

TEST REPORT

Application No.: SZCR2312004052AT
Applicant: Mattel Asia Pacific Sourcing Ltd.
Address of Applicant: 11/F., South Tower, World Finance Centre, Harbour City, Tsimshatsui, Kowloon 852 Hong Kong
Manufacturer: Mattel Asia Pacific Sourcing Ltd.
Address of Manufacturer: 11/F., South Tower, World Finance Centre, Harbour City, Tsimshatsui, Kowloon 852 Hong Kong
Equipment Under Test (EUT):
EUT Name: Fisher-Price® Link Squad™ Opposites Fox™
Model No.: HTW99, HYK94, HYL02, HYL11, HYL20, HYL27, HYL29, HYL37, HYL38, HYL39 ♣
 ♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
FCC ID: PIY-HTW99-24-A5T
Standard(s) : 47 CFR Part 15, Subpart C 15.249
Date of Receipt: 2023-12-12
Date of Test: 2023-12-13 to 2023-12-29
Date of Issue: 2024-01-05

| | |
|---------------------|--------------|
| Test Result: | Pass* |
|---------------------|--------------|

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

Kenx. Xu

Keny Xu
EMC Laboratory Manager



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Report No.: SZCR231200405202

Page: 2 of 44

| Revision Record | | | | |
|-----------------|---------|------------|----------|----------|
| Version | Chapter | Date | Modifier | Remark |
| 01 | | 2024-01-05 | | Original |
| | | | | |
| | | | | |

| | | | | |
|--------------------------|--|----------------------------|--|--|
| Authorized for issue by: | | | | |
| | | Gebin Sun | | |
| | | Gebin Sun/Project Engineer | | |
| | | Eric Fu | | |
| | | Eric Fu/Reviewer | | |



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2 Test Summary

| Radio Spectrum Technical Requirement | | | | |
|--------------------------------------|----------------------------------|--------|----------------------------------|--------|
| Item | Standard | Method | Requirement | Result |
| Antenna Requirement | 47 CFR Part 15, Subpart C 15.249 | N/A | 47 CFR Part 15, Subpart C 15.203 | Pass |

| Radio Spectrum Matter Part | | | | |
|--|----------------------------------|------------------------------------|---|--------|
| Item | Standard | Method | Requirement | Result |
| 20dB Bandwidth | 47 CFR Part 15, Subpart C 15.249 | ANSI C63.10 (2013) Section 6.9 | 47 CFR Part 15, Subpart C 15.215 | Pass |
| Field Strength of the Fundamental Signal (15.249(a)) | | ANSI C63.10 (2013) Section 6.5&6.6 | 47 CFR Part 15, Subpart C 15.249(a) | Pass |
| Restricted Band Around Fundamental Frequency | | ANSI C63.10 (2013) Section 6.10.5 | 47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209 | Pass |
| Radiated Emissions Below 1GHz | | ANSI C63.10 (2013) Section 6.4&6.5 | 47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d) | Pass |
| Radiated Emissions Above 1GHz | | ANSI C63.10 (2013) Section 6.6 | 47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d) | Pass |

Declaration of EUT Family Grouping:

Model No.: HTW99, HYK94, HYL02, HYL11, HYL20, HYL27, HYL29, HYL37, HYL38, HYL39

Only the model HTW99 was tested, since according to the declaration from the applicant, the electrical circuit design, PCB layout, components used, internal wiring and functions were identical for all the above models, with only difference on model name and IC language.



3 Contents

| | Page |
|--|------|
| 1 Cover Page | 1 |
| 2 Test Summary | 3 |
| 3 Contents | 4 |
| 4 General Information | 6 |
| 4.1 Details of E.U.T. | 6 |
| 4.2 Description of Support Units | 6 |
| 4.3 Measurement Uncertainty | 6 |
| 4.4 Test Location | 7 |
| 4.5 Test Facility | 7 |
| 4.6 Deviation from Standards | 7 |
| 4.7 Abnormalities from Standard Conditions | 7 |
| 5 Equipment List | 8 |
| 6 Radio Spectrum Technical Requirement | 10 |
| 6.1 Antenna Requirement | 10 |
| 6.1.1 Test Requirement: | 10 |
| 6.1.2 Conclusion | 10 |
| 7 Radio Spectrum Matter Test Results | 11 |
| 7.1 20dB Bandwidth | 11 |
| 7.1.1 E.U.T. Operation | 11 |
| 7.1.2 Test Mode Description | 11 |
| 7.1.3 Test Setup Diagram | 11 |
| 7.1.4 Measurement Procedure and Data | 11 |
| 7.2 Field Strength of the Fundamental Signal (15.249(a)) | 15 |
| 7.2.1 E.U.T. Operation | 16 |
| 7.2.2 Test Mode Description | 16 |
| 7.2.3 Test Setup Diagram | 17 |
| 7.2.4 Measurement Procedure and Data | 18 |
| 7.3 Restricted Band Around Fundamental Frequency | 25 |
| 7.3.1 E.U.T. Operation | 25 |
| 7.3.2 Test Mode Description | 25 |
| 7.3.3 Test Setup Diagram | 26 |
| 7.3.4 Measurement Procedure and Data | 27 |
| 7.4 Radiated Emissions Below 1GHz | 32 |
| 7.4.1 E.U.T. Operation | 32 |
| 7.4.2 Test Mode Description | 32 |
| 7.4.3 Test Setup Diagram | 32 |
| 7.4.4 Measurement Procedure and Data | 33 |
| 7.5 Radiated Emissions Above 1GHz | 36 |
| 7.5.1 E.U.T. Operation | 36 |



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SZEMC-TRF-01 Rev. A/1

Report No.: SZCR231200405202

Page: 5 of 44

| | | |
|----------|--|-----------|
| 7.5.2 | Test Mode Description | 36 |
| 7.5.3 | Test Setup Diagram | 36 |
| 7.5.4 | Measurement Procedure and Data..... | 37 |
| 8 | Test Setup Photo | 44 |
| 9 | EUT Constructional Details (EUT Photos) | 44 |



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4 General Information

4.1 Details of E.U.T.

| | |
|----------------------|---------------------------------------|
| Power supply: | 4.5V DC(1.5V x 3 "AA" Size Batteries) |
| Operation Frequency: | 2420MHz; 2440MHz; 2456MHz |
| Modulation Type: | GFSK |
| Number of Channels: | 3 |
| Antenna Type: | Wire Antenna |
| Antenna Gain: | 3.42dBi |

Remark: The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

4.2 Description of Support Units

| Description | Manufacturer | Model No. | Serial No. |
|-------------|-----------------|-----------------------|-------------------|
| RF cable | supplied by SGS | N/A(cable loss:0.6dB) | REF. No.SEL000089 |

4.3 Measurement Uncertainty

| Test Item | Measurement Uncertainty |
|--|---|
| 20dB Bandwidth | ± 3% |
| Field Strength of the Fundamental Signal (15.249(a)) | ± 4.5dB (Below 1GHz); ± 4.8dB (Above 1GHz) |
| Restricted Band Around Fundamental Frequency | ± 6.0dB (Below 1GHz); ± 4.6dB (Above 1GHz) |
| Radiated Emissions Below 1GHz | ± 6.0dB for 3m; ± 5.0dB for 10m |
| Radiated Emissions Above 1GHz | ± 4.6dB (1GHz-18GHz); ± 4.8dB (18MHz-40GHz) |

Remark:

The U_{lab} (lab Uncertainty) is less than $U_{CISPR/ETSI}$ (CISPR/ETSI 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.: SZCR231200405202

Page: 7 of 44

4.4 Test Location

All tests were performed at:

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Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

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

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI (Member No. 1937)

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen EMC laboratory have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1336

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1336. Test Firm Registration Number: 787754.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

| 20dB Bandwidth | | | | | |
|---|------------------------------|---------------|---------------|------------|--------------|
| Equipment | Manufacturer | Model No. | Inventory No. | Cal Date | Cal Due Date |
| DC Power Supply | Chroma | 62012P-80-60 | SEM011-11 | 2023-10-19 | 2024-10-18 |
| MXA Signal Analyzer | KEYSIGHT | N9020A | SEM004-19 | 2023-03-21 | 2024-03-20 |
| Measurement Software | TST PASS | TST PASS V2.0 | N/A | N/A | N/A |
| Coaxial Cable | SGS | N/A | SEM031-01 | 2023-07-07 | 2024-07-06 |
| Attenuator | Huber+Suhner | 6620_SMA-50-1 | SEM021-09 | 2023-03-31 | 2024-03-30 |
| Programmable Temperature & Humidity Chamber | Votsch Industrietechnik GmbH | VT 4002 | SEM002-15 | 2023-03-21 | 2024-03-20 |

| Field Strength of the Fundamental Signal (15.249(a)) | | | | | |
|--|-----------------|-----------------|---------------|------------|--------------|
| Equipment | Manufacturer | Model No. | Inventory No. | Cal Date | Cal Due Date |
| 3m Fully-Anechoic Chamber | AUDIX | N/A | SEM001-02 | 2023-04-01 | 2026-03-31 |
| Signal Analyzer | Rohde & Schwarz | FSV40 | SEM008-04 | 2023-03-20 | 2024-03-19 |
| Horn Antenna | Rohde&Schwarz | HF907 | SEM003-07 | 2023-07-23 | 2025-07-22 |
| Microwave system amplifier | Agilent | 83017A | SEM005-25 | 2023-09-19 | 2024-09-18 |
| Measurement Software | AUDIX | e3 V8.2014-6-27 | N/A | N/A | N/A |
| Coaxial Cable | SGS | N/A | SEM026-01 | 2023-07-07 | 2024-07-06 |

| Restricted Band Around Fundamental Frequency | | | | | |
|--|------------------------------------|-----------------|---------------|------------|--------------|
| Equipment | Manufacturer | Model No. | Inventory No. | Cal Date | Cal Due Date |
| 3m Fully-Anechoic Chamber | AUDIX | N/A | SEM001-02 | 2023-04-01 | 2026-03-31 |
| Signal Analyzer | Rohde & Schwarz | FSV40 | SEM008-04 | 2023-03-20 | 2024-03-19 |
| Horn Antenna | Rohde&Schwarz | HF907 | SEM003-07 | 2023-07-23 | 2025-07-22 |
| Microwave system amplifier | Agilent | 83017A | SEM005-25 | 2023-09-19 | 2024-09-18 |
| Measurement Software | AUDIX | e3 V8.2014-6-27 | N/A | N/A | N/A |
| Coaxial Cable | SGS | N/A | SEM026-01 | 2023-07-07 | 2024-07-06 |
| Broad-Band Horn Antenna | Schwarzbeck | BBHA 9170 | SEM003-15 | 2022-08-10 | 2024-08-09 |
| Pre-Amplifier | Compliance Directions Systems Inc. | PAP-2640-50 | SEM005-08 | 2023-03-20 | 2024-03-19 |



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Report No.: SZCR231200405202

Page: 9 of 44

Radiated Emissions Below 1GHz

| Equipment | Manufacturer | Model No. | Inventory No. | Cal Date | Cal Due Date |
|--------------------------|----------------------|-----------------|---------------|------------|--------------|
| Loop Antenna | ETS-Lindgren | 6502 | SEM003-08 | 2023-11-20 | 2025-11-19 |
| 3m Semi-Anechoic Chamber | ETS-LINDGREN | N/A | SEM001-01 | 2023-06-19 | 2026-06-18 |
| MXE EMI Receiver | Agilent Technologies | N9038A | SEM004-15 | 2023-10-19 | 2024-10-18 |
| BiConiLog Antenna | ETS-LINDGREN | 3142C | SEM003-01 | 2023-09-16 | 2025-09-15 |
| Pre-Amplifier | Agilent Technologies | 8447D | SEM005-01 | 2023-03-20 | 2024-03-19 |
| Measurement Software | AUDIX | e3 V8.2014-6-27 | N/A | N/A | N/A |
| Coaxial Cable | SGS | N/A | SEM025-01 | 2023-07-07 | 2024-07-06 |

Radiated Emissions Above 1GHz

| Equipment | Manufacturer | Model No. | Inventory No. | Cal Date | Cal Due Date |
|----------------------------|-----------------|-----------------|---------------|------------|--------------|
| 3m Fully-Anechoic Chamber | AUDIX | N/A | SEM001-02 | 2023-04-01 | 2026-03-31 |
| Signal Analyzer | Rohde & Schwarz | FSV40 | SEM008-04 | 2023-03-20 | 2024-03-19 |
| Horn Antenna | Rohde&Schwarz | HF907 | SEM003-07 | 2023-07-23 | 2025-07-22 |
| Microwave system amplifier | Agilent | 83017A | SEM005-25 | 2023-09-19 | 2024-09-18 |
| Measurement Software | AUDIX | e3 V8.2014-6-27 | N/A | N/A | N/A |
| Coaxial Cable | SGS | N/A | SEM026-01 | 2023-07-07 | 2024-07-06 |

General used equipment

| Equipment | Manufacturer | Model No. | Inventory No. | Cal Date | Cal Due Date |
|---------------------------------|---|-----------|---------------|------------|--------------|
| Humidity/ Temperature Indicator | deli | 8838 | SEM002-32 | 2023-07-28 | 2024-07-27 |
| Humidity/ Temperature Indicator | deli | 8838 | SEM002-33 | 2023-07-28 | 2024-07-27 |
| Barometer | Changchun Meteorological Industry Factory | DYM3 | SEM002-01 | 2023-03-23 | 2024-03-22 |



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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

6.1.2 Conclusion

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 3.42dBi.

Antenna location: Refer to internal photos



7 Radio Spectrum Matter Test Results

7.1 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.215

Test Method: ANSI C63.10 (2013) Section 6.9

7.1.1 E.U.T. Operation

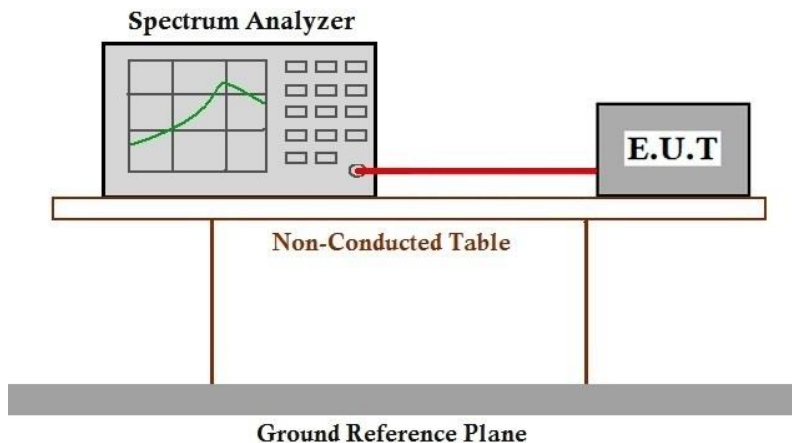
Operating Environment:

Temperature: 22.9 °C Humidity: 42.6 % RH Atmospheric Pressure: 1000 mbar

7.1.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|-----------------------|-----------|--|
| Final test | 00 | TX mode_Keep the EUT in transmitting with modulation mode. |

7.1.3 Test Setup Diagram

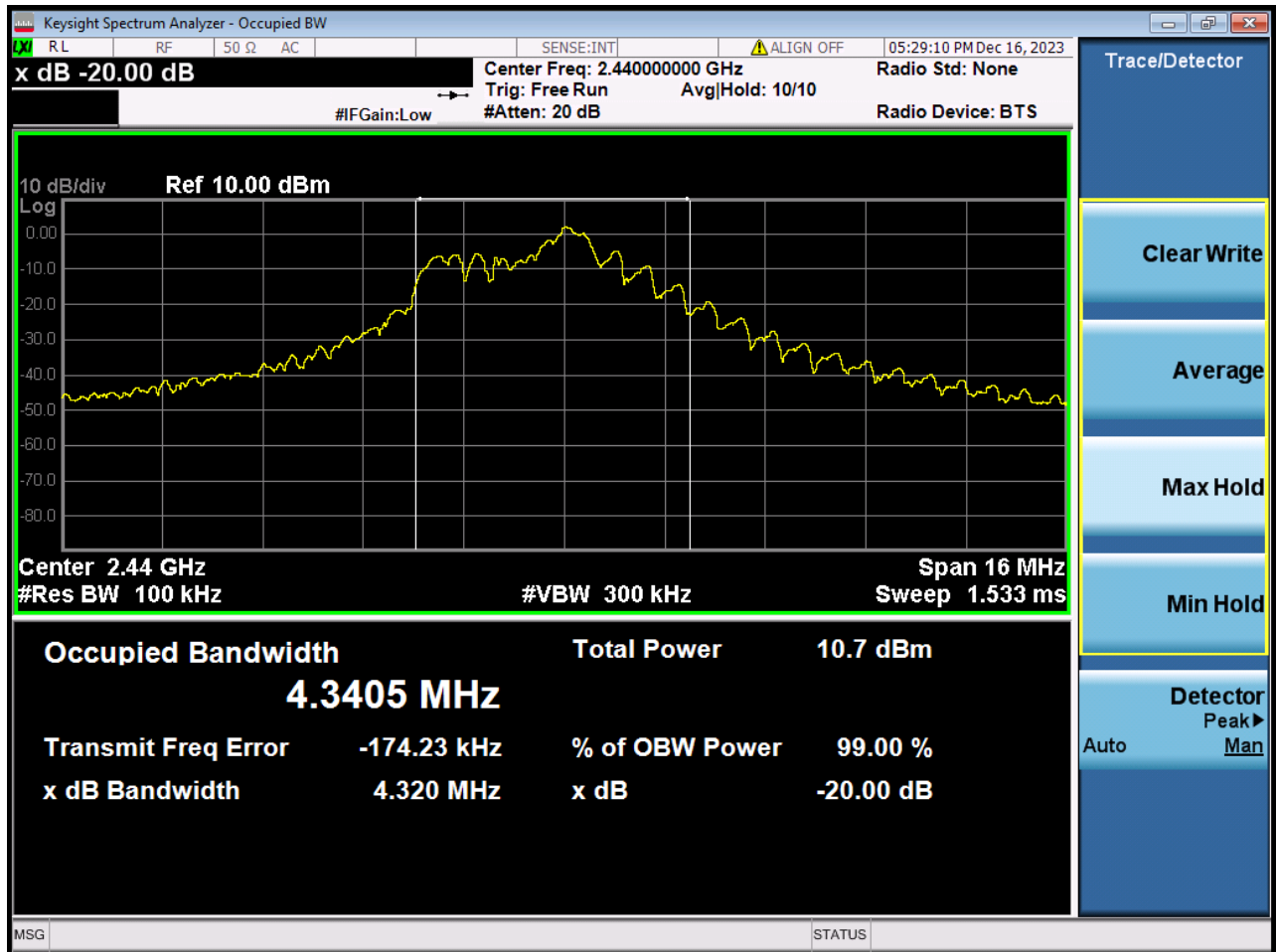


7.1.4 Measurement Procedure and Data

| Test channel | 20dB bandwidth (MHz) | Results |
|--------------|----------------------|---------|
| Lowest | 5.130 | Pass |
| Middle | 4.320 | Pass |
| Highest | 3.660 | Pass |







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SZEMC-TRF-01 Rev. A/1

Report No.: SZCR231200405202

Page: 14 of 44



7.2 Field Strength of the Fundamental Signal (15.249(a))

Test Requirement 47 CFR Part 15, Subpart C 15.249(a)

Test Method: ANSI C63.10 (2013) Section 6.5&6.6

Measurement Distance: 3m

Limit:

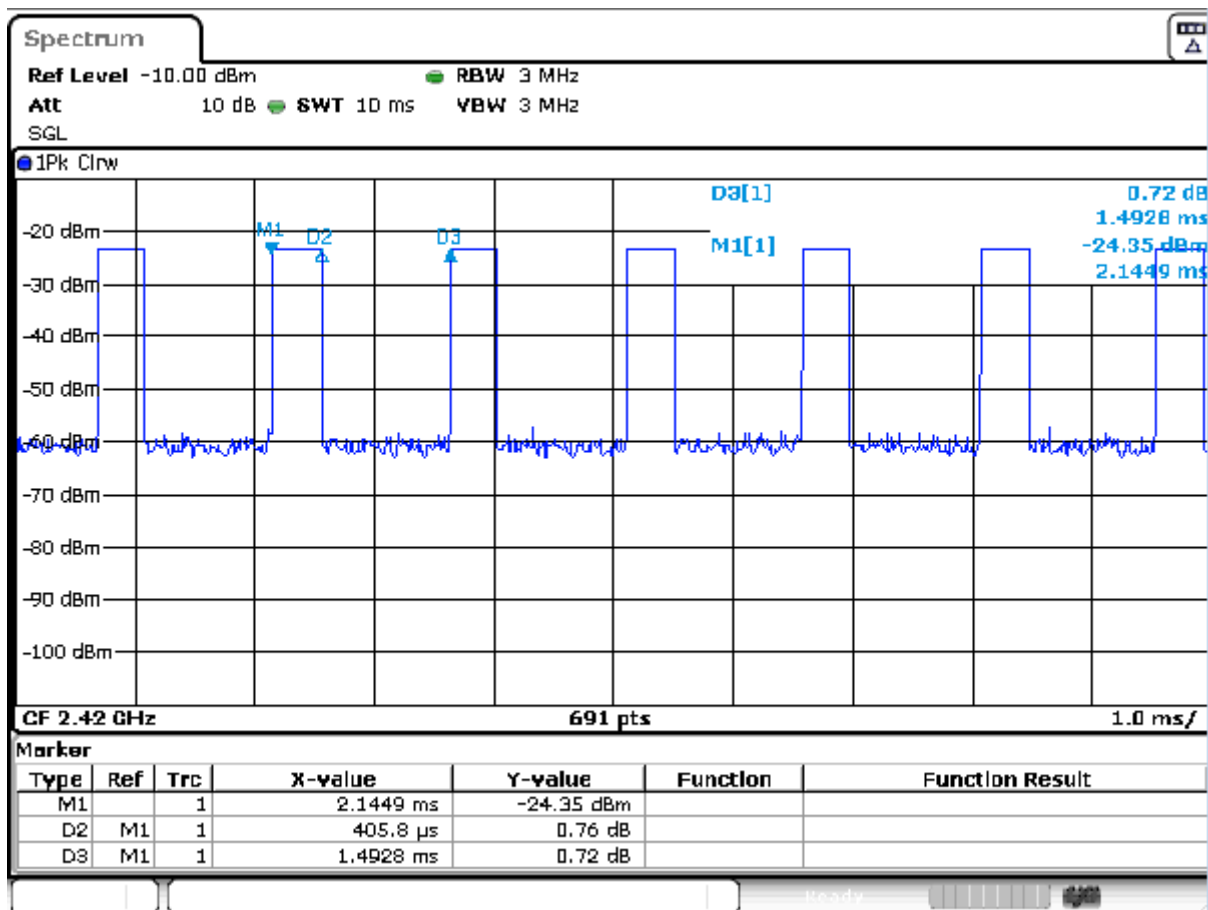
| Fundamental frequency(MHz) | Field strength of fundamental(millivolts/meter) | Field strength of harmonics(microvolts/meter) |
|----------------------------|---|---|
| 902-928 | 50 | 500 |
| 2400-2483.5 | 50 | 500 |
| 5725-5875 | 50 | 500 |
| 24000-24250 | 250 | 2500 |

Remark: The frequencies above 1000MHz 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 fundamental frequency in "902-928MHz", the field strength of fundamental is based on Quasi-Peak.

Average value:

| | |
|--------------------|----------------------------------|
| Calculate Formula: | Average value=Peak value + PDCF |
| | PDCF=20 log(Duty cycle) |
| | Duty cycle= T on time / T period |
| Test data: | Ton time =0.4058ms |
| | T period =1.4298ms |
| | Duty cycle=28.38% |
| | PDCF value= -10.94dB |



7.2.1 E.U.T. Operation

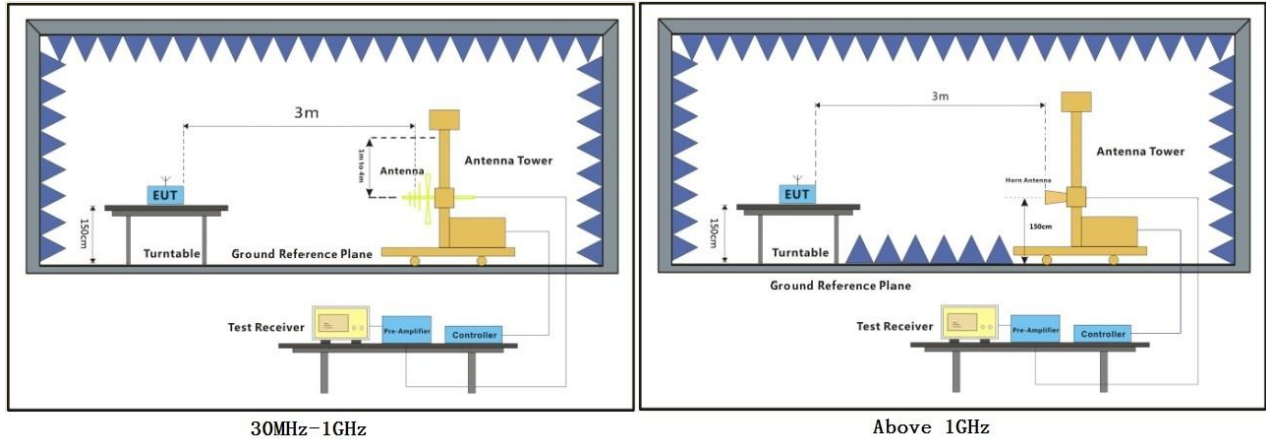
Operating Environment:

Temperature: 21.5 °C Humidity: 62.4 % RH Atmospheric Pressure: 1000 mbar

7.2.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|-----------------------|-----------|--|
| Final test | 00 | TX mode_Keep the EUT in transmitting with modulation mode. |

7.2.3 Test Setup Diagram



30MHz-1GHz

Above 1GHz



7.2.4 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 middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark:

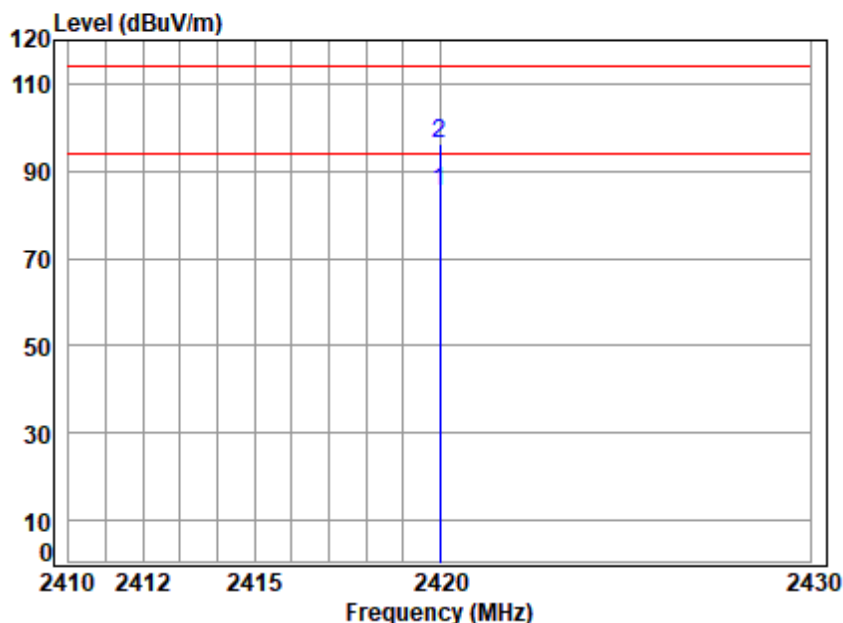
1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

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

2) 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. So, only the above measurement data were shown in the report



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



Site : chamber

Condition: 3m HORIZONTAL

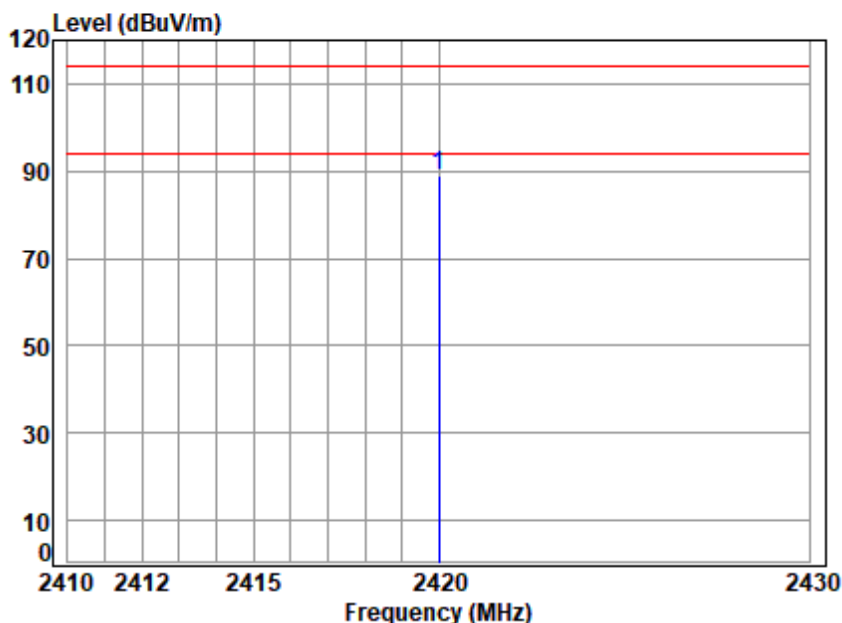
Job No : 04052AT\04053AT

Mode : 2420 Field strength

| | | Cable | Ant | Preamp | Read | Limit | Over | |
|--------------|------|--------|--------|--------|--------|--------|--------|---------|
| Freq | Loss | Factor | Factor | Level | Level | Line | Limit | Remark |
| MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB | |
| 1 q 2420.000 | 5.10 | 29.02 | 37.36 | 88.70 | 85.46 | 94.00 | -8.54 | Average |
| 2 q 2420.000 | 5.10 | 29.02 | 37.36 | 99.64 | 96.40 | 114.00 | -17.60 | peak |



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



Site : chamber

Condition: 3m VERTICAL

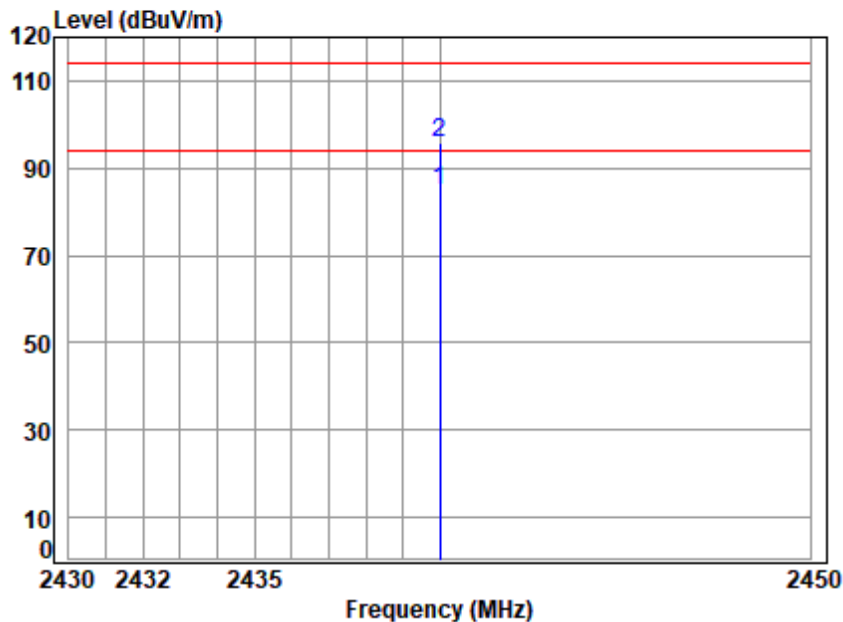
Job No : 04052AT\04053AT

Mode : 2420 Field strength

| | Cable | Ant | Preamp | Read | Limit | Over | |
|--------------|-------|--------|--------|-------|--------|--------|--------------|
| Freq | Loss | Factor | Factor | Level | Level | Line | Limit Remark |
| MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB |
| 1 q 2420.000 | 5.10 | 29.02 | 37.36 | 92.22 | 88.98 | 114.00 | -25.02 peak |



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



Site : chamber

Condition: 3m HORIZONTAL

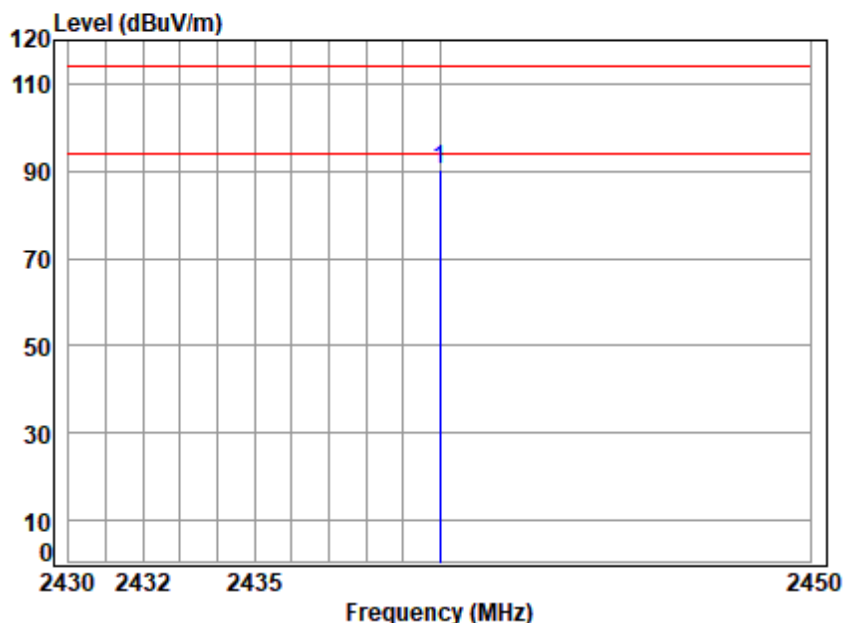
Job No : 04052AT\04053AT

Mode : 2440 Field strength

| | | Cable | Ant | Preamp | Read | Limit | Over | |
|--------------|------|--------|--------|--------|--------|--------|--------|---------|
| Freq | Loss | Factor | Factor | Level | Level | Line | Limit | Remark |
| MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB | |
| 1 q 2440.000 | 5.12 | 28.94 | 37.32 | 88.22 | 84.96 | 94.00 | -9.04 | Average |
| 2 q 2440.000 | 5.12 | 28.94 | 37.32 | 99.16 | 95.90 | 114.00 | -18.10 | peak |



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



Site : chamber

Condition: 3m VERTICAL

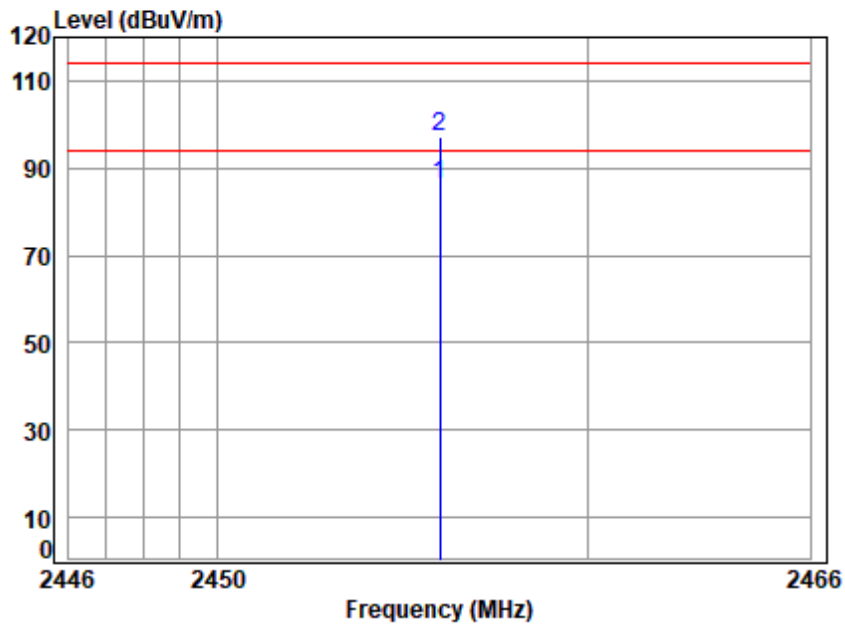
Job No : 04052AT\04053AT

Mode : 2440 Field strength

| | Cable | Ant | Preamp | Read | | Limit | Over | |
|--------------|-------|--------|--------|-------|--------|--------|--------|--------|
| Freq | Loss | Factor | Factor | Level | Level | Line | Limit | Remark |
| MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB | |
| 1 q 2440.000 | 5.12 | 28.94 | 37.32 | 93.53 | 90.27 | 114.00 | -23.73 | peak |



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



Site : chamber

Condition: 3m HORIZONTAL

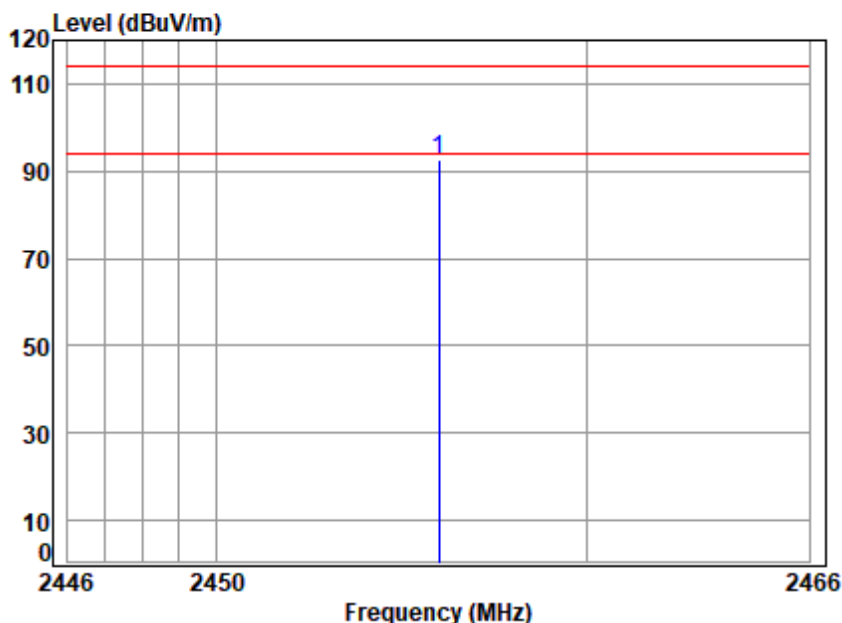
Job No : 04052AT\04053AT

Mode : 2456 Field strength

| | | Cable | Ant | Preamp | Read | Limit | Over | |
|--------------|------|--------|--------|--------|--------|--------|--------|---------|
| Freq | Loss | Factor | Factor | Level | Level | Line | Limit | Remark |
| MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB | |
| 1 q 2456.000 | 5.14 | 28.90 | 37.28 | 89.26 | 86.02 | 94.00 | -7.98 | Average |
| 2 q 2456.000 | 5.14 | 28.90 | 37.28 | 100.20 | 96.96 | 114.00 | -17.04 | peak |



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



Site : chamber

Condition: 3m VERTICAL

Job No : 04052AT\04053AT

Mode : 2456 Field strength

| | Cable | Ant | Preamp | Read | Limit | Over | |
|--------------|-------|--------|--------|-------|--------|--------|--------------|
| Freq | Loss | Factor | Factor | Level | Level | Line | Limit Remark |
| MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB |
| 1 q 2456.000 | 5.14 | 28.90 | 37.28 | 95.72 | 92.48 | 114.00 | -21.52 peak |



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SZEMC-TRF-01 Rev. A/1

Report No.: SZCR231200405202

Page: 25 of 44

7.3 Restricted Band Around Fundamental Frequency

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209

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

Measurement Distance: 3m

Limit:

| Frequency | Limit (dBuV/m @3m) | Remark |
|---------------|--------------------|------------------|
| 30MHz-88MHz | 40.0 | Quasi-peak Value |
| 88MHz-216MHz | 43.5 | Quasi-peak Value |
| 216MHz-960MHz | 46.0 | Quasi-peak Value |
| 960MHz-1GHz | 54.0 | Quasi-peak Value |
| Above 1GHz | 54.0 | Average Value |
| Above 1GHz | 74.0 | Peak Value |

Emission radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 21.5 °C

Humidity: 62.7 % RH

Atmospheric Pressure: 1000 mbar

7.3.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|-----------------------|-----------|--|
| Final test | 00 | TX mode_Keep the EUT in transmitting with modulation mode. |



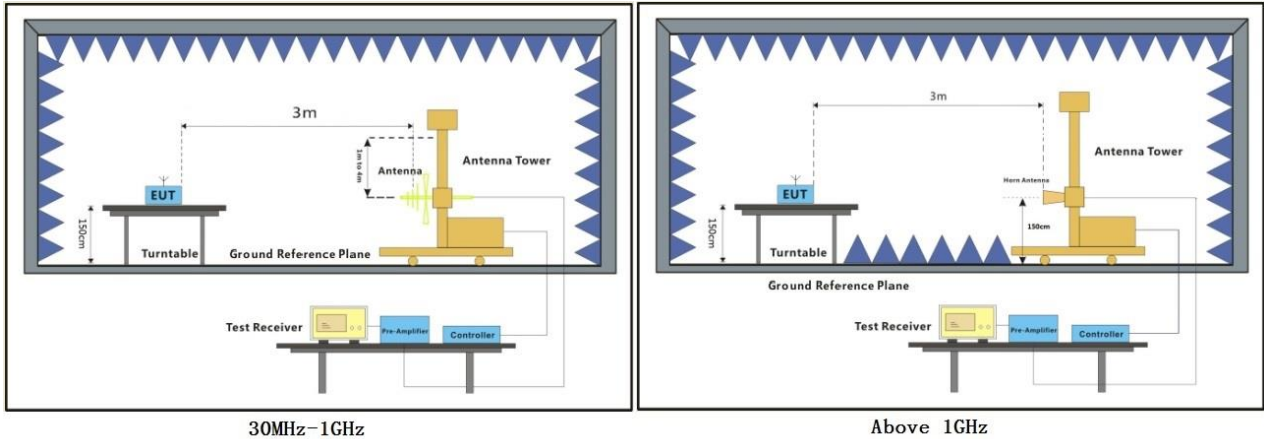
SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch Testing & Calibration Laboratory

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7.3.3 Test Setup Diagram



30MHz-1GHz

Above 1GHz



7.3.4 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 middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark:

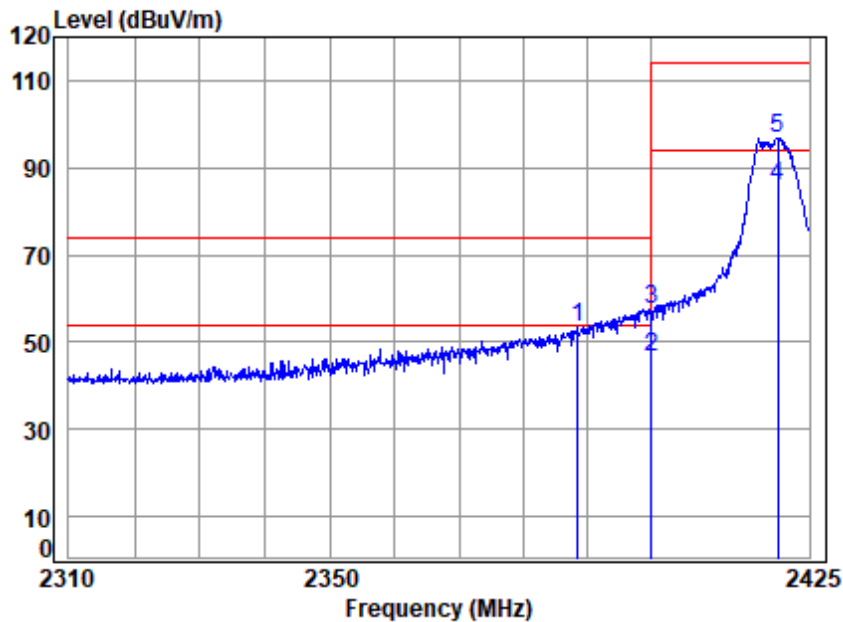
1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

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

2) 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. So, only the above measurement data were shown in the report



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

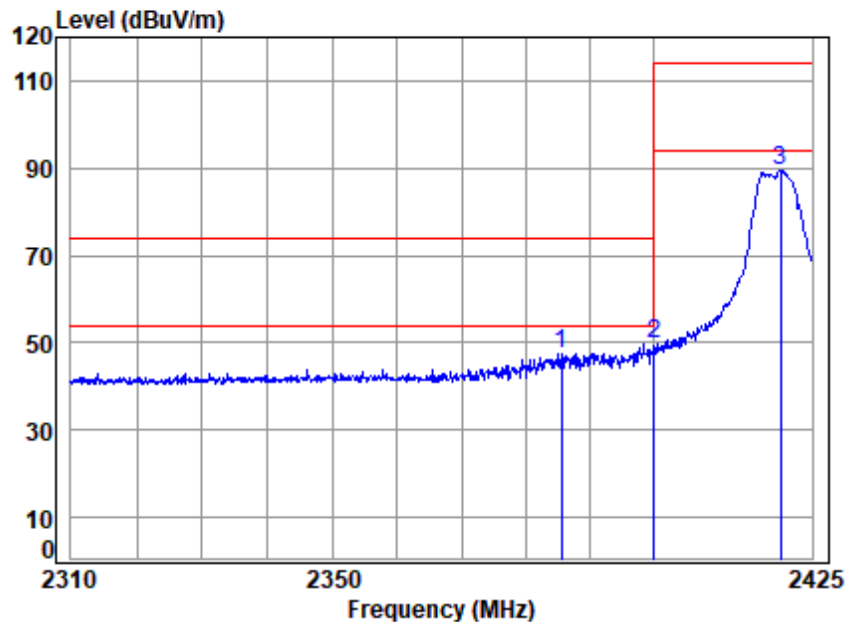


Site : chamber
Condition: 3m HORIZONTAL
Job No : 04052AT\04053AT
Mode : 2420 Band edge

| | | Cable | Ant | Preamp | Read | Limit | Over | |
|------|------------|-------|--------|--------|-------|--------|--------|---------------|
| Freq | | Loss | Factor | Factor | Level | Level | Line | Limit Remark |
| MHz | | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB |
| 1 | 2388.403 | 5.07 | 29.10 | 37.44 | 56.80 | 53.53 | 74.00 | -20.47 Peak |
| 2 | q 2400.000 | 5.08 | 29.10 | 37.41 | 49.75 | 46.52 | 54.00 | -7.48 Average |
| 3 | q 2400.000 | 5.08 | 29.10 | 37.41 | 60.69 | 57.46 | 74.00 | -16.54 peak |
| 4 | 2420.002 | 5.10 | 29.02 | 37.36 | 88.91 | 85.67 | 94.00 | -8.33 Average |
| 5 | 2420.002 | 5.10 | 29.02 | 37.36 | 99.85 | 96.61 | 114.00 | -17.39 peak |



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



Site : chamber

Condition: 3m VERTICAL

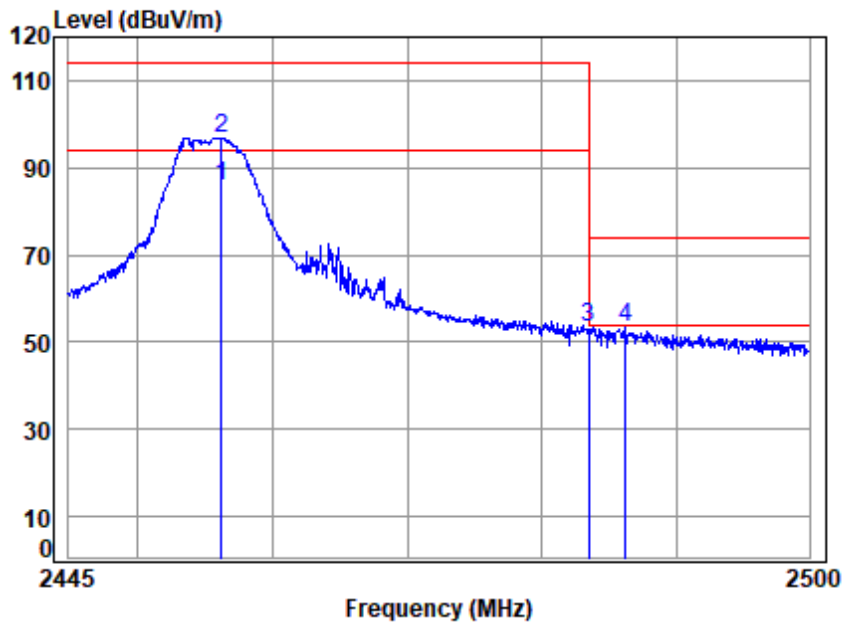
Job No : 04052AT\04053AT

Mode : 2420 Band edge

| | | Cable | Ant | Preamp | Read | Limit | Over | |
|-----|----------|-------|--------|--------|-------|--------|--------|-------------|
| | Freq | Loss | Factor | Factor | Level | Line | Limit | Remark |
| | MHz | dB | dB/m | dB | dBuV | dBuV/m | dB | |
| 1 | 2385.503 | 5.07 | 29.10 | 37.45 | 50.85 | 47.57 | 74.00 | -26.43 Peak |
| 2 q | 2400.000 | 5.08 | 29.10 | 37.42 | 52.87 | 49.63 | 74.00 | -24.37 peak |
| 3 | 2420.057 | 5.10 | 29.02 | 37.36 | 92.57 | 89.33 | 114.00 | -24.67 peak |



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



Site : chamber

Condition: 3m HORIZONTAL

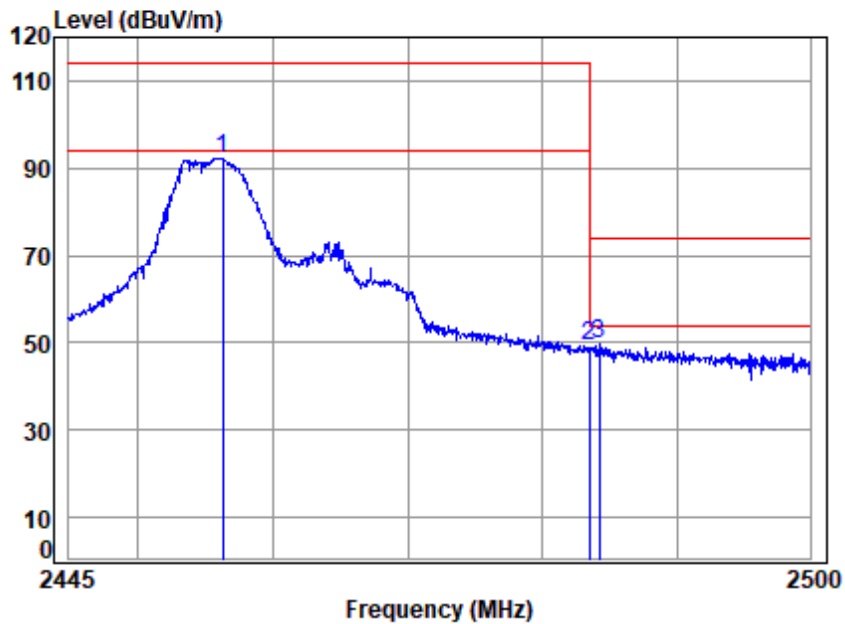
Job No : 04052AT\04053AT

Mode : 2456 Band edge

| | | Cable | Ant | Preamp | Read | Limit | Over | |
|------|----------|-------|--------|--------|--------|--------|--------|---------------|
| Freq | | Loss | Factor | Factor | Level | Level | Line | Limit Remark |
| MHz | | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB |
| 1 q | 2456.285 | 5.14 | 28.90 | 37.28 | 89.20 | 85.96 | 94.00 | -8.04 Average |
| 2 q | 2456.285 | 5.14 | 28.90 | 37.28 | 100.14 | 96.90 | 114.00 | -17.10 peak |
| 3 | 2483.500 | 5.16 | 28.90 | 37.22 | 56.61 | 53.45 | 74.00 | -20.55 peak |
| 4 | 2486.246 | 5.16 | 28.90 | 37.21 | 56.40 | 53.25 | 74.00 | -20.75 Peak |



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



Site : chamber

Condition: 3m VERTICAL

Job No : 04052AT\04053AT

Mode : 2456 Band edge

| | | Cable | Ant | Preamp | Read | Limit | Over | |
|-----|----------|-------|--------|--------|-------|--------|--------|--------------|
| | Freq | Loss | Factor | Factor | Level | Level | Line | Limit Remark |
| | MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB |
| 1 q | 2456.339 | 5.14 | 28.90 | 37.28 | 95.31 | 92.07 | 114.00 | -21.93 peak |
| 2 | 2483.500 | 5.16 | 28.90 | 37.22 | 52.63 | 49.47 | 74.00 | -24.53 peak |
| 3 | 2484.255 | 5.16 | 28.90 | 37.21 | 52.89 | 49.74 | 74.00 | -24.26 Peak |



7.4 Radiated Emissions Below 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)

Test Method: ANSI C63.10 (2013) Section 6.4&6.5

Measurement Distance: 3m

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 |
| 960-1000 | 500 | 3 |

7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 23.2 °C

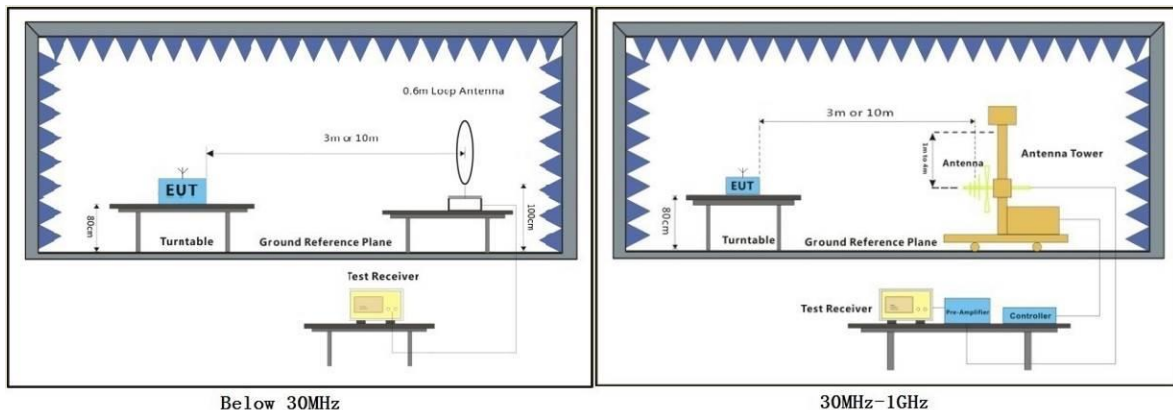
Humidity: 45.8 % RH

Atmospheric Pressure: 1000 mbar

7.4.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|-----------------------|-----------|--|
| Final test | 00 | TX mode_Keep the EUT in transmitting with modulation mode. |

7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

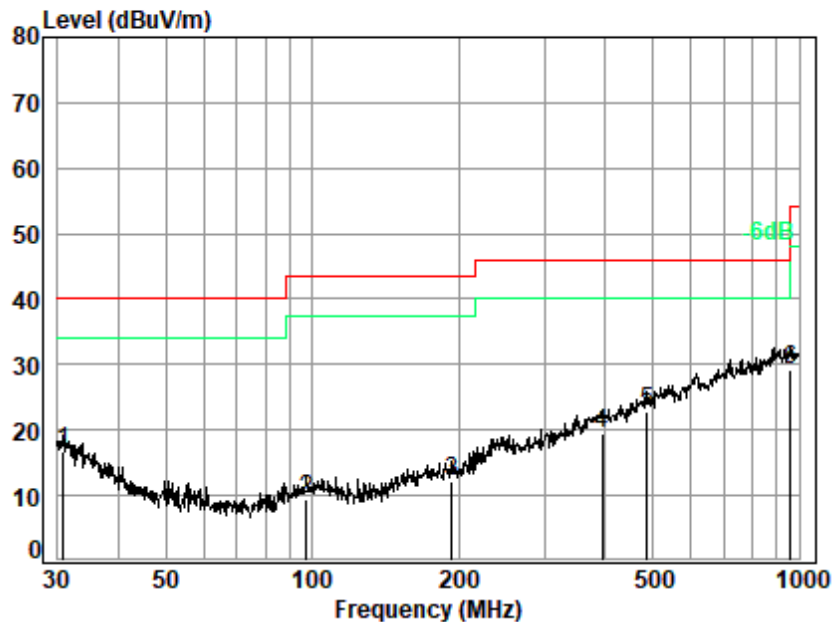
- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, 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 quasi-peak 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.



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



Site : chamber

Condition: 3m HORIZONTAL

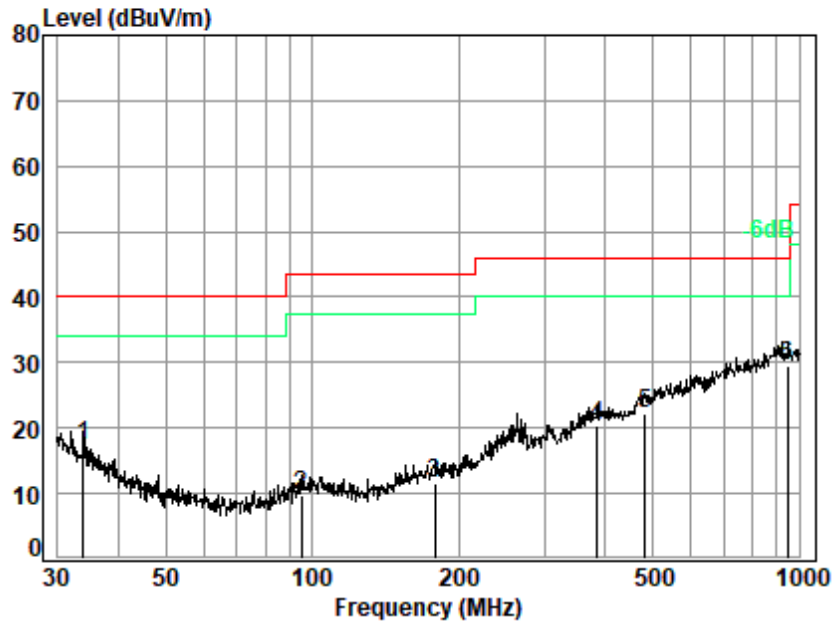
Job No. : 04052AT/04053AT

Test Mode: 00

| | Ant | Cable | Preamp | Read | | Limit | Over | |
|-----|---------|--------|--------|--------|-------|--------|--------|--------------|
| | Freq | Factor | Loss | Factor | Level | Level | Line | Limit Remark |
| | MHz | dB/m | dB | dB | dBuV | dBuV/m | dBuV/m | dB |
| 1 | 30.853 | 20.80 | 0.65 | 27.80 | 22.95 | 16.60 | 40.00 | -23.40 QP |
| 2 | 97.456 | 12.19 | 1.17 | 27.62 | 23.75 | 9.49 | 43.50 | -34.01 QP |
| 3 | 193.773 | 14.18 | 1.70 | 27.27 | 23.64 | 12.25 | 43.50 | -31.25 QP |
| 4 | 394.855 | 20.70 | 2.53 | 27.31 | 23.53 | 19.45 | 46.00 | -26.55 QP |
| 5 | 487.315 | 22.87 | 2.85 | 27.73 | 24.97 | 22.96 | 46.00 | -23.04 QP |
| 6 q | 958.794 | 28.11 | 4.24 | 26.85 | 23.78 | 29.28 | 46.00 | -16.72 QP |



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



Site : chamber

Condition: 3m VERTICAL

Job No. : 04052AT/04053AT

Test Mode: 00

| | Ant | Cable | Preamp | Read | | Limit | Over | |
|------|---------|-------|--------|-------|--------|--------|-------|-----------|
| Freq | Factor | Loss | Factor | Level | Level | Line | Limit | Remark |
| MHz | dB/m | dB | dB | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 33.917 | 19.46 | 0.68 | 27.79 | 25.04 | 17.39 | 40.00 | -22.61 QP |
| 2 | 95.093 | 12.11 | 1.16 | 27.62 | 23.98 | 9.63 | 43.50 | -33.87 QP |
| 3 | 178.758 | 14.04 | 1.62 | 27.33 | 23.38 | 11.71 | 43.50 | -31.79 QP |
| 4 | 385.281 | 20.89 | 2.49 | 27.27 | 24.20 | 20.31 | 46.00 | -25.69 QP |
| 5 | 482.216 | 22.84 | 2.83 | 27.70 | 24.15 | 22.12 | 46.00 | -23.88 QP |
| 6 q | 948.761 | 28.23 | 4.22 | 26.90 | 23.99 | 29.54 | 46.00 | -16.46 QP |



7.5 Radiated Emissions Above 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)

Test Method: ANSI C63.10 (2013) Section 6.6

Measurement Distance: 3m

Limit:

| Frequency(MHz) | Field strength(microvolts/meter) | Measurement distance(meters) |
|----------------|----------------------------------|------------------------------|
| Above 1000 | 500 | 3 |

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 21.5 °C

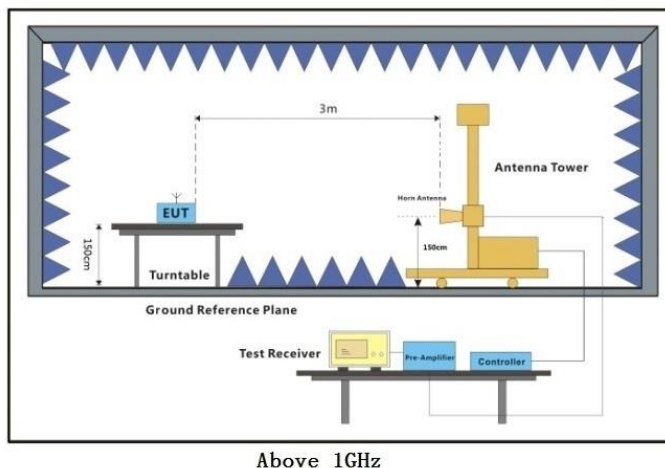
Humidity: 62.5 % RH

Atmospheric Pressure: 1000 mbar

7.5.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|-----------------------|-----------|--|
| Final test | 00 | TX mode_Keep the EUT in transmitting with modulation mode. |

7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

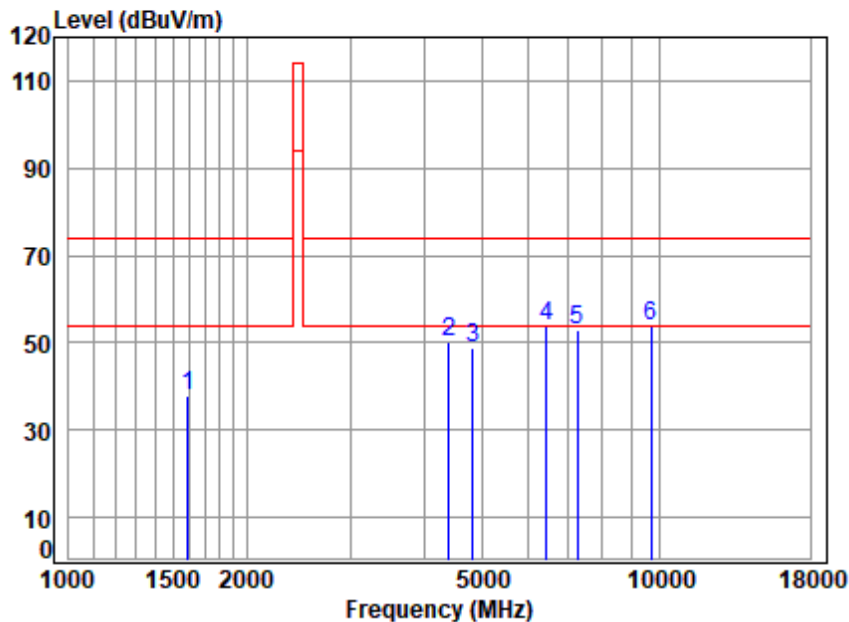
- a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which 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 (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 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. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
2. Scan from 18GHz to 40GHz, 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. As shown in this section, 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.



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

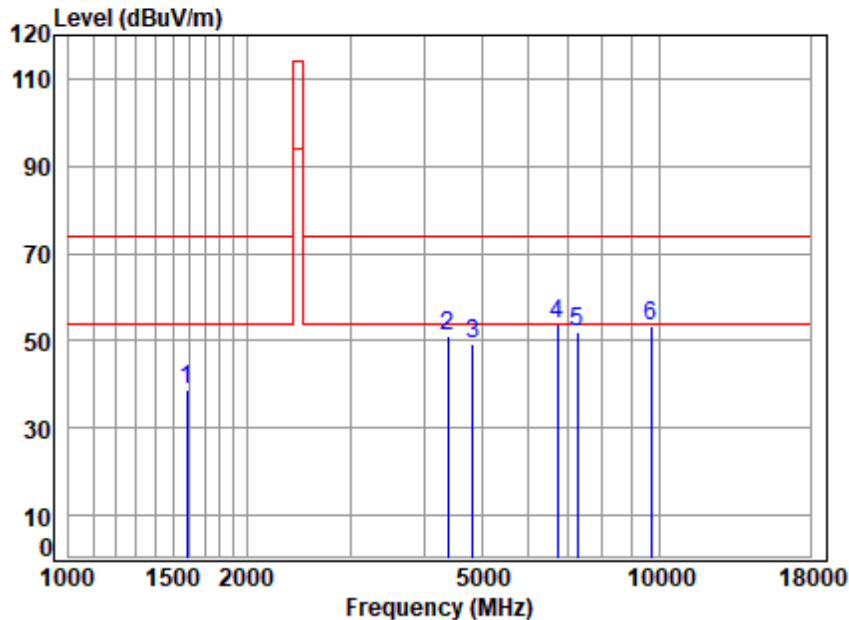


Site : chamber
Condition: 3m HORIZONTAL
Job No : 04052AT\04053AT
Mode : 2420 TX RSE

| | | Cable | Ant | Preamp | Read | | Limit | Over | |
|-----|----------|-------|--------|--------|-------|--------|--------|--------|--------|
| | Freq | Loss | Factor | Factor | Level | Level | Line | Limit | Remark |
| | MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 1592.571 | 4.19 | 26.83 | 38.40 | 45.48 | 38.10 | 74.00 | -35.90 | peak |
| 2 | 4405.090 | 7.06 | 34.74 | 35.79 | 44.23 | 50.24 | 74.00 | -23.76 | peak |
| 3 | 4840.000 | 7.34 | 34.46 | 35.49 | 42.72 | 49.03 | 74.00 | -24.97 | peak |
| 4 q | 6432.732 | 8.51 | 35.40 | 35.20 | 45.21 | 53.92 | 74.00 | -20.08 | peak |
| 5 | 7260.000 | 9.24 | 35.70 | 35.84 | 43.70 | 52.80 | 74.00 | -21.20 | peak |
| 6 | 9680.000 | 12.41 | 37.50 | 37.44 | 41.34 | 53.81 | 74.00 | -20.19 | peak |



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



Site : chamber

Condition: 3m VERTICAL

Job No : 04052AT\04053AT

Mode : 2420 TX RSE

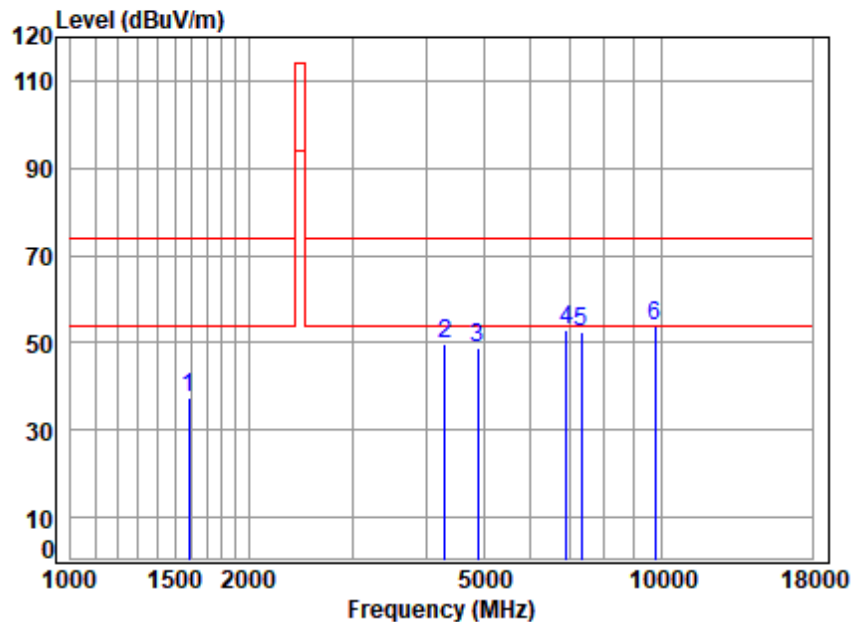
| | | Cable | Ant | Preamp | Read | | Limit | Over | |
|-----|----------|-------|--------|--------|-------|--------|--------|--------|--------|
| | Freq | Loss | Factor | Factor | Level | Level | Line | Limit | Remark |
| | MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 1587.975 | 4.18 | 26.85 | 38.40 | 46.12 | 38.75 | 74.00 | -35.25 | peak |
| 2 | 4392.376 | 7.05 | 34.74 | 35.80 | 45.02 | 51.01 | 74.00 | -22.99 | peak |
| 3 | 4840.000 | 7.34 | 34.46 | 35.49 | 42.84 | 49.15 | 74.00 | -24.85 | peak |
| 4 q | 6717.762 | 8.72 | 35.20 | 35.39 | 45.20 | 53.73 | 74.00 | -20.27 | peak |
| 5 | 7260.000 | 9.24 | 35.70 | 35.84 | 43.05 | 52.15 | 74.00 | -21.85 | peak |
| 6 | 9680.000 | 12.41 | 37.50 | 37.44 | 40.71 | 53.18 | 74.00 | -20.82 | peak |



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Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

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

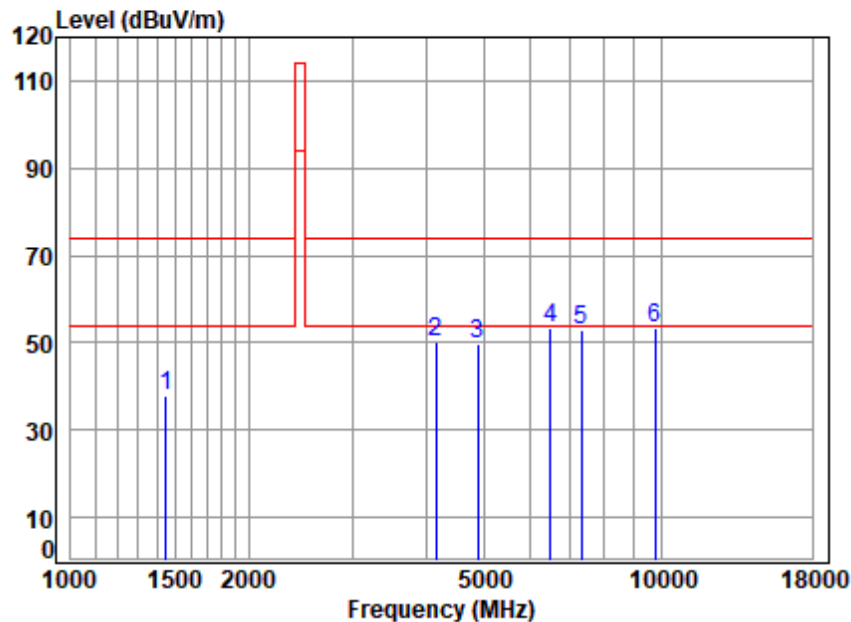


Site : chamber
Condition: 3m HORIZONTAL
Job No : 04052AT\04053AT
Mode : 2440 TX RSE

| | | Cable | Ant | Preamp | Read | | Limit | Over | |
|-----|----------|-------|--------|--------|-------|--------|--------|--------|--------|
| | Freq | Loss | Factor | Factor | Level | Level | Line | Limit | Remark |
| | MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 1587.975 | 4.18 | 26.85 | 38.40 | 44.82 | 37.45 | 74.00 | -36.55 | peak |
| 2 | 4304.400 | 6.99 | 34.04 | 35.87 | 44.47 | 49.63 | 74.00 | -24.37 | peak |
| 3 | 4880.000 | 7.36 | 34.62 | 35.47 | 42.24 | 48.75 | 74.00 | -25.25 | peak |
| 4 | 6914.763 | 8.86 | 35.66 | 35.52 | 43.98 | 52.98 | 74.00 | -21.02 | peak |
| 5 | 7320.000 | 9.32 | 35.70 | 35.90 | 43.51 | 52.63 | 74.00 | -21.37 | peak |
| 6 q | 9760.000 | 12.47 | 37.38 | 37.43 | 41.39 | 53.81 | 74.00 | -20.19 | peak |



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



Site : chamber

Condition: 3m VERTICAL

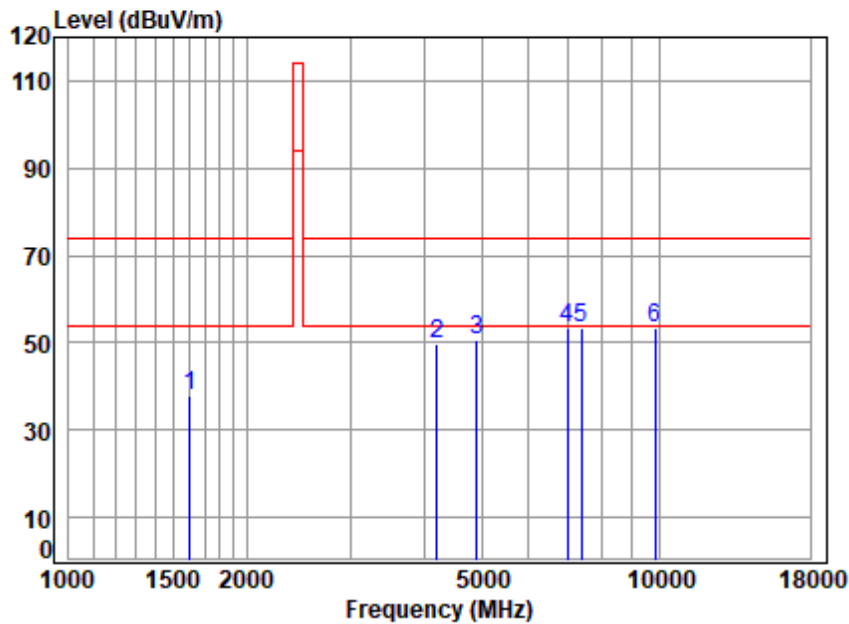
Job No : 04052AT\04053AT

Mode : 2440 TX RSE

| | | Cable | Ant | Preamp | Read | | Limit | Over | |
|-----|----------|-------|--------|--------|-------|--------|--------|--------|--------|
| | Freq | Loss | Factor | Factor | Level | Level | Line | Limit | Remark |
| | MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 1451.878 | 3.99 | 25.45 | 38.38 | 46.76 | 37.82 | 74.00 | -36.18 | peak |
| 2 | 4157.664 | 6.89 | 33.80 | 35.98 | 45.28 | 49.99 | 74.00 | -24.01 | peak |
| 3 | 4880.000 | 7.36 | 34.62 | 35.47 | 43.30 | 49.81 | 74.00 | -24.19 | peak |
| 4 | 6488.754 | 8.55 | 35.58 | 35.24 | 44.37 | 53.26 | 74.00 | -20.74 | peak |
| 5 | 7320.000 | 9.32 | 35.70 | 35.90 | 43.95 | 53.07 | 74.00 | -20.93 | peak |
| 6 q | 9760.000 | 12.47 | 37.38 | 37.43 | 41.06 | 53.48 | 74.00 | -20.52 | peak |



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



Site : chamber

Condition: 3m HORIZONTAL

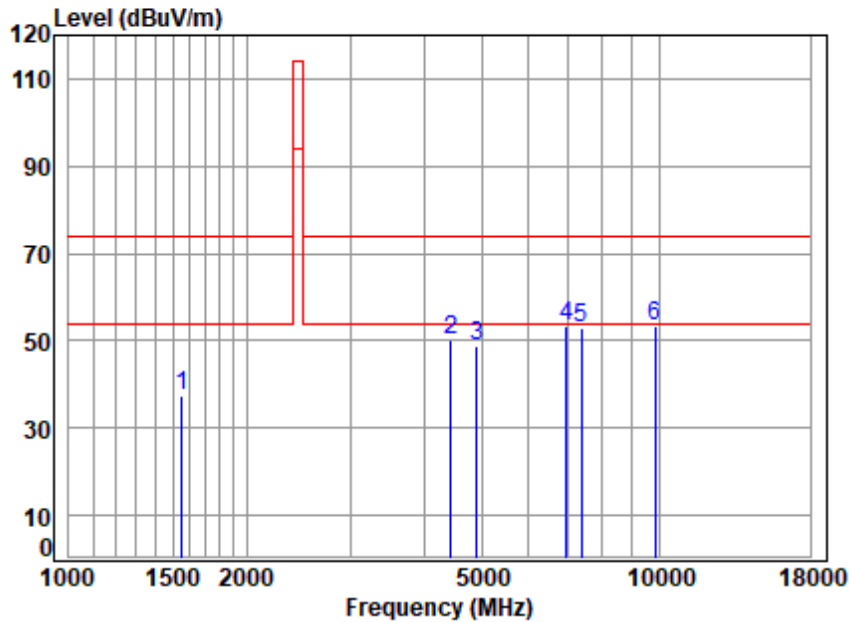
Job No : 04052AT\04053AT

Mode : 2456 TX RSE

| | | Cable | Ant | Preamp | Read | | Limit | Over | |
|-----|----------|-------|--------|--------|-------|--------|--------|--------|--------|
| | Freq | Loss | Factor | Factor | Level | Level | Line | Limit | Remark |
| | MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 1601.804 | 4.20 | 26.78 | 38.40 | 45.51 | 38.09 | 74.00 | -35.91 | peak |
| 2 | 4206.011 | 6.93 | 33.80 | 35.94 | 45.15 | 49.94 | 74.00 | -24.06 | peak |
| 3 | 4912.000 | 7.38 | 34.68 | 35.45 | 44.21 | 50.82 | 74.00 | -23.18 | peak |
| 4 | 6974.982 | 8.90 | 35.75 | 35.55 | 44.07 | 53.17 | 74.00 | -20.83 | peak |
| 5 | 7368.000 | 9.37 | 35.74 | 35.95 | 44.16 | 53.32 | 74.00 | -20.68 | peak |
| 6 q | 9824.000 | 12.51 | 37.25 | 37.41 | 41.03 | 53.38 | 74.00 | -20.62 | peak |



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



Site : chamber

Condition: 3m VERTICAL

Job No : 04052AT\04053AT

Mode : 2456 TX RSE

| | | Cable | Ant | Preamp | Read | | Limit | Over | |
|-----|----------|-------|--------|--------|-------|--------|--------|--------|--------|
| | Freq | Loss | Factor | Factor | Level | Level | Line | Limit | Remark |
| | MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 1556.169 | 4.14 | 26.98 | 38.40 | 44.88 | 37.60 | 74.00 | -36.40 | peak |
| 2 | 4430.628 | 7.08 | 34.43 | 35.77 | 44.33 | 50.07 | 74.00 | -23.93 | peak |
| 3 | 4912.000 | 7.38 | 34.68 | 35.45 | 42.08 | 48.69 | 74.00 | -25.31 | peak |
| 4 q | 6954.852 | 8.89 | 35.79 | 35.54 | 44.42 | 53.56 | 74.00 | -20.44 | peak |
| 5 | 7368.000 | 9.37 | 35.74 | 35.95 | 43.82 | 52.98 | 74.00 | -21.02 | peak |
| 6 | 9824.000 | 12.51 | 37.25 | 37.41 | 41.12 | 53.47 | 74.00 | -20.53 | peak |



8 Test Setup Photo

Refer to Appendix - Test Setup Photo for SZCR2312004052AT

9 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for SZCR2312004052AT

- End of the Report -

