



**SGS-CSTC Standards Technical Services Ltd.
Shenzhen Branch**

No. 1 Workshop, M-10, Middle section, Science & Technology Park,
Shenzhen, Guangdong, China 518057

Telephone: +86 (0) 755 2601 2053
Fax: +86 (0) 755 2671 0594
Email: ee.shenzhen@sgs.com

Report No.: SZEM160800727601
Page: 1 of 31

FCC REPORT

Application No. : SZEM1608007276CR (SGS SZ No.:T51610240118EM)
Applicant: SHANTOU CHENGHAI GUANHUA IMPORT AND EXPORT TRADE CO., LTD.
Product Name: AIRCRAFT SERIES / GRAVITY Q3 DRONE
Model No.(EUT): 482016020
Add Model No.: Q3, 482015017, 05077124, 482015003, 507227, M19, M10N, M12, M2, M3, M5, M6, M7, M9, M10, M11, M12, M32, M63, M68, M80, MH6072002, MH6072003, MH6072004, MH6072007, MH6072035, MH6072036, MH6072037, MH6072038, 339, 340, 342, 350, 360, 362, 365, 388, 389, 6010, 6021, 6015, 6023, 6032, MH4514035, MH4514060, MH4514063, MH4514089, MH4514078, MH4556089, MH4556060
FCC ID: 2ACUT-482016020-M68
Country of Origin: China
Standards: 47 CFR Part 15, Subpart C (2015)
Date of Receipt: 2016-08-26
Date of Test: 2016-08-29 to 2016-09-05
Date of Issue: 2016-09-07

| | |
|---------------------|---------------|
| Test Result: | PASS * |
|---------------------|---------------|

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

Authorized Signature:



Jack Zhang
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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. All test results in this report can be traceable to National or International Standards.

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.



2 Version

| Revision Record | | | | |
|-----------------|---------|------------|----------|----------|
| Version | Chapter | Date | Modifier | Remark |
| 00 | | 2016-09-07 | | Original |
| | | | | |
| | | | | |

| | | | | |
|--------------------------|--|---|--|------------|
| Authorized for issue by: | | | | |
| Tested By | |  | | |
| | | | | 2016-09-06 |
| | | (Bill Chen) /Project Engineer | | Date |
| Checked By | |  | | |
| | | | | 2016-09-07 |
| | | (Eric Fu) /Reviewer | | Date |



3 Test Summary

| Test Item | Test Requirement | Test method | Result |
|---|---|--------------------|--------|
| Antenna Requirement | 47 CFR Part 15, Subpart C Section 15.203 | ANSI C63.10 (2013) | PASS |
| Field Strength of the Fundamental Signal | 47 CFR Part 15, Subpart C Section 15.249 (a) | ANSI C63.10 (2013) | PASS |
| Spurious Emissions | 47 CFR Part 15, Subpart C Section 15.249 (a)/15.209 | ANSI C63.10 (2013) | PASS |
| Restricted bands around fundamental frequency (Radiated Emission) | 47 CFR Part 15, Subpart C Section 15.249(a)/15.205 | ANSI C63.10 (2013) | PASS |
| 20dB Occupied Bandwidth | 47 CFR Part 15, Subpart C Section 15.215 (c) | ANSI C63.10 (2013) | PASS |



4 Contents

| | Page |
|---|-------------|
| 1 OVER PAGE..... | 1 |
| 2 VERSION..... | 2 |
| 3 TEST SUMMARY | 3 |
| 4 CONTENTS | 4 |
| 5 GENERAL INFORMATION | 5 |
| 5.1 CLIENT INFORMATION..... | 5 |
| 5.2 GENERAL DESCRIPTION OF EUT | 5 |
| 5.3 TEST ENVIRONMENT AND MODE | 7 |
| 5.4 DESCRIPTION OF SUPPORT UNITS | 7 |
| 5.5 TEST LOCATION..... | 7 |
| 5.6 TEST FACILITY | 8 |
| 5.7 DEVIATION FROM STANDARDS | 8 |
| 5.8 ABNORMALITIES FROM STANDARD CONDITIONS..... | 8 |
| 5.9 OTHER INFORMATION REQUESTED BY THE CUSTOMER | 8 |
| 5.10 EQUIPMENT LIST | 9 |
| 6 TEST RESULTS AND MEASUREMENT DATA | 12 |
| 6.1 ANTENNA REQUIREMENT..... | 12 |
| 6.2 RADIATED EMISSION | 13 |
| 6.3 RESTRICTED BANDS AROUND FUNDAMENTAL FREQUENCY | 21 |
| 6.4 20DB BANDWIDTH | 27 |
| 7 PHOTOGRAPHS..... | 30 |
| 7.1 RADIATED EMISSION TEST SETUP | 30 |
| 7.2 RADIATED SPURIOUS EMISSION..... | 31 |
| 7.3 EUT CONSTRUCTIONAL DETAILS..... | 31 |



5 General Information

5.1 Client Information

| | |
|-----------------------|---|
| Applicant: | SHANTOU CHENGHAI GUANHUA IMPORT AND EXPORT TRADE CO., LTD. |
| Address of Applicant: | RM.202-204, BLOCK 2, YAQIAN, ZHONGSHAN ROAD SOUTH, CHENGHAI, SHANTOU CITY, GUANGDONG, CHINA |

5.2 General Description of EUT

| | |
|----------------------|--|
| Product Name: | AIRCRAFT SERIES / GRAVITY Q3 DRONE |
| Model No.: | 482016020 |
| Operation Frequency: | 2.4G Wireless |
| Modulation Type: | GFSK |
| Sample Type: | Portable product |
| Channel Numbers: | 49 |
| Channel Separation: | 1MHz |
| Antenna Type: | Integral |
| Antenna Gain: | 5.09dBi |
| EUT power Supply: | 6.0V DC (1.5V x 4 "AA" Size Batteries) |

Declaration of EUT Family Grouping:

Model No.:

482016020, Q3, 482015017, 05077124, 482015003, 507227, M19, M10N, M12, M2, M3, M5, M6, M7, M9, M10, M11, M12, M32, M63, M68, M80, MH6072002, MH6072003, MH6072004, MH6072007, MH6072035, MH6072036, MH6072037, MH6072038, 339, 340, 342, 350, 360, 362, 365, 388, 389, 6010, 6021, 6015, 6023, 6032, MH4514035, MH4514060, MH4514063, MH4514089, MH4514078, MH4556089, MH4556060

Only the model 482016020 was tested, since the electrical circuit design, layout, components used, internal wiring and functions were identical for all the above models, with only difference on model No..



SGS-CSTC Standards Technical Services Ltd. Shenzhen Branch

Report No.: SZEM160800727601

Page : 6 of 31

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|---------|-----------------|---------|-----------------|
| 1 | 2413 | 14 | 2426 | 27 | 2439 | 40 | 2452 |
| 2 | 2414 | 15 | 2427 | 28 | 2440 | 41 | 2453 |
| 3 | 2415 | 16 | 2428 | 29 | 2441 | 42 | 2454 |
| 4 | 2416 | 17 | 2429 | 30 | 2442 | 43 | 2455 |
| 5 | 2417 | 18 | 2430 | 31 | 2443 | 44 | 2456 |
| 6 | 2418 | 19 | 2431 | 32 | 2444 | 45 | 2457 |
| 7 | 2419 | 20 | 2432 | 33 | 2445 | 46 | 2458 |
| 8 | 2420 | 21 | 2433 | 34 | 2446 | 47 | 2459 |
| 9 | 2421 | 22 | 2434 | 35 | 2447 | 48 | 2460 |
| 10 | 2422 | 23 | 2435 | 36 | 2448 | 49 | 2461 |
| 11 | 2423 | 24 | 2436 | 37 | 2449 | | |
| 12 | 2424 | 25 | 2437 | 38 | 2450 | | |
| 13 | 2425 | 26 | 2438 | 39 | 2451 | | |

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

| Channel | Frequency |
|----------------------------|-----------|
| The lowest channel (CH1) | 2413MHz |
| The middle channel (CH33) | 2445MHz |
| The highest channel (CH49) | 2461MHz |



5.3 Test Environment and Mode

| Operating Environment: | |
|------------------------|--|
| Temperature: | 25.0 °C |
| Humidity: | 52 % RH |
| Atmospheric Pressure: | 1005 mbar |
| Test mode: | |
| Transmitting mode: | Keep the EUT in transmitting mode with modulation. |

5.4 Description of Support Units

The EUT has been tested independently.

5.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China.
518057.

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

No tests were sub-contracted.



5.6 Test Facility

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

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 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**

The 10m Semi-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.: G-823, R-4188, T-1153 and C-2383 respectively.

- **FCC – Registration No.: 556682**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

5.7 Deviation from Standards

None.

5.8 Abnormalities from Standard Conditions

None.

5.9 Other Information Requested by the Customer

None.



5.10 Equipment List

| RF connected test | | | | | | |
|-------------------|-------------------|-----------------|-----------|---------------|---------------------------|------------------------------|
| Item | Test Equipment | Manufacturer | Model No. | Inventory No. | Cal. date (yyyy-mm-dd) | Cal.Due date (yyyy-mm-dd) |
| 1 | DC Power Supply | ZhaoXin | RXN-305D | SEM011-02 | 2015-10-09 | 2016-10-09 |
| 2 | Spectrum Analyzer | Rohde & Schwarz | FSP | SEM004-06 | 2015-10-17 | 2016-10-17 |
| 3 | Signal Generator | Rohde & Schwarz | SML03 | SEM006-02 | 2016-04-25 | 2017-04-25 |
| 4 | Power Meter | Rohde & Schwarz | NRVS | SEM014-02 | 2015-10-09 | 2016-10-09 |



SGS-CSTC Standards Technical Services Ltd. Shenzhen Branch

Report No.: SZEM160800727601

Page : 10 of 31

| RE in Chamber | | | | | | |
|---------------|--------------------------------|----------------------|-----------|---------------|---------------------------|------------------------------|
| Item | Test Equipment | Manufacturer | Model No. | Inventory No. | Cal. date (yyyy-mm-dd) | Cal.Due date (yyyy-mm-dd) |
| 1 | 3m Semi-Anechoic Chamber | ETS-LINDGREN | N/A | SEM001-01 | 2016-05-13 | 2017-05-13 |
| 2 | EMI Test Receiver | Agilent Technologies | N9038A | SEM004-05 | 2015-09-16 | 2016-09-16 |
| 3 | BiConiLog Antenna (26-3000MHz) | ETS-LINDGREN | 3142C | SEM003-01 | 2014-11-01 | 2017-11-01 |
| 4 | Double-ridged horn (1-18GHz) | ETS-LINDGREN | 3117 | SEM003-11 | 2015-10-17 | 2018-10-17 |
| 5 | Horn Antenna (18-26GHz) | ETS-LINDGREN | 3160 | SEM003-12 | 2014-11-24 | 2017-11-24 |
| 6 | Pre-amplifier (0.1-1300MHz) | Agilent Technologies | 8447D | SEM005-01 | 2016-04-25 | 2017-04-25 |
| 7 | Band filter | Amindeon | Asi 3314 | SEM023-01 | N/A | N/A |
| 8 | DC Power Supply | Zhao Xin | RXN-305D | SEM011-02 | 2015-10-09 | 2016-10-09 |
| 9 | Loop Antenna | Beijing Daze | ZN30401 | SEM003-09 | 2015-05-13 | 2018-05-13 |



**SGS-CSTC Standards Technical Services Ltd.
Shenzhen Branch**

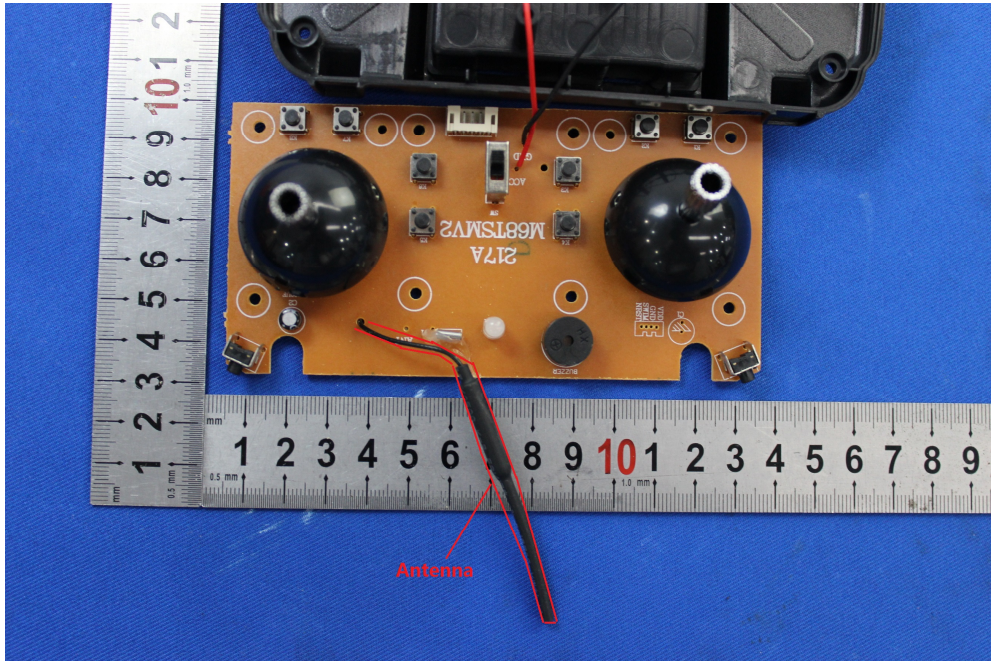
Report No.: SZEM160800727601

Page : 11 of 31

| RE in Chamber | | | | | | |
|---------------|-----------------------------------|----------------------|-------------------|---------------|---------------------------|------------------------------|
| Item | Test Equipment | Manufacturer | Model No. | Inventory No. | Cal. date (yyyy-mm-dd) | Cal.Due date (yyyy-mm-dd) |
| 1 | 3m Semi-Anechoic Chamber | AUDIX | N/A | SEM001-02 | 2016-05-13 | 2017-05-13 |
| 2 | EMI Test Receiver | Rohde & Schwarz | ESIB26 | SEM004-04 | 2016-04-25 | 2017-04-25 |
| 3 | BiConiLog Antenna (26-3000MHz) | ETS-Lindgren | 3142C | SEM003-02 | 2014-11-15 | 2017-11-15 |
| 4 | Amplifier (0.1-1300MHz) | HP | 8447D | SEM005-02 | 2015-10-09 | 2016-10-09 |
| 5 | Horn Antenna (1-18GHz) | Rohde & Schwarz | HF907 | SEM003-07 | 2015-06-14 | 2018-06-14 |
| 6 | Horn Antenna (18-26GHz) | ETS-Lindgren | 3160 | SEM003-12 | 2014-11-24 | 2017-11-24 |
| 7 | Horn Antenna(26GHz-40GHz) | A.H.Systems, inc. | SAS-573 | SEM003-13 | 2015-02-12 | 2018-02-12 |
| 8 | Low Noise Amplifier | Black Diamond Series | BDLNA-0118-352810 | SEM005-05 | 2015-10-09 | 2016-10-09 |
| 9 | Band filter | Amindeon | Asi 3314 | SEM023-01 | N/A | N/A |

6 Test results and Measurement Data

6.1 Antenna Requirement

| | |
|--|---|
| Standard requirement: | 47 CFR Part 15C Section 15.203 |
| <p>15.203 requirement:</p> <p>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.</p> | |
| EUT Antenna: |  |
| <p>The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 5.09dBi.</p> | |



6.2 Radiated Emission

| | | | | | |
|---|---|-------------------------------------|-------------------|---------------|-----------------------------|
| Test Requirement: | 47 CFR Part 15C Section 15.249 and 15.209 | | | | |
| Test Method: | ANSI C63.10: 2013 | | | | |
| Test Site: | Measurement Distance: 3m (fully Anechoic Chamber) 3m (semi Anechoic Chamber) | | | | |
| Receiver Setup: | Frequency | Detector | RBW | VBW | Remark |
| | 0.009MHz-0.090MHz | Peak | 10kHz | 30KHz | Peak |
| | 0.009MHz-0.090MHz | Average | 10kHz | 30KHz | Average |
| | 0.090MHz-0.110MHz | Quasi-peak | 10kHz | 30KHz | Quasi-peak |
| | 0.110MHz-0.490MHz | Peak | 10kHz | 30KHz | Peak |
| | 0.110MHz-0.490MHz | Average | 10kHz | 30KHz | Average |
| | 0.490MHz -30MHz | Quasi-peak | 10kHz | 30kHz | Quasi-peak |
| | 30MHz-1GHz | Quasi-peak | 100 kHz | 300KHz | Quasi-peak |
| | Above 1GHz | Peak | 1MHz | 3MHz | Peak |
| | | Peak | 1MHz | 10Hz | Average |
| Limit: (Spurious Emissions) | Frequency | Field strength (microvolt/meter) | Limit (dBuV/m) | Remark | Measurement distance (m) |
| | 0.009MHz-0.490MHz | 2400/F(kHz) | - | - | 300 |
| | 0.490MHz-1.705MHz | 24000/F(kHz) | - | - | 30 |
| | 1.705MHz-30MHz | 30 | - | - | 30 |
| | 30MHz-88MHz | 100 | 40.0 | Quasi-peak | 3 |
| | 88MHz-216MHz | 150 | 43.5 | Quasi-peak | 3 |
| | 216MHz-960MHz | 200 | 46.0 | Quasi-peak | 3 |
| | 960MHz-1GHz | 500 | 54.0 | Quasi-peak | 3 |
| | Above 1GHz | 500 | 54.0 | Average | 3 |
| Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device. | | | | | |
| Limit: (Field strength of the fundamental signal) | Frequency | Limit (dBuV/m @3m) | | Remark | |
| | 2400MHz-2483.5MHz | 94.0 | | Average Value | |
| | | 114.0 | | Peak Value | |

Test Setup:

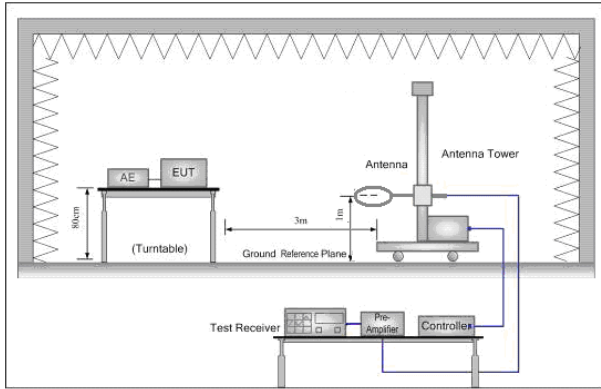


Figure 1. Below 30MHz

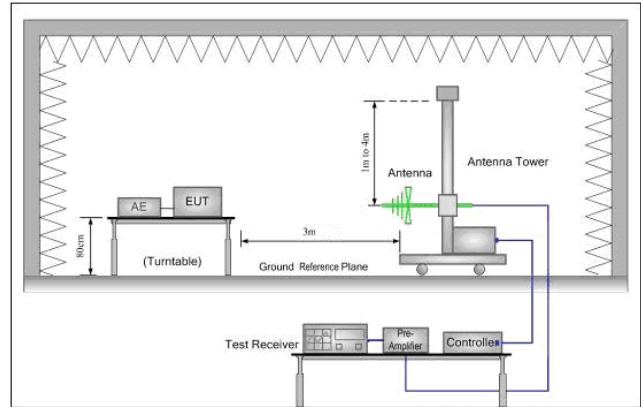


Figure 2. 30MHz to 1GHz

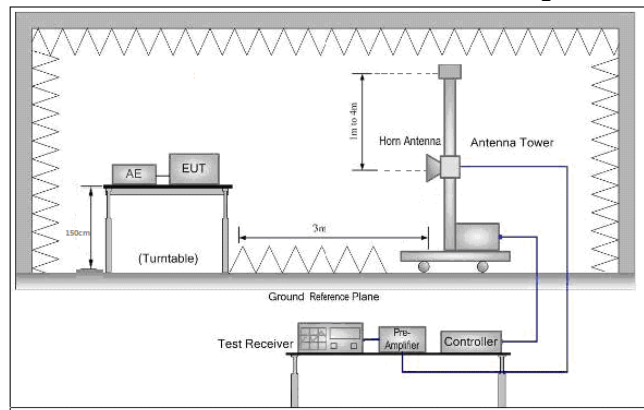


Figure 3. Above 1 GHz

Test Procedure:

- 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.
- 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.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



SGS-CSTC Standards Technical Services Ltd. Shenzhen Branch

Report No.: SZEM160800727601

Page : 15 of 31

| | |
|-------------------|---|
| | <p>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.</p> <p>h. Test the EUT in the lowest channel,the middle channel,the Highest channel</p> <p>i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode,And found the X axis positioning which it is worse case .</p> <p>j. Repeat above procedures until all frequencies measured was complete.</p> |
| Test Mode: | Transmitting mode. |
| Instruments Used: | Refer to section 5.10 for details |
| Test Results: | Pass |

Measurement Data

6.2.1 Field Strength Of The Fundamental Signal

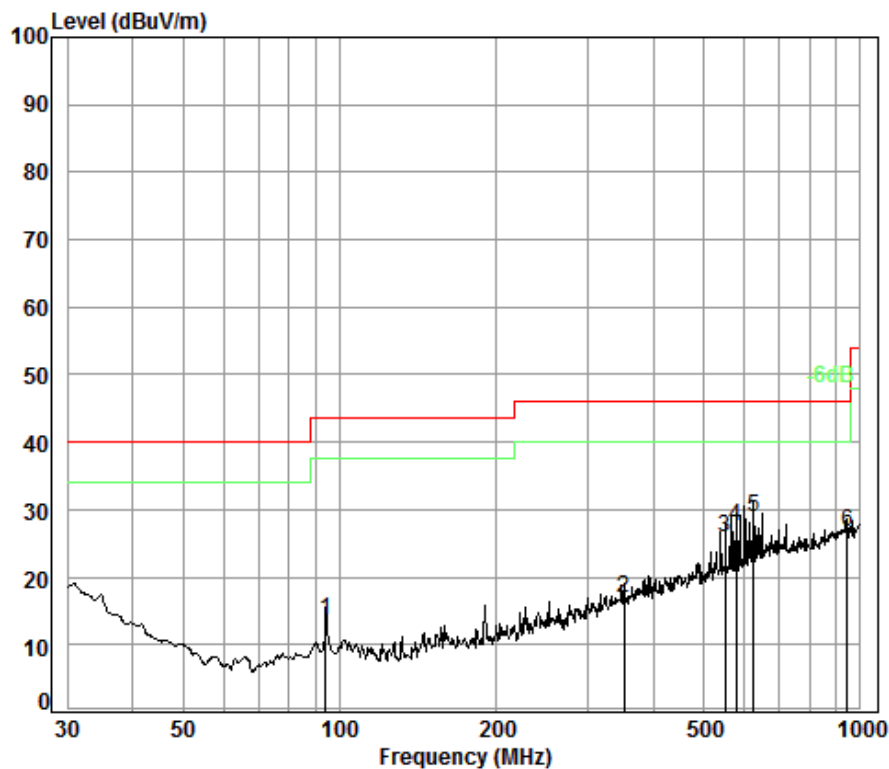
Peak value:

| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Read Level (dBuV) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|-----------------|-----------------------|-----------------|--------------------|-------------------|----------------|---------------------|-----------------|--------------|
| 2413 | 29.15 | 5.36 | 38.15 | 95.57 | 91.93 | 114 | -22.07 | Horizontal |
| 2413 | 29.15 | 5.36 | 38.15 | 88.08 | 84.44 | 114 | -29.56 | Vertical |
| 2445 | 29.24 | 5.38 | 38.15 | 93.96 | 90.43 | 114 | -23.57 | Horizontal |
| 2445 | 29.24 | 5.38 | 38.15 | 82.04 | 78.51 | 114 | -35.49 | Vertical |
| 2461 | 29.29 | 5.39 | 38.15 | 94.06 | 90.59 | 114 | -23.41 | Horizontal |
| 2461 | 29.29 | 5.39 | 38.15 | 82.11 | 78.64 | 114 | -35.36 | Vertical |



6.2.2 Spurious Emissions

| 30MHz~1GHz | | |
|------------|-------------------|----------|
| Test mode: | Transmitting mode | Vertical |



Condition: 3m Vertical

Job No. : 7276CR

Test mode: TX

| | Freq | Cable Loss | Ant Factor | Preamp Factor | Read Level | Level | Limit | Over |
|------|--------|------------|------------|---------------|------------|--------|--------|--------|
| | MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB |
| 1 | 94.10 | 1.14 | 8.93 | 27.31 | 30.76 | 13.52 | 43.50 | -29.98 |
| 2 | 351.71 | 2.07 | 15.53 | 26.88 | 26.24 | 16.96 | 46.00 | -29.04 |
| 3 | 550.95 | 2.65 | 19.00 | 27.65 | 31.94 | 25.94 | 46.00 | -20.06 |
| 4 | 576.64 | 2.68 | 19.05 | 27.73 | 33.51 | 27.51 | 46.00 | -18.49 |
| 5 pp | 622.89 | 2.75 | 20.25 | 27.75 | 33.68 | 28.93 | 46.00 | -17.07 |
| 6 | 942.13 | 3.64 | 23.26 | 26.74 | 26.54 | 26.70 | 46.00 | -19.30 |

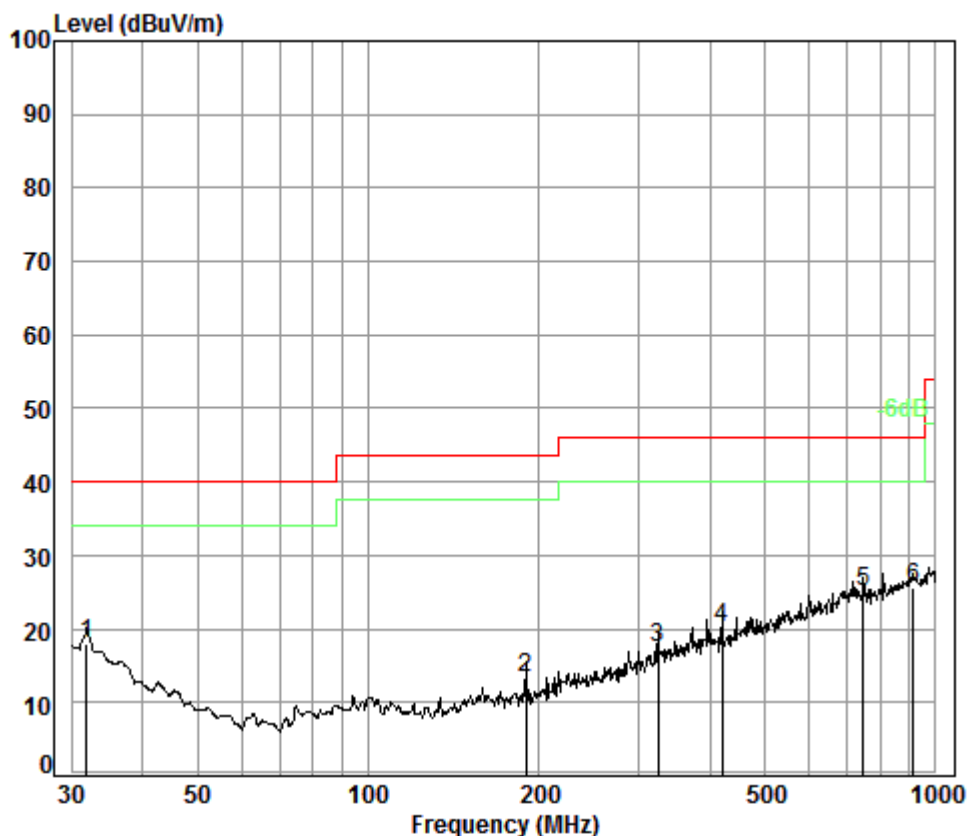


SGS-CSTC Standards Technical Services Ltd. Shenzhen Branch

Report No.: SZEM160800727601

Page : 17 of 31

| | | |
|------------|-------------------|------------|
| Test mode: | Transmitting mode | Horizontal |
|------------|-------------------|------------|



Condition: 3m Horizontal

Job No. : 7276CR

Test mode: TX

| | Freq | Cable Loss | Ant Factor | Preamp Factor | Read Level | Level | Limit Line | Over Limit |
|------|--------|------------|------------|---------------|------------|--------|------------|------------|
| | MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB |
| 1 | 31.95 | 0.60 | 17.73 | 27.40 | 27.10 | 18.03 | 40.00 | -21.97 |
| 2 | 189.74 | 1.39 | 10.09 | 26.89 | 28.89 | 13.48 | 43.50 | -30.02 |
| 3 | 324.46 | 1.98 | 14.77 | 26.74 | 27.55 | 17.56 | 46.00 | -28.44 |
| 4 | 420.58 | 2.29 | 16.32 | 27.18 | 28.82 | 20.25 | 46.00 | -25.75 |
| 5 | 744.87 | 3.04 | 21.60 | 27.50 | 27.91 | 25.05 | 46.00 | -20.95 |
| 6 pp | 912.86 | 3.62 | 23.30 | 26.87 | 25.52 | 25.57 | 46.00 | -20.43 |



SGS-CSTC Standards Technical Services Ltd. Shenzhen Branch

Report No.: SZEM160800727601

Page : 18 of 31

| Above 1GHz | | | | | | | | |
|--------------------|-----------------------------|-----------------------|--------------------------|-------------------------|-------------------|------------------------|-----------------------|--------------|
| Test mode: | | Transmitting | Test channel: | | Lowest | Remark: | | Peak |
| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Read Level (dBuV) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 3966.435 | 33.51 | 7.80 | 38.69 | 44.51 | 47.13 | 74 | -26.87 | Vertical |
| 4826.000 | 34.20 | 8.90 | 39.04 | 47.81 | 51.87 | 74 | -22.13 | Vertical |
| 6087.002 | 34.77 | 10.45 | 38.94 | 44.93 | 51.21 | 74 | -22.79 | Vertical |
| 7239.000 | 36.40 | 10.69 | 38.15 | 44.18 | 53.12 | 74 | -20.88 | Vertical |
| 9652.000 | 37.53 | 12.53 | 36.97 | 40.70 | 53.79 | 74 | -20.21 | Vertical |
| 12120.390 | 38.67 | 14.46 | 38.42 | 38.46 | 53.17 | 74 | -20.83 | Vertical |
| 3786.970 | 33.03 | 7.74 | 38.60 | 45.06 | 47.23 | 74 | -26.77 | Horizontal |
| 4826.000 | 34.20 | 8.90 | 39.04 | 49.13 | 53.19 | 74 | -20.81 | Horizontal |
| 5778.052 | 34.57 | 9.94 | 39.02 | 45.47 | 50.96 | 74 | -23.04 | Horizontal |
| 7239.000 | 36.40 | 10.69 | 38.15 | 44.49 | 53.43 | 74 | -20.57 | Horizontal |
| 9652.000 | 37.53 | 12.53 | 36.97 | 40.39 | 53.48 | 74 | -20.52 | Horizontal |
| 12102.870 | 38.66 | 14.47 | 38.41 | 39.20 | 53.92 | 74 | -20.08 | Horizontal |



**SGS-CSTC Standards Technical Services Ltd.
Shenzhen Branch**

Report No.: SZEM160800727601

Page : 19 of 31

| Test mode: | | Transmitting | | Test channel: | | Middle | | Remark: | | Peak | |
|-----------------|-----------------------|-----------------|--------------------|-------------------|----------------|---------------------|-----------------|--------------|--|------|--|
| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Read Level (dBuV) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization | | | |
| 3858.877 | 33.22 | 7.76 | 38.64 | 44.85 | 47.19 | 74 | -26.81 | Vertical | | | |
| 4890.000 | 34.31 | 8.99 | 39.06 | 48.47 | 52.71 | 74 | -21.29 | Vertical | | | |
| 6357.042 | 34.99 | 10.11 | 38.78 | 44.83 | 51.15 | 74 | -22.85 | Vertical | | | |
| 7335.000 | 36.36 | 10.73 | 38.05 | 44.72 | 53.76 | 74 | -20.24 | Vertical | | | |
| 9780.000 | 37.56 | 12.60 | 36.90 | 39.63 | 52.89 | 74 | -21.11 | Vertical | | | |
| 12120.390 | 38.67 | 14.46 | 38.42 | 39.17 | 53.88 | 74 | -20.12 | Vertical | | | |
| 3599.965 | 32.50 | 7.67 | 38.52 | 45.57 | 47.22 | 74 | -26.78 | Horizontal | | | |
| 4890.000 | 34.31 | 8.99 | 39.06 | 49.57 | 53.81 | 74 | -20.19 | Horizontal | | | |
| 6193.614 | 34.86 | 10.31 | 38.88 | 45.13 | 51.42 | 74 | -22.58 | Horizontal | | | |
| 7335.000 | 36.36 | 10.73 | 38.05 | 44.71 | 53.75 | 74 | -20.25 | Horizontal | | | |
| 9780.000 | 37.56 | 12.60 | 36.90 | 40.16 | 53.42 | 74 | -20.58 | Horizontal | | | |
| 12155.510 | 38.69 | 14.43 | 38.46 | 39.29 | 53.95 | 74 | -20.05 | Horizontal | | | |



SGS-CSTC Standards Technical Services Ltd. Shenzhen Branch

Report No.: SZEM160800727601

Page : 20 of 31

| Test mode: | | Transmitting | | Test channel: | | Highest | | Remark: | | Peak | |
|-----------------|-----------------------|-----------------|--------------------|-------------------|----------------|---------------------|-----------------|--------------|--|------|--|
| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Read Level (dBuV) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization | | | |
| 3842.163 | 33.18 | 7.76 | 38.63 | 44.48 | 46.79 | 74 | -27.21 | Vertical | | | |
| 4922.000 | 34.37 | 9.03 | 39.07 | 48.68 | 53.01 | 74 | -20.99 | Vertical | | | |
| 6078.201 | 34.76 | 10.46 | 38.95 | 44.70 | 50.97 | 74 | -23.03 | Vertical | | | |
| 7383.000 | 36.35 | 10.75 | 38.00 | 44.03 | 53.13 | 74 | -20.87 | Vertical | | | |
| 9844.000 | 37.57 | 12.63 | 36.88 | 40.17 | 53.49 | 74 | -20.51 | Vertical | | | |
| 12226.070 | 38.74 | 14.37 | 38.53 | 39.01 | 53.59 | 74 | -20.41 | Vertical | | | |
| 3842.163 | 33.18 | 7.76 | 38.63 | 44.48 | 46.79 | 74 | -27.21 | Horizontal | | | |
| 4922.000 | 34.37 | 9.03 | 39.07 | 48.68 | 53.01 | 74 | -20.99 | Horizontal | | | |
| 6078.201 | 34.76 | 10.46 | 38.95 | 44.70 | 50.97 | 74 | -23.03 | Horizontal | | | |
| 7383.000 | 36.35 | 10.75 | 38.00 | 44.03 | 53.13 | 74 | -20.87 | Horizontal | | | |
| 9844.000 | 37.57 | 12.63 | 36.88 | 40.17 | 53.49 | 74 | -20.51 | Horizontal | | | |
| 12226.070 | 38.74 | 14.37 | 38.53 | 39.01 | 53.59 | 74 | -20.41 | Horizontal | | | |

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 9kHz to 25GHz, the disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics 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. So, only the peak measurements were shown in the report.

6.3 Restricted bands around fundamental frequency

| | | | |
|-------------------|--|--------------------|------------------|
| Test Requirement: | 47 CFR Part 15C Section 15.209 and 15.205 | | |
| Test Method: | ANSI C63.10: 2013 | | |
| Test Site: | Measurement Distance: 3m (fully Anechoic Chamber) | | |
| Limit(Band Edge): | Emissions 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. | | |
| | 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 |
| | | 74.0 | Peak Value |
| Test Setup: | | | |

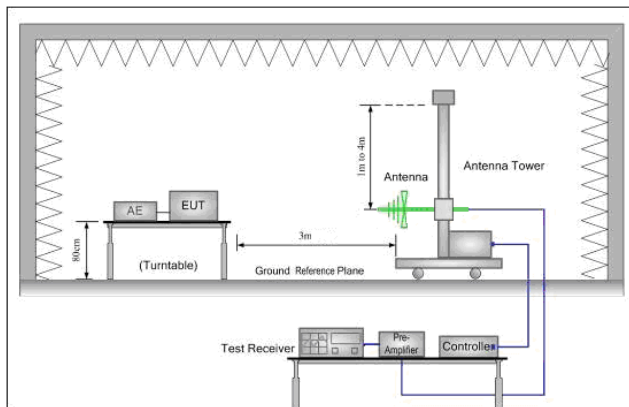


Figure 1. 30MHz to 1GHz

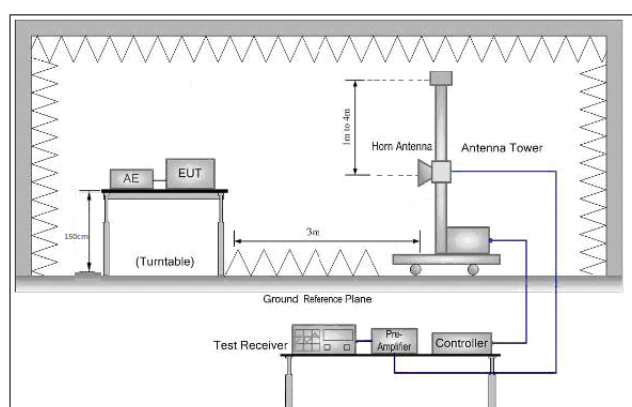


Figure 2. Above 1 GHz



SGS-CSTC Standards Technical Services Ltd. Shenzhen Branch

Report No.: SZEM160800727601

Page : 22 of 31

| | |
|-------------------|--|
| Test Procedure: | <ul style="list-style-type: none">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. 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 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 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. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channelh. Test the EUT in the lowest channel , the Highest channeli. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.j. Repeat above procedures until all frequencies measured was complete. |
| Instruments Used: | Refer to section 5.10 for details |
| Test Mode: | Transmitting mode . |
| Test Results: | Pass |



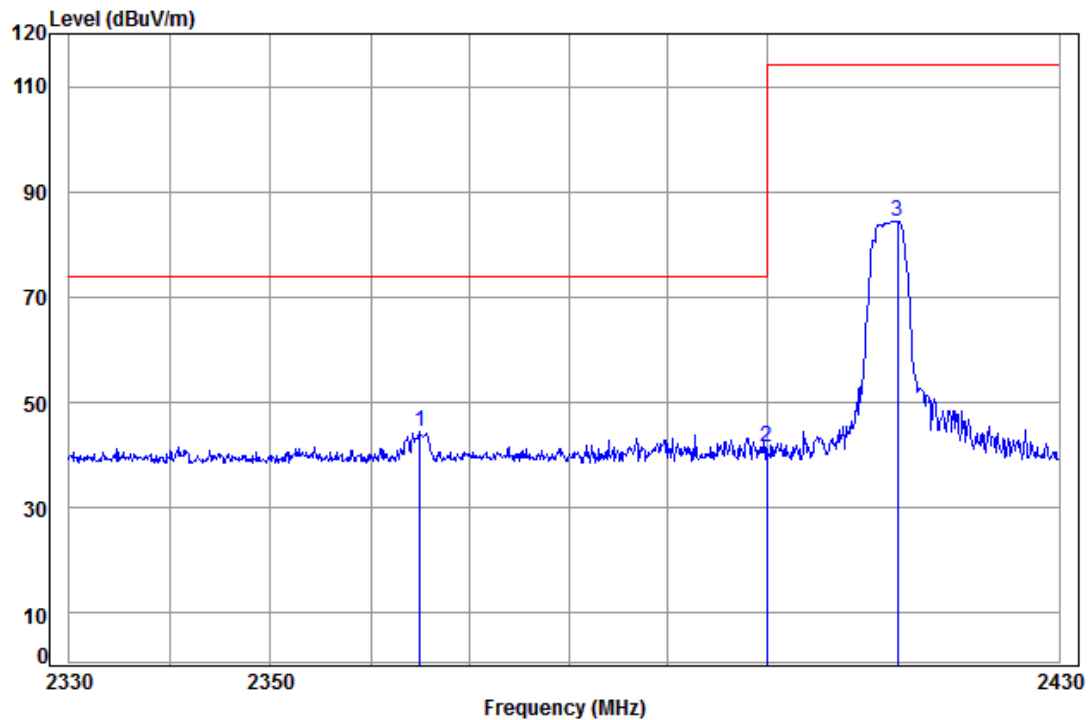
SGS-CSTC Standards Technical Services Ltd. Shenzhen Branch

Report No.: SZEM160800727601

Page : 23 of 31

Test plot as follows:

| | | | | | | |
|------------|--------------------|---------------|--------|---------|------|----------|
| Test mode: | Transmitting mode. | Test channel: | Lowest | Remark: | Peak | Vertical |
|------------|--------------------|---------------|--------|---------|------|----------|



Condition: 3m Vertical

Job No: : 7276CR

Mode: : 2413 Band edge

: 2.4G

| | | 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 pp | 2364.920 | 5.32 | 29.00 | 38.14 | 48.28 | 44.46 | 74.00 | -29.54 | |
| 2 | 2400.000 | 5.34 | 29.11 | 38.14 | 45.31 | 41.62 | 74.00 | -32.38 | |
| 3 | 2413.412 | 5.36 | 29.15 | 38.15 | 88.08 | 84.44 | 114.00 | -29.56 | |

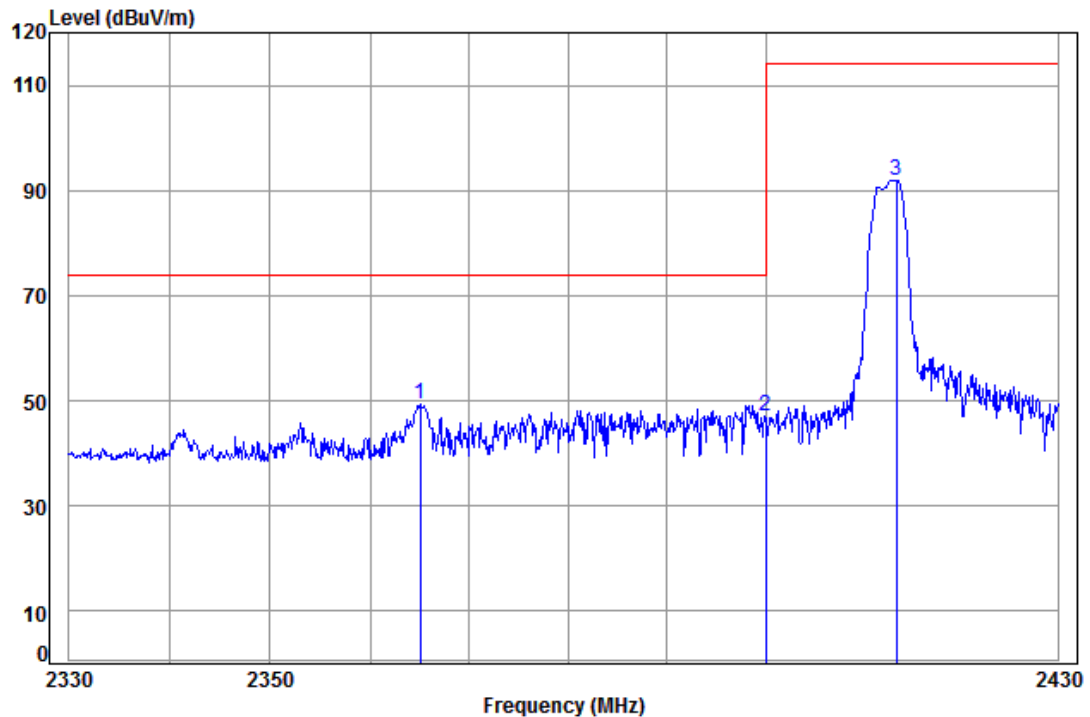


SGS-CSTC Standards Technical Services Ltd.
Shenzhen Branch

Report No.: SZEM160800727601

Page : 24 of 31

| | | | | | | |
|------------|--------------------|---------------|--------|---------|------|------------|
| Test mode: | Transmitting mode. | Test channel: | Lowest | Remark: | Peak | Horizontal |
|------------|--------------------|---------------|--------|---------|------|------------|



Condition: 3m Horizontal

Job No: : 7276CR

Mode: : 2413 Band edge

: 2.4G

| | Freq | Cable Loss | Ant Factor | Preamp Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|------|----------|---------------|---------------|------------------|---------------|--------|---------------|---------------|--------|
| | MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2365.020 | 5.32 | 29.00 | 38.14 | 53.10 | 49.28 | 74.00 | -24.72 | |
| 2 | 2400.000 | 5.34 | 29.11 | 38.14 | 50.64 | 46.95 | 74.00 | -27.05 | |
| 3 pp | 2413.412 | 5.36 | 29.15 | 38.15 | 95.57 | 91.93 | 114.00 | -22.07 | |

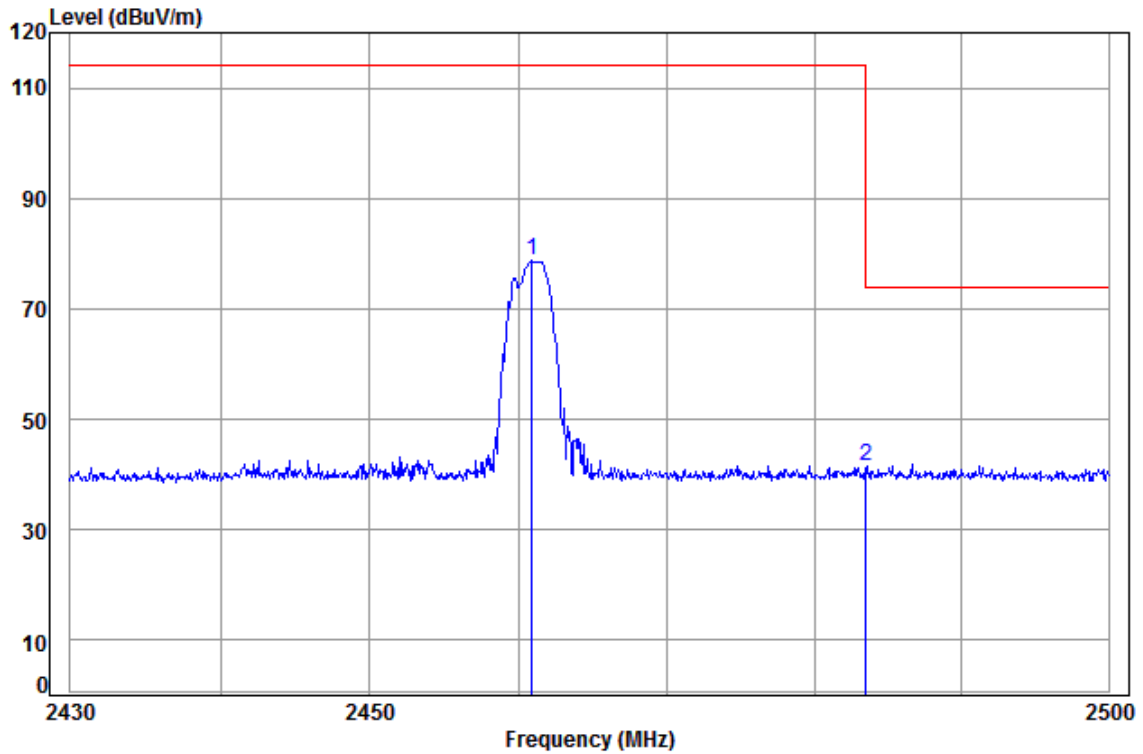


SGS-CSTC Standards Technical Services Ltd. Shenzhen Branch

Report No.: SZEM160800727601

Page : 25 of 31

| | | | | | | |
|------------|-----------------------------|---------------|---------|---------|------|----------|
| Test mode: | Charge + Transmitting mode. | Test channel: | Highest | Remark: | Peak | Vertical |
|------------|-----------------------------|---------------|---------|---------|------|----------|



Condition: 3m Vertical

Job No: : 7276CR

Mode: : 2461 Band edge

: 2.4G

| | Freq | Cable Loss | Ant Factor | Preamp Factor | Read Level | Limit | Over | Remark |
|------|----------|------------|------------|---------------|------------|--------|--------|--------|
| | MHz | dB | dB/m | dB | dBuV | dBuV/m | dB | |
| 1 | 2460.905 | 5.39 | 29.29 | 38.15 | 82.11 | 78.64 | 114.00 | -35.36 |
| 2 pp | 2483.500 | 5.41 | 29.35 | 38.15 | 45.02 | 41.63 | 74.00 | -32.37 |

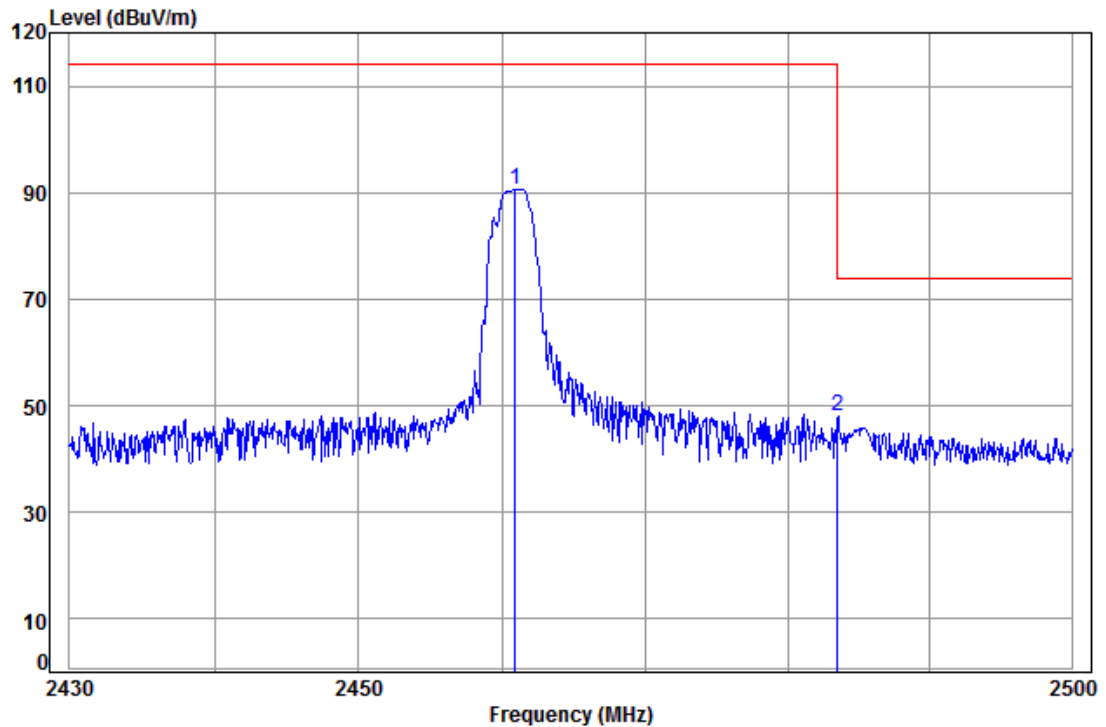


SGS-CSTC Standards Technical Services Ltd. Shenzhen Branch

Report No.: SZEM160800727601

Page : 26 of 31

| | | | | | | |
|------------|-----------------------------|---------------|---------|---------|------|------------|
| Test mode: | Charge + Transmitting mode. | Test channel: | Highest | Remark: | Peak | Horizontal |
|------------|-----------------------------|---------------|---------|---------|------|------------|



Condition: 3m Horizontal
Job No: : 7276CR
Mode: : 2461 Band edge
: 2.4G

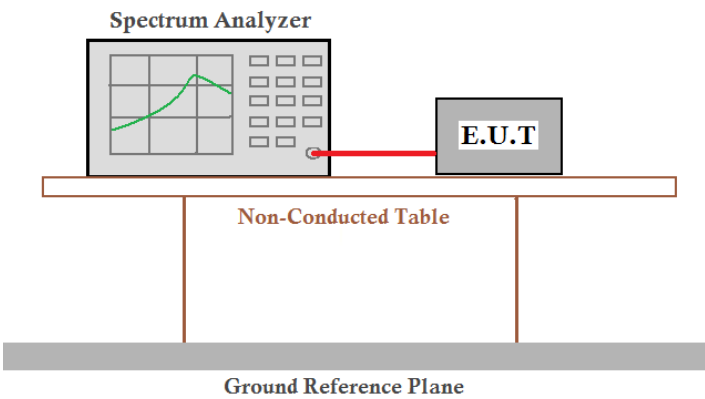
| | Freq | Cable Loss | Ant Factor | Preamp Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|------|----------|------------|------------|---------------|------------|--------|------------|------------|--------|
| | MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB | |
| 1 pp | 2460.905 | 5.39 | 29.29 | 38.15 | 94.06 | 90.59 | 114.00 | -23.41 | |
| 2 | 2483.500 | 5.41 | 29.35 | 38.15 | 51.39 | 48.00 | 74.00 | -26.00 | |

Note:

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

6.4 20dB Bandwidth

| | |
|-------------------|--|
| Test Requirement: | 47 CFR Part 15C Section 15.215 |
| Test Method: | ANSI C63.10:2013 |
| Test Setup: |  |
| Test Mode: | Transmitting mode. |
| Limit: | N/A |
| Instruments Used: | Refer to section 5.10 for details |
| Test Results: | Pass |

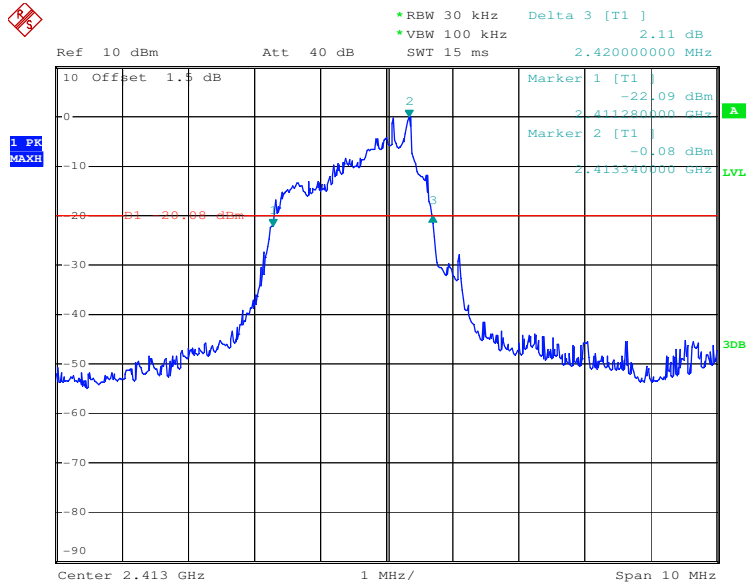
Measurement Data

| Test Channel | 20dB bandwidth (MHz) | Results |
|--------------|----------------------|---------|
| Lowest | 2.42 | Pass |
| Middle | 2.20 | Pass |
| Highest | 1.76 | Pass |

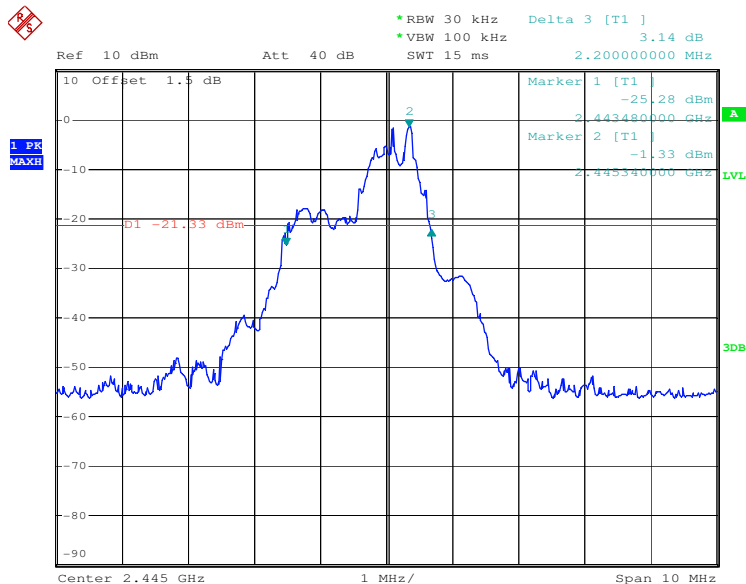


Test plot as follows:

| | |
|---------------|--------|
| Test channel: | Lowest |
|---------------|--------|



| | |
|---------------|--------|
| Test channel: | Middle |
|---------------|--------|



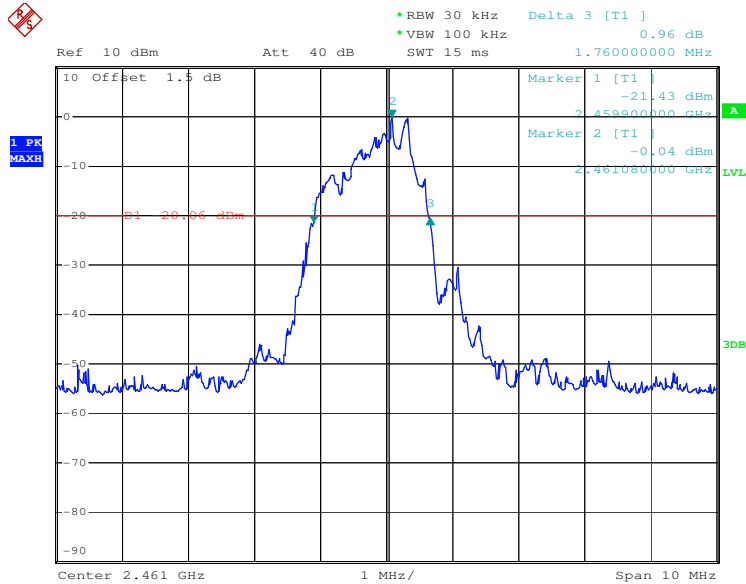


SGS-CSTC Standards Technical Services Ltd. Shenzhen Branch

Report No.: SZEM160800727601

Page : 29 of 31

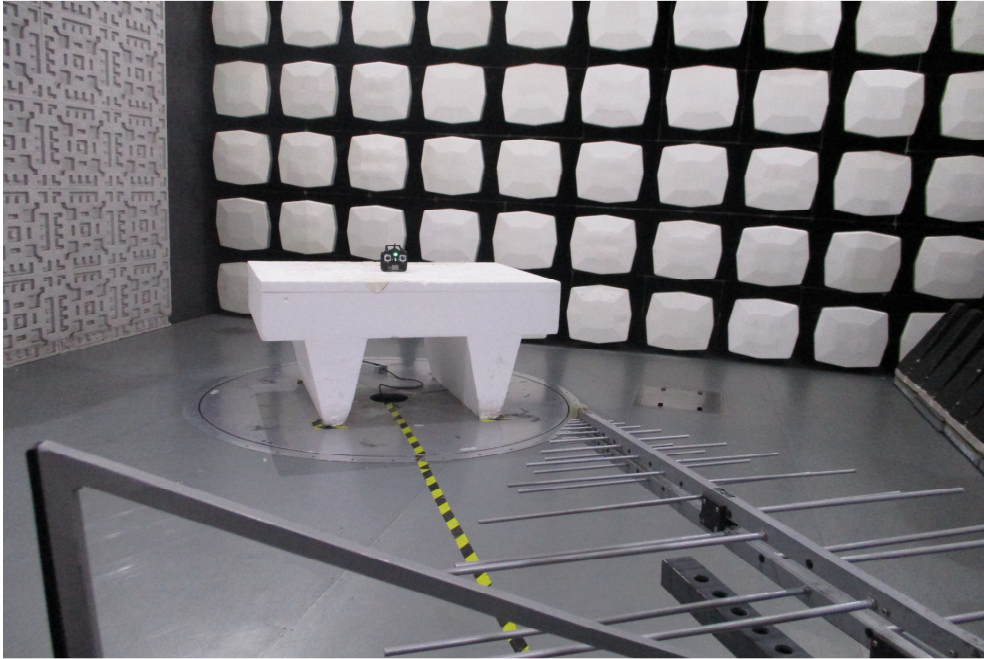
| | |
|---------------|---------|
| Test channel: | Highest |
|---------------|---------|



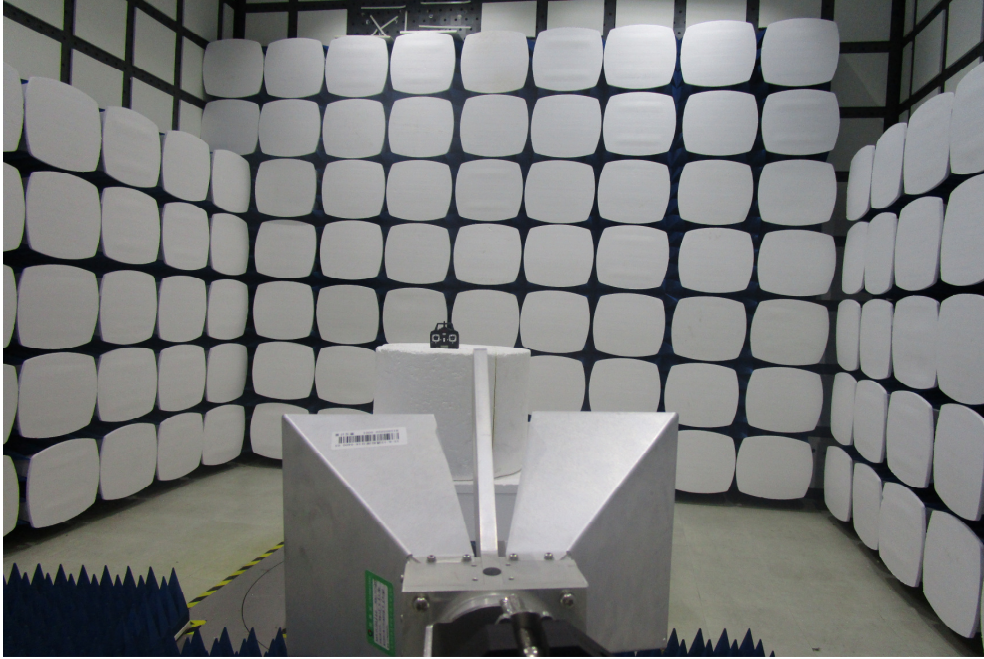
7 Photographs

Test model No.: 482016020

7.1 Radiated Emission Test Setup



7.2 Radiated Spurious Emission



7.3 EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1608007276CR.