10.5

Limit:

| Frequency(MHz) | Field strength(microvolts/meter) | Measurement distance(meters) |  |  |
|----------------|----------------------------------|------------------------------|--|--|
| 0.009-0.490    | 2400/F(kHz)                      | 300                          |  |  |
| 0.490-1.705    | 24000/F(kHz)                     | 30                           |  |  |
| 1.705-30.0     | 30                               | 30                           |  |  |
| 30-88          | 100                              | 3                            |  |  |
| 88-216         | 150                              | 3                            |  |  |
| 216-960        | 200                              | 3                            |  |  |
| Above 960      | 500                              | 3                            |  |  |

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.



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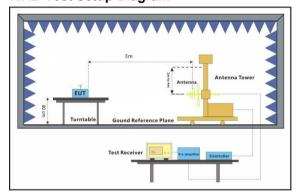
#### 7.7.1 E.U.T. Operation

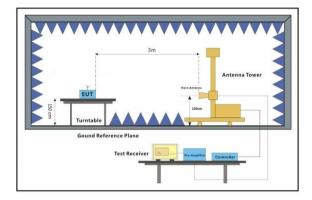
Operating Environment:

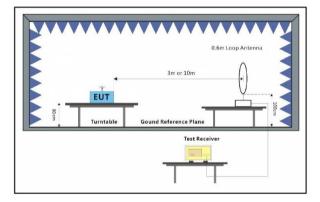
Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar Test mode f:Module MT7668 TX mode Keep the EUT in continuously transmitting mode with

GFSK modulation.

#### 7.7.2 Test Setup Diagram









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#### 7.7.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height 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.
- e. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- i. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



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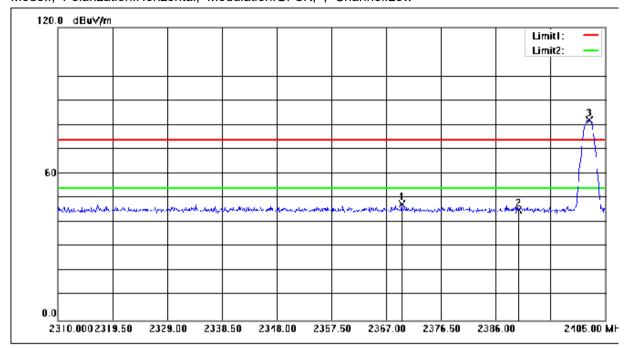
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Mode:f; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



| No. | Frequency | Reading | Correction   | Result   | Limit    | Margin | Remark |
|-----|-----------|---------|--------------|----------|----------|--------|--------|
|     | (MHz)     | (dBuV)  | factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB)   |        |
| 1   | 2369.660  | 61.50   | -14.07       | 47.43    | 74.00    | -26.57 | peak   |
| 2   | 2390.000  | 59.02   | -14.01       | 45.01    | 74.00    | -28.99 | peak   |
| 3   | 2402.245  | 96.00   | -13.97       | 82.03    | 74.00    | 8.03   | peak   |



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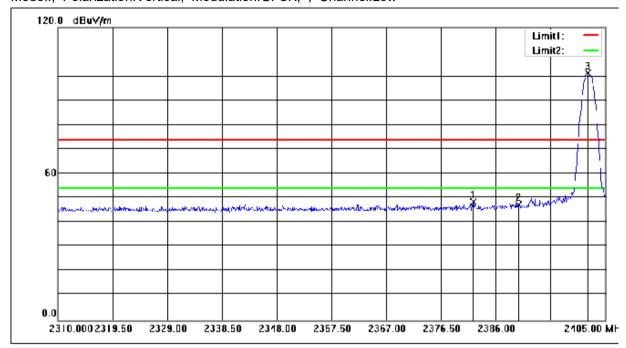
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Mode:f; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



| No. | Frequency | Reading | Correction   | Result   | Limit    | Margin | Remark |
|-----|-----------|---------|--------------|----------|----------|--------|--------|
|     | (MHz)     | (dBuV)  | factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB)   |        |
| 1   | 2382.105  | 62.62   | -14.03       | 48.59    | 74.00    | -25.41 | peak   |
| 2   | 2390.000  | 61.37   | -14.01       | 47.36    | 74.00    | -26.64 | peak   |
| 3   | 2401.960  | 115.13  | -13.98       | 101.15   | 74.00    | 27.15  | peak   |



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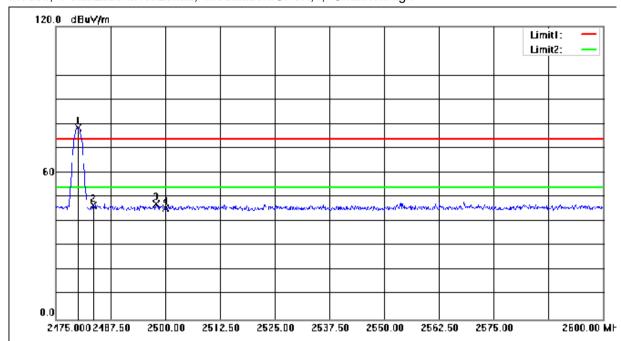
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Mode:f; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correction<br>factor(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|----------------------------|--------------------|-------------------|----------------|--------|
| 1   | 2480.000           | 92.31             | -13.71                     | 78.60              | 74.00             | 4.60           | peak   |
| 2   | 2483.500           | 60.40             | -13.71                     | 46.69              | 74.00             | -27.31         | peak   |
| 3   | 2497.875           | 60.83             | -13.66                     | 47.17              | 74.00             | -26.83         | peak   |
| 4   | 2500.000           | 59.17             | -13.64                     | 45.53              | 74.00             | -28.47         | peak   |



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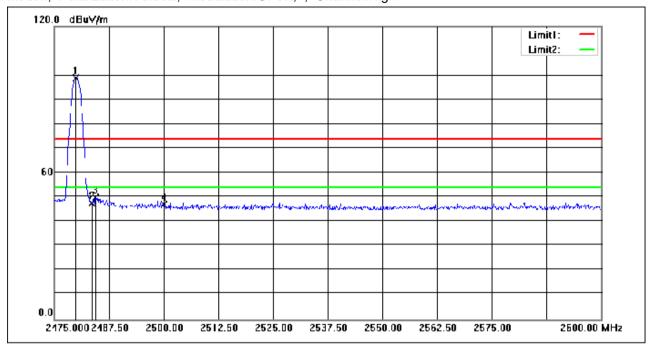
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Mode:f; Polarization:Vertical; Modulation:GFSK; ; Channel:High



| No. | Frequency | Reading | Correction   | Result   | Limit    | Margin | Remark |
|-----|-----------|---------|--------------|----------|----------|--------|--------|
|     | (MHz)     | (dBuV)  | factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB)   |        |
| 1   | 2479.875  | 112.69  | -13.71       | 98.98    | 74.00    | 24.98  | peak   |
| 2   | 2483.500  | 61.37   | -13.71       | 47.66    | 74.00    | -26.34 | peak   |
| 3   | 2484.375  | 63.67   | -13.70       | 49.97    | 74.00    | -24.03 | peak   |
| 4   | 2500.000  | 60.47   | -13.64       | 46.83    | 74.00    | -27.17 | peak   |



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# 7.8 Radiated Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6

Limit:

| Frequency(MHz) | Field strength(microvolts/meter) | Measurement distance(meters) |  |  |
|----------------|----------------------------------|------------------------------|--|--|
| 0.009-0.490    | 2400/F(kHz)                      | 300                          |  |  |
| 0.490-1.705    | 24000/F(kHz)                     | 30                           |  |  |
| 1.705-30.0     | 30                               | 30                           |  |  |
| 30-88          | 100                              | 3                            |  |  |
| 88-216         | 150                              | 3                            |  |  |
| 216-960        | 200                              | 3                            |  |  |
| Above 960      | 500                              | 3                            |  |  |

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.



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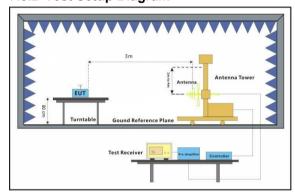
#### 7.8.1 E.U.T. Operation

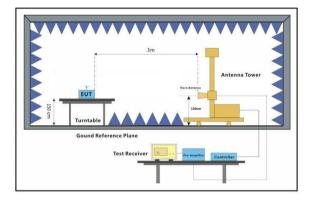
Operating Environment:

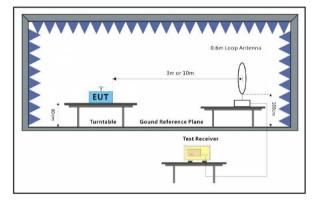
Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar Test mode f:Module MT7668 TX mode Keep the EUT in continuously transmitting mode with

GFSK modulation.

#### 7.8.2 Test Setup Diagram









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#### 7.8.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height 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.
- e. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

#### Remark:

- 1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor

- 3) Scan from 9kHz to 25GHz, the disturbance above 18GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
- 4) For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



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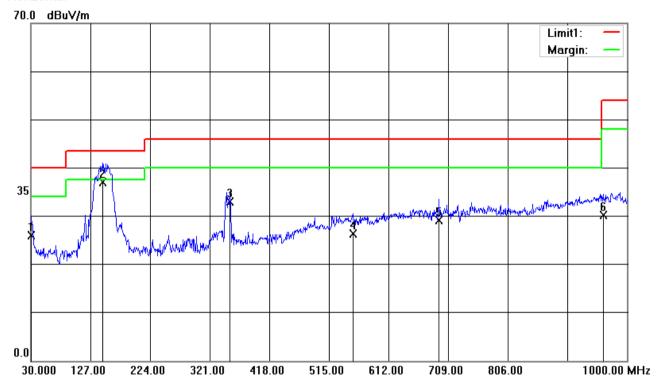
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30MHz-1GHz Horizontal



| Frequency | Reading  | Correct   | Result   | Limit   | Margin   | Remark  |
|-----------|--|---|--|---|--|---|
| (MHz)     | (dBuV)   | Factor(dB/m)  | (dBuV/m)   | (dBuV/m)  | (dB)   |   |
| 30.9700   | 0.59   | 25.38   | 25.97  | 40.00   | -14.03   | QP  |
| 147.3700  | 17.02  | 20.05   | 37.07  | 43.50   | -6.43  | QP  |
| 353.9800  | 10.47  | 22.48   | 32.95  | 46.00   | -13.05   | QP  |
| 553.8000  | 0.45   | 25.88   | 26.33  | 46.00   | -19.67   | QP  |
| 693.4800  | 1.67   | 27.45   | 29.12  | 46.00   | -16.88   | QP  |
| 961.2000  | 0.90   | 29.28   | 30.18  | 54.00   | -23.82   | QP  |
|           | (MHz)<br>30.9700<br>147.3700<br>353.9800<br>553.8000<br>693.4800 | (MHz)         (dBuV)           30.9700         0.59           147.3700         17.02           353.9800         10.47           553.8000         0.45           693.4800         1.67 | (MHz)         (dBuV)         Factor(dB/m)           30.9700         0.59         25.38           147.3700         17.02         20.05           353.9800         10.47         22.48           553.8000         0.45         25.88           693.4800         1.67         27.45 | (MHz)         (dBuV)         Factor(dB/m)         (dBuV/m)           30.9700         0.59         25.38         25.97           147.3700         17.02         20.05         37.07           353.9800         10.47         22.48         32.95           553.8000         0.45         25.88         26.33           693.4800         1.67         27.45         29.12 | (MHz)         (dBuV)         Factor(dB/m)         (dBuV/m)         (dBuV/m)           30.9700         0.59         25.38         25.97         40.00           147.3700         17.02         20.05         37.07         43.50           353.9800         10.47         22.48         32.95         46.00           553.8000         0.45         25.88         26.33         46.00           693.4800         1.67         27.45         29.12         46.00 | (MHz)         (dBuV)         Factor(dB/m)         (dBuV/m)         (dBuV/m)         (dB)           30.9700         0.59         25.38         25.97         40.00         -14.03           147.3700         17.02         20.05         37.07         43.50         -6.43           353.9800         10.47         22.48         32.95         46.00         -13.05           553.8000         0.45         25.88         26.33         46.00         -19.67           693.4800         1.67         27.45         29.12         46.00         -16.88 |



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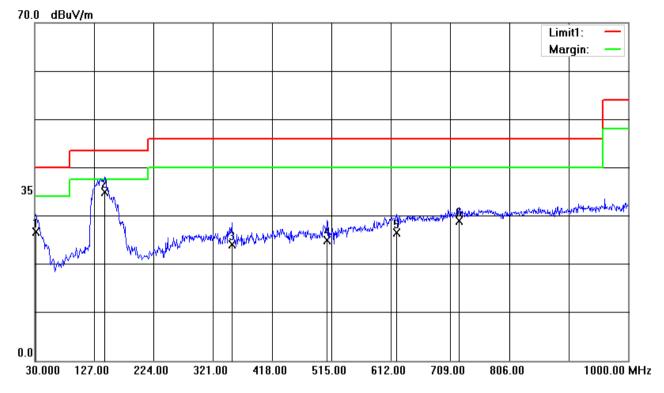
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#### Vertical



| No. | Frequency | Reading | Correct      | Result   | Limit    | Margin | Remark |
|-----|-----------|---------|--------------|----------|----------|--------|--------|
|     | (MHz)     | (dBuV)  | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB)   |        |
| 1   | 31.9400   | 1.93    | 24.82        | 26.75    | 40.00    | -13.25 | QP     |
| 2   | 144.4600  | 14.90   | 19.96        | 34.86    | 43.50    | -8.64  | QP     |
| 3   | 352.0400  | 1.67    | 22.43        | 24.10    | 46.00    | -21.90 | QP     |
| 4   | 507.2400  | -0.31   | 25.33        | 25.02    | 46.00    | -20.98 | QP     |
| 5   | 621.7000  | -0.30   | 26.77        | 26.47    | 46.00    | -19.53 | QP     |
| 6   | 723.5500  | 1.46    | 27.49        | 28.95    | 46.00    | -17.05 | QP     |



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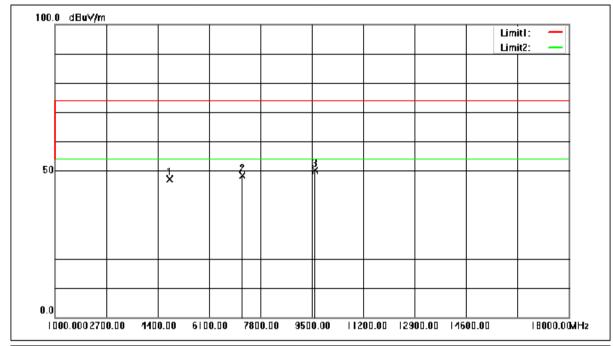


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#### Above 1GHz

Mode:f; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



| No. | Frequency | Reading | Correction   | Result   | Limit    | Margin | Remark |
|-----|-----------|---------|--------------|----------|----------|--------|--------|
|     | (MHz)     | (dBuV)  | factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB)   |        |
| 1   | 4804.000  | 56.00   | -8.86        | 47.14    | 74.00    | -26.86 | peak   |
| 2   | 7206.000  | 54.24   | -5.89        | 48.35    | 74.00    | -25.65 | peak   |
| 3   | 9608.000  | 51.27   | -1.26        | 50.01    | 74.00    | -23.99 | peak   |



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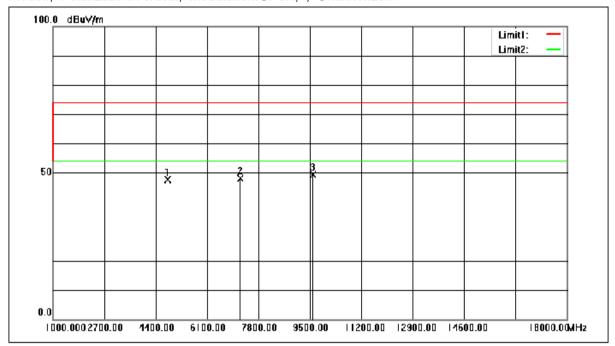
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Mode:f; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



| No. | Frequency | Reading | Correction   | Result   | Limit    | Margin | Remark |
|-----|-----------|---------|--------------|----------|----------|--------|--------|
|     | (MHz)     | (dBuV)  | factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB)   |        |
| 1   | 4804.000  | 56.47   | -8.86        | 47.61    | 74.00    | -26.39 | peak   |
| 2   | 7206.000  | 54.14   | -5.89        | 48.25    | 74.00    | -25.75 | peak   |
| 3   | 9608.000  | 50.64   | -1.26        | 49.38    | 74.00    | -24.62 | peak   |



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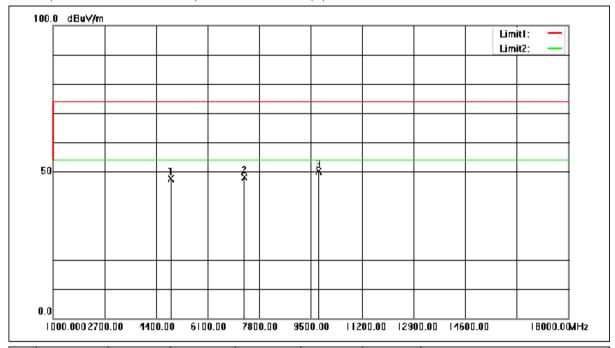
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#### Mode:f; Polarization:Horizontal; Modulation:GFSK; ; Channel:middle



| No. | Frequency | Reading | Correction   | Result   | Limit    | Margin | Remark |
|-----|-----------|---------|--------------|----------|----------|--------|--------|
|     | (MHz)     | (dBuV)  | factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB)   |        |
| 1   | 4880.000  | 56.21   | -8.60        | 47.61    | 74.00    | -26.39 | peak   |
| 2   | 7320.000  | 53.86   | -5.77        | 48.09    | 74.00    | -25.91 | peak   |
| 3   | 9760.000  | 51.56   | -1.45        | 50.11    | 74.00    | -23.89 | peak   |



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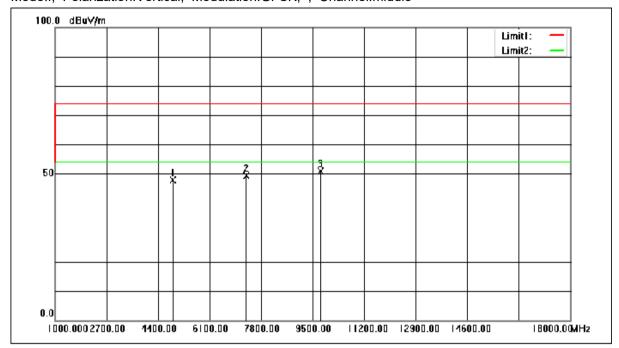
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## Mode:f; Polarization:Vertical; Modulation:GFSK; ; Channel:middle



| No. | Frequency | Reading | Correction   | Result   | Limit    | Margin | Remark |
|-----|-----------|---------|--------------|----------|----------|--------|--------|
|     | (MHz)     | (dBuV)  | factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB)   |        |
| 1   | 4880.000  | 56.42   | -8.60        | 47.82    | 74.00    | -26.18 | peak   |
| 2   | 7320.000  | 55.14   | -5.77        | 49.37    | 74.00    | -24.63 | peak   |
| 3   | 9760.000  | 52.28   | -1.45        | 50.83    | 74.00    | -23.17 | peak   |



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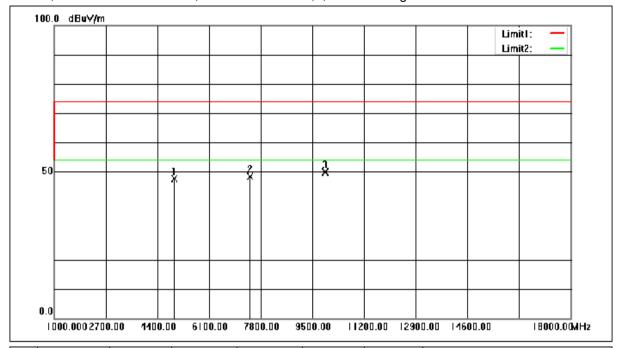
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Mode:f; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



| No. | Frequency |        | Correction   | Result   | Limit    | Margin | Remark |
|-----|-----------|--------|--------------|----------|----------|--------|--------|
|     | (MHz)     | (dBuV) | factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB)   |        |
| 1   | 4960.000  | 55.83  | -8.32        | 47.51    | 74.00    | -26.49 | peak   |
| 2   | 7440.000  | 53.97  | -5.63        | 48.34    | 74.00    | -25.66 | peak   |
| 3   | 9920.000  | 50.81  | -0.94        | 49.87    | 74.00    | -24.13 | peak   |



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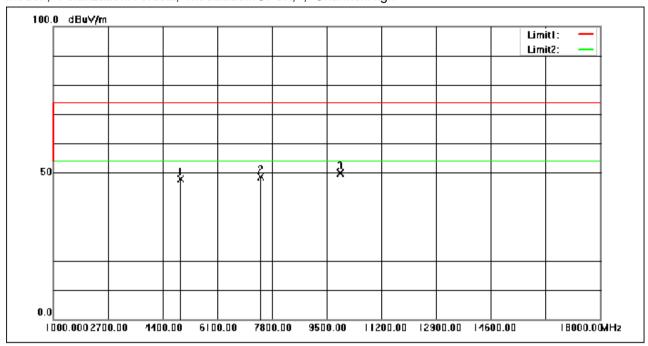
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Mode:f; Polarization:Vertical; Modulation:GFSK; ; Channel:High



| No. | Frequency | Reading | Correction   | Result   | Limit    | Margin | Remark |
|-----|-----------|---------|--------------|----------|----------|--------|--------|
|     | (MHz)     | (dBuV)  | factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB)   |        |
| 1   | 4960.000  | 56.24   | -8.32        | 47.92    | 74.00    | -26.08 | peak   |
| 2   | 7440.000  | 54.19   | -5.63        | 48.56    | 74.00    | -25.44 | peak   |
| 3   | 9920.000  | 50.82   | -0.94        | 49.88    | 74.00    | -24.12 | peak   |



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#### 7.9 99% Bandwidth

Test Requirement RSS-Gen Section 6.7
Test Method: ANSI C63.10 Section 6.9.3

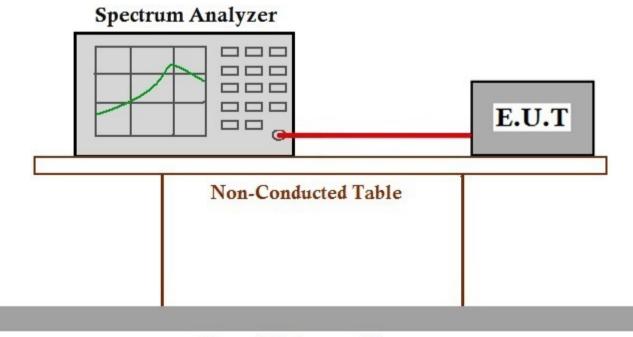
#### 7.9.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar Test mode f:Module MT7668 TX mode Keep the EUT in continuously transmitting mode with

GFSK modulation.

#### 7.9.2 Test Setup Diagram



# Ground Reference Plane

#### 7.9.3 Measurement Procedure and Data

The detailed test data see: Appendix D for KSCR220100003204AT-FCC-BLE-MT7668



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# 8 Test Setup Photographs

Refer to the < Test Setup photos>.

# 9 EUT Constructional Details

Refer to the < External Photos > & < Internal Photos >.

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