

Rev 1.0

EMC-TRF-01

# SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch



Report No.: GZCR210802082901 Page: 1 of 79 FCC ID: SS3-L2P2104

# TEST REPORT

| Application No.:          | GZCR2108020829AT  |
|---------------------------|---|
| Applicant:                | SZ DJI TECHNOLOGY CO.,LTD.  |
| Address of Applicant:     | 14th floor, West Wing, Skyworth Semiconductor Design Building NO.18<br>Gaoxin South 4th Ave, Nanshan District, Shenzhen, Guangdong, China |
| Manufacturer:             | SZ DJI TECHNOLOGY CO.,LTD.  |
| Address of Manufacturer:  | 14th floor, West Wing, Skyworth Semiconductor Design Building NO.18<br>Gaoxin South 4th Ave, Nanshan District, Shenzhen, Guangdong, China |
| Equipment Under Test (EUT | ):  |
| EUT Name:                 | DJI Mavic 3 Cine, DJI Mavic 3   |
| Model No.:                | L2P, L2A 🐥  |
| <b>.</b>                  | Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.           |
| Trade mark:               | DJI   |
| Standard(s) :             | 47 CFR Part 15, Subpart C 15.247  |
| Date of Receipt:          | 2021-08-13  |
| Date of Test:             | 2021-08-13 to 2021-08-28  |
| Date of Issue:            | 2021-09-01  |
| Test Result:              | Pass*   |

\* In the configuration tested, the EUT complied with the standards specified above.

oke. Jun

Kobe Jian EMC Laboratory Manager



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Report No.: GZCR210802082901 Page: 2 of 79

|         | Revision Record                      |            |  |          |  |  |  |  |
|---------|--------------------------------------|------------|--|----------|--|--|--|--|
| Version | Version Chapter Date Modifier Remark |            |  |          |  |  |  |  |
| 01      |                                      | 2021-09-01 |  | Original |  |  |  |  |
|         |                                      |            |  |          |  |  |  |  |
|         |                                      |            |  |          |  |  |  |  |

| Authorized for issue by |                            |  |
|-------------------------|----------------------------|--|
|                         | CJ Vu                      |  |
|                         | Curry Wu /Project Engineer |  |
|                         | Ridey Lin                  |  |
|                         | Ricky Liu/Reviewer         |  |



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Report No.: GZCR210802082901 3 of 79 Page:

#### 2 **Test Summary**

| Radio Spectrum Technical Requirement |                                     |     |  |        |  |
|--------------------------------------|-------------------------------------|-----|--|--------|--|
| Item Standard Method Require         |                                     |     |  | Result |  |
| Antenna Requirement                  | 47 CFR Part 15,<br>Subpart C 15.247 | N/A | 47 CFR Part 15, Subpart<br>C 15.203 & 15.247(b)(4) | Pass   |  |

| Radio Spectrum Matter Part                                  |                  |   |  |        |  |
|---|------------------|---|--|--------|--|
| Item  | Standard         | Method                                    | Requirement                                  | Result |  |
| Conducted Emissions<br>at AC Power Line<br>(150kHz-30MHz)   |                  | ANSI C63.10 (2013)<br>Section 6.2         | 47 CFR Part 15, Subpart<br>C 15.207          | Pass   |  |
| Conducted Peak<br>Output Power                              |                  | ANSI C63.10 (2013)<br>Section 11.9.1.3    | 47 CFR Part 15, Subpart<br>C 15.247(b)(3)    | Pass   |  |
| Minimum 6dB<br>Bandwidth                                    |                  | ANSI C63.10 (2013)<br>Section 11.8.1      | 47 CFR Part 15, Subpart<br>C 15.247a(2)      | Pass   |  |
| Power Spectrum<br>Density                                   | 47 CFR Part 15,  | ANSI C63.10 (2013)<br>Section 11.10.2     | 47 CFR Part 15, Subpart<br>C 15.247(e)       | Pass   |  |
| Conducted Band<br>Edges Measurement                         |                  | ANSI C63.10 (2013)<br>Section 11.13.3.2   | 47 CFR Part 15, Subpart<br>C 15.247(d)       | Pass   |  |
| Conducted Spurious<br>Emissions                             | Subpart C 15.247 | ANSI C63.10 (2013)<br>Section 11.11       | 47 CFR Part 15, Subpart<br>C 15.247(d)       | Pass   |  |
| Radiated Emissions<br>which fall in the<br>restricted bands |                  | ANSI C63.10 (2013)<br>Section 6.10.5      | 47 CFR Part 15, Subpart<br>C 15.205 & 15.209 | Pass   |  |
| Radiated Spurious<br>Emissions (Below<br>1GHz)              |                  | ANSI C63.10 (2013)<br>Section 6.4,6.5,6.6 | 47 CFR Part 15, Subpart<br>C 15.205 & 15.209 | Pass   |  |
| Radiated Spurious<br>Emissions (Above<br>1GHz)              |                  | ANSI C63.10 (2013)<br>Section 6.4,6.5,6.6 | 47 CFR Part 15, Subpart<br>C 15.205 & 15.209 | Pass   |  |

### Note:

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.



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Report No.: GZCR210802082901 Page: 4 of 79

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

| Model No.: | Product Description |
|------------|---------------------|
| L2P        | DJI Mavic 3 Cine    |
| L2A        | DJI Mavic 3         |

Model No.:L2P, L2A

Only the model L2P was tested, since according to the declaration from the applicant, the electrical circuit design, layout, components used, internal wiring and functions were identical for the above models, the difference between L2P and L2A is that the memory is different. L2P has one more SSD than L2A.



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Report No.: GZCR210802082901 Page: 5 of 79

# 3 Contents

|   |                |   | Page |
|---|----------------|---|------|
| 1 | Cov            | er Page   | 1    |
| 2 | Test           | Summary   | 3    |
|   |                |   |      |
| 3 | Con            | tents   | 5    |
| 4 | Gen            | eral Information                                    | 7    |
|   | 4.1            | Details of E.U.T.                                   | 7    |
|   | 4.2            | Description of Support Units                        |      |
|   | 4.3            | Measurement Uncertainty                             |      |
|   | 4.4            | Test Location                                       |      |
|   | 4.5<br>4.6     | Test Facility<br>Deviation from Standards           |      |
|   | 4.0<br>4.7     | Abnormalities from Standard Conditions              |      |
| _ |                |   |      |
| 5 | Equi           | pment List  | 11   |
| 6 | Radi           | o Spectrum Technical Requirement                    | 14   |
|   | 6.1            | Antenna Requirement                                 |      |
|   | 6.1.1          |   |      |
|   | 6.1.2          | 1   |      |
| 7 | Radi           | o Spectrum Matter Test Results                      | 15   |
|   | 7.1            | Conducted Emissions at AC Power Line (150kHz-30MHz) | 15   |
|   | 7.1.1          |   |      |
|   | 7.1.2          | •   |      |
|   | 7.1.3          |   | 16   |
|   | 7.1.4          |   |      |
|   | 7.2            | Conducted Peak Output Power                         |      |
|   | 7.2.1          |   |      |
|   | 7.2.2<br>7.2.3 |   |      |
|   | 7.2.3          |   |      |
|   | 7.3            | Minimum 6dB Bandwidth                               |      |
|   | 7.3.1          |   |      |
|   | 7.3.2          | 2 Test Mode Description                             | 21   |
|   | 7.3.3          |   |      |
|   | 7.3.4          |   |      |
|   | 7.4            | Power Spectrum Density                              |      |
|   | 7.4.1          | I   |      |
|   | 7.4.2<br>7.4.3 |   |      |
|   | 7.4.3          |   |      |
|   | 7.5            | Conducted Band Edges Measurement                    |      |
|   | 7.5.1          |   |      |
|   | 7.5.2          |   |      |
|   | 7.5.3          | B Test Setup Diagram                                | 23   |



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Report No.: GZCR210802082901

| EMC-TRF- | 01 Rev 1.0  | Page: | 6 of 79 |
|----------|---|-------|---------|
| 7.5.     | 4 Measurement Procedure and Data                      |       | 2       |
| 7.6      | Conducted Spurious Emissions                          |       |         |
| 7.6.     | 1 E.U.T. Operation                                    |       | 24      |
| 7.6.     | 2 Test Mode Description                               |       | 24      |
| 7.6.     | 3 Test Setup Diagram                                  |       | 24      |
| 7.6.     |   |       |         |
| 7.7      | Radiated Emissions which fall in the restricted bands |       |         |
| 7.7.     |   |       |         |
| 7.7.     |   |       |         |
| 7.7.     |   |       |         |
| 7.7.     |   |       |         |
| 7.8      | Radiated Spurious Emissions (Below 1GHz)              |       |         |
| 7.8.     |   |       |         |
| 7.8.     |   |       |         |
| 7.8.     |   |       |         |
| 7.8.     |   |       |         |
| 7.9      | Radiated Spurious Emissions (Above 1GHz)              |       |         |
| 7.9.     |   |       |         |
| 7.9.     |   |       |         |
| 7.9.     |   |       |         |
| 7.9.     | 4 Measurement Procedure and Data                      |       | 43      |
| 8 Tes    | t Setup Photo   |       | 50      |
| 9 EU     | Constructional Details (EUT Photos)                   |       | 5       |
| 10 Apr   | endix   |       | 5       |
| in Ab    | νς Ι Ι ΨΙ Λ   |       |         |



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Report No.: GZCR210802082901 Page: 7 of 79

#### **General Information** 4

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

| Power supply:        | Input:DC 15.4V   |
|----------------------|--|
|                      | DC 15.4V 5000mAh, 77Wh Lithium-ion rechargeable battery(to be charged from Type C port), |
|                      | Model: BWX260-5000-15.4  |
| Operation Frequency: | 2402MHz to 2480MHz   |
| Bluetooth Version:   | V5.1   |
| Modulation Type:     | GFSK   |
| Channel Spacing:     | 2MHz   |
| Number of Channels:  | 40   |
| Data Rate:           | 1Mbps, 2Mbps   |
| Antenna Type:        | PCB Antenna  |
| Antenna Gain:        | -2.5dBi  |

### 4.2 Description of Support Units

| Description Manufacturer |     | Model No. | Serial No. |
|--------------------------|-----|-----------|------------|
| AC/DC Adapter            | DJI | PD-65US   | N/A        |



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Report No.: GZCR210802082901 Page: 8 of 79

### 4.3 Measurement Uncertainty

| Test Item   | Measurement Uncertainty                    |
|---|--|
| Conducted Emissions at AC Power Line (150kHz-<br>30MHz) | ±3.12dB                                    |
| Conducted Peak Output Power                             | ± 0.75dB                                   |
| Minimum 6dB Bandwidth                                   | ± 3%                                       |
| Power Spectrum Density                                  | ± 2.84dB                                   |
| Conducted Band Edges Measurement                        | ± 0.75dB                                   |
| Conducted Spurious Emissions                            | ± 0.75dB                                   |
| Radiated Emissions which fall in the restricted bands   | ±5.08dB (1GHz-6GHz);±5.14dB(above<br>6GHz) |
| Radiated Spurious Emissions (Below 1GHz)                | ±5.06dB (3m); ±4.46dB (10m)                |
| Radiated Spurious Emissions (Above 1GHz)                | ±5.08dB (1GHz-6GHz);±5.14dB(above<br>6GHz) |

Remark:

The Ulab (lab Uncertainty) is less than Ucispr (CISPR Uncertainty), so the test results

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;

- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.



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Report No.: GZCR210802082901 Page: 9 of 79

### 4.4 Test Location

All tests were performed at: SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory, 198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District, Guangzhou, China 510663 Tel: +86 20 8215555 Fax: +86 20 82075059 No tests were sub-contracted.

### 4.5 Test Facility

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

### • NVLAP (Lab Code: 200611-0)

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

### • ACMA

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian/New Zealand Regulatory Compliance Mark (RCM).

### SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

### • CNAS (Lab Code: L0167)

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to

ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

### • FCC Recognized Accredited Test Firm(Registration No.: 486818)

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818.

#### • ISED (Registration No.: 4620B, CAB identifier: CN0052)

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

#### • VCCI (Registration No.: R-12460, C-12584, G-20107 and T-11179)

The 10m Semi-anechoic chamber, 966 Anechoic Chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-20107 and T-11179 respectively.

### • CBTL (Lab Code: TL129)

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2017, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.



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Report No.: GZCR210802082901 Page: 10 of 79

- 4.6 Deviation from Standards None
- 4.7 Abnormalities from Standard Conditions None



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EMC-TRF-01 Rev 1.0 Report No.: GZCR210802082901 Page: 11 of 79

#### **Equipment List** 5

| Conducted Emissions at AC Power Line (150kHz-30MHz) |                   |                   |              |            |              |  |
|---|-------------------|-------------------|--------------|------------|--------------|--|
| Equipment   | Manufacturer      | Model No          | Inventory No | Cal Date   | Cal Due Date |  |
| Shielding Room                                      | ChangZhou ZhongYu | 8m x 3m x<br>3.8m | EMC0306      | N/A        | N/A          |  |
| Two-Line V-Network                                  | Rohde & Schwarz   | ENV216            | EMC0118      | 2021-01-08 | 2022-01-06   |  |
| Two-Line V-Network-GZ                               | Rohde & Schwarz   | ENV216            | EMC2135      | 2020-09-25 | 2021-09-24   |  |
| Coaxial Cable                                       | HangTianXing      | 2m                | EMC0107      | 2020-09-09 | 2022-09-08   |  |
| Test Software E3c                                   | Audix             | Ver. 5.4.1221b    | GZE100-62    | N/A        | N/A          |  |
| EMI Test<br>Receiver(9kHz-3.6GHz)                   | Rohde & Schwarz   | ESR4              | EMC2221      | 2021-06-01 | 2022-05-31   |  |

| Conducted Peak Output Power  |                         |                    |              |            |              |
|------------------------------|-------------------------|--------------------|--------------|------------|--------------|
| Equipment                    | Manufacturer            | Model No           | Inventory No | Cal Date   | Cal Due Date |
| Power Meter<br>(U2021XA_Ch2) | Agilent<br>Technologies | U2021XA_Ch2        | SEM009-02    | 2021-05-19 | 2022-05-18   |
| 6dB Attenuator               | HP                      | 8491A              | EMC2062      | 2020-04-15 | 2022-04-14   |
| Measurement Software         | TST                     | TST PASS<br>V1.0.5 | N/A          | N/A        | N/A          |
| MI CABLE                     | SGS-EMC                 | 0.8M               | EMC2136      | 2019-11-02 | 2021-11-01   |

| Minimum 6dB Bandwidth             |                         |                    |              |            |              |
|-----------------------------------|-------------------------|--------------------|--------------|------------|--------------|
| Equipment                         | Manufacturer            | Model No           | Inventory No | Cal Date   | Cal Due Date |
| EXA Signal<br>Analzer(10Hz-44GHz) | Agilent<br>Technologies | N9010A             | EMC2138      | 2020-09-17 | 2021-09-16   |
| 6dB Attenuator                    | HP                      | 8491A              | EMC2062      | 2020-04-15 | 2022-04-14   |
| Measurement Software              | TST                     | TST PASS<br>V1.0.5 | N/A          | N/A        | N/A          |
| MI CABLE                          | SGS-EMC                 | 0.8M               | EMC2136      | 2019-11-02 | 2021-11-01   |

| Power Spectrum Densit             | у                       |                    |              |            |              |
|-----------------------------------|-------------------------|--------------------|--------------|------------|--------------|
| Equipment                         | Manufacturer            | Model No           | Inventory No | Cal Date   | Cal Due Date |
| EXA Signal<br>Analzer(10Hz-44GHz) | Agilent<br>Technologies | N9010A             | EMC2138      | 2020-09-17 | 2021-09-16   |
| 6dB Attenuator                    | HP                      | 8491A              | EMC2062      | 2020-04-15 | 2022-04-14   |
| Measurement Software              | TST                     | TST PASS<br>V1.0.5 | N/A          | N/A        | N/A          |
| MI CABLE                          | SGS-EMC                 | 0.8M               | EMC2136      | 2019-11-02 | 2021-11-01   |



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Report No.: GZCR210802082901 Page: 12 of 79

| Conducted Band Edges Measurement  |                         |                    |              |            |              |
|-----------------------------------|-------------------------|--------------------|--------------|------------|--------------|
| Equipment                         | Manufacturer            | Model No           | Inventory No | Cal Date   | Cal Due Date |
| EXA Signal<br>Analzer(10Hz-44GHz) | Agilent<br>Technologies | N9010A             | EMC2138      | 2020-09-17 | 2021-09-16   |
| 6dB Attenuator                    | HP                      | 8491A              | EMC2062      | 2020-04-15 | 2022-04-14   |
| Measurement Software              | TST                     | TST PASS<br>V1.0.5 | N/A          | N/A        | N/A          |
| MI CABLE                          | SGS-EMC                 | 0.8M               | EMC2136      | 2019-11-02 | 2021-11-01   |

| Conducted Spurious Emissions      |                         |                    |              |            |              |
|-----------------------------------|-------------------------|--------------------|--------------|------------|--------------|
| Equipment                         | Manufacturer            | Model No           | Inventory No | Cal Date   | Cal Due Date |
| EXA Signal<br>Analzer(10Hz-44GHz) | Agilent<br>Technologies | N9010A             | EMC2138      | 2020-09-17 | 2021-09-16   |
| 6dB Attenuator                    | HP                      | 8491A              | EMC2062      | 2020-04-15 | 2022-04-14   |
| Measurement Software              | TST                     | TST PASS<br>V1.0.5 | N/A          | N/A        | N/A          |
| MI CABLE                          | SGS-EMC                 | 0.8M               | EMC2136      | 2019-11-02 | 2021-11-01   |

| Radiated Emissions which fall in the restricted bands |                                |               |              |            |              |
|---|--------------------------------|---------------|--------------|------------|--------------|
| Equipment   | Manufacturer                   | Model No      | Inventory No | Cal Date   | Cal Due Date |
| EMI Test<br>Receiver(20Hz-<br>26.5GHz)                | Rohde & Schwarz                | ESIB26        | EMC0522      | 2021-01-08 | 2022-01-07   |
| Chamber cable(Above<br>1GHz)                          | Scoflex                        | KMKM-8.0m     | EMC0545      | 2020-09-09 | 2022-09-08   |
| Horn Antenna(1GHz-<br>18GHz)                          | SCHWARZBECK<br>MESS-ELEKTRONIK | BBHA 9120D    | EMC2026      | 2019-09-25 | 2022-09-24   |
| 1GHz-26.5 GHz<br>Pre-Amplifier                        | Agilent                        | 8449B         | EMC0521      | 2021-01-08 | 2022-01-07   |
| 2.4GHz Filter   | Micro-Tronics                  | BRM 50702     | EMC2069      | 2021-01-08 | 2022-01-07   |
| 966 Anechoic Chamber                                  | C.R.T                          | 9m x 6m x 6m  | EMC2142      | 2020-12-20 | 2023-12-19   |
| MXE EMI<br>Receiver(10Hz-8.4GHz)                      | Keysight                       | N9038A        | EMC2139      | 2020-11-13 | 2021-11-12   |
| EXA Signal<br>Analyzer(10Hz-44GHz)                    | Keysight                       | N9010A        | EMC2138      | 2020-09-17 | 2021-09-16   |
| Test Software E3                                      | Audix                          | Ver.6.120110a | GZE100-61    | N/A        | N/A          |
| Horn Antenna(14-<br>40GHz)                            | SCHWARZBECK                    | BBHA 9170     | EMC2041      | 2020-06-28 | 2023-06-27   |
| Microwave Broadband<br>Preamplifier<br>(18-40GHz)     | SCHWARZBECK                    | BBV 9721      | EMC2172      | 2020-09-09 | 2021-09-08   |



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Report No.: GZCR210802082901 Page: 13 of 79

| Radiated Spurious Emissions (Below 1GHz)        |                                |               |              |            |              |
|---|--------------------------------|---------------|--------------|------------|--------------|
| Equipment                                       | Manufacturer                   | Model No      | Inventory No | Cal Date   | Cal Due Date |
| Chamber cable                                   | HangTianXing                   | N/A           | EMC0542      | 2020-09-09 | 2022-09-08   |
| Trilog Broadband<br>Antenna(25MHz-1GHz)-<br>Lab | SCHWARZBECK<br>MESS-ELEKTRONIK | VULB 9168     | SEM003-18    | 2019-02-22 | 2022-02-22   |
| Amplifier(9kHz-1.3GHz)                          | HP                             | 8447F         | EMC2065      | 2021-05-19 | 2022-05-18   |
| Active Loop Antenna-<br>RED                     | ETS-Lindgren                   | 6502          | EMC2190      | 2019-12-27 | 2021-12-26   |
| 10m Semi-Anechoic<br>Chamber                    | ETS                            | N/A           | EMC0530      | 2019-10-20 | 2022-10-19   |
| Test Software E3                                | Audix                          | Ver.6.120110a | GZE100-61    | N/A        | N/A          |
| EMI Test Receiver(1Hz-<br>8GHz)                 | Rohde & Schwarz                | ESW8          | EMC2220      | 2021-05-26 | 2022-05-25   |

| Radiated Spurious Emissions (Above 1GHz)          |                                |               |              |            |              |
|---|--------------------------------|---------------|--------------|------------|--------------|
| Equipment   | Manufacturer                   | Model No      | Inventory No | Cal Date   | Cal Due Date |
| EMI Test<br>Receiver(20Hz-<br>26.5GHz)            | Rohde & Schwarz                | ESIB26        | EMC0522      | 2021-01-08 | 2022-01-07   |
| Chamber cable(Above<br>1GHz)                      | Scoflex                        | KMKM-8.0m     | EMC0545      | 2020-09-09 | 2022-09-08   |
| Horn Antenna(1GHz-<br>18GHz)                      | SCHWARZBECK<br>MESS-ELEKTRONIK | BBHA 9120D    | EMC2026      | 2019-09-25 | 2022-09-24   |
| 1GHz-26.5 GHz<br>Pre-Amplifier                    | Agilent                        | 8449B         | EMC0521      | 2021-01-08 | 2022-01-07   |
| 2.4GHz Filter                                     | Micro-Tronics                  | BRM 50702     | EMC2069      | 2021-01-08 | 2022-01-07   |
| 966 Anechoic Chamber                              | C.R.T                          | 9m x 6m x 6m  | EMC2142      | 2020-12-20 | 2023-12-19   |
| MXE EMI<br>Receiver(10Hz-8.4GHz)                  | Keysight                       | N9038A        | EMC2139      | 2020-11-13 | 2021-11-12   |
| EXA Signal<br>Analyzer(10Hz-44GHz)                | Keysight                       | N9010A        | EMC2138      | 2020-09-17 | 2021-09-16   |
| Test Software E3                                  | Audix                          | Ver.6.120110a | GZE100-61    | N/A        | N/A          |
| Horn Antenna(14-<br>40GHz)                        | SCHWARZBECK                    | BBHA 9170     | EMC2041      | 2020-06-28 | 2023-06-27   |
| Microwave Broadband<br>Preamplifier<br>(18-40GHz) | SCHWARZBECK                    | BBV 9721      | EMC2172      | 2020-09-09 | 2021-09-08   |

| General used equipmen | t            |          |              |            |              |
|-----------------------|--------------|----------|--------------|------------|--------------|
| Equipment             | Manufacturer | Model No | Inventory No | Cal Date   | Cal Due Date |
| DMM                   | Fluke        | 73       | EMC0006      | 2021-07-05 | 2022-07-05   |
| DMM                   | Fluke        | 73       | EMC0007      | 2021-07-05 | 2022-07-05   |



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Report No.: GZCR210802082901 Page: 14 of 79

#### 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 -2.5 dBi.

Please refer to internal photos.



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Report No.: GZCR210802082901 15 of 79 Page:

#### **Radio Spectrum Matter Test Results** 7

### 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:           |                                  |

|  | 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.                        |                       |           |  |  |
| Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz |                       |           |  |  |

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

**Operating Environment:** Temperature: 22.3 °C

Humidity: 62.8 % RH

Atmospheric Pressure: 1010 mbar

### 7.1.2 Test Mode Description

| Pre-scan /<br>Final test | Mode<br>Code | Description   |
|--------------------------|--------------|---|
| Final test               | 02           | Charge + TX mode(1Mbps)_Keep the EUT in charging and continuously transmitting mode with GFSK modulation. |
| Pre-scan                 | 03           | Charge + TX mode(2Mbps)_Keep the EUT in charging and continuously transmitting mode with GFSK modulation. |



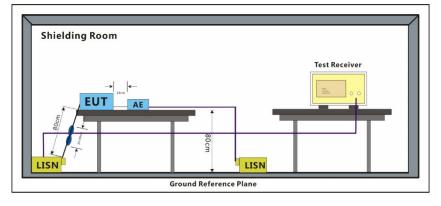
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EMC-TRF-01 Rev 1.0 Report No.: GZCR210802082901 Page: 16 of 79

7.1.3 Test Setup Diagram



#### 7.1.4 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 50ohm/50µH + 5ohm 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

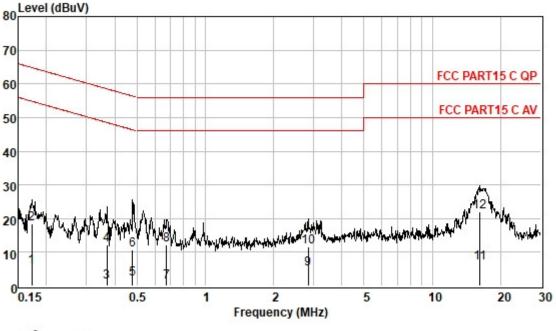


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Report No.: GZCR210802082901 17 of 79 Page:



Test Mode: 02; Line: Live line Modulation:GFSK; Channel:Low

Pol :LINE Mode :02 Model :

| Frequenc<br>MHz | Read<br>Level<br>dBuV | Cable<br>Loss<br>dB | LISN<br>Factor<br>dB | Measured<br>Level<br>dBuV | Limit<br>Line<br>dBuV | Over<br>Limit<br>dB | Remark  |
|-----------------|-----------------------|---------------------|----------------------|---------------------------|-----------------------|---------------------|---------|
| 0.17            | -4.09                 | 0.06                | 9,62                 | 5.59                      | 54.86                 | -49.27              | Average |
| 0.17            | 8.62                  | 0.06                | 9.62                 | 18.30                     | 64.86                 | -46.56              | OP      |
| 0.37            | -8.35                 | 0.06                | 9.63                 | 1.34                      | 48.52                 | -47.18              | Average |
| 0.37            | 2.48                  | 0.06                | 9.63                 | 12.17                     | 58.52                 | -46.35              | QP      |
| 0.48            | -7.62                 | 0.07                | 9.63                 | 2.08                      | 46.36                 | -44.28              | Average |
| 0.48            | 1.09                  | 0.07                | 9.63                 | 10.79                     | 56.36                 | -45.57              | QP      |
| 0.68            | -8.63                 | 0.07                | 9.63                 | 1.07                      | 46.00                 | -44.93              | Average |
| 0.68            | 2.49                  | 0.07                | 9.63                 | 12.19                     | 56.00                 | -43.81              | QP      |
| 2.84            | -4.56                 | 0.14                | 9.62                 | 5.20                      | 46.00                 | -40.80              | Average |
| 2.84            | 1.96                  | 0.14                | 9.62                 | 11.72                     | 56.00                 | -44.28              | QP      |
| 16.23           | -3.35                 | 0.32                | 9.75                 | 6.72                      | 50.00                 | -43.28              | Average |
| 16.23           | 12.08                 | 0.32                | 9.75                 | 22.15                     | 60.00                 | -37.85              | QP      |



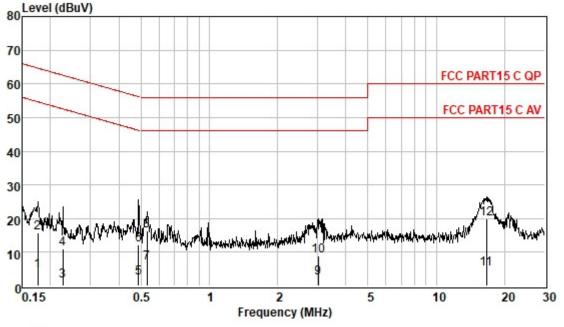
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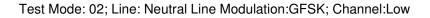
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Report No.: GZCR210802082901 Page: 18 of 79





:NEUTRAL Pol Mode :02 Model :

| Frequenc<br>MHz | Read<br>Level<br>dBuV | Cable<br>Loss<br>dB | LISN<br>Factor<br>dB | Measured<br>Level<br>dBuV | Limit<br>Line<br>dBuV | Over<br>Limit<br>dB | Remark  |
|-----------------|-----------------------|---------------------|----------------------|---------------------------|-----------------------|---------------------|---------|
|                 |                       |                     |                      |                           |                       |                     |         |
| 0.18            | -5.13                 | 0.06                | 9.55                 | 4.48                      | 54.68                 | -50.20              | Average |
| 0.18            | 6.20                  | 0.06                | 9.55                 | 15.81                     | 64.68                 | -48.87              | QP      |
| 0.23            | -8.18                 | 0.06                | 9.55                 | 1.43                      | 52.57                 | -51.14              | Average |
| 0.23            | 1.43                  | 0.06                | 9.55                 | 11.04                     | 62.57                 | -51.53              | QP      |
| 0.49            | -7.25                 | 0.07                | 9.55                 | 2.37                      | 46.19                 | -43.82              | Average |
| 0.49            | 2.53                  | 0.07                | 9.55                 | 12.15                     | 56.19                 | -44.04              | QP      |
| 0.53            | -2.90                 | 0.07                | 9.55                 | 6.72                      | 46.00                 | -39.28              | Average |
| 0.53            | 6.75                  | 0.07                | 9.55                 | 16.37                     | 56.00                 | -39.63              | QP      |
| 3.03            | -7.36                 | 0.15                | 9.56                 | 2.35                      | 46.00                 | -43.65              | Average |
| 3.03            | -0.72                 | 0.15                | 9.56                 | 8.99                      | 56.00                 | -47.01              | QP      |
| 16.57           | -4.89                 | 0.33                | 9.65                 | 5.09                      | 50.00                 | -44.91              | Average |
| 16.57           | 9.80                  | 0.33                | 9.65                 | 19.78                     | 60.00                 | -40.22              | QP      |



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Report No.: GZCR210802082901 Page: 19 of 79

### 7.2 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3) Test Method: ANSI C63.10 (2013) Section 11.9.1.3 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 modulation |

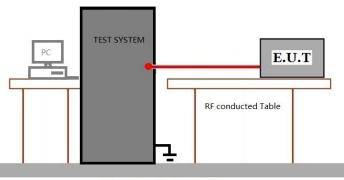
### 7.2.1 E.U.T. Operation

**Operating Environment:** Temperature: 23.0 °C Humidity: 41.0 % RH Atmospheric Pressure: 1010 mbar

### 7.2.2 Test Mode Description

| Pre-scan /<br>Final test | Mode<br>Code | Description   |
|--------------------------|--------------|---|
| Final test               | 00           | TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation. |
| Final test               | 01           | TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation. |

### 7.2.3 Test Setup Diagram



Ground Reference Plane



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Report No.: GZCR210802082901 Page: 20 of 79

### 7.2.4 Measurement Procedure and Data

cable loss=0.9dB

Please Refer to Appendix for Details



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Report No.: GZCR210802082901 Page: 21 of 79

### 7.3 Minimum 6dB Bandwidth

| 47 CFR Part 15, Subpart C 15.247a(2) |
|--------------------------------------|
| ANSI C63.10 (2013) Section 11.8.1    |
| ≥500 kHz                             |
|                                      |

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

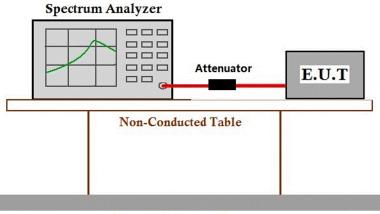
**Operating Environment:** Temperature: 23.0 °C

Humidity: 41.0 % RH Atmospheric Pressure: 1010 mbar

#### 7.3.2 Test Mode Description

| Pre-scan /<br>Final test | Mode<br>Code | Description   |
|--------------------------|--------------|---|
| Final test               | 00           | TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation. |
| Final test               | 01           | TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation. |

#### 7.3.3 Test Setup Diagram



#### **Ground Reference Plane**

### 7.3.4 Measurement Procedure and Data

cable loss=0.9dB

Please Refer to Appendix for Details



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Report No.: GZCR210802082901 Page: 22 of 79

### 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

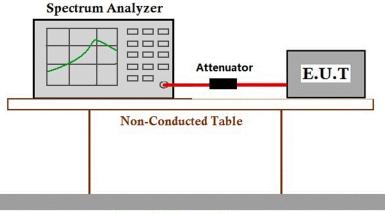
Operating Environment:

| Temperature: 23.0 °C Humidity: 41.0 % RH Atmospheric Pressure: 1010 mba | Temperature: | 23.0 °C | Humidity: 41.0 % RH | Atmospheric Pressure: 1010 | ) mbar |
|---|--------------|---------|---------------------|----------------------------|--------|
|---|--------------|---------|---------------------|----------------------------|--------|

#### 7.4.2 Test Mode Description

| Pre-scan /<br>Final test | Mode<br>Code | Description   |
|--------------------------|--------------|---|
| Final test               | 00           | TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation. |
| Final test               | 01           | TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation. |

#### 7.4.3 Test Setup Diagram



**Ground Reference Plane** 

#### 7.4.4 Measurement Procedure and Data

cable loss=0.9dB

Please Refer to Appendix for Details



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Report No.: GZCR210802082901 Page: 23 of 79

### 7.5 Conducted Band Edges Measurement

Test Requirement47 CFR Part 15, Subpart C 15.247(d)Test Method:ANSI C63.10 (2013) Section 11.13.3.2Limit: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 §15.205(c).

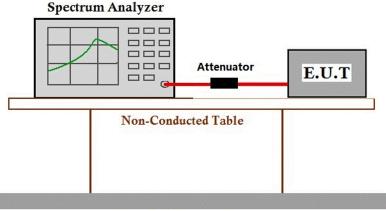
#### 7.5.1 E.U.T. Operation

Operating Environment: Temperature: 23.0 °C Humidity: 41.0 % RH Atmospheric Pressure: 1010 mbar

#### 7.5.2 Test Mode Description

| Pre-scan /<br>Final test | Mode<br>Code | Description   |
|--------------------------|--------------|---|
| Final test               | 00           | TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation. |
| Final test               | 01           | TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation. |

### 7.5.3 Test Setup Diagram



#### **Ground Reference Plane**

### 7.5.4 Measurement Procedure and Data

cable loss=0.9dB

#### Please Refer to Appendix for Details



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Report No.: GZCR210802082901 Page: 24 of 79

### 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    |
| 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).

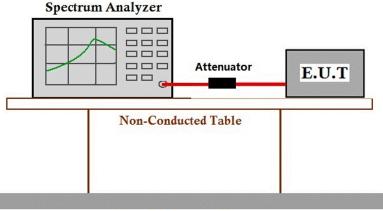
#### 7.6.1 E.U.T. Operation

| Operating Enviro | onment: |           |           |                          |          |
|------------------|---------|-----------|-----------|--------------------------|----------|
| Temperature:     | 23.0 °C | Humidity: | 41.0 % RH | Atmospheric Pressure: 10 | 010 mbar |

#### 7.6.2 Test Mode Description

| Pre-scan /<br>Final test | Mode<br>Code | Description   |
|--------------------------|--------------|---|
| Final test               | 00           | TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation. |
| Final test               | 01           | TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation. |

### 7.6.3 Test Setup Diagram



**Ground Reference Plane** 

### 7.6.4 Measurement Procedure and Data

cable loss=0.9dB

Please Refer to Appendix for Details



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Report No.: GZCR210802082901 Page: 25 of 79

### 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.

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

**Operating Environment:** 21.6 °C Temperature:

Humidity: 51.9 % RH

Atmospheric Pressure: 1010 mbar

### 7.7.2 Test Mode Description

| Pre-scan /<br>Final test | Mode<br>Code | Description   |  |
|--------------------------|--------------|---|--|
| Final test               | 00           | TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.                       |  |
| Final test               | 01           | TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.                       |  |
| Pre-scan                 | 02           | Charge + TX mode(1Mbps)_Keep the EUT in charging and continuously transmitting mode with GFSK modulation. |  |
| Pre-scan                 | 03           | Charge + TX mode(2Mbps)_Keep the EUT in charging and continuously transmitting mode with GFSK modulation. |  |



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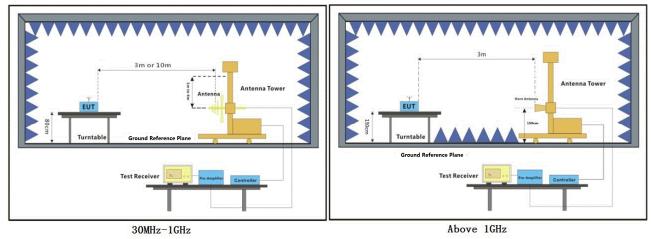
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EMC-TRF-01 Rev 1.0

Report No.: GZCR210802082901 Page: 26 of 79

### 7.7.3 Test Setup Diagram



#### 7.7.4 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 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: 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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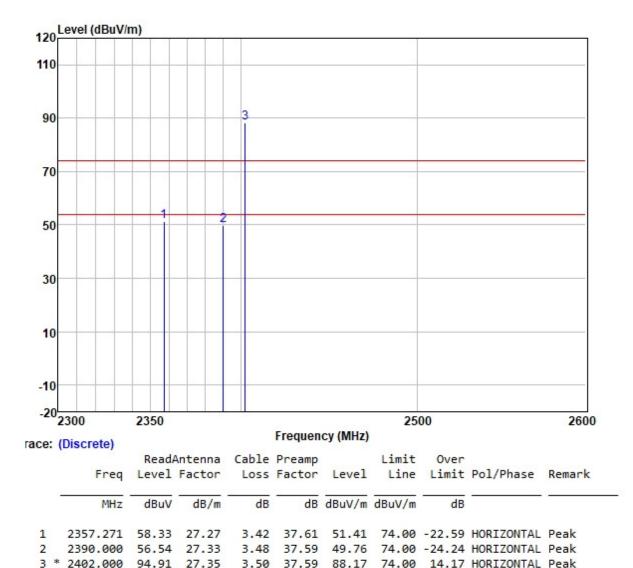
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Report No.: GZCR210802082901 Page: 27 of 79

Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:Low





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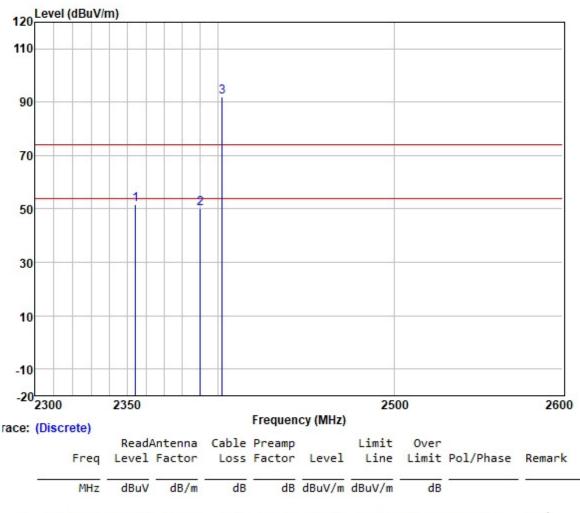
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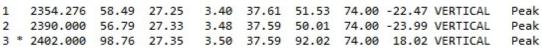
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Report No.: GZCR210802082901 Page: 28 of 79







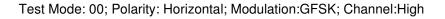


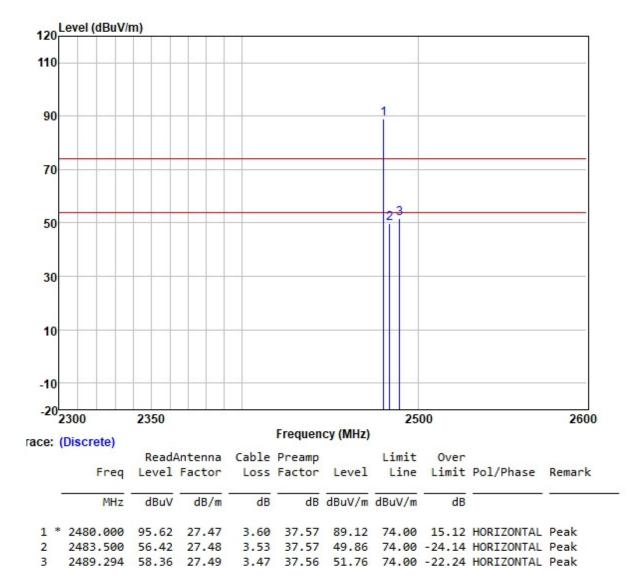
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Report No.: GZCR210802082901 Page: 29 of 79







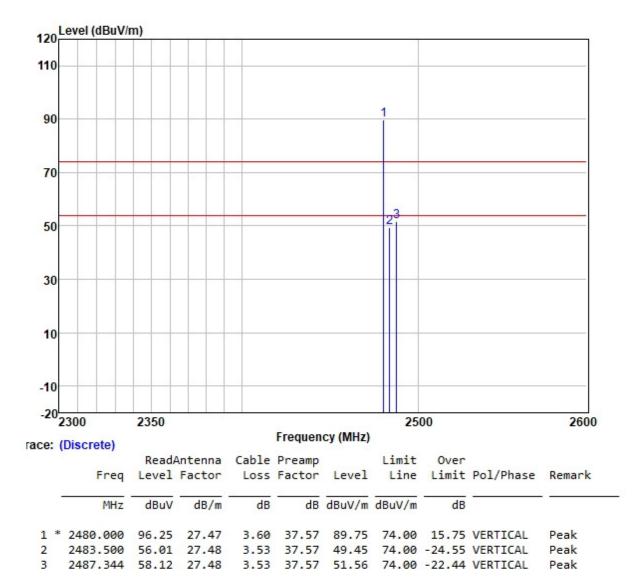
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Report No.: GZCR210802082901 Page: 30 of 79

Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:High



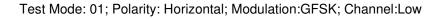


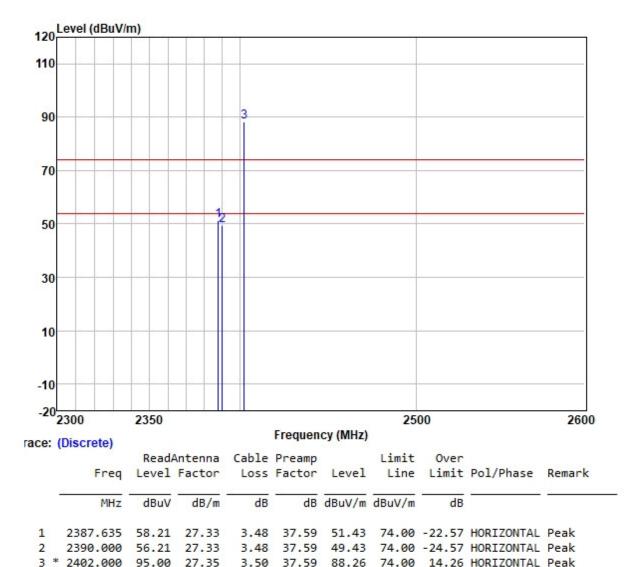
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Report No.: GZCR210802082901 Page: 31 of 79







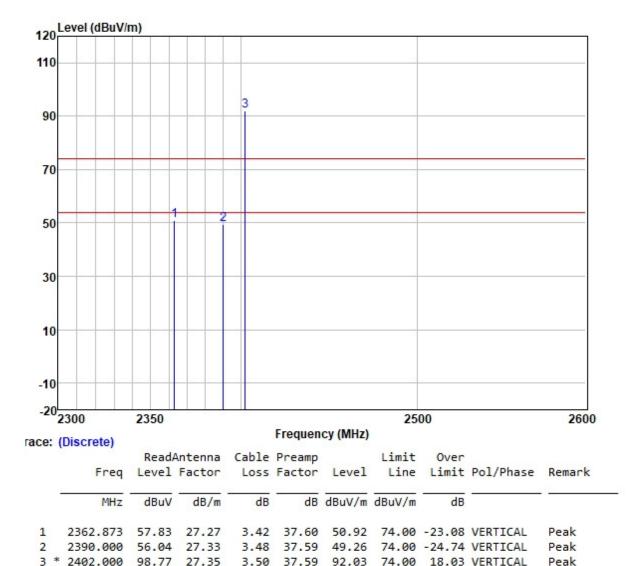
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Report No.: GZCR210802082901 Page: 32 of 79





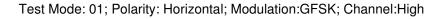


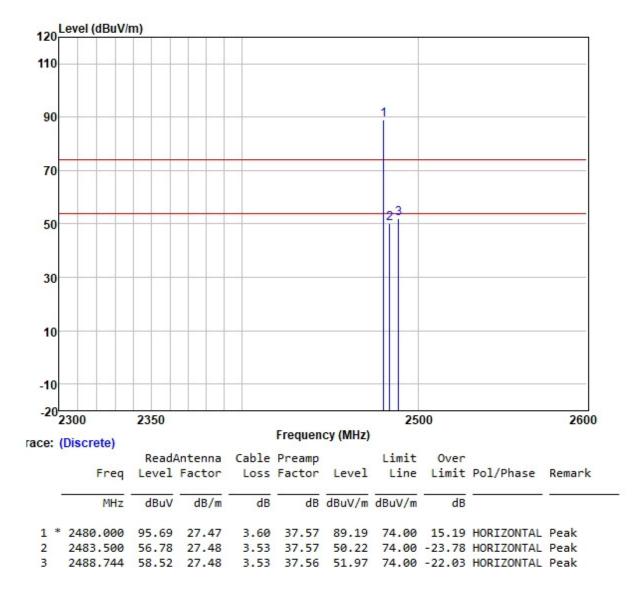
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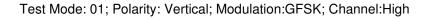


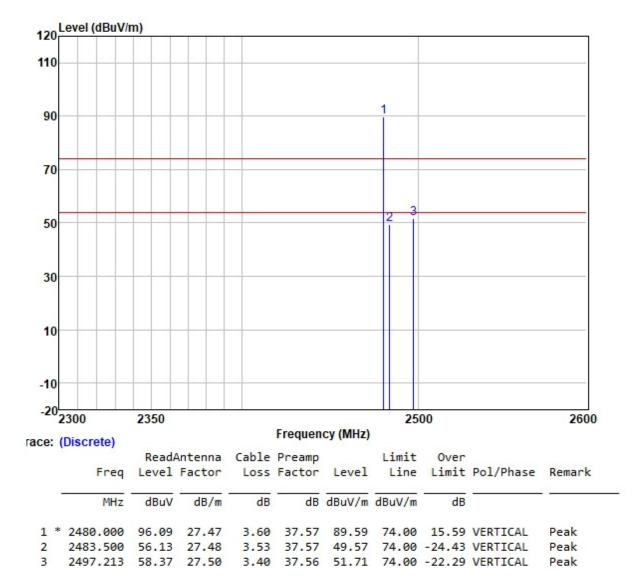
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Report No.: GZCR210802082901 Page: 35 of 79

### 7.8 Radiated Spurious Emissions (Below 1GHz)

| 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.

### 7.8.1 E.U.T. Operation

| Operating Environment: |         |           |           |                       |      |      |
|------------------------|---------|-----------|-----------|-----------------------|------|------|
| Temperature:           | 23.6 °C | Humidity: | 49.5 % RH | Atmospheric Pressure: | 1010 | mbar |

### 7.8.2 Test Mode Description

| Pre-scan /<br>Final test | Mode<br>Code | Description   |  |
|--------------------------|--------------|---|--|
| Pre-scan                 | 00           | TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.                       |  |
| Pre-scan                 | 01           | TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.                       |  |
| Final test               | 02           | Charge + TX mode(1Mbps)_Keep the EUT in charging and continuously transmitting mode with GFSK modulation. |  |
| Pre-scan                 | 03           | Charge + TX mode(2Mbps)_Keep the EUT in charging and continuously transmitting mode with GFSK modulation. |  |



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Page:

Report No.: GZCR210802082901 36 of 79

EMC-TRF-01 Rev 1.0

7.8.3 Test Setup Diagram

0.6m Loop Antenna 3m 3m or 10m Antenna Tower Anten EUT EUT nd Reference Plane Turntabl **Ground Reference Plane** Turntable Test Receiver Test Receiver Cor



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Report No.: GZCR210802082901

EMC-TRF-01 Rev 1.0 Page: 37 of 79

#### 7.8.4 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. 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.

c. 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.

d. 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.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. 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.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. 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) 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 1 GHz, the disturbance 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.

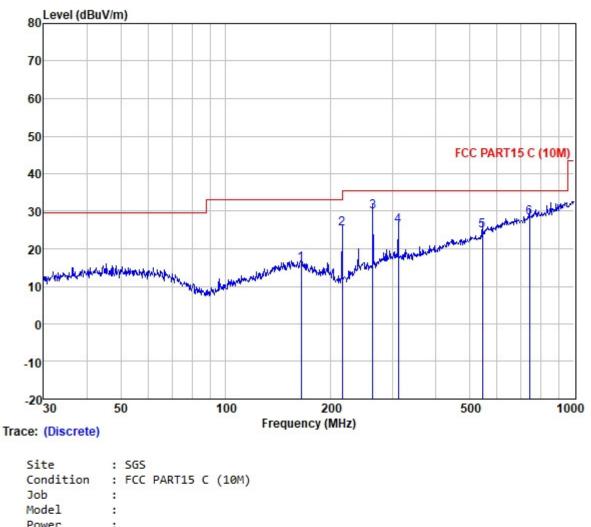


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Report No.: GZCR210802082901 Page: 38 of 79



Test Mode: 02; Polarity: Horizontal Modulation:GFSK; Channel:Low

| Condition | : FCC PART15 C (10M) |
|-----------|----------------------|
| Job       |                      |
| Model     | :                    |
| Power     | :                    |
| Test Mode | : 02                 |
|           |                      |

|   | Freq   |       |       |      |       | Measured<br>Level |        |        | Pol/<br>Phase | Remark |
|---|--------|-------|-------|------|-------|-------------------|--------|--------|---------------|--------|
|   | MHz    | dBuV  | dB/m  | dB   | dB    | dBuV/m            | dBuV/m | dBuV   |               |        |
| 1 | 164.33 | 26.99 | 13.48 | 2.37 | 26.79 | 16.05             | 33.10  | -17.05 | HORIZONTAL    | QP     |
| 2 | 216.02 | 39.72 | 9.80  | 2.62 | 26.71 | 25.43             | 35.60  | -10.17 | HORIZONTAL    | QP     |
| 3 | 263.82 | 41.14 | 12.37 | 3.00 | 26.59 | 29.92             | 35.60  | -5.68  | HORIZONTAL    | QP     |
| 4 | 312.18 | 35.58 | 14.00 | 3.26 | 26.61 | 26.23             | 35.60  | -9.37  | HORIZONTAL    | QP     |
| 5 | 545.18 | 29.64 | 18.55 | 4.76 | 28.09 | 24.86             | 35.60  | -10.74 | HORIZONTAL    | QP     |
| 6 | 744.87 | 28.35 | 22.10 | 5.97 | 28.10 | 28.32             | 35.60  | -7.28  | HORIZONTAL    | QP     |

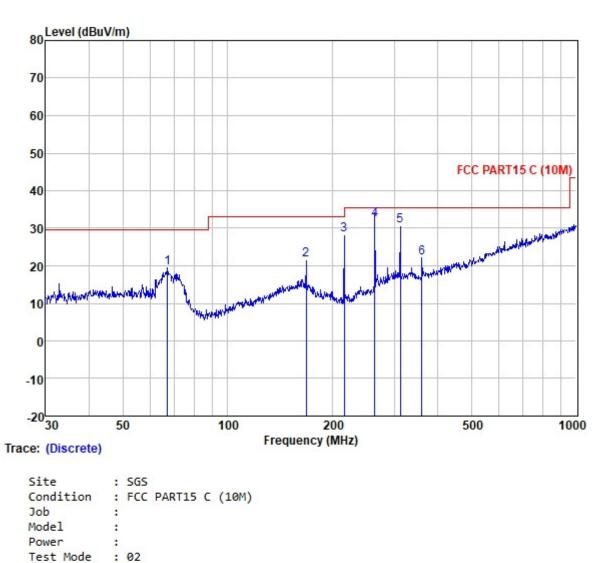


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Report No.: GZCR210802082901 Page: 39 of 79



Test Mode: 02: Polarity: Vertical Modulation:GFSK; Channel:Low

|   | Freq   |       |       |      |       | Measured<br>Level |        |        | Pol/<br>Phase | Remark |
|---|--------|-------|-------|------|-------|-------------------|--------|--------|---------------|--------|
|   | MHz    | dBuV  | dB/m  | dB   | dB    | dBuV/m            | dBuV/m | dBuV   |               |        |
| 1 | 67.20  | 32.81 | 12.34 | 1.38 | 27.14 | 19.39             | 29.50  | -10.11 | VERTICAL      | QP     |
| 2 | 167.82 | 32.63 | 13.30 | 2.38 | 26.78 | 21.53             | 33.10  | -11.57 | VERTICAL      | QP     |
| 3 | 216.02 | 42.48 | 9.80  | 2.62 | 26.71 | 28.19             | 35.60  | -7.41  | VERTICAL      | QP     |
| 4 | 263.82 | 43.37 | 12.37 | 3.00 | 26.59 | 32.15             | 35.60  | -3.45  | VERTICAL      | QP     |
| 5 | 312.18 | 40.12 | 14.00 | 3.26 | 26.61 | 30.77             | 35.60  | -4.83  | VERTICAL      | QP     |
| 6 | 360.45 | 30.65 | 14.90 | 3.70 | 27.11 | 22.14             | 35.60  | -13.46 | VERTICAL      | QP     |



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Report No.: GZCR210802082901 Page: 40 of 79

The test was performed at a 10m test site. According to below formulate and the test data at 10m test distance,

 $L_3 / L_{10} = D_{10} / D_3$ 

Note:

L<sub>3</sub>: Level @ 3m distance. Unit: uV/m;

L10: Level @ 10m distance. Unit: uV/m;

D3: 3m distance. Unit: m

D<sub>10</sub>: 10m distance. Unit: m

The level at 3m test distance is below:

| Frequency<br>(MHz) | Level @<br>10m<br>(dBuV/m) | Level @<br>10m (uV/m) | Level @ 3m<br>(uV/m) | Level @ 3m<br>(dBuV/m) | Limit @ 3m<br>(dBuV/m) | Margin (dB) | Ant.<br>Polarization |
|--------------------|----------------------------|-----------------------|----------------------|------------------------|------------------------|-------------|----------------------|
| 67.20              | 19.39                      | 9.32                  | 31.07                | 29.85                  | 40.00                  | -10.15      | V                    |
| 167.82             | 21.53                      | 11.93                 | 39.75                | 31.99                  | 43.50                  | -11.51      | V                    |
| 216.02             | 28.19                      | 25.67                 | 85.58                | 38.65                  | 46.00                  | -7.35       | V                    |
| 263.82             | 32.15                      | 40.50                 | 135.01               | 42.61                  | 46.00                  | -3.39       | V                    |
| 312.18             | 30.77                      | 34.55                 | 115.18               | 41.23                  | 46.00                  | -4.77       | V                    |
| 360.45             | 22.14                      | 12.79                 | 42.65                | 32.60                  | 46.00                  | -13.40      | V                    |
| 164.33             | 16.05                      | 6.35                  | 21.15                | 26.51                  | 43.50                  | -16.99      | Н                    |
| 216.02             | 25.43                      | 18.69                 | 62.28                | 35.89                  | 46.00                  | -10.11      | Н                    |
| 263.82             | 29.92                      | 31.33                 | 104.44               | 40.38                  | 46.00                  | -5.62       | Н                    |
| 312.18             | 26.23                      | 20.49                 | 68.29                | 36.69                  | 46.00                  | -9.31       | Н                    |
| 545.18             | 24.86                      | 17.50                 | 58.33                | 35.32                  | 46.00                  | -10.68      | Н                    |
| 744.87             | 28.32                      | 26.06                 | 86.87                | 38.78                  | 46.00                  | -7.22       | Н                    |



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Report No.: GZCR210802082901 Page: 41 of 79

#### 7.9 Radiated Spurious Emissions (Above 1GHz)

| 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.

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

| Operating Enviror | nment:  |           |           |                       |      |      |
|-------------------|---------|-----------|-----------|-----------------------|------|------|
| Temperature:      | 21.5 °C | Humidity: | 51.9 % RH | Atmospheric Pressure: | 1010 | mbar |

#### 7.9.2 Test Mode Description

| Pre-scan /<br>Final test | Mode<br>Code | Description   |
|--------------------------|--------------|---|
| Final test               | 00           | TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.                       |
| Final test               | 01           | TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.                       |
| Pre-scan                 | 02           | Charge + TX mode(1Mbps)_Keep the EUT in charging and continuously transmitting mode with GFSK modulation. |
| Pre-scan                 | 03           | Charge + TX mode(2Mbps)_Keep the EUT in charging and continuously transmitting mode with GFSK modulation. |



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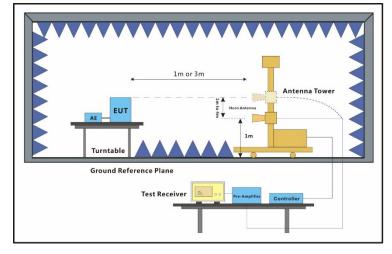
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EMC-TRF-01 Rev 1.0

Report No.: GZCR210802082901 Page: 42 of 79

7.9.3 Test Setup Diagram





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Report No.: GZCR210802082901

EMC-TRF-01 Rev 1.0 Page: 43 of 79

#### 7.9.4 Measurement Procedure and Data

a. 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.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. 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.

d. 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 from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. 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.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. 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) 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

2) Scan from 1GHz to 25GHz, the disturbance above 18GHz 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.

3) 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.

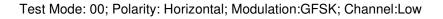


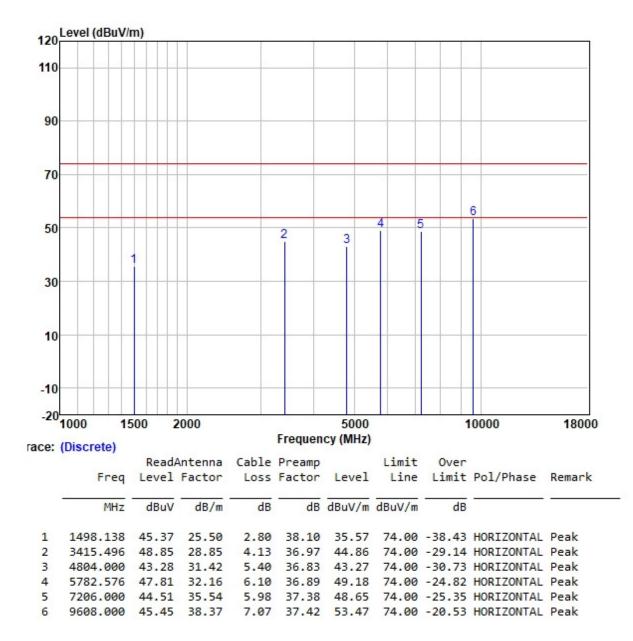
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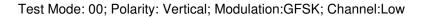
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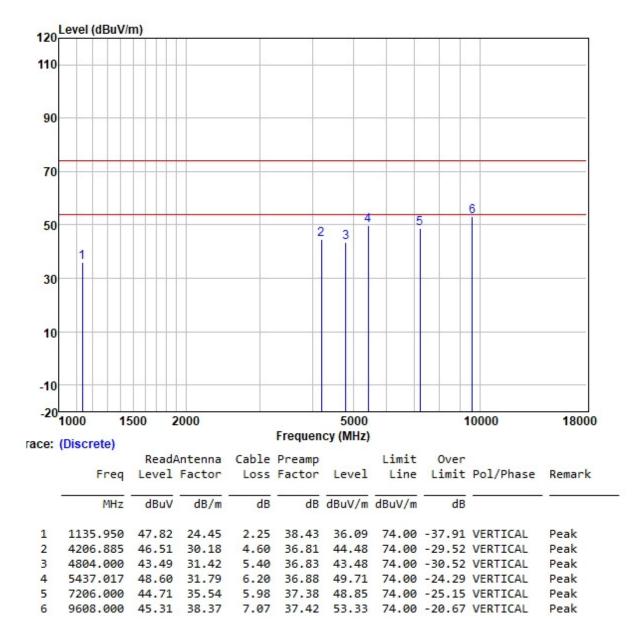
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Report No.: GZCR210802082901 Page: 45 of 79







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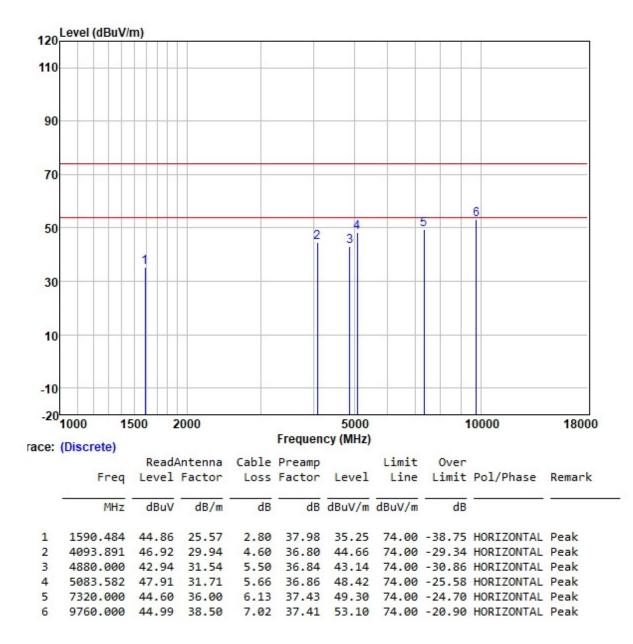
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Report No.: GZCR210802082901 Page: 46 of 79





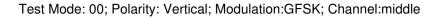


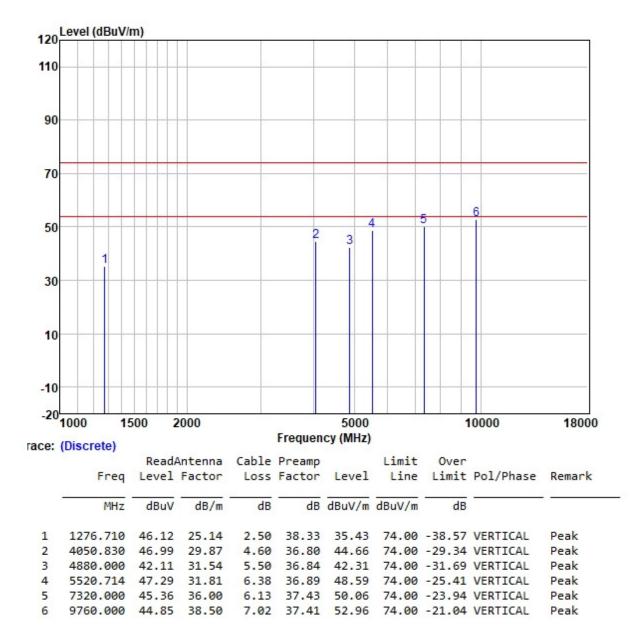
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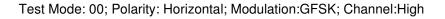


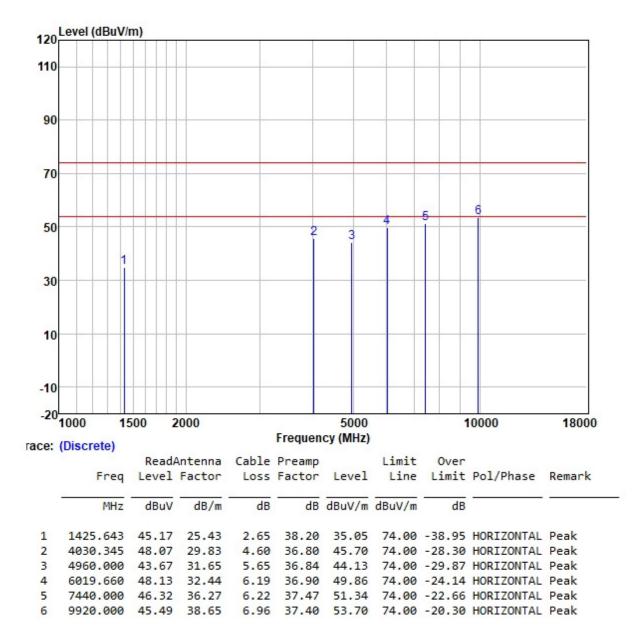
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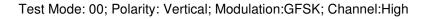
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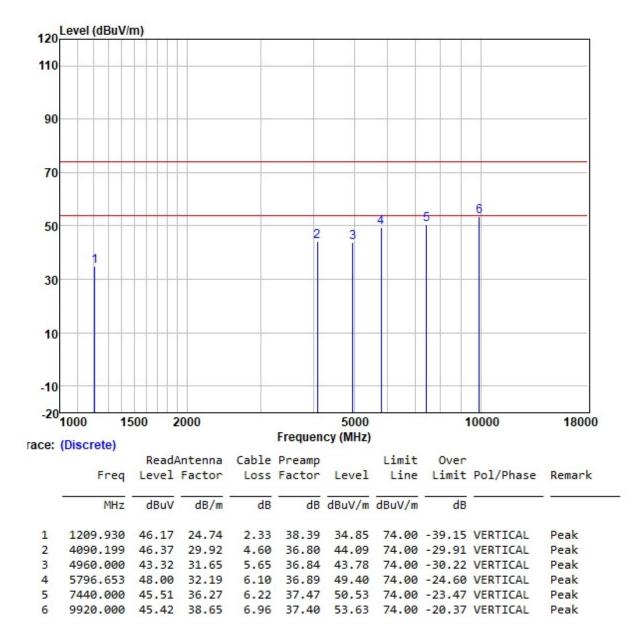
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Report No.: GZCR210802082901 Page: 49 of 79





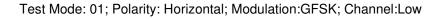


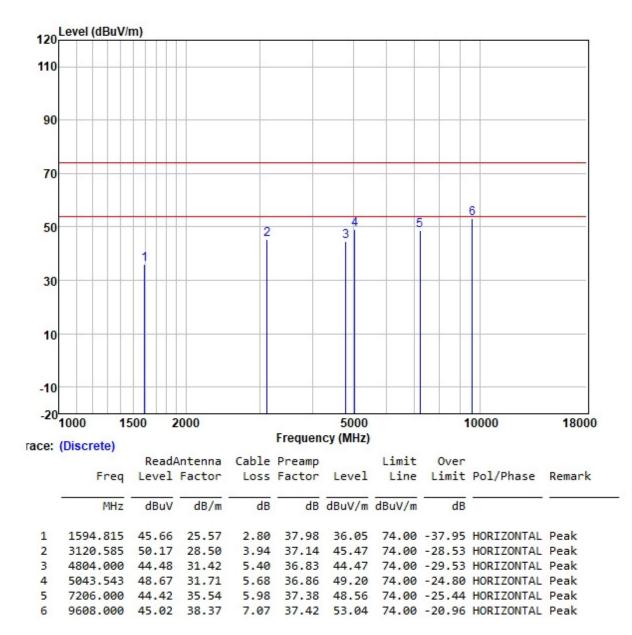
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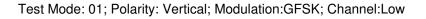


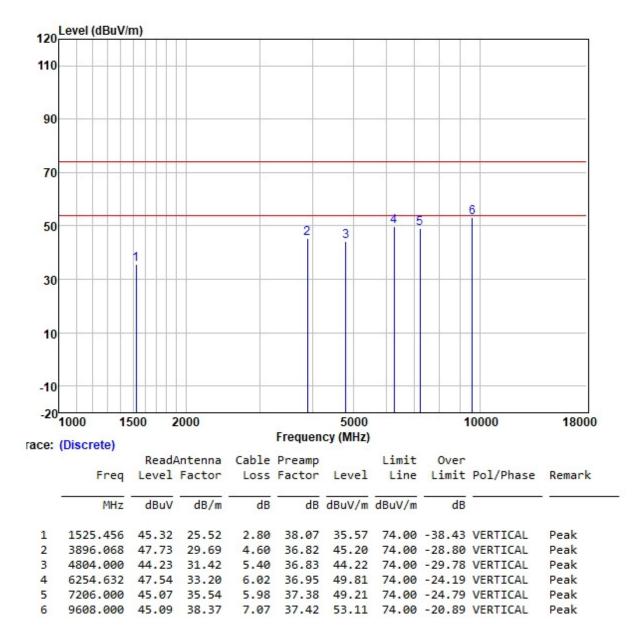
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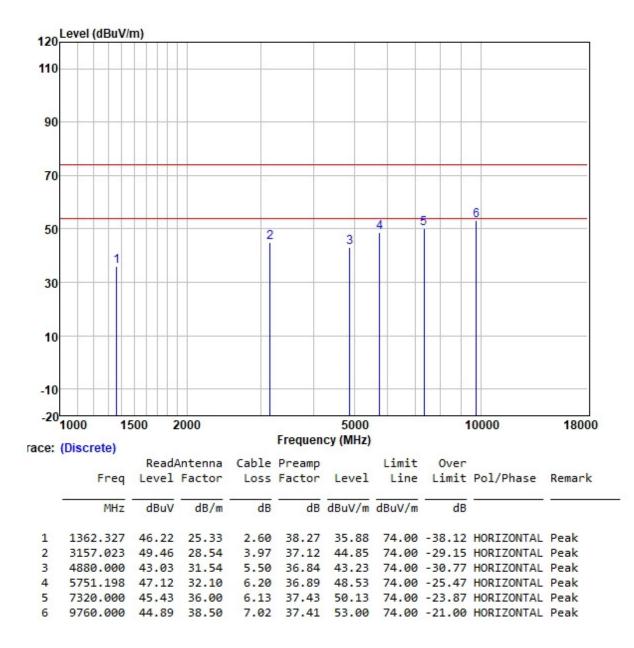
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Report No.: GZCR210802082901 Page: 52 of 79





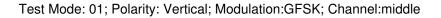


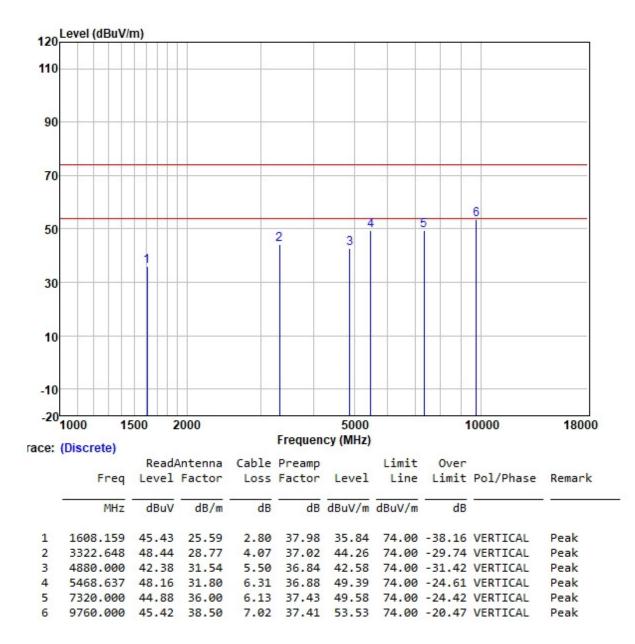
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Report No.: GZCR210802082901 Page: 53 of 79





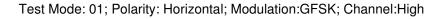


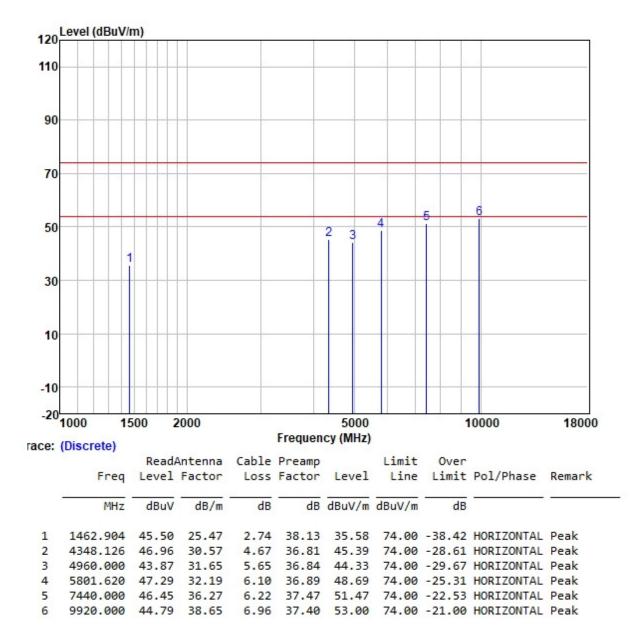
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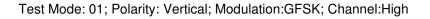
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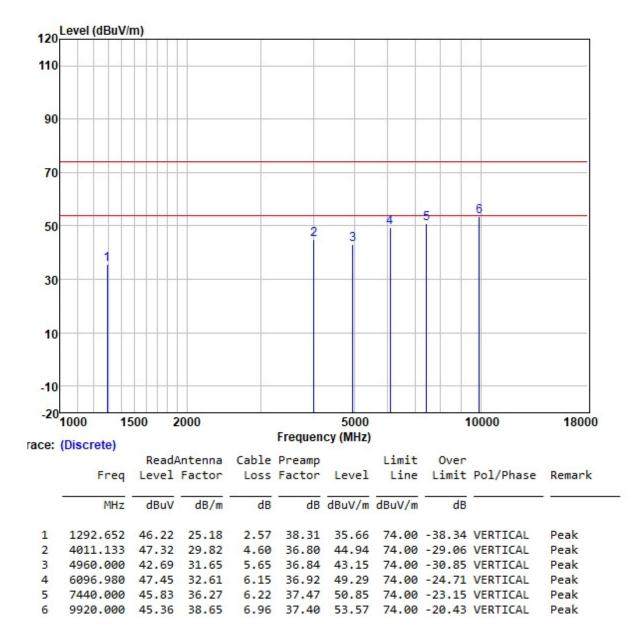
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Report No.: GZCR210802082901 Page: 56 of 79

#### **Test Setup Photo** 8

Refer to Appendix - Test Setup Photo for GZCR2108020829AT

#### **EUT Constructional Details (EUT Photos)** 9

Refer to Appendix - external and internal photos for GZCR2108020829AT



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Report No.: GZCR210802082901 Page: 57 of 79

# 10 Appendix

#### 1. Duty Cycle

1.1 Ant1

#### 1.1.1 Test Result

|      | Ant1       |                    |              |                |                   |                                      |                          |  |  |  |  |
|------|------------|--------------------|--------------|----------------|-------------------|--------------------------------------|--------------------------|--|--|--|--|
| Mode | ТХ<br>Туре | Frequency<br>(MHz) | T_on<br>(ms) | Period<br>(ms) | Duty Cycle<br>(%) | Duty Cycle<br>Correction Factor (dB) | Max. DC<br>Variation (%) |  |  |  |  |
|      |            | 2402               | 0.082        | 0.625          | 13.12             | 8.82                                 | 0.01                     |  |  |  |  |
| 1M   | SISO       | 2440               | 0.081        | 0.625          | 12.96             | 8.87                                 | 0.03                     |  |  |  |  |
|      |            | 2480               | 0.082        | 0.625          | 13.12             | 8.82                                 | 0.00                     |  |  |  |  |
|      |            | 2402               | 0.046        | 0.625          | 7.36              | 11.33                                | 0.00                     |  |  |  |  |
| 2M   | SISO       | 2440               | 0.046        | 0.625          | 7.36              | 11.33                                | 0.00                     |  |  |  |  |
|      |            | 2480               | 0.046        | 0.625          | 7.36              | 11.33                                | 0.00                     |  |  |  |  |



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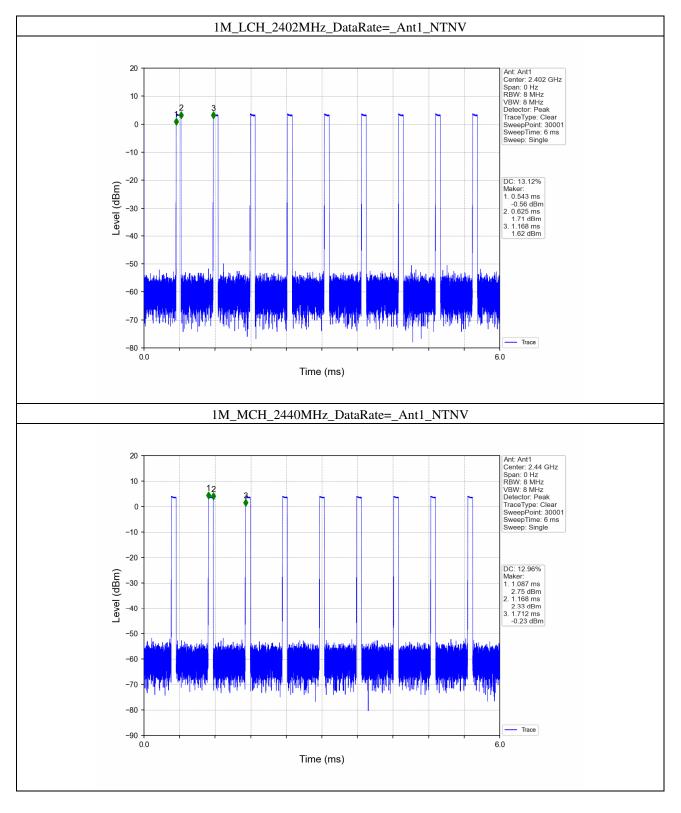
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Report No.: GZCR210802082901 Page: 58 of 79

#### 1.1.2 Test Graph



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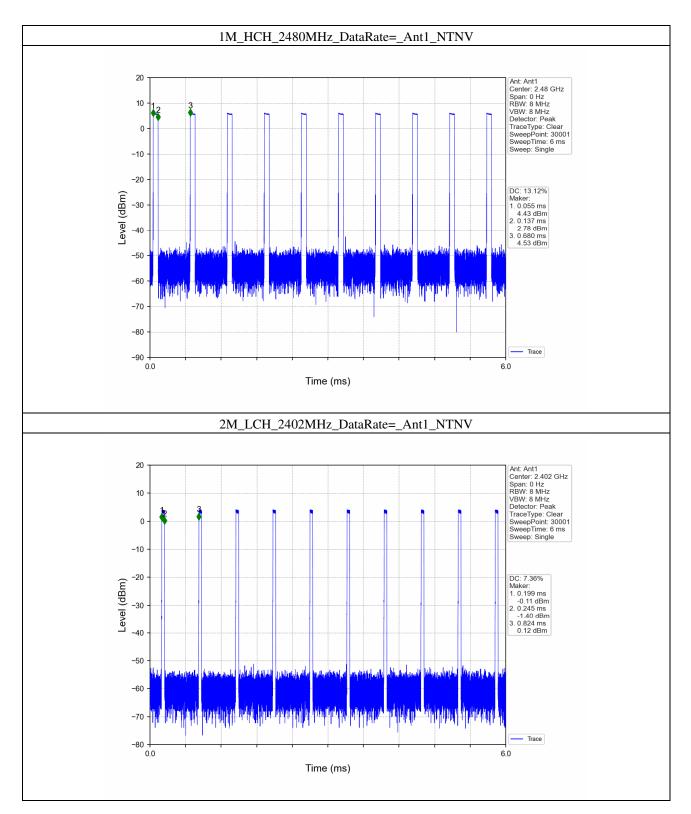
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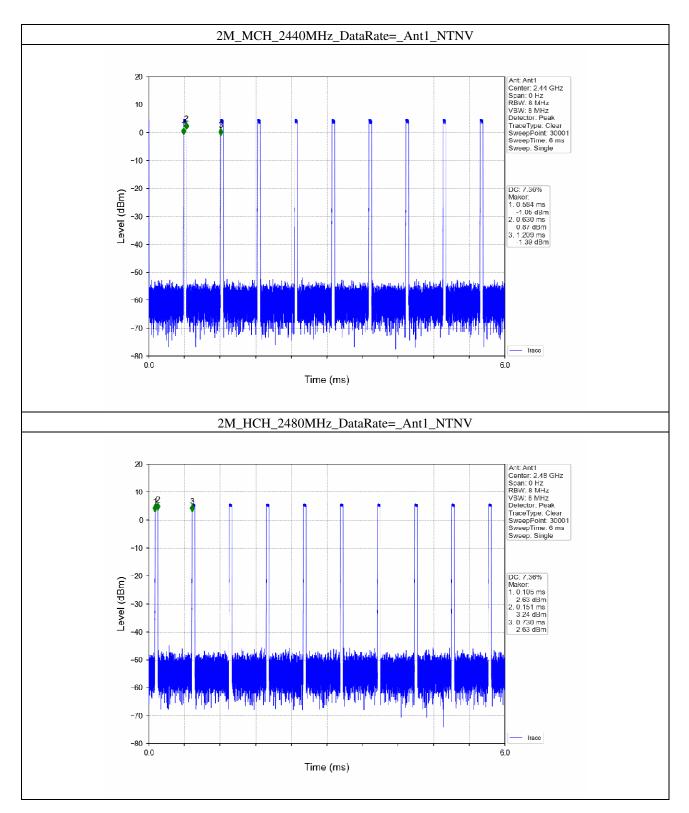
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Report No.: GZCR210802082901 Page: 61 of 79

#### 2. Bandwidth

- 2.1 6dB BW
- 2.1.1 Test Result

| Mada | ТΧ   | Frequency | A est | 6dB Bandv | vidth (MHz) | Verdict |
|------|------|-----------|-------|-----------|-------------|---------|
| Mode | Туре | (MHz)     | Ant   | Result    | Limit       | verdict |
|      |      | 2402      | 1     | 0.652     | >=0.5       | Pass    |
| 1M   | SISO | 2440      | 1     | 0.650     | >=0.5       | Pass    |
|      |      | 2480      | 1     | 0.651     | >=0.5       | Pass    |
|      |      | 2402      | 1     | 1.156     | >=0.5       | Pass    |
| 2M   | SISO | 2440      | 1     | 1.154     | >=0.5       | Pass    |
|      |      | 2480      | 1     | 1.162     | >=0.5       | Pass    |



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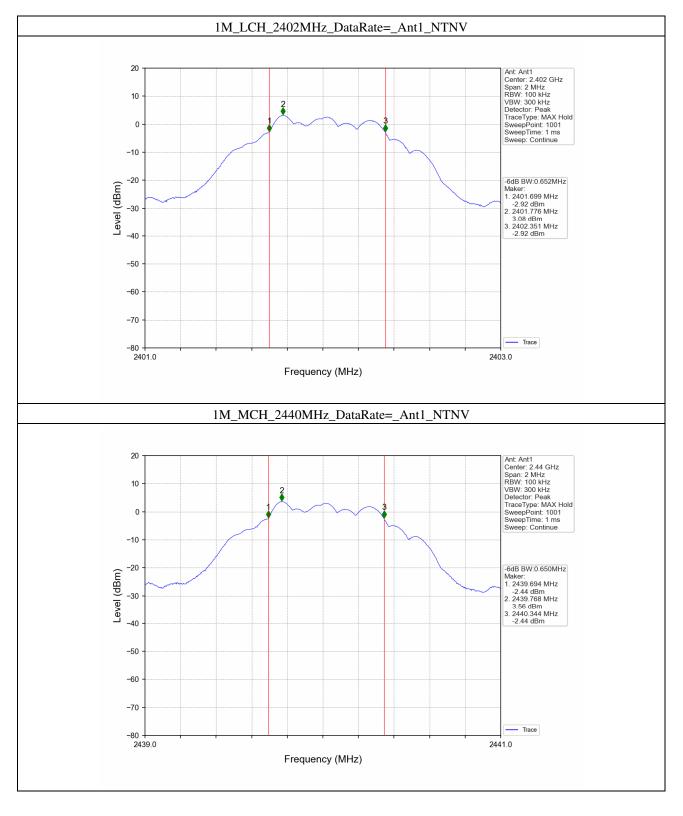
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#### 2.2.2 Test Graph



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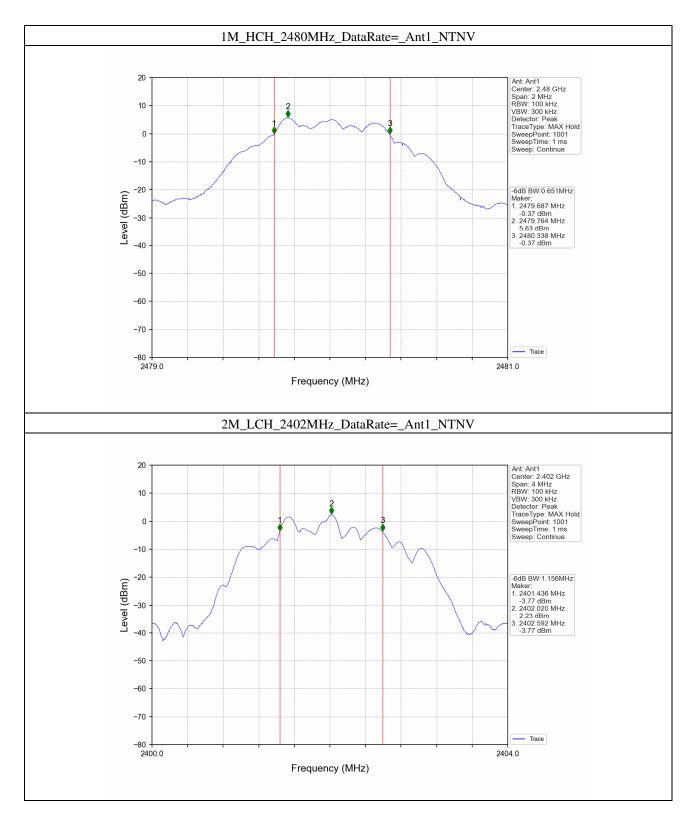
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Report No.: GZCR210802082901 Page: 63 of 79





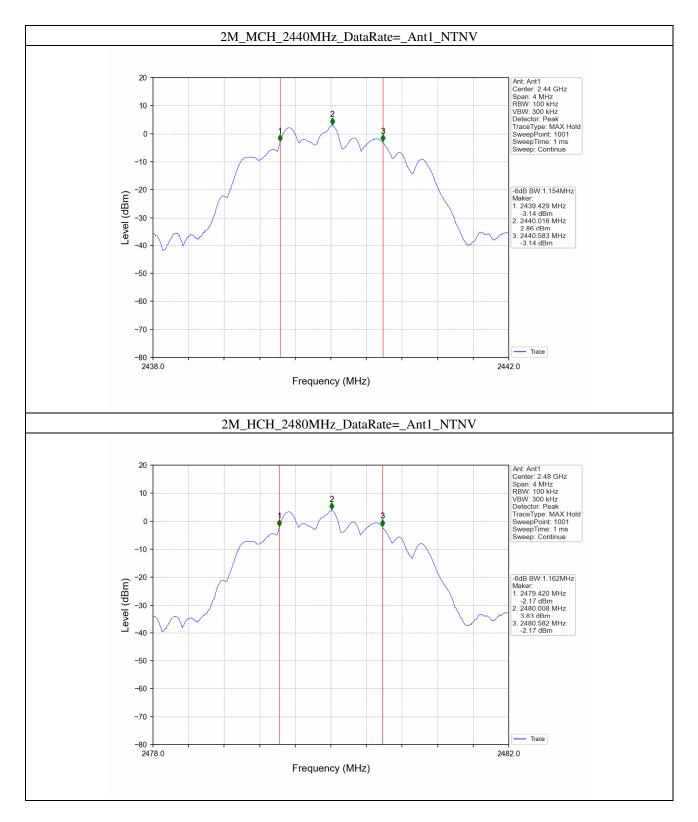
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Report No.: GZCR210802082901 Page: 64 of 79





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Report No.: GZCR210802082901 Page: 65 of 79

#### 3. Maximum Conducted Output Power

- 3.1 Power
- 3.1.1 Test Result

| Mode TX    |              | Frequency       | Maximum Peak Conduct | Verdict |         |  |
|------------|--------------|-----------------|----------------------|---------|---------|--|
| Mode       | Туре         | (MHz)           | Ant1                 | Limit   | verdict |  |
|            |              | 2402            | 3.54                 | <=30    | Pass    |  |
| 1M         | SISO         | 2440            | 4.01                 | <=30    | Pass    |  |
|            |              | 2480            | 5.98                 | <=30    | Pass    |  |
|            |              | 2402            | 4.02                 | <=30    | Pass    |  |
| 2M         | SISO         | 2440            | 4.61                 | <=30    | Pass    |  |
|            |              | 2480            | 5.87                 | <=30    | Pass    |  |
| Note1: Ant | enna Gain: / | Ant1: -2.50dBi; |                      |         |         |  |



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Report No.: GZCR210802082901 Page: 66 of 79

#### 4. Maximum Power Spectral Density

4.1 PSD

4.1.1 Test Result

| Mada          | ТХ               | Frequency | Maximum PS | D (dBm/3kHz) | Verdict |
|---------------|------------------|-----------|------------|--------------|---------|
| Mode          | Туре             | (MHz)     | Ant1       | Limit        | verdict |
|               |                  | 2402      | -13.57     | <=8          | Pass    |
| 1M            | SISO             | 2440      | -13.04     | <=8          | Pass    |
|               |                  | 2480      | -11.00     | <=8          | Pass    |
|               |                  | 2402      | -18.97     | <=8          | Pass    |
| 2M            | SISO             | 2440      | -18.27     | <=8          | Pass    |
|               |                  | 2480      | -17.31     | <=8          | Pass    |
| Note1: Antenr | na Gain: Ant1: - | 2.50dBi:  |            |              |         |



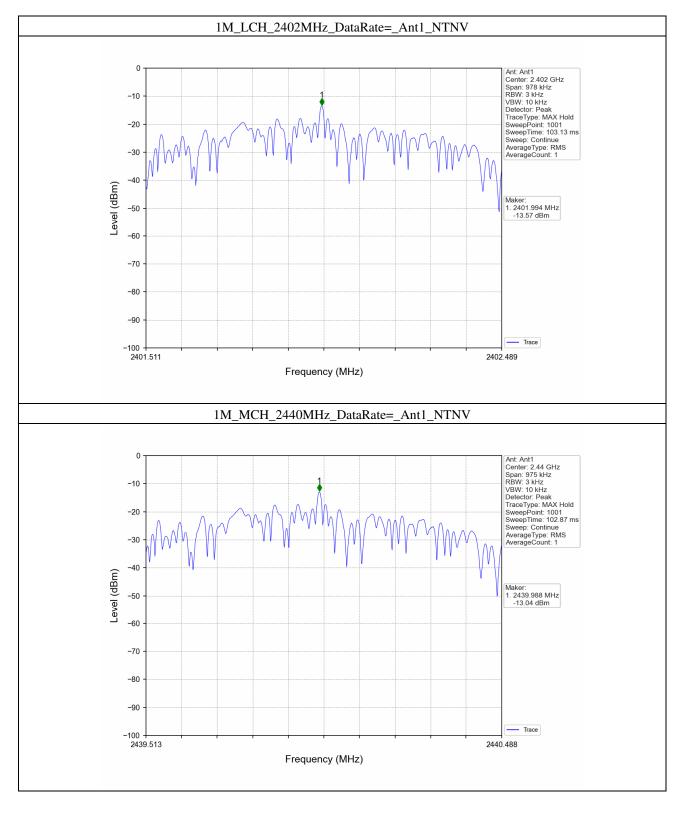
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#### 4.1.2 Test Graph



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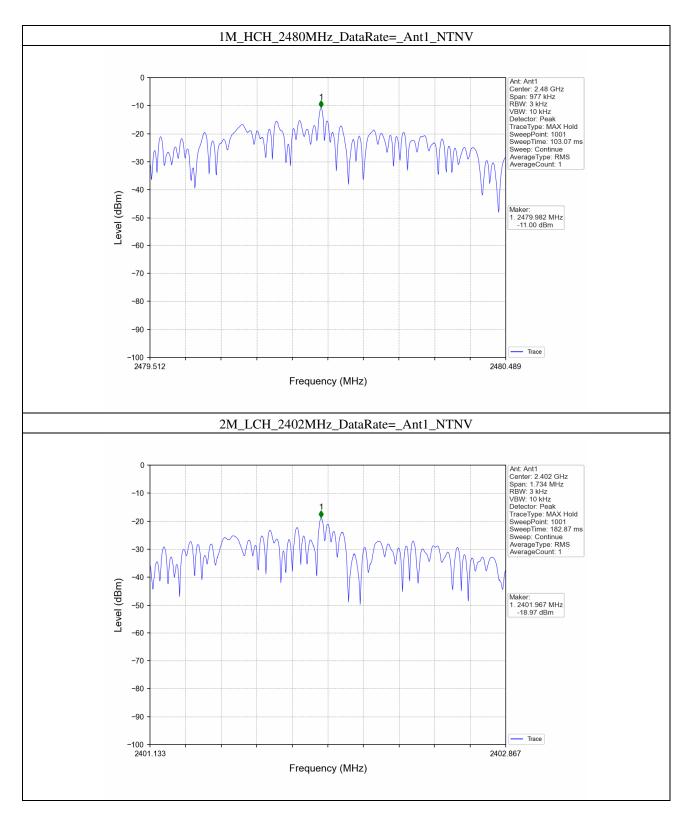
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Report No.: GZCR210802082901 Page: 68 of 79





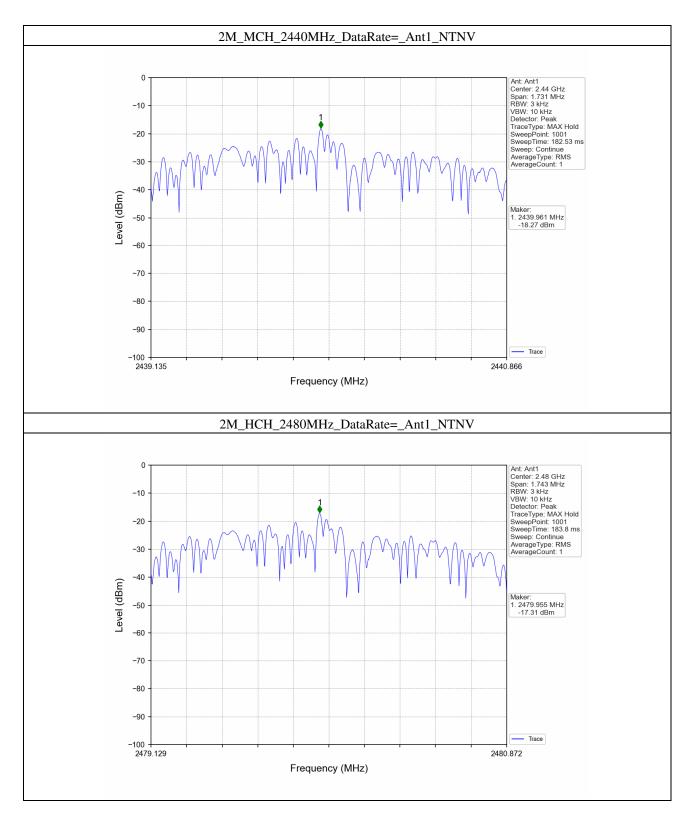
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Report No.: GZCR210802082901 Page: 69 of 79





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Report No.: GZCR210802082901 Page: 70 of 79

#### 5. Unwanted Emissions In Non-restricted Frequency Bands

- 5.1 Ref
- 5.1.1 Test Result

| Mode  | ТХ<br>Туре | Frequency<br>(MHz) | Ant | Level of Reference<br>(dBm) |  |  |  |
|---|------------|--------------------|-----|-----------------------------|--|--|--|
| 1M  | SISO       | 2402               | 1   | 3.01                        |  |  |  |
|   |            | 2440               | 1   | 3.57                        |  |  |  |
|   |            | 2480               | 1   | 5.61                        |  |  |  |
| 2M  | SISO       | 2402               | 1   | 2.26                        |  |  |  |
|   |            | 2440               | 1   | 2.90                        |  |  |  |
|   |            | 2480               | 1   | 3.79                        |  |  |  |
| Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level. |            |                    |     |                             |  |  |  |



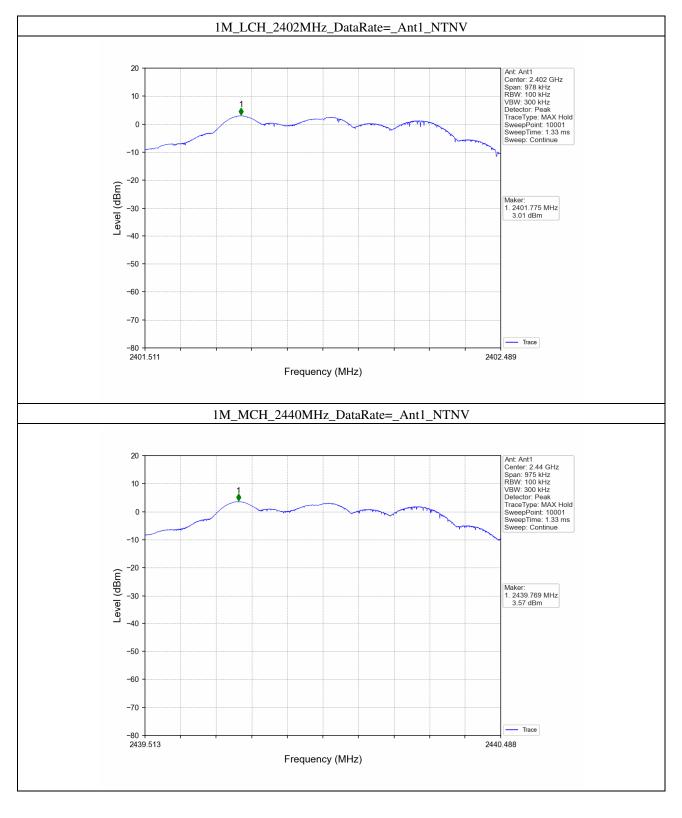
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Report No.: GZCR210802082901 Page: 71 of 79

#### 5.1.2 Test Graph





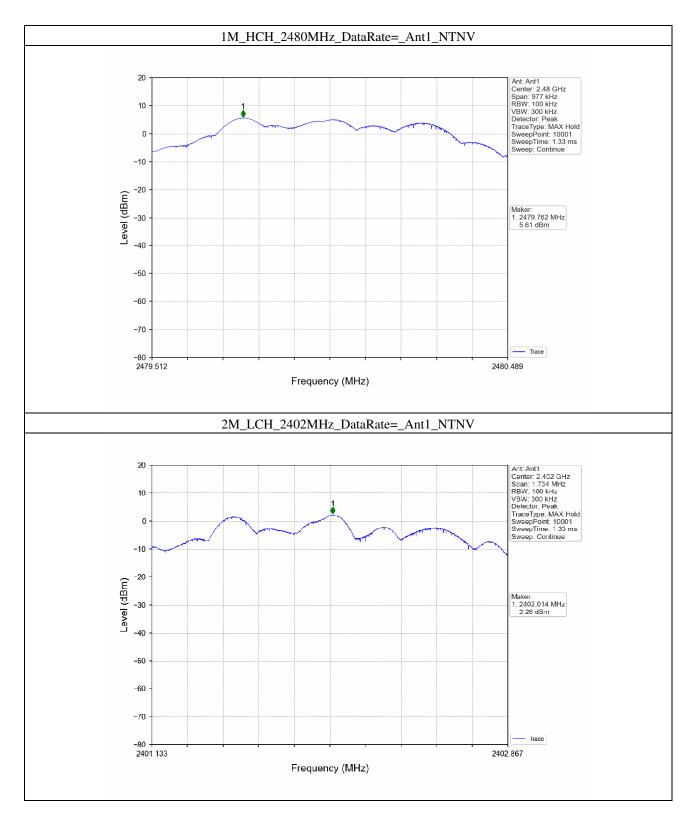
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Report No.: GZCR210802082901 72 of 79 Page:





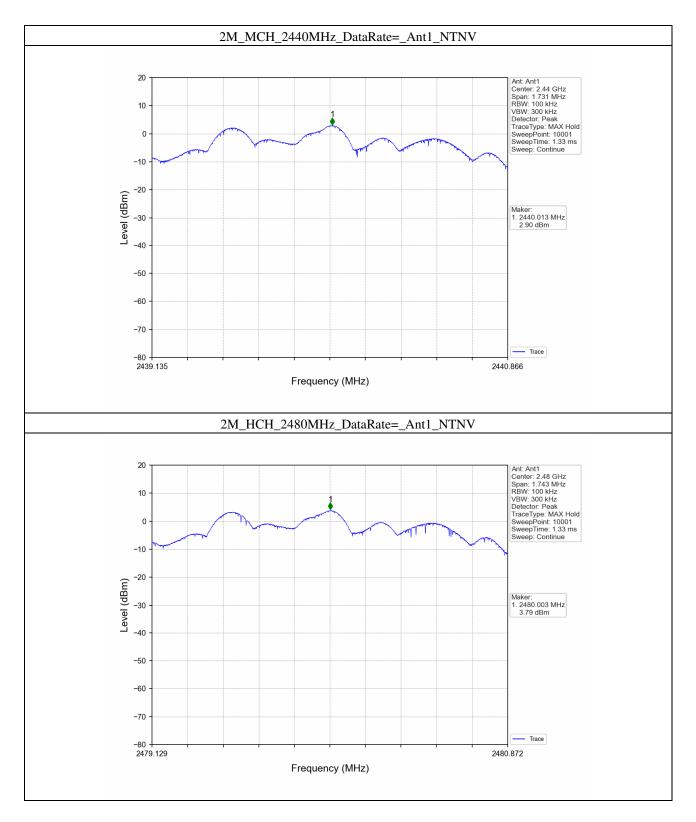
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Report No.: GZCR210802082901 Page: 73 of 79





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Report No.: GZCR210802082901 Page: 74 of 79

#### 5.2 CSE

5.2.1 Test Result

| Mode  | ТХ<br>Туре | Frequency<br>(MHz) | Ant | Level of Reference<br>(dBm) | Limit<br>(dBm) | Verdict |  |  |  |
|---|------------|--------------------|-----|-----------------------------|----------------|---------|--|--|--|
| 1M  | SISO       | 2402               | 1   | 5.61                        | -14.39         | Pass    |  |  |  |
|   |            | 2440               | 1   | 5.61                        | -14.39         | Pass    |  |  |  |
|   |            | 2480               | 1   | 5.61                        | -14.39         | Pass    |  |  |  |
| 2M  | SISO       | 2402               | 1   | 3.79                        | -16.21         | Pass    |  |  |  |
|   |            | 2440               | 1   | 3.79                        | -16.21         | Pass    |  |  |  |
|   |            | 2480               | 1   | 3.79                        | -16.21         | Pass    |  |  |  |
| Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level. |            |                    |     |                             |                |         |  |  |  |



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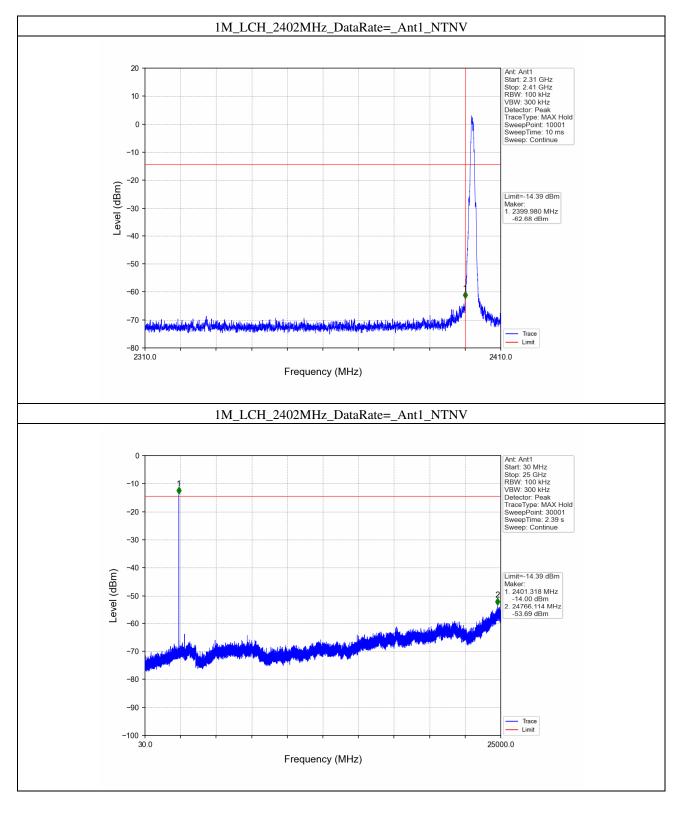
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Report No.: GZCR210802082901 75 of 79 Page:

#### 5.2.2 Test Graph





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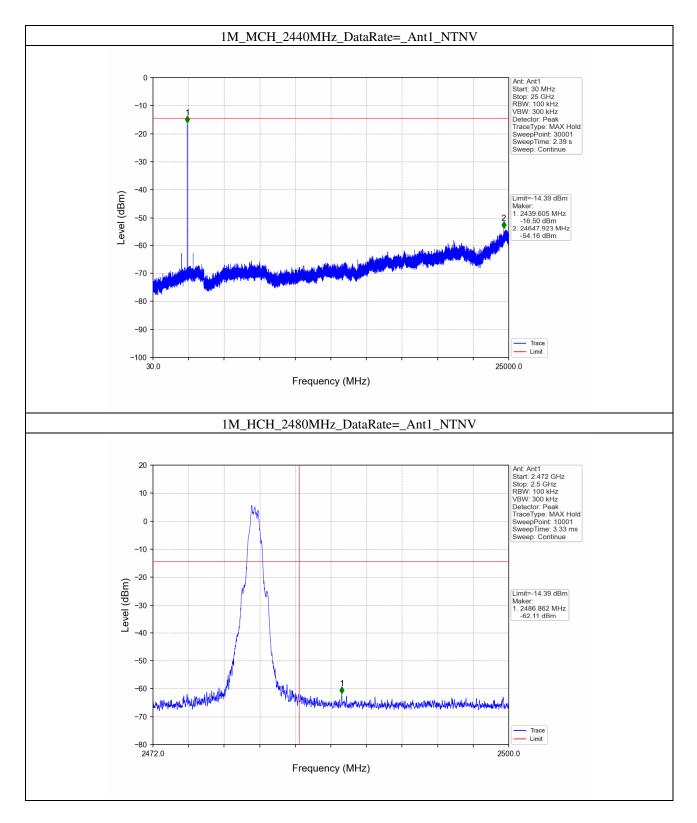
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Report No.: GZCR210802082901 76 of 79 Page:





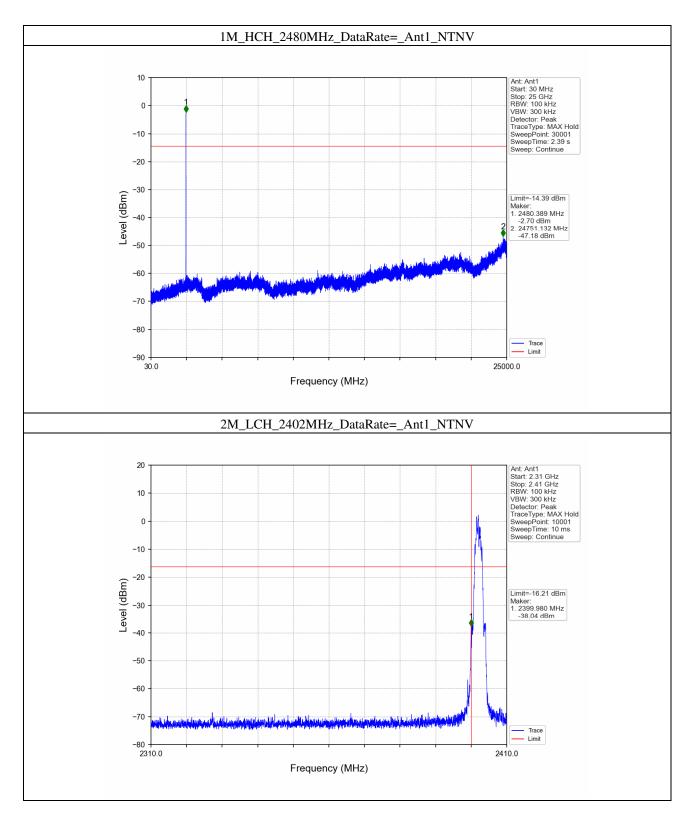
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Report No.: GZCR210802082901 77 of 79 Page:





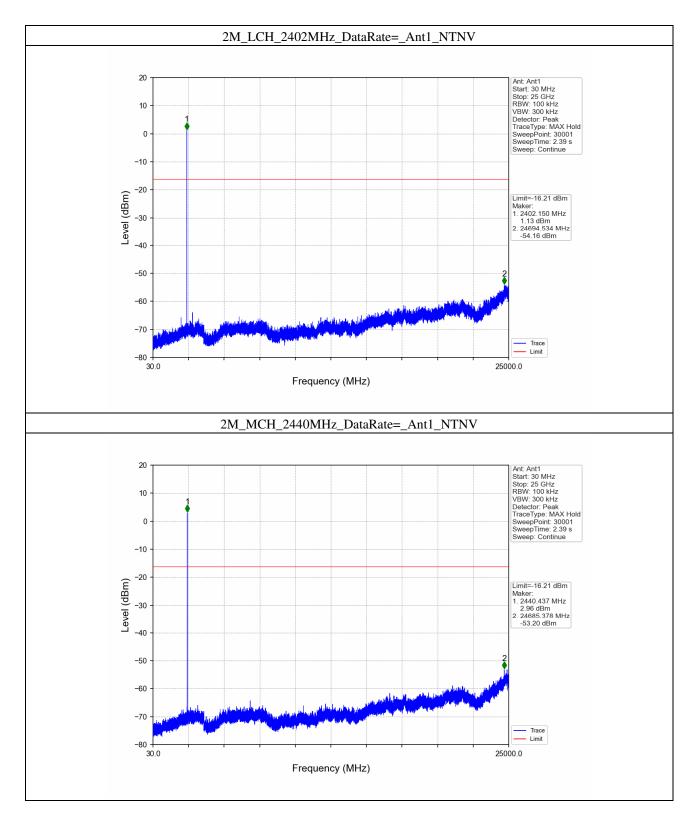
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Report No.: GZCR210802082901 Page: 78 of 79





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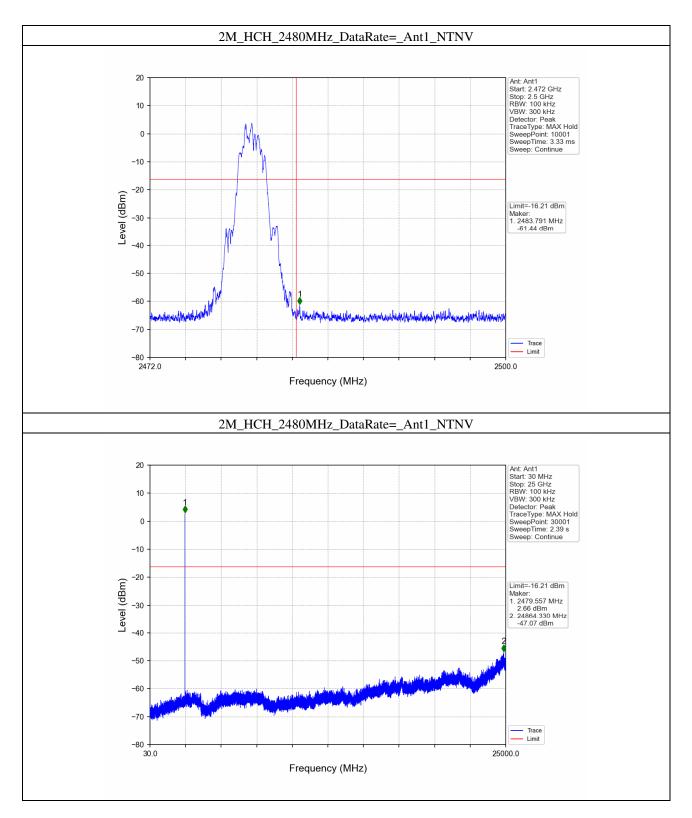
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Report No.: GZCR210802082901 79 of 79 Page:



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邮编: 510663 t (86-20) 82155555 f (86-20) 82075058 sgs.china@sgs.com