# FCC Test Report

Report No.: AGC07814210504FE03

| | | |
|---|---|---|
| **FCC ID** | : | 2AZCSSL-303A |
| **APPLICATION PURPOSE** | : | Original Equipment |
| **PRODUCT DESIGNATION** | : | Remote control car |
| **BRAND NAME** | : | N/A |
| **MODEL NAME** | : | Please see page 4 |
| **APPLICANT** | : | GUANGDONG HAOYUAN STEM TOYS CO., LTD. |
| **DATE OF ISSUE** | : | Jun. 10, 2021 |
| **STANDARD(S)<br>TEST PROCEDURE(S)** | : | FCC Part 15 Rules |
| **REPORT VERSION** | : | V1.1 |

Attestation of Global Compliance (Shenzhen) Co., Ltd

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## REPORT REVISE RECORD

| Report Version | Revise Time | Issued Date | Valid Version | Notes |
|---|---|---|---|---|
| V1.0 | / | Jun. 03, 2021 | Invalid | Initial Release |
| V1.1 | / | Jun. 10, 2021 | Valid | Revise Report |

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## 1. VERIFICATION OF CONFORMITY

| | |
|---|---|
| **Applicant** | GUANGDONG HAOYUAN STEM TOYS CO., LTD. |
| **Address** | MIDDLE SECTION OF FU'AN ROAD, CHENGHAI DISTRICT, SHANTOU CITY, GUANGDONG, CHINA |
| **Manufacturer** | GUANGDONG HAOYUAN STEM TOYS CO., LTD. |
| **Address** | MIDDLE SECTION OF FU'AN ROAD,CHENGHAI DISTRICT, SHANTOU CITY, GUANGDONG, CHINA |
| **Factory** | GUANGDONG HAOYUAN STEM TOYS CO., LTD. |
| **Address** | MIDDLE SECTION OF FU'AN ROAD,CHENGHAI DISTRICT, SHANTOU CITY, GUANGDONG, CHINA |
| **Product Designation** | Remote control car |
| **Brand Name** | N/A |
| **Test Model** | SL-303A |
| **Series Model** | See page 6 |
| **Difference Description** | All the series models are the same as the test model except for the model names and the color of appearance. |
| **Date of test** | May 21, 2021 to Jun. 03, 2021 |
| **Deviation** | No any deviation from the test method |
| **Condition of Test Sample** | Normal |
| **Test Result** | Pass |
| **Report Template** | AGCRT-US-BR/RF |

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rules Part 15.249.

| | | |
|---|---|---|
| Prepared By | Eddy Liu<br>(Project Engineer) | Jun. 03, 2021 |
| Reviewed By | Max Zhang<br>(Reviewer) | Jun. 10, 2021 |
| Approved By | Forrest Lei<br>(Authorized Officer) | Jun. 10, 2021 |

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# 2. GENERAL INFORMATION

## 2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

| | |
|---|---|
| **Operation Frequency** | 2410MHz-2473MHz |
| **Maximum field strength** | 80.45dBuV/m(Average)@3m |
| **Modulation** | GFSK |
| **Number of channels** | 32 |
| **Antenna Gain** | 0dBi |
| **Antenna Designation** | Internal Antenna |
| **Hardware Version** | 20190818 |
| **Software Version** | N/A |
| **Power Supply** | Remote control: DC 3V by battery<br>Receiver: DC 6V by battery |

| | |
|---|---|
| **Series Model** | SL-230A, SL-231A, SL-232A, SL-275A, SL-276A, SL-277A, SL-278A, SL-279A, SL-280A, SL-297A, SL-298A, SL-299A, SL-300A, SL-301A, SL-302A, SL-304A, SL-313A, SL-314A, SL-315A, SL-320A, SL-321A, SL-322A, SL-253A, SL-254A, SL-255A, SL-256A, SL-257A, SL-258A, SL-259A, SL-260A, SL-261A, SL-262A, SL-263A, SL-264A, SL-265A, SL-266A, SL-267A, SL-268A, SL-210A, SL-211A, SL-229A, SL-233A, SL-274A, SL-332A, SL-333A, SL-334A, SL-335A, SL-336A, SL-337A, SL-338A, SL-339A, SL-340A, SL-341A, SL-342A, SL-343A, SL-344A, SL-345A, SL-346A, SL-347A, SL-348A, SL-349A, SL-350A, SL-351A, SL-352A, SL-353A, SL-354A, SL-355A, SL-356A, SL-357A, SL-358A, SL-359A, SL-360A, SL-361A, SL-362A, SL-363A, SL-364A, SL-365A, SL-366A, SL-367A, SL-368A, SL-369A, SL-370A, SL-371A, SL-372A, SL-373A, SL-374A, SL-375A, SL-376A, SL-377A, SL-378A, SL-379A, SL-380A, SL-381A, SL-382A, SL-383A, SL-384A, SL-385A, SL-386A |

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## 2.2. TABLE OF CARRIER FREQUENCY

| Frequency Band | Channel Number | Frequency(MHZ) | Channel Number | Frequency(MHZ) |
|---|---|---|---|---|
| 2400~2483.5MHZ | 1 | 2410 | 17 | 2441 |
| | 2 | 2414 | 18 | 2442 |
| | 3 | 2415 | 19 | 2444 |
| | 4 | 2416 | 20 | 2446 |
| | 5 | 2417 | 21 | 2450 |
| | 6 | 2418 | 22 | 2452 |
| | 7 | 2419 | 23 | 2454 |
| | 8 | 2421 | 24 | 2456 |
| | 9 | 2426 | 25 | 2458 |
| | 10 | 2428 | 26 | 2462 |
| | 11 | 2429 | 27 | 2464 |
| | 12 | 2430 | 28 | 2465 |
| | 13 | 2431 | 29 | 2466 |
| | 14 | 2433 | 30 | 2467 |
| | 15 | 2434 | 31 | 2469 |
| | 16 | 2439 | 32 | 2473 |

## 2.3. ANTENNA REQUIREMENT

This intentional radiator is designed with a permanently attached antenna of an antenna to ensure that no antenna other than that furnished by the responsible party shall be used with the device.
For more information of the antenna, please refer to the APPENDIX B: PHOTOGRAPHS OF EUT.

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## 3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by CISPR and ANSI.

- Uncertainty of Conducted Emission, Uc = ±3.1 dB
- Uncertainty of Radiated Emission below 1GHz, Uc = ±4.0 dB
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.8 dB

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## 4. DESCRIPTION OF TEST MODES

| NO. | TEST MODE DESCRIPTION |
|---|---|
| 1 | TX mode at 2410MHz |
| 2 | TX mode at 2442MHz |
| 3 | TX mode at 2473MHz |

Note:
1. All the test modes can be supply by battery, only the result of the worst case was recorded in the report, if no other cases.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
3. Set the EUT into the individual test modes by pressing the EUT buttons.
4. For battery operated equipment, the equipment tests are performed using a new battery.

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# 5. SYSTEM TEST CONFIGURATION

## 5.1. CONFIGURATION OF EUT SYSTEM

Configure:

EUT

## 5.2 EQUIPMENT USED IN TESTED SYSTEM

| Item | Equipment | Model No. | ID or Specification | Remark |
|---|---|---|---|---|
| 1 | Remote control car | SL-303A | 2AZCSSL-303A | EUT |

## 5.3. SUMMARY OF TEST RESULTS

| FCC RULES | DESCRIPTION OF TEST | RESULT |
|---|---|---|
| §15.249&15.209 | Radiated Emission | Compliant |
| §15.249 | Band Edges | Compliant |
| §15.215 | 20dB bandwidth | Compliant |
| §15.207 | Conducted Emission | Not applicable |

Note: The conducted emission tests at AC port are not required for devices which only employ battery power for operation.

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## 6. TEST FACILITY

| | |
|---|---|
| **Test Site** | Attestation of Global Compliance (Shenzhen) Co., Ltd |
| **Location** | 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China |
| **Designation Number** | CN1259 |
| **FCC Test Firm Registration Number** | 975832 |
| **A2LA Cert. No.** | 5054.02 |
| **Description** | Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA |

### TEST EQUIPMENT OF RADIATED EMISSION TEST

| Equipment | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| TEST RECEIVER | R&S | ESCI | 10096 | Apr. 14, 2021 | Apr. 13, 2022 |
| EXA Signal Analyzer | Aglient | N9010A | MY53470504 | Dec. 07, 2020 | Dec. 06, 2021 |
| 2.4GHz Fliter | EM Electronics | 2400-2500MHz | N/A | Mar. 23, 2020 | Mar. 22, 2022 |
| Attenuator | ZHINAN | E-002 | N/A | Sep. 03, 2020 | Sep. 02, 2022 |
| Horn antenna | SCHWARZBECK | BBHA 9170 | #768 | Sep.21, 2019 | Sep. 20, 2021 |
| Active loop antenna (9K-30MHz) | ZHINAN | ZN30900C | 18051 | May 22, 2020 | May 21, 2022 |
| Double-Ridged Waveguide Horn | ETS LINDGREN | 3117 | 00154520 | Oct. 26, 2019 | Oct. 25, 2021 |
| Broadband Preamplifier | ETS LINDGREN | 3117PA | 00225134 | Oct. 15, 2019 | Oct. 16, 2021 |
| ANTENNA | SCHWARZBECK | VULB9168 | 494 | Jan. 08, 2021 | Jan. 07, 2023 |
| Test software | Tonscend | JS32-RE (Ver.2.5) | N/A | N/A | N/A |

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# 7. RADIATED EMISSION

## 7.1TEST LIMIT

**Standard FCC15.249**

| Fundamental Frequency | Field Strength of Fundamental (millivolts/meter) | Field Strength of Harmonics (microvolts/meter) |
|---|---|---|
| 900-928MHz | 50 | 500 |
| 2400-2483.5MHz | 50 | 500 |
| 5725-5875MHz | 50 | 500 |
| 24.0-24.25GHz | 250 | 2500 |

**Standard FCC 15.209**

| Frequency (MHz) | Distance Meters | Field Strengths Limit | |
|---|---|---|---|
| | | μ V/m | dB(μV)/m |
| 0.009 ~ 0.490 | 300 | 2400/F(kHz) | --- |
| 0.490 ~ 1.705 | 30 | 24000/F(kHz) | --- |
| 1.705 ~ 30 | 30 | 30 | --- |
| 30 ~ 88 | 3 | 100 | 40.0 |
| 88 ~ 216 | 3 | 150 | 43.5 |
| 216 ~ 960 | 3 | 200 | 46.0 |
| 960 ~ 1000 | 3 | 500 | 54.0 |
| Above 1000 | 3 | Other:74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average) | |

Remark: (1) Emission level dB μ V = 20 log Emission level μ V/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

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## 7.2. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use minimum resolution bandwidth of 1 MHz. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

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The following table is the setting of spectrum analyzer and receiver.

| Spectrum Parameter | Setting |
|---|---|
| Start ~Stop Frequency | 9KHz~150KHz/RB 200Hz for QP |
| Start ~Stop Frequency | 150KHz~30MHz/RB 9KHz for QP |
| Start ~Stop Frequency | 30MHz~1000MHz/RB 120KHz for QP |
| Start ~Stop Frequency | 1GHz~26.5GHz<br>RBW 2.4MHz/ VBW 8MHz for Peak,<br>RBW 2.4MHz/3MHz for Average |

| Receiver Parameter | Setting |
|---|---|
| Start ~Stop Frequency | 9KHz~150KHz/RB 200Hz for QP |
| Start ~Stop Frequency | 150KHz~30MHz/RB 9KHz for QP |
| Start ~Stop Frequency | 30MHz~1000MHz/RB 120KHz for QP |

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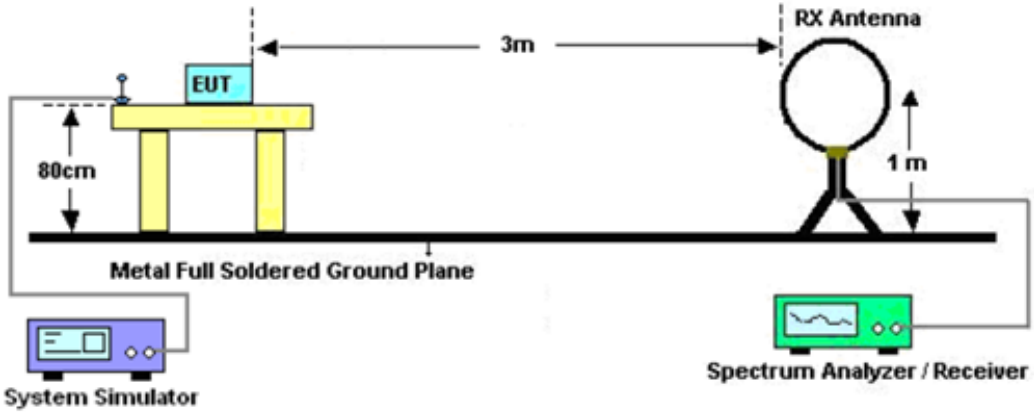
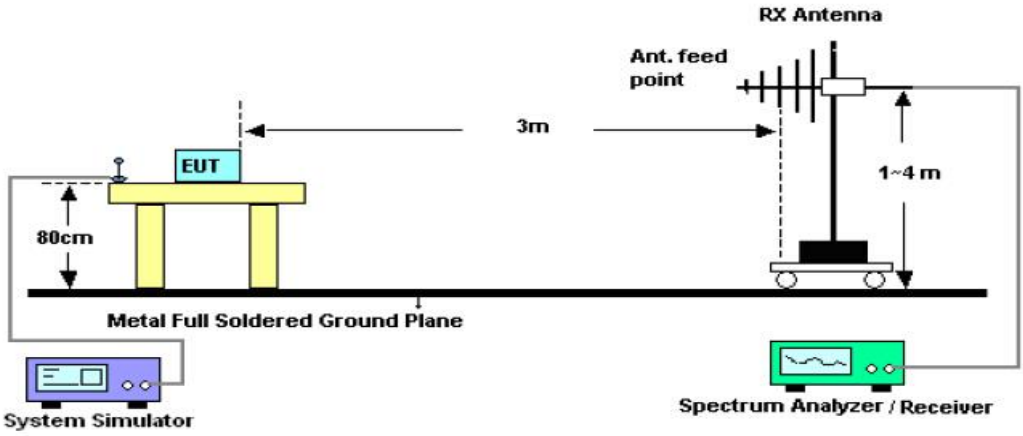
## 7.3. TEST SETUP

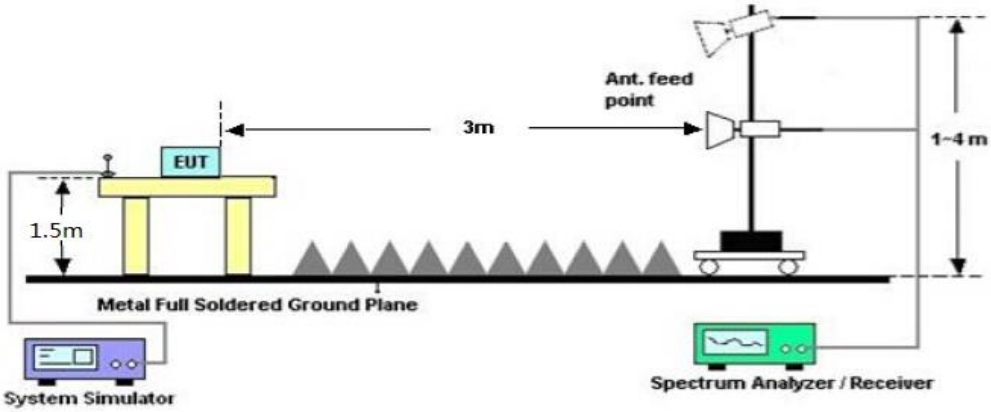
Radiated Emission Test-Setup Frequency Below 30MHz




RADIATED EMISSION TEST SETUP 30MHz-1000MHz




RADIATED EMISSION TEST SETUP ABOVE 1000MHz

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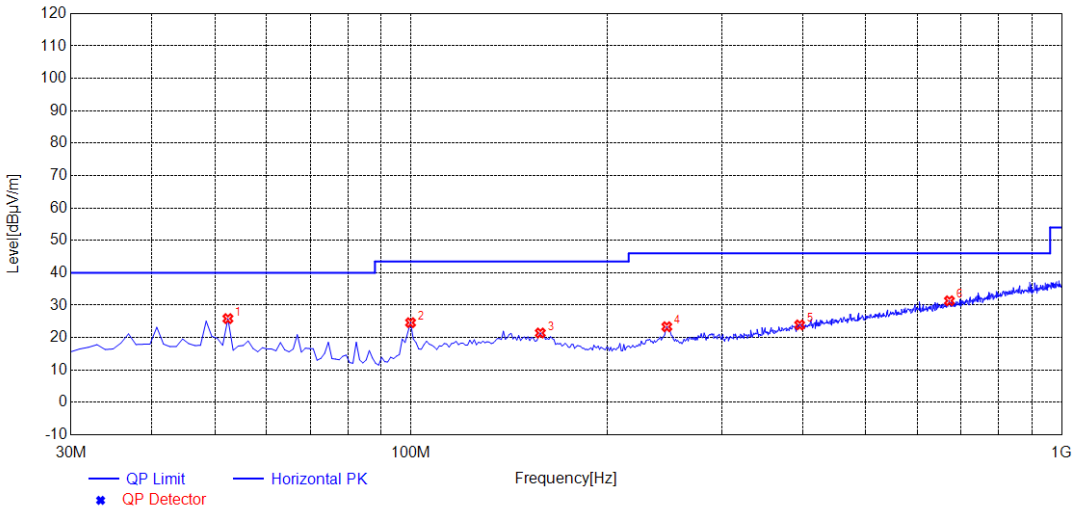
## 7.4. TEST RESULT

### RADIATED EMISSION BELOW 30MHZ

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

### RADIATED EMISSION 30MHz- 1GHZ

| | | | |
|---|---|---|---|
| EUT | Remote control car | Model Name | SL-303A |
| Temperature | 25℃ | Relative Humidity | 60% |
| Pressure | 101kPa | Test Voltage | DC 3V |
| Test Mode | Mode 1 | Polarization | Horizontal |




| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|---|---|---|---|---|---|---|---|---|
| 1 | 52.3100 | 25.87 | 11.49 | 40.00 | 14.13 | 100 | 254 | Horizontal |
| 2 | 99.8400 | 24.62 | 11.30 | 43.50 | 18.88 | 100 | 246 | Horizontal |
| 3 | 158.0400 | 21.43 | 14.93 | 43.50 | 22.07 | 100 | 194 | Horizontal |
| 4 | 247.2800 | 23.36 | 14.73 | 46.00 | 22.64 | 100 | 82 | Horizontal |
| 5 | 395.6900 | 23.92 | 19.60 | 46.00 | 22.08 | 100 | 20 | Horizontal |
| 6 | 672.1400 | 31.36 | 25.51 | 46.00 | 14.64 | 100 | 347 | Horizontal |

**RESULT: PASS**

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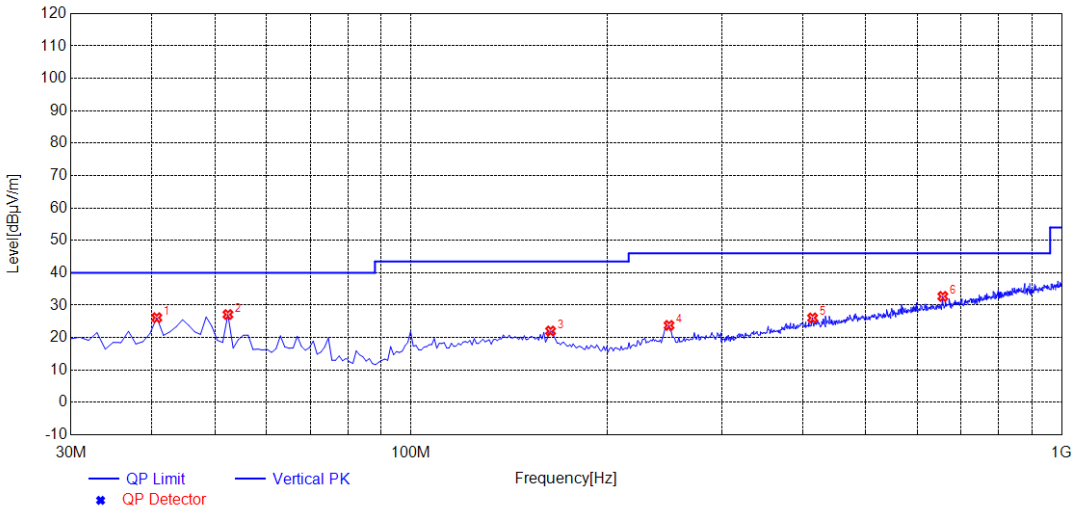
| | | | |
|---|---|---|---|
| EUT | Remote control car | Model Name | SL-303A |
| Temperature | 25℃ | Relative Humidity | 60% |
| Pressure | 101kPa | Test Voltage | DC 3V |
| Test Mode | Mode 1 | Polarization | Vertical |




| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|---|---|---|---|---|---|---|---|---|
| 1 | 40.6700 | 26.15 | 11.91 | 40.00 | 13.85 | 100 | 320 | Vertical |
| 2 | 52.3100 | 27.13 | 11.49 | 40.00 | 12.87 | 100 | 73 | Vertical |
| 3 | 163.8600 | 22.04 | 14.55 | 43.50 | 21.46 | 100 | 70 | Vertical |
| 4 | 249.2200 | 23.77 | 14.70 | 46.00 | 22.23 | 100 | 1 | Vertical |
| 5 | 414.1200 | 26.09 | 20.10 | 46.00 | 19.91 | 100 | 237 | Vertical |
| 6 | 656.6200 | 32.73 | 25.25 | 46.00 | 13.27 | 100 | 270 | Vertical |

**RESULT: PASS**

**Note:** Factor=Antenna Factor + Cable loss, Margin=Limit- Level.

The “Factor” value can be calculated automatically by software of measurement system.

All modes of each antenna are tested. The mode 1 is the worst case and recorded in the report.

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## FIELD STRENGTH OF FUNDAMENTAL

| | | | |
|---|---|---|---|
| EUT | Remote control car | Model Name | SL-303A |
| Temperature | 25℃ | Relative Humidity | 60% |
| Pressure | 101kPa | Test Voltage | DC 3V |
| Test Modulation | GFSK | Polarization | Horizontal |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 2410 | 43.71 | 49.05 | 92.76 | 114.00 | -21.24 | peak |
| 2410 | 31.40 | 49.05 | 80.45 | 94.00 | -13.55 | AVG |
| 2442 | 39.29 | 49.12 | 88.41 | 114.00 | -25.59 | peak |
| 2442 | 30.12 | 49.12 | 79.24 | 94.00 | -14.76 | AVG |
| 2473 | 43.19 | 49.25 | 92.44 | 114.00 | -21.56 | peak |
| 2473 | 30.12 | 49.25 | 79.37 | 94.00 | -14.63 | AVG |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

| | | | |
|---|---|---|---|
| EUT | Remote control car | Model Name | SL-303A |
| Temperature | 25℃ | Relative Humidity | 60% |
| Pressure | 101kPa | Test Voltage | DC 3V |
| Test Modulation | GFSK | Polarization | Vertical |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 2410 | 44.37 | 49.05 | 90.77 | 114.00 | -23.23 | peak |
| 2410 | 29.51 | 49.05 | 78.95 | 94.00 | -15.06 | AVG |
| 2442 | 45.31 | 49.12 | 89.58 | 114.00 | -24.42 | peak |
| 2442 | 30.11 | 49.12 | 70.37 | 94.00 | -23.63 | AVG |
| 2473 | 40.78 | 49.25 | 90.42 | 114.00 | -23.58 | peak |
| 2473 | 30.48 | 49.25 | 79.00 | 94.00 | -15.00 | AVG |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

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## RADIATED EMISSION ABOVE 1GHZ

| | | | |
|---|---|---|---|
| EUT | Remote control car | Model Name | SL-303A |
| Temperature | 25℃ | Relative Humidity | 60% |
| Pressure | 101kPa | Test Voltage | DC 3V |
| Test Mode | Mode 1 | Polarization | Horizontal |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 4820 | 41.68 | 0.08 | 41.76 | 74.00 | -32.24 | peak |
| 4820 | 35.24 | 0.08 | 35.32 | 54.00 | -18.68 | AVG |
| 7230 | 35.91 | 2.21 | 38.12 | 74.00 | -35.88 | peak |
| 7230 | 30.95 | 2.21 | 33.16 | 54.00 | -20.84 | AVG |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

| | | | |
|---|---|---|---|
| EUT | Remote control car | Model Name | SL-303A |
| Temperature | 25℃ | Relative Humidity | 60% |
| Pressure | 101kPa | Test Voltage | DC 3V |
| Test Mode | Mode 1 | Polarization | Vertical |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 4820 | 40.59 | 0.08 | 40.67 | 74.00 | -33.33 | peak |
| 4820 | 36.45 | 0.08 | 36.53 | 54.00 | -17.47 | AVG |
| 7230 | 36.74 | 2.21 | 38.95 | 74.00 | -35.05 | peak |
| 7230 | 32.18 | 2.21 | 34.39 | 54.00 | -19.61 | AVG |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

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| | | | |
|---|---|---|---|
| EUT | Remote control car | Model Name | SL-303A |
| Temperature | 25℃ | Relative Humidity | 60% |
| Pressure | 101kPa | Test Voltage | DC 3V |
| Test Mode | Mode 2 | Polarization | Horizontal |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 4884 | 42.41 | 0.14 | 42.55 | 74.00 | -31.45 | peak |
| 4884 | 36.76 | 0.14 | 36.90 | 54.00 | -17.10 | AVG |
| 7326 | 35.85 | 2.36 | 38.21 | 74.00 | -35.79 | peak |
| 7326 | 31.48 | 2.36 | 33.84 | 54.00 | -20.16 | AVG |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

| | | | |
|---|---|---|---|
| EUT | Remote control car | Model Name | SL-303A |
| Temperature | 25℃ | Relative Humidity | 60% |
| Pressure | 101kPa | Test Voltage | DC 3V |
| Test Mode | Mode 2 | Polarization | Vertical |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 4884 | 41.28 | 0.14 | 41.42 | 74.00 | -32.58 | peak |
| 4884 | 36.90 | 0.14 | 37.04 | 54.00 | -16.96 | AVG |
| 7326 | 35.46 | 2.36 | 37.82 | 74.00 | -36.18 | peak |
| 7326 | 31.29 | 2.36 | 33.65 | 54.00 | -20.35 | AVG |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

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| | | | |
|---|---|---|---|
| EUT | Remote control car | Model Name | SL-303A |
| Temperature | 25℃ | Relative Humidity | 60% |
| Pressure | 101kPa | Test Voltage | DC 3V |
| Test Mode | Mode 3 | Polarization | Horizontal |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 4946 | 40.18 | 0.22 | 40.40 | 74.00 | -33.60 | peak |
| 4946 | 36.44 | 0.22 | 36.66 | 54.00 | -17.34 | AVG |
| 7419 | 37.97 | 2.64 | 40.61 | 74.00 | -33.39 | peak |
| 7419 | 33.65 | 2.64 | 36.29 | 54.00 | -17.71 | AVG |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

| | | | |
|---|---|---|---|
| EUT | Remote control car | Model Name | SL-303A |
| Temperature | 25℃ | Relative Humidity | 60% |
| Pressure | 101kPa | Test Voltage | DC 3V |
| Test Mode | Mode 3 | Polarization | Vertical |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 4946 | 39.77 | 0.22 | 39.99 | 74.00 | -34.01 | peak |
| 4946 | 35.31 | 0.22 | 35.53 | 54.00 | -18.47 | AVG |
| 7419 | 36.85 | 2.64 | 39.49 | 74.00 | -34.51 | peak |
| 7419 | 33.66 | 2.64 | 36.30 | 54.00 | -17.70 | AVG |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

**Note:** The amplitude of other spurious emissions from 1G to 25 GHz which are attenuated more than 20 dB below the permissible value need not be reported.

Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.

The “Factor” value can be calculated automatically by software of measurement system.

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# 8. BAND EDGE EMISSION

## 8.1. MEASUREMENT PROCEDURE

1. The EUT operates at transmitting mode. The operate channel is tested to verify the largest transmission and spurious emissions power at the continuous transmission mode.

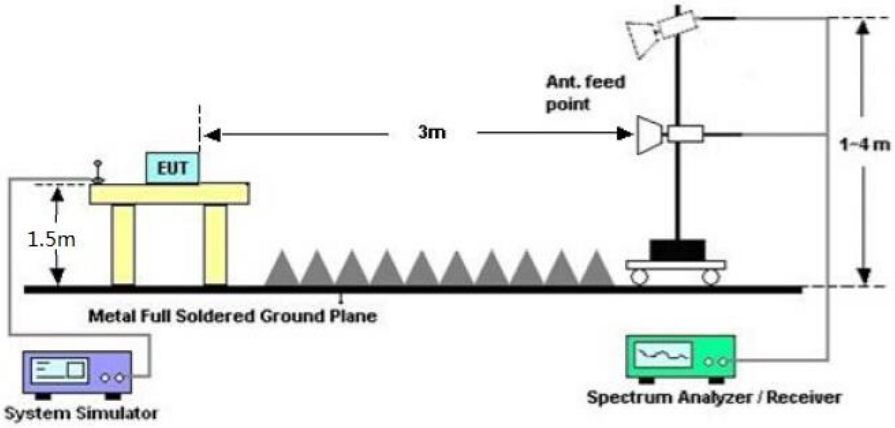
2. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission: (a) PEAK: RBW=1MHz, VBW=3MHz / Sweep=AUTO

(b) AVERAGE: RBW=1MHz ; VBW=3MHz / Sweep=AUTO

3. Other procedures refer to clause 7.2.

## 8.2 TEST SETUP

RADIATED EMISSION TEST SETUP




## 8.3 RADIATED TEST RESULT

**Note**:

1. Factor=Antenna Factor + Cable loss - Amplifier gain. Field Strength=Factor + Reading level
2. The factor had been edited in the “Input Correction” of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB(μV) to represent the Amplitude. Use the F dB(μV/m) to represent the Field Strength. So A=F.

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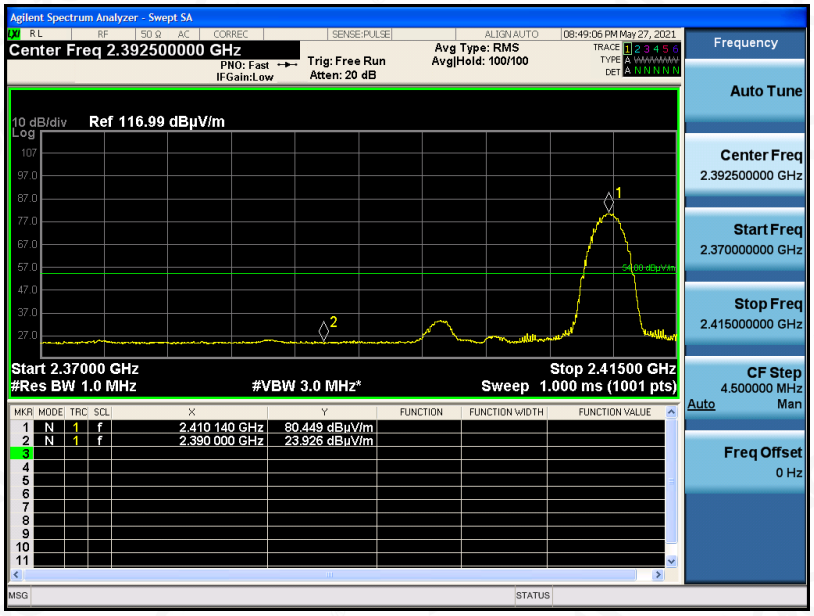
| | | | |
|---|---|---|---|
| EUT | Remote control car | Model Name | SL-303A |
| Temperature | 25℃ | Relative Humidity | 60% |
| Pressure | 101kPa | Test Voltage | DC 3V |
| Test Mode | Mode 1 | Polarization | Horizontal |

Peak Value

Average Value

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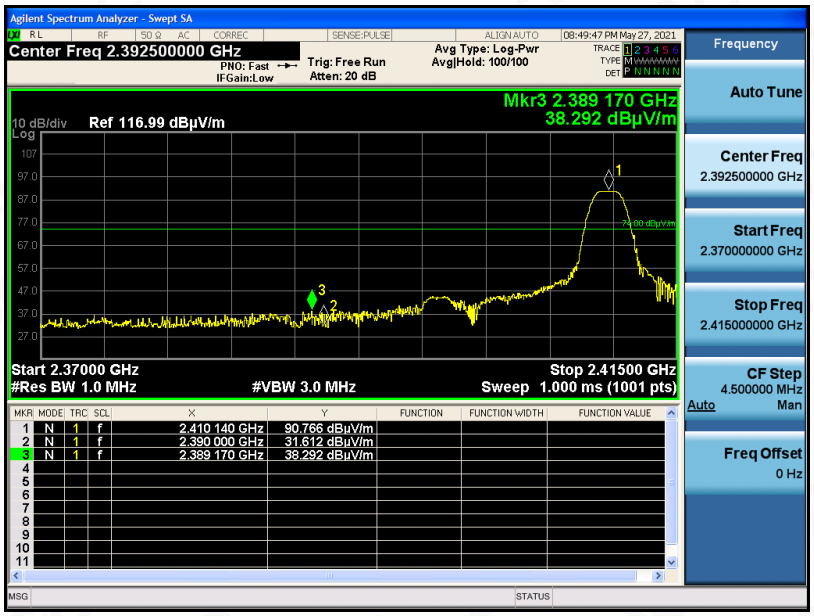
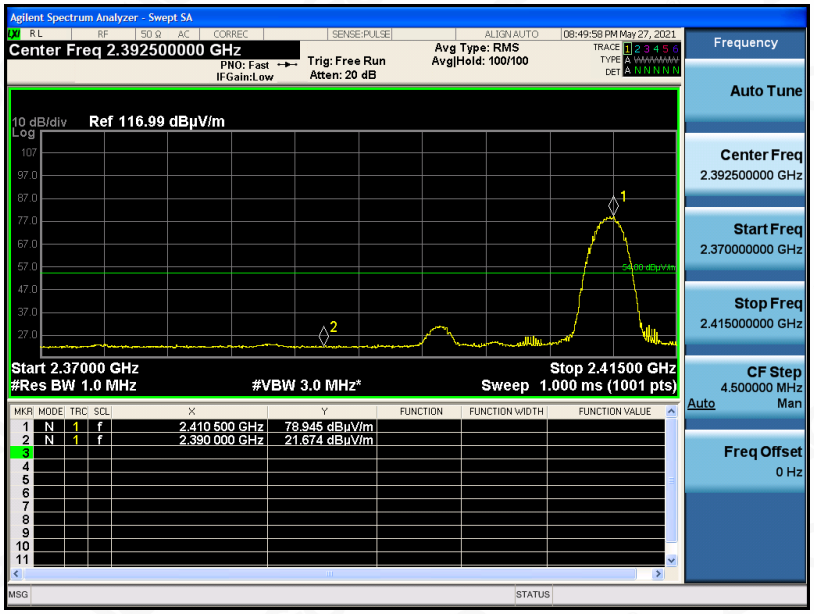
| | | | |
|---|---|---|---|
| EUT | Remote control car | Model Name | SL-303A |
| Temperature | 25℃ | Relative Humidity | 60% |
| Pressure | 101kPa | Test Voltage | DC 3V |
| Test Mode | Mode 1 | Polarization | Vertical |

Peak Value




Average Value

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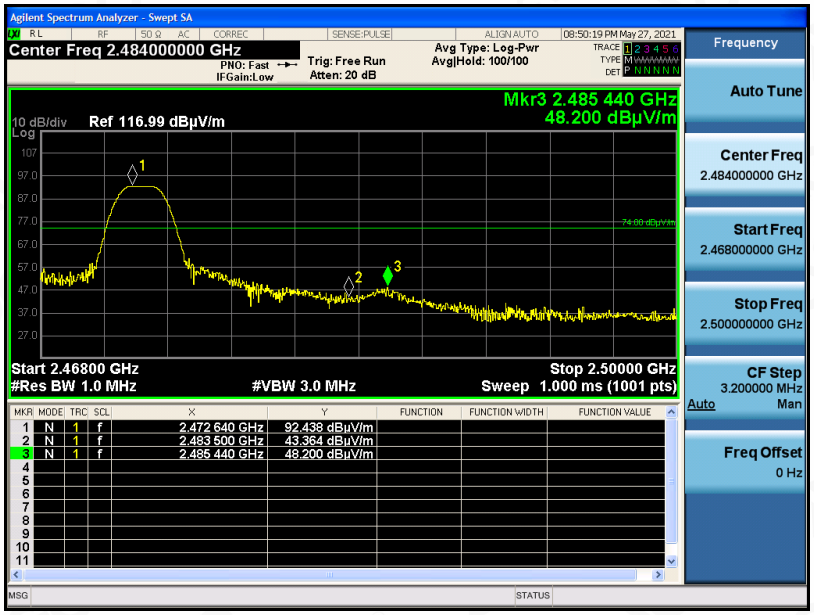
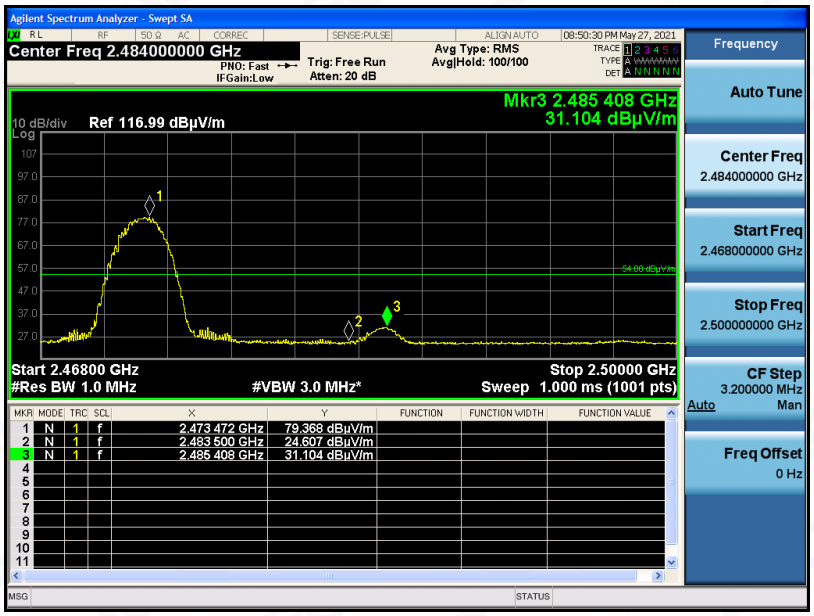
| | | | |
|---|---|---|---|
| EUT | Remote control car | Model Name | SL-303A |
| Temperature | 25℃ | Relative Humidity | 60% |
| Pressure | 101kPa | Test Voltage | DC 3V |
| Test Mode | Mode 3 | Polarization | Horizontal |

Peak Value




Average Value

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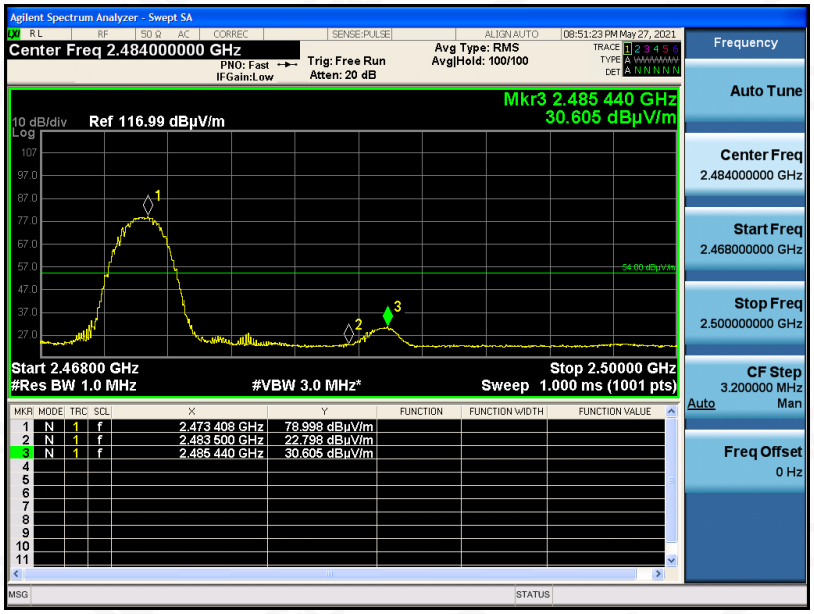
| | | | |
|---|---|---|---|
| EUT | Remote control car | Model Name | SL-303A |
| Temperature | 25℃ | Relative Humidity | 60% |
| Pressure | 101kPa | Test Voltage | DC 3V |
| Test Mode | Mode 3 | Polarization | Vertical |

Peak Value

Average Value

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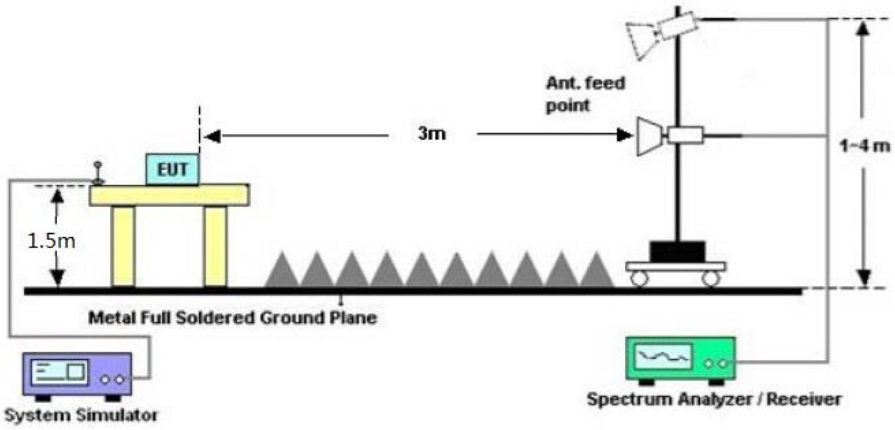
# 9. 20DB BANDWIDTH

## 9.1. MEASUREMENT PROCEDURE

1. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
2. Set SPA Centre Frequency = Operation Frequency, RBW= 30 KHz, VBW≥3×RBW.
3. Set SPA Trace 1 Max hold, then View.

## 9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

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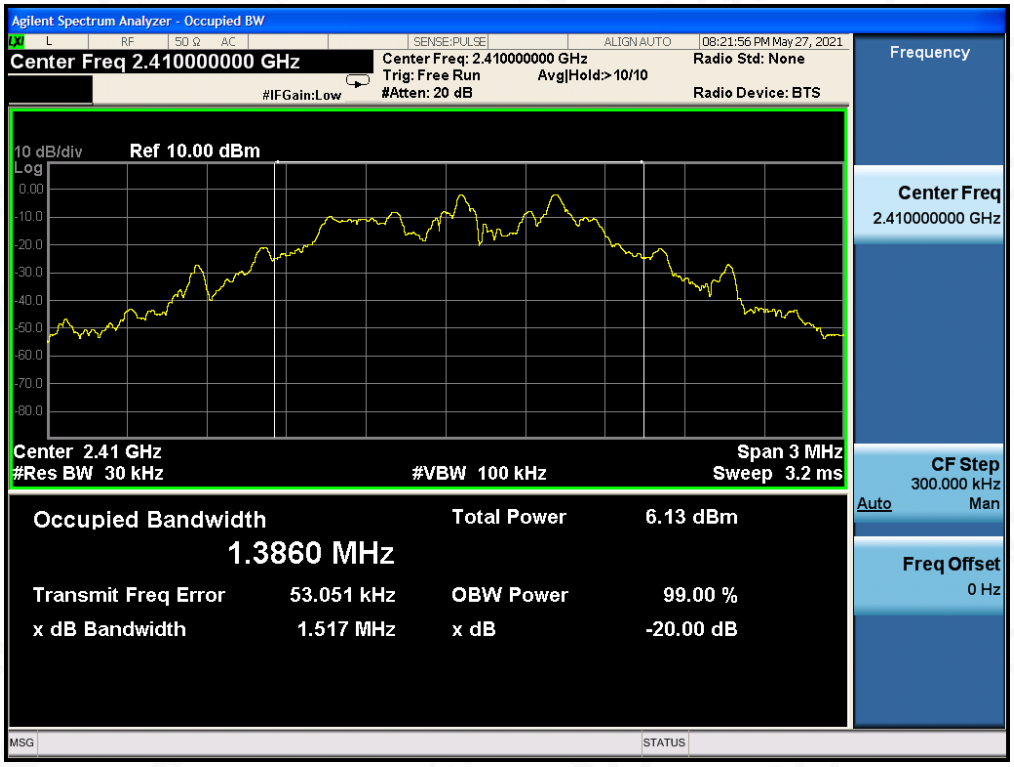
## 9.3. MEASUREMENT RESULTS

| | |
|---|---|
| **TEST ITEM** | 20DB BANDWIDTH |
| **TEST MODULATION** | GFSK |

| Test Channel (MHz) | 20DB BANDWIDTH (MHz) | 99% BANDWIDTH (MHz) | Criteria |
|---|---|---|---|
| 2410 | 1.517 | 1.3860 | PASS |
| 2442 | 1.533 | 1.4487 | PASS |
| 2473 | 1.538 | 1.4806 | PASS |

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

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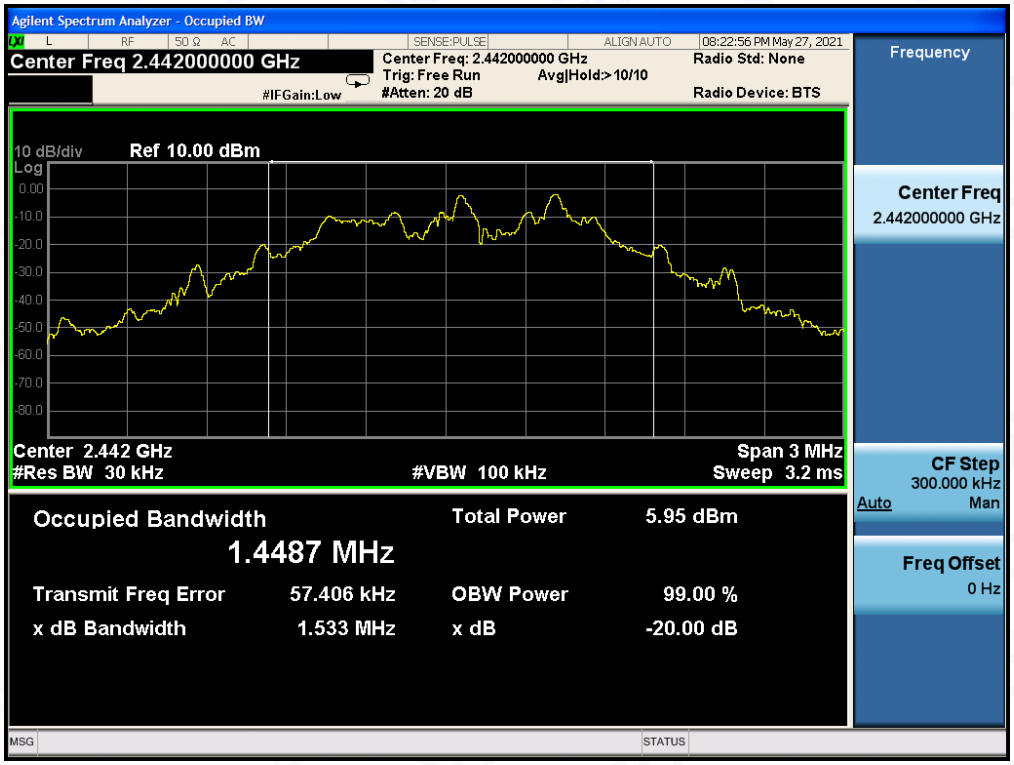
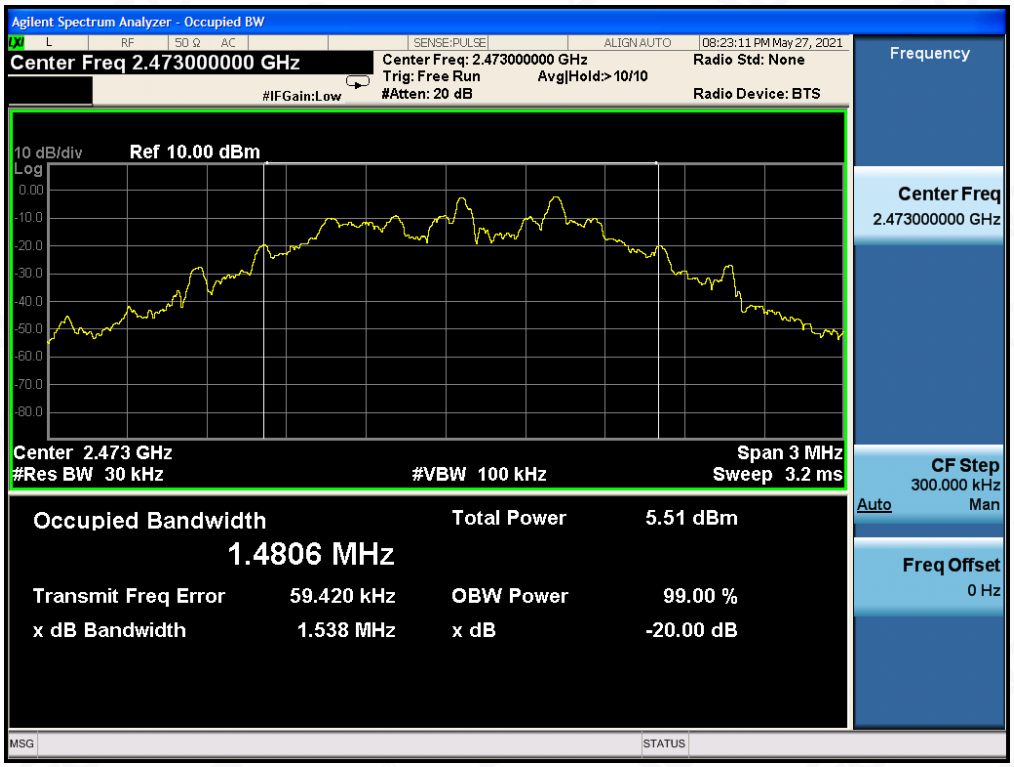
TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL




TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

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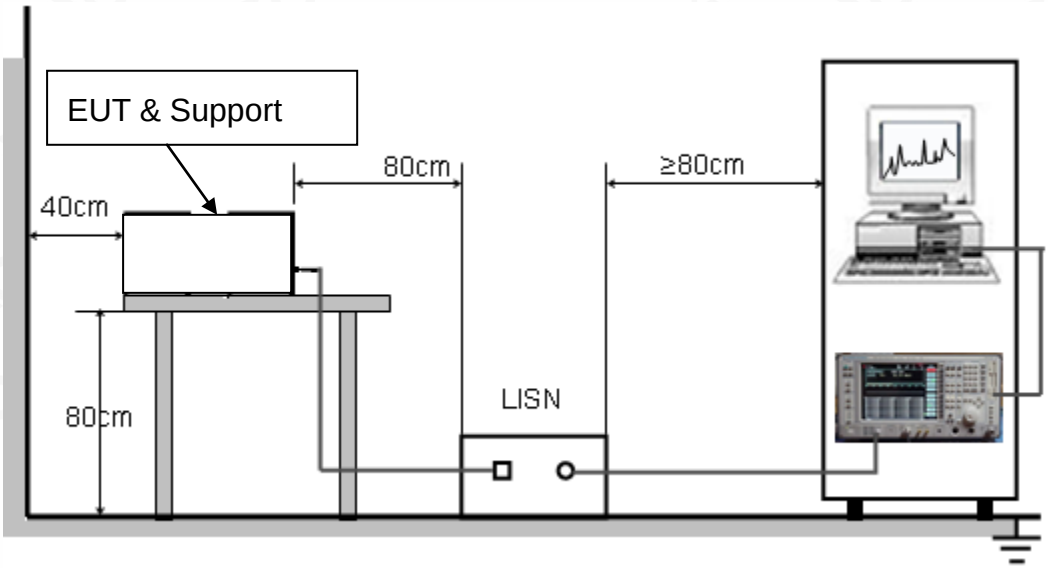
# 10. FCC LINE CONDUCTED EMISSION TEST

## 10.1. LIMITS OF LINE CONDUCTED EMISSION TEST

| Frequency | Maximum RF Line Voltage | |
|---|---|---|
| | Q.P.( dBuV) | Average( dBuV) |
| 150kHz~500kHz | 66-56 | 56-46 |
| 500kHz~5MHz | 56 | 46 |
| 5MHz~30MHz | 60 | 50 |

Note:
1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

## 10.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST

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## 10.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipment received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC 3V power from PC which received AC120V/60Hz power from a LISN.

6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

## 12.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

## 12.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

N/A

Note: The conducted emission tests at AC port are not required for devices which only employ battery power for operation.

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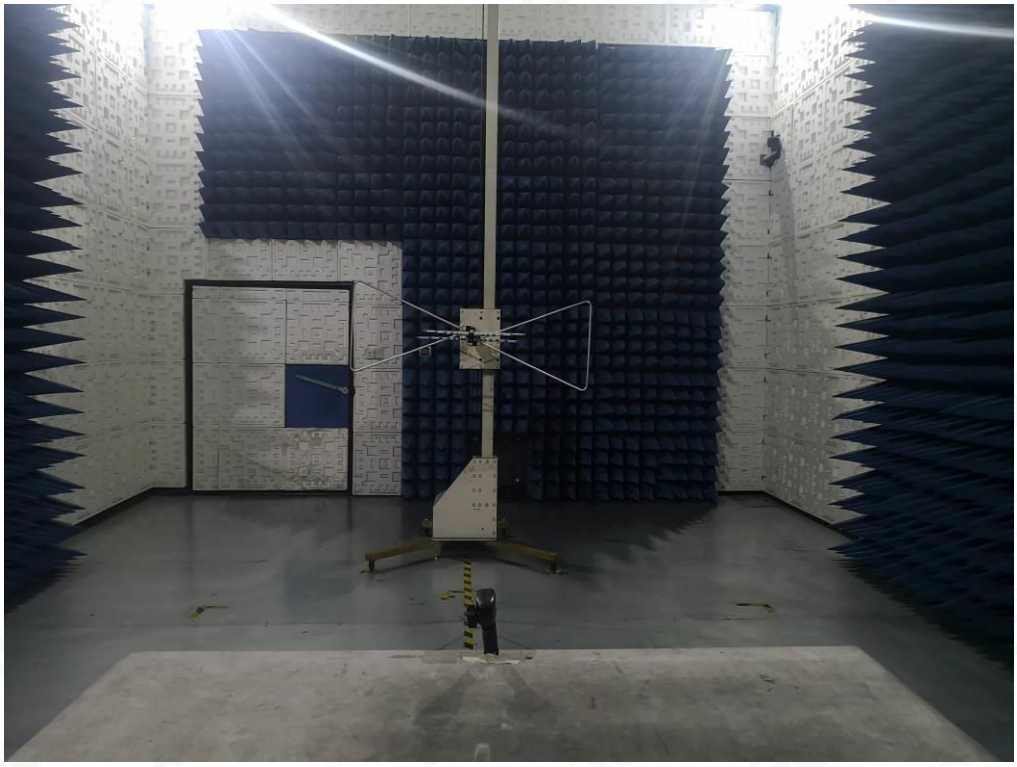
# APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC RADIATED EMISSION TEST SETUP BELOW 1GHZ



FCC RADIATED EMISSION TEST SETUP ABOVE 1GHZ

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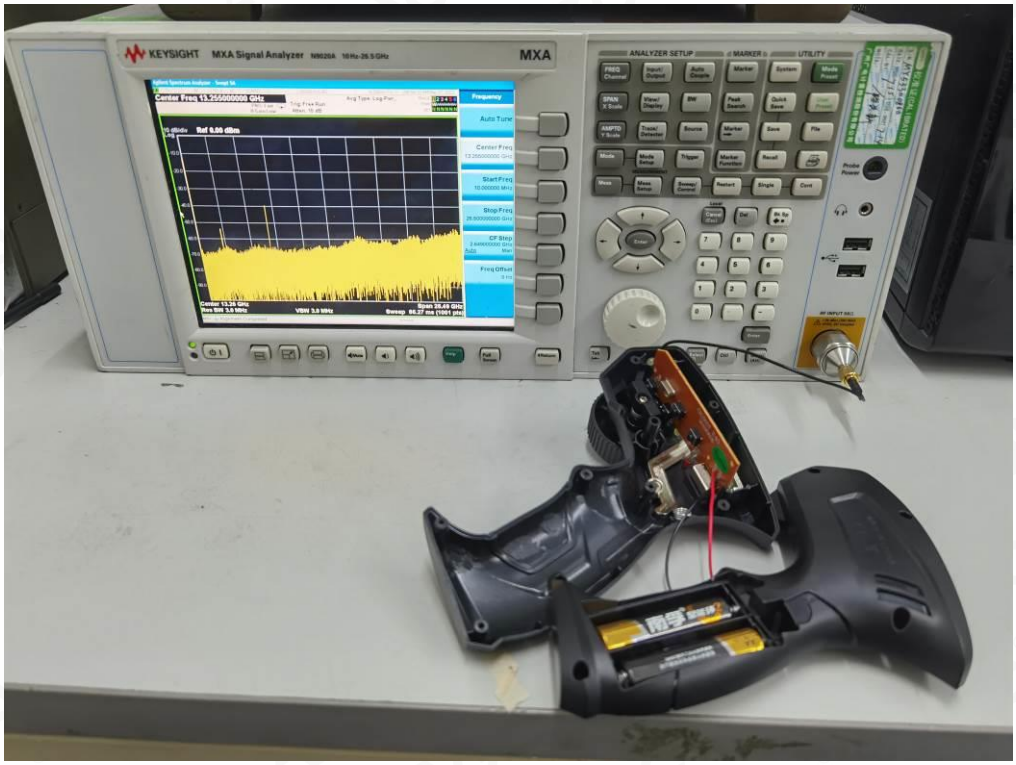
CONDUCTED TEST SETUP

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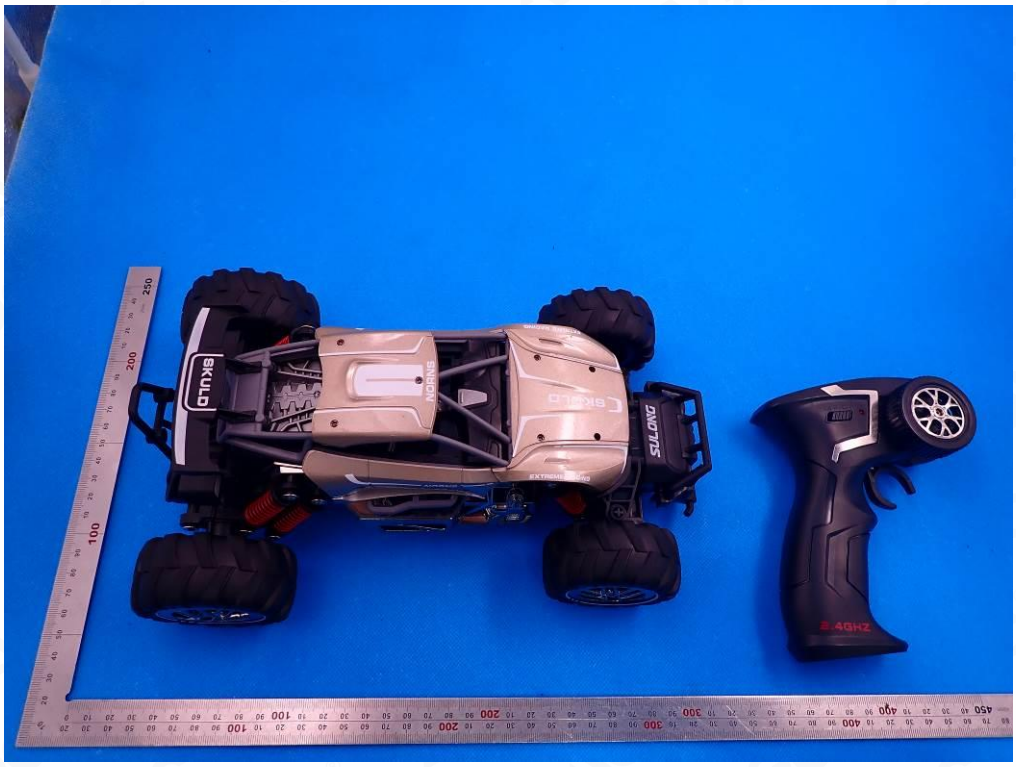
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Web: http://cn.agc-cert.com/

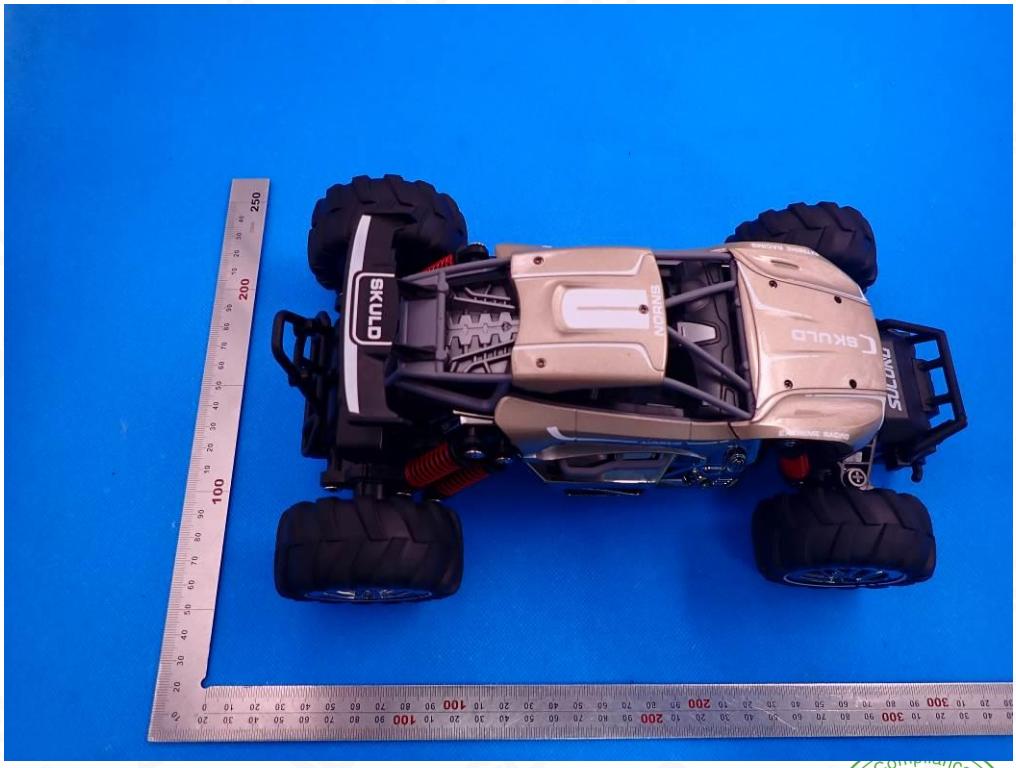
# APPENDIX B: PHOTOGRAPHS OF THE EUT

ALL VIEW OF EUT




**Receiver**

OUTSIDE VIEW-1 OF EUT

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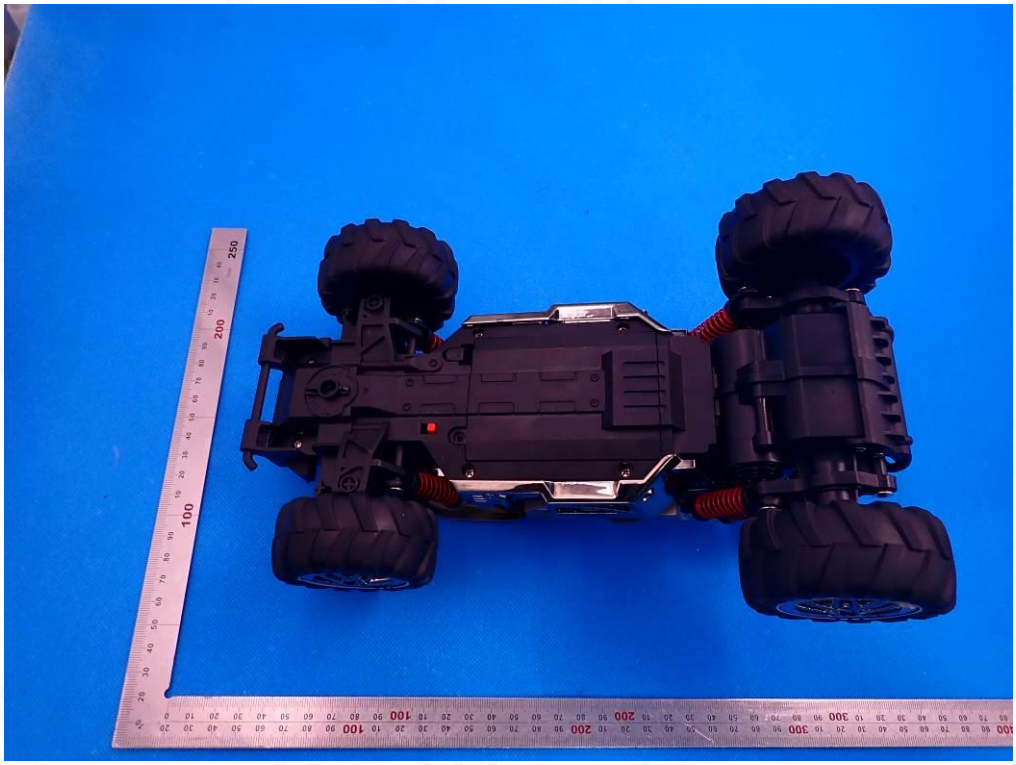
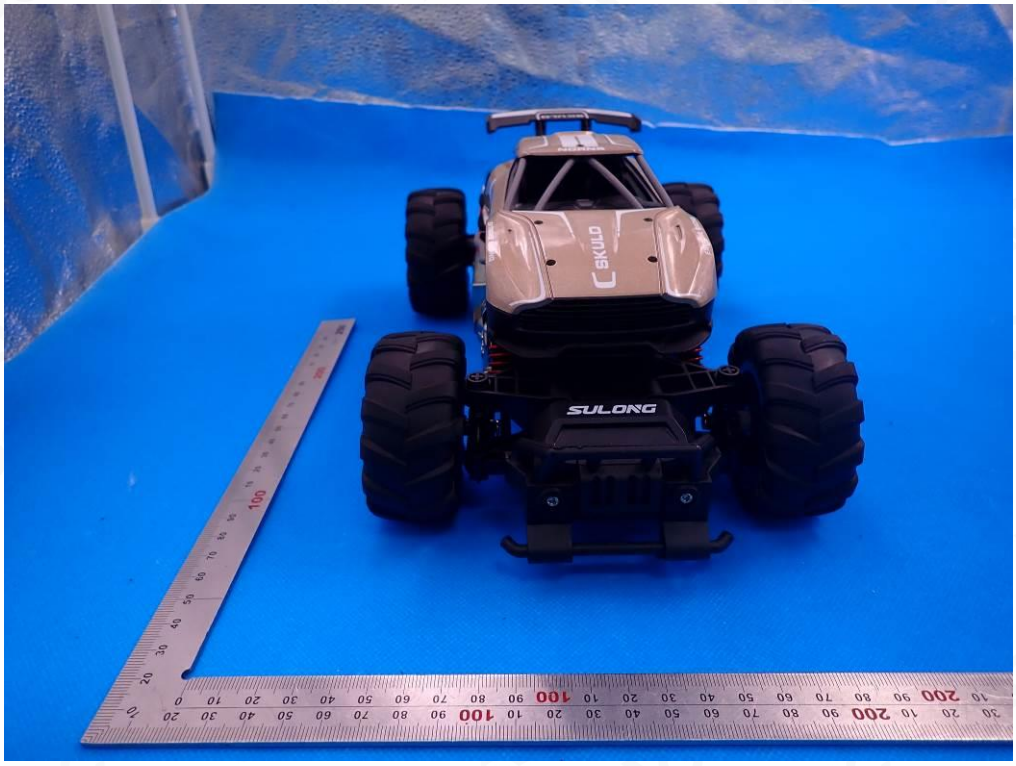
OUTSIDE VIEW-2 OF EUT



OUTSIDE VIEW-3 OF EUT

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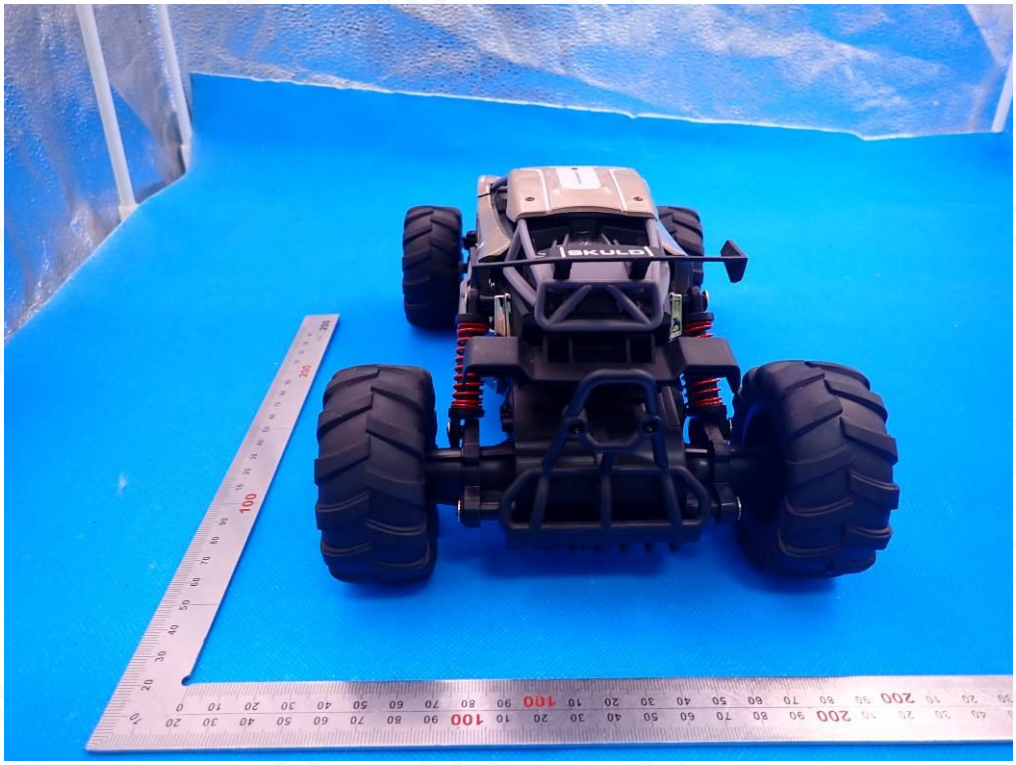
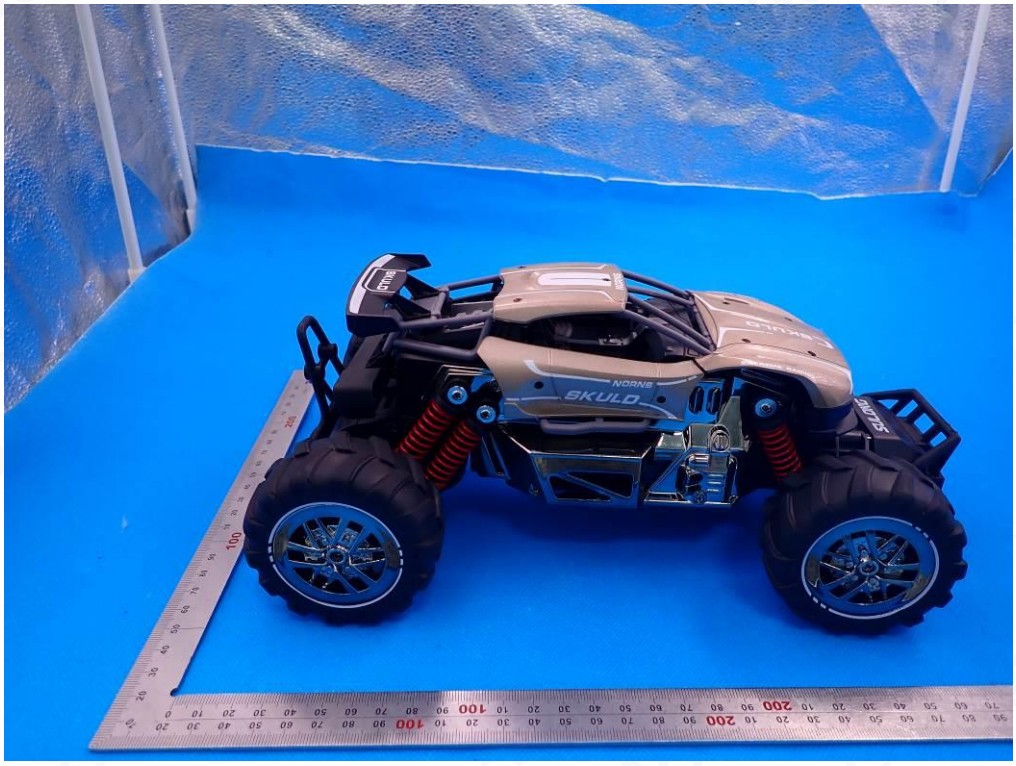
OUTSIDE VIEW-4 OF EUT




OUTSIDE VIEW-5 OF EUT

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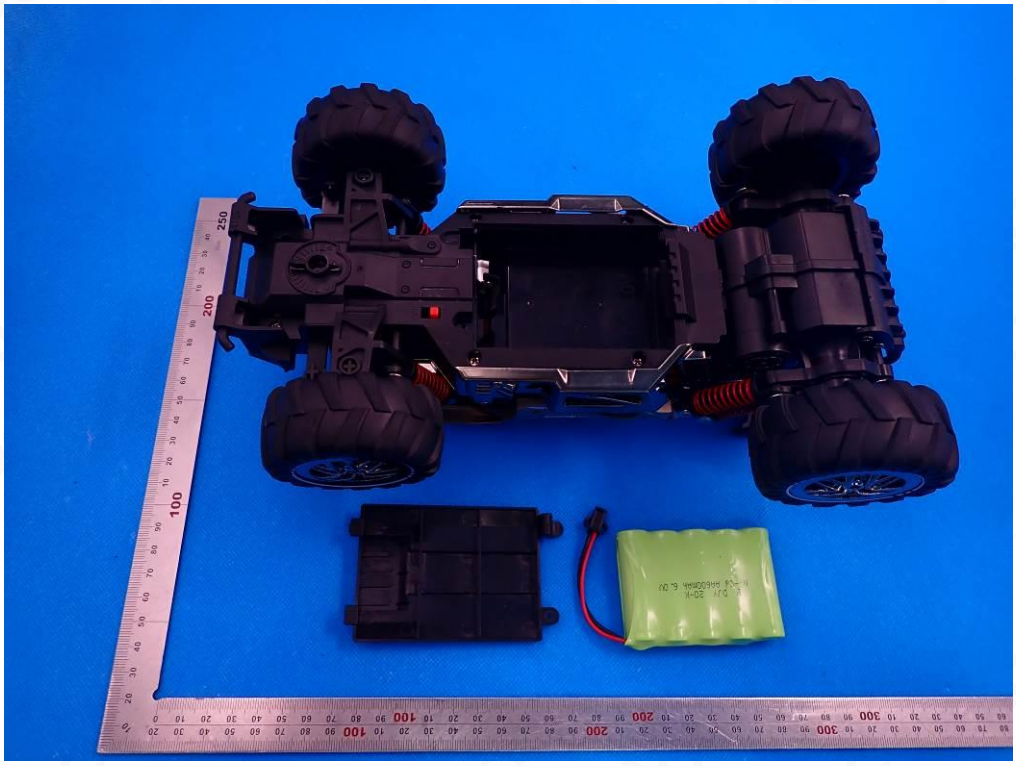
OUTSIDE VIEW-6 OF EUT

OPEN VIEW-1 OF EUT



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