# SPECTRUM REPORT

| | |
|---|---|
| **Applicant:** | Shenzhen Sunricher Technology Limited |
| **Address of Applicant:** | 3rd Floor,B building,Jia'an Industrial Building,Liu Xian Third road,No.72 area,Xin'an Street, Baoan District,Shenzhen,China |
| **Manufacturer/Factory:** | Shenzhen Sunricher Technology Limited |
| **Address of Manufacturer/Factory:** | 3rd Floor,B building,Jia'an Industrial Building,Liu Xian Third road,No.72 area,Xin'an Street, Baoan District,Shenzhen,China |

**Equipment Under Test (EUT)**

| | |
|---|---|
| Product Name: | RF LED CONTROLLER |
| Model No.: | Transmitter: SR-2835DIM, SR-2836D, SR-2835DIM(2PIN), 4991706, SR-2835CCT, SR-2835CCT(2PIN), 5991702, SR-2835RGB, SR-2835N , SR-2835N-CCT, SR-2835N-RGB, SR-2836NF, SR-2836R, SR-2836RCCT, SR-2836RGB, SR-2836DCCT, SR-2836DRGB<br>Receiver: SR-1009CS, SR-1009CS3, SR-1009CS7 |
| **Applicable standards:** | ETSI EN 300 220-1 V3.1.1 (2017-02),<br>ETSI EN 300 220-2 V3.1.1 (2017-02) |
| **Date of sample receipt:** | July 06, 2017 |
| **Date of Test:** | July 07-12, 2017 |
| **Date of report issue:** | July 13, 2017 |
| **Test Result :** | Pass * |

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

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives. The protection requirements with respect to electromagnetic compatibility contained in Directive 2014/53/EU are considered.

**Robinson Lo**
**Laboratory Manager**

## 2 Version

| Version No. | Date | Description |
|---|---|---|
| *00* | *July 13, 2017* | *Original* |
| | | |
| | | |
| | | |
| | | |

| | | | |
|---|---|---|---|
| ***Prepared By:*** | | ***Date:*** | *July 13, 2017* |
| | ***Project Engineer*** | | |
| ***Check By:*** | | ***Date:*** | *July 13, 2017* |
| | ***Reviewer*** | | |

# 3 Contents

# 4 Test Summary

| Radio Spectrum Matter (RSM) Part of Tx | | | | |
|---|---|---|---|---|
| **Test item** | **Test Requirement** | **Test method** | **Limit/Severity** | **Result** |
| Operating frequency(Declared by manufacturer) | ETSI EN 300 220-2 | ETSI EN 300 220-1 | Annexes B or C of EN 300 220-2 | Pass |
| Effective Radiated Power | ETSI EN 300 220-2 | ETSI EN 300 220-1 | Annexes B or C of EN 300 220-2 | Pass |
| Maximum e.r.p. Spectral Density | ETSI EN 300 220-2 | ETSI EN 300 220-1 | Annexes B or C of EN 300 220-2 | N/A |
| Duty cycle | ETSI EN 300 220-2 | ETSI EN 300 220-1 | Annexes B or C of EN 300 220-2 | Pass |
| Occupied Bandwidth | ETSI EN 300 220-2 | ETSI EN 300 220-1 | Annexes B or C of EN 300 220-2 | Pass |
| Frequency Error | ETSI EN 300 220-2 | ETSI EN 300 220-1 | Clause 5.7 | Pass |
| Tx Out of Band Emissions | ETSI EN 300 220-2 | ETSI EN 300 220-1 | Clause 5.8.2 | Pass |
| Transmit Spurious Emmisions | ETSI EN 300 220-2 | ETSI EN 300 220-1 | Clause 5.9.2 | Pass |
| Transient Power | ETSI EN 300 220-2 | ETSI EN 300 220-1 | Clause 5.10.2 | Pass |
| Adjacent Channel Power | ETSI EN 300 220-2 | ETSI EN 300 220-1 | Clause 5.11.2 | Pass |
| TX behaviour under Low Voltage Conditions | ETSI EN 300 220-2 | ETSI EN 300 220-1 | Clause 5.12.2 | Pass |
| Adaptive Power Control | ETSI EN 300 220-2 | ETSI EN 300 220-1 | Clause 5.13.2 | N/A |
| Short Term Behaviour | ETSI EN 300 220-2 | N/A | annex C, table C.1 | N/A |
| FHSS Equipment Requirements | ETSI EN 300 220-2 | N/A | Clause 4.3.10.2 | N/A |
| **Radio Spectrum Matter (RSM) Part of Rx** | | | | |
| **Test item** | **Test Requirement** | **Test method** | **Limit/Severity** | **Result** |
| Receiver sensitivity | ETSI EN 300 220-2 | ETSI EN 300 220-1 | Clause 5.14.2 | N/A |
| Adjacent channel selectivity | ETSI EN 300 220-1 | ETSI EN 300 220-1 | Clause 5.15.2 | N/A |
| Receiver saturation at Adjacent Channel | ETSI EN 300 220-1 | ETSI EN 300 220-1 | Clause 5.16.2 | N/A |
| Spurious response rejection | ETSI EN 300 220-1 | ETSI EN 300 220-1 | Clause 5.17.2 | N/A |
| Blocking | ETSI EN 300 220-2 | ETSI EN 300 220-1 | Clause 5.18.2 | Pass |
| Behaviour at high wanted signal level | ETSI EN 300 220-1 | ETSI EN 300 220-1 | Clause 5.19.2 | N/A |
| Clear Channel Assessment threshold | ETSI EN 300 220-2 | ETSI EN 300 220-1 | Clause 5.21.2.2 | N/A |
| Polite spectrum access timing parameters | ETSI EN 300 220-2 | ETSI EN 300 220-1 | Clause 5.21.3.1 | N/A |
| Adaptive Frequency Agility | ETSI EN 300 220-2 | N/A | N/A | N/A |
| Receive Spurious emmisions | ETSI EN 300 220-2 | ETSI EN 300 220-1 | Clause 5.9.2 | Pass |
| Bi-Directional Operation Verification | ETSI EN 300 220-1 | ETSI EN 300 220-1 | Clause 5.22.2 | N/A |

# 5 General Information

## 5.1 General Description of EUT

| | |
|---|---|
| Product Name: | RF LED CONTROLLER |
| Model No.: | Transmitter: SR-2835DIM, SR-2836D, SR-2835DIM(2PIN), 4991706, SR-2835CCT, SR-2835CCT(2PIN), 5991702, SR-2835RGB, SR-2835N, SR-2835N-CCT, SR-2835N-RGB, SR-2836NF, SR-2836R, SR-2836RCCT, SR-2836RGB, SR-2836DCCT, SR-2836DRGB<br>Receiver: SR-1009CS, SR-1009CS3, SR-1009CS7 |
| Test Model No.: | Transmitter: SR-2835DIM, SR-2836D<br>Receiver: SR-1009CS |
| *Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The only difference is the model name for commercial purpose.* | |
| Operation Frequency: | 869.5MHz (Declared by manufacturer) |
| Occupied bandwidth | 200kHz(Declared by manufacturer) |
| Number of Channels: | 1 |
| Antenna type: | TX:PCB Antenna<br>RX:Integrated antenna |
| Modulation type: | FSK(Declared by manufacturer) |
| Antenna Gain: | 0dBi(Declared by manufacturer) |
| Power supply: | TX:<br>Model: SR-2835DIM DC 3.0V (1 x 3V “CR2430” Button cell)<br>Model: SR-2836D DC 3.0V (1 x 3V “CR2025” Button cell)<br>RX: DC12-48V |

## 5.2 Test mode

| | |
|---|---|
| Transmitting mode | Keep the EUT in continuously transmitting mode |
| Receiving mode | Keep the EUT in receiving mode |

## 5.3 Test Facility

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

● **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fuly described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 22, 2016.

● **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, August 15, 2016.

## 5.4 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
Fax: 0755-27798960

## 5.5 Description of Support Units

None

## 5.6 Deviation from Standards

None

## 5.7 Abnormalities from Standard Conditions

None

## 5.8 Other Information Requested by the Customer

None

# 6 Test Instruments list

**RF Test:**

| Item | Test Equipment | Manufacturer | Model No. | Inventory No. | Cal.Date (mm-dd-yy) | Cal.Due date (mm-dd-yy) |
|---|---|---|---|---|---|---|
| 1 | 3m Semi- Anechoic Chamber | ZhongYu Electron | 9.2(L)*6.2(W)* 6.4(H) | GTS250 | July 03 2015 | July 02 2020 |
| 2 | Control Room | ZhongYu Electron | 6.2(L)*2.5(W)* 2.4(H) | GTS251 | N/A | N/A |
| 3 | Spectrum Analyzer | Agilent | E4440A | GTS533 | June 28 2017 | June 27 2018 |
| 4 | EMI Test Receiver | Rohde & Schwarz | ESU26 | GTS203 | June 28 2017 | June 27 2018 |
| 5 | BiConiLog Antenna | SCHWARZBECK MESS-ELEKTRONIK | VULB9163 | GTS214 | June 28 2017 | June 27 2018 |
| 6 | Double -ridged waveguide horn | SCHWARZBECK MESS-ELEKTRONIK | 9120D-829 | GTS208 | June 28 2017 | June 27 2018 |
| 7 | Horn Antenna | ETS-LINDGREN | 3160 | GTS217 | June 28 2017 | June 27 2018 |
| 8 | EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |
| 9 | Coaxial Cable | GTS | N/A | GTS213 | June 28 2017 | June 27 2018 |
| 10 | Coaxial Cable | GTS | N/A | GTS211 | June 28 2017 | June 27 2018 |
| 11 | Coaxial cable | GTS | N/A | GTS210 | June 28 2017 | June 27 2018 |
| 12 | Coaxial Cable | GTS | N/A | GTS212 | June 28 2017 | June 27 2018 |
| 13 | Amplifier(100kHz-3GHz) | HP | 8347A | GTS204 | June 28 2017 | June 27 2018 |
| 14 | Amplifier(2GHz-20GHz) | HP | 8349B | GTS206 | June 28 2017 | June 27 2018 |
| 15 | Amplifier (18-26GHz) | Rohde & Schwarz | AFS33-18002 650-30-8P-44 | GTS218 | June 28 2017 | June 27 2018 |
| 16 | Band filter | Amindeon | 82346 | GTS219 | June 28 2017 | June 27 2018 |
| 17 | Power Meter | Anritsu | ML2495A | GTS540 | June 28 2017 | June 27 2018 |
| 18 | Power Sensor | Anritsu | MA2411B | GTS541 | June 28 2017 | June 27 2018 |

# 7 Radio Technical Requirements Specification in ETSI EN 300 220-2

## 7.1 Test conditions

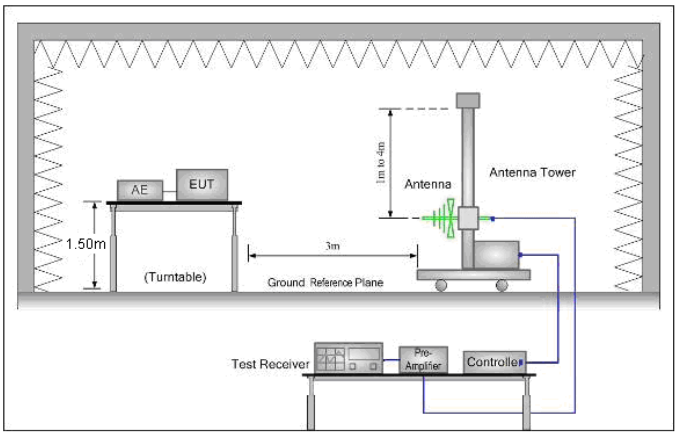
| | | | |
|---|---|---|---|
| Normal conditions | Ambient: | Temperature.: | +15°C to +35°C |
| | | relative humidity: | 20 % to 75 % |
| | Power supply: | Battery: | Nominal |
| | | AC mains source | Nominal |
| | | Other power sources | Nominal |
| Extreme conditions | Ambient: | Temperature.: | -20°C to +55°C |
| | Power supply: | Battery: | 0.9 and 1.3 mutiplied for lead-acid battery<br>0.85 and 1.15 mutiplied for"gel-cell" type batteries<br>0.85 and 0.9 mutiplied for lithium and nickel-cadmium type batteries<br>For other types it may declared by manufacturer |
| | | AC mains source | ±10% of the norminal power source |
| | | Other power sources | Declared by manufacturer |

## 7.2 Transmitter Requirement

### 7.2.1 Operation Frequency

| |
|---|
| The Operational Frequency band was declared by the manufacturer which conforms annexes B, C or any NRI of ETSI EN 300220-2. |

### 7.2.2 Effective Radiated Power

| | |
|---|---|
| Test Requirement: | ETSI EN 300 220-2 clause 4.3.1 |
| Test Method: | ETSI EN 300 220-1 clause 5.2 |
| Test site: | Measurement Distance: 3m (Semi-Anechoic Chamber) |
| Receiver setup: | RBW=120kHz, VBW=300kHz, Detector= peak |
| Limit: | 500mW=26.9897dBm (Refer to Annex B of ETSI EN 300220-2) |
| Test setup: |  |
| Test procedure: | Substitution method was performed to determine the actual ERP emission levels of the EUT.<br>The following test procedure as below:<br>1. On the test site as test setup graph above,the EUT shall be placed at the 1.5m support on the turntable and in the position closest to normal use as declared by the provider.<br>2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter.The output of the test antenna shall be connected to the measuring receiver.<br>3. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test.<br>4. The test antenna shall be raised and lowered from 1m to 4m until a maximum signal level is detected by the measuring receiver. Then the turntable should be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.<br>5. Repeat step 4 for test frequency with the test antenna polarized horizontally.<br>6. Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At the lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.<br>7. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. |

| | |
|---|---|
| | With the antennas at both ends vertically polarized, and with the signal generator tuned to a particular test frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.<br>8. Repeat step 7 with both antennas horizontally polarized for each test frequency.<br>9. Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps 7 and 8 by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula:<br>ERP(dBm) = Pg(dBm)) + antenna gain (dBd)<br>where:<br>Pg is the generator output power into the substitution antenna. |
| Measurement Record: | Uncertainty: ± 1.5dB |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

**Measurement Data**

Model: SR-2835DIM

| Test mode | Frequency (MHz) | ERP Level (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| Transmitting with modulation | 869.5MHz | -3.28 | 26.9897 | Pass |

Model: SR-2836D

| Test mode | Frequency (MHz) | ERP Level (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| Transmitting with modulation | 869.5MHz | -3.37 | 26.9897 | Pass |

Remark:Peak value is applicable.

### 7.2.3 Duty Cycle

| | |
|---|---|
| Test Requirement: | ETSI EN 300 220-2 clause 4.3.3 |
| Test Method: | ETSI EN 300 220-1 clause 5.4 |
| Limit: | 10% |
| Limit: | The device is manual operation for remote controller. It's declared by the manufacturer as a duty cycle ratio of less than 10%. |
| Result: | Pass |

**Measurement Data**

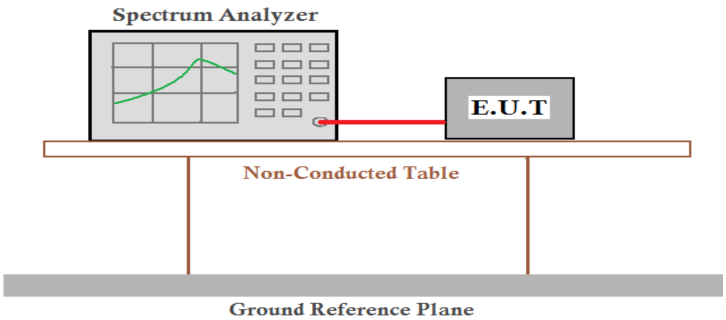
Model: SR-2835DIM

| Ton time(s) | Tcycle time(s) | Dutycycle | Limit | Result |
|---|---|---|---|---|
| 0.416 | 60 | 0.7% | 10% | Pass |

Model: SR-2836D

| Ton time(s) | Tcycle time(s) | Dutycycle | Limit | Result |
|---|---|---|---|---|
| 0.415 | 60 | 0.7% | 10% | Pass |

### 7.2.4 Occupied Bandwidth

<table>
<tr><td>Test Requirement:</td><td>ETSI EN 300 220-2 clause 4.3.4</td></tr>
<tr><td>Test Method:</td><td>ETSI EN 300 220-1 clause 5.6</td></tr>
<tr><td>Receive setup:</td><td>
Table 12: Test Parameters for Max Occupied Bandwidth Measurement
<table>
<tr><th>Setting</th><th>Value</th><th>Notes</th></tr>
<tr><td>Centre frequency</td><td>The nominal Operating Frequency</td><td>The highest or lowest Operating Frequency as declared by the manufacturer</td></tr>
<tr><td>RBW</td><td>1 % to 3 % of OCW without being below 100 Hz</td><td></td></tr>
<tr><td>VBW</td><td>3 x RBW</td><td>Nearest available analyser setting to 3 x RBW</td></tr>
<tr><td>Span</td><td>At least 2 x Operating Channel width</td><td>Span should be large enough to include all major components of the signal and its side bands</td></tr>
<tr><td>Detector Mode</td><td>RMS</td><td></td></tr>
<tr><td>Trace</td><td>Max hold</td><td></td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>The Operating Channel shall be declared and shall reside entirely within the Operational Frequency Band.<br>The Maximum Occupied Bandwidth at 99 % shall reside entirely within the Operating Channel defined by $F_{low}$ and $F_{high}$.<br>Note: For 865 MHz to 868 MHz FHSS equipment.The Maximum occupied bandwidth per hopping channel shell less or equal to 50kHz. For 863 MHz to 870 MHz FHSS equipment.The Maximum occupied bandwidth per hopping channel shell less or equal to 100kHz.</td></tr>
<tr><td>Test setup:</td><td>


</td></tr>
<tr><td>Test Procedure:</td><td>Step 1:<br>Operation of the EUT shall be started, on the highest operating frequency as declared by the manufacturer, with the appropriate test signal.<br>The signal attenuation shall be adjusted to ensure that the signal power envelope is sufficiently above the noise floor of the analyser to avoid the noise signals on either side of the power envelope being included in the measurement.<br>Step 2:<br>When the trace is completed the peak value of the trace shall be located and the analyser marker placed on this peak.<br>Step 3:<br>The 99 % occupied bandwidth function of the spectrum analyser shall be used to measure the occupied bandwidth of the signal.</td></tr>
<tr><td>Measurement Record:</td><td>Uncertainty: ±5%</td></tr>
<tr><td>Test Instruments:</td><td>Refer to section 6.0 for details</td></tr>
<tr><td>Test mode:</td><td>Refer to section 5.2 for details</td></tr>
<tr><td>Test results:</td><td>Pass</td></tr>
</table>

**Measurement Data**

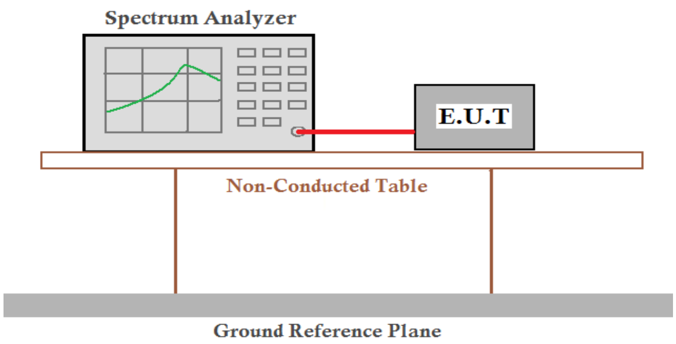
Model: SR-2835DIM

| 99% Occupied Bandwidth(MHz) | | | Limit | Result |
|---|---|---|---|---|
| $F_L$ | 869.410 | 0.18 | Within the band refer to Anex B or C | Pass |
| $F_H$ | 869.590 | | | |

Model: SR-2836D

| 99% Occupied Bandwidth(MHz) | | | Limit | Result |
|---|---|---|---|---|
| $F_L$ | 869.410 | 0.18 | Within the band refer to Anex B or C | Pass |
| $F_H$ | 869.590 | | | |

### 7.2.5 Frequency Error

| | |
|---|---|
| Test Requirement: | ETSI EN 300 220-2 clause 4.3.3 |
| Test Method: | ETSI EN 300 220-1 clause 5.7 |
| Test setup: |   |
| Test Procedure: | Step 1:<br>Operation of the EUT shall be started on the nominal frequency as declared by the manufacturer under extreme high temperature and extreme voltage conditions.<br>The frequency of the unmodulated carrier shall be measured and noted.<br>Step 2:<br>Operation of the EUT shall be started on the nominal frequency as declared by the manufacturer under extreme low temperature and extreme voltage conditions. |
| Measurement Record: | Uncertainty: ± 0.5ppm |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

**Measurement Data**

Model: SR-2835DIM

| Test conditions | Frequency(MHz) | A-N(KHz) | B-N(KHz) |
|---|---|---|---|
| N(NTNV) | 869.5MHz | 0 | 0 |
| B(HTHV) | 869.5MHz | | |
| A(LTLV) | 869.5MHz | | |

Model: SR-2836D

| Test conditions | Frequency(MHz) | A-N(KHz) | B-N(KHz) |
|---|---|---|---|
| N(NTNV) | 869.5MHz | 0 | 0 |
| B(HTHV) | 869.5MHz | | |
| A(LTLV) | 869.5MHz | | |

*Remark:HTHV is the extreme high temperature and extreme voltage condition. LTLV is the extreme low temperature and extreme voltage condition.*

### 7.2.6 TX Out Of Band Emissions

| | |
|---|---|
| Test Requirement: | ETSI EN 300 220-2 clause 4.3.5 |
| Test Method: | ETSI EN 300 220-1 clause 5.8.3 |

Receive setup:

**Table 16: Test Parameters for Out Of Band for Operating Channel Measurement**

| Spectrum Analyser Setting | Value | Notes |
|---|---|---|
| Centre frequency | Operating Frequency | |
| Span | 6 x Operating Channel width | |
| RBW | 1 kHz (see note) | Resolution bandwidth for Out Of Band domain measurements |
| Detector Function | RMS | |
| Trace Mode | Linear AVG | Applies only for EUT generating D-M2 test signal. An appropriate number of samples should be averaged to give a stable reading |
| | Max Hold | Applies only for EUT generating D-M2a or D-M3 test signal. |

NOTE: If the value of RBW used is different from $RBW_{REF}$ in clause 5.8.2, use the bandwidth correction in clause 4.3.10.1.

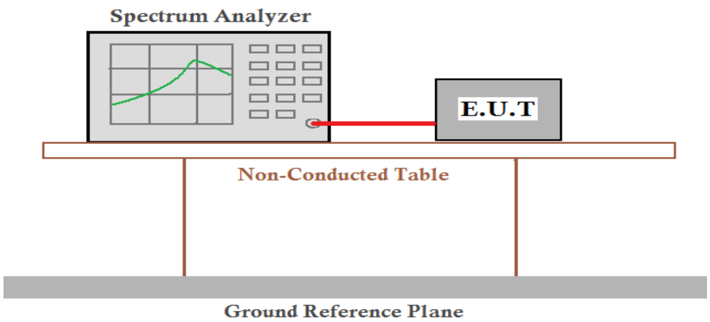
Limit:

**Table 15: Emission limits in the Out Of Band domains**

| Domain | Frequency Range | $RBW_{REF}$ | Max power limit |
|---|---|---|---|
| OOB limits applicable to Operational Frequency Band (See Figure 6) | $f \le f_{low\_OFB}$ - 400 kHz | 10 kHz | -36 dBm |
| | $F_{low\_OFB}$ - 400 kHz $\le f \le f_{low\_OFB}$ - 200 kHz | 1 kHz | -36 dBm |
| | $f_{low}$ - 200 kHz $\le f < f_{low\_OFB}$ | 1 kHz | See Figure 6 |
| | $f = f_{low\_OFB}$ | 1 kHz | 0 dBm |
| | $f = f_{high\_OFB}$ | 1 kHz | 0 dBm |
| | $F_{high\_OFB} < f \le f_{high\_OFB}$ + 200 kHz | 1 kHz | See Figure 6 |
| | $F_{high\_OFB}$ + 200 kHz $\le f \le f_{high\_OFB}$ + 400 kHz | 1 kHz | -36 dBm |
| | $F_{high\_OFB}$ + 400 kHz $\le f$ | 10 kHz | -36 dBm |
| OOB limits applicable to Operating Channel (See Figure 5) | $f = f_c$- 2.5 x OCW | 1 kHz | -36 dBm |
| | $f_c$ - 2,5 x OCW $\le f \le f_c$ - 0,5 x OCW | 1 kHz | See Figure 5 |
| | $f = f_c$ - 0,5 x OCW | 1 kHz | 0 dBm |
| | $f = f_c$ + 0,5 x OCW | 1 kHz | 0 dBm |
| | $f_c$ + 0,5 x OCW $\le f \le f_c$ + 2,5 x OCW | 1 kHz | See Figure 5 |
| | $f = f_c$+ 2,5 x OCW | 1 kHz | -36 dBm |

NOTE: f is the measurement frequency.
$f_c$ is the Operating Frequency.
$F_{low\_OFB}$ is the lower edge of the Operational Frequency Band.
$F_{high\_OFB}$ is the upper edge of the Operational Frequency Band.
OCW is the operating channel bandwidth.

Test setup:




| | |
|---|---|
| Test Procedure: | Refer to clause 5.8.3.4 of ETSI EN300220-1 |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

**Measurement Data**

Model: SR-2835DIM, SR-2836D

| Domain | Frequency Range | Result |
|---|---|---|
| OOB limits applicable to Operational Frequency Band | $f \leq f_{low\_OFB}$ - 400 kHz | Pass |
| | $F_{low\_OFB}$ - 400 kHz $\leq f \leq f_{low\_OFB}$ - 200 kHz | Pass |
| | $f_{low}$ - 200 kHz $\leq f < f_{low\_OFB}$ | Pass |
| | $f = f_{low\_OFB}$ | Pass |
| | $f = f_{high\_OFB}$ | Pass |
| | $F_{high\_OFB} < f \leq f_{high\_OFB}$ + 200 kHz | Pass |
| | $F_{high\_OFB}$ + 200 kHz $\leq f \leq f_{high\_OFB}$ + 400 kHz | Pass |
| | $F_{high\_OFB}$ + 400 kHz $\leq f$ | Pass |
| OOB limits applicable to Operating Channel | $f = f_c$- 2.5 x OCW | Pass |
| | $f_c$ - 2,5 x OCW $\leq f \leq f_c$ - 0,5 x OCW | Pass |
| | $f = f_c$ - 0,5 x OCW | Pass |
| | $f = f_c$ + 0,5 x OCW | Pass |
| | $f_c$ + 0,5 x OCW $\leq f \leq f_c$ + 2,5 x OCW | Pass |
| | $f = f_c$+ 2,5 x OCW | Pass |

### 7.2.7 Transient power

<table>
<tr><td>Test Requirement:</td><td>ETSI EN 300 220-2 Clause 4.3.6</td></tr>
<tr><td>Test Method:</td><td>ETSI EN 300 220-1 Clause 5.10</td></tr>
<tr><td>Limit:</td><td>

**Table 23: Transmitter Transient Power limits**

| Absolute offset from centre frequency | $RBW_{REF}$ | Peak power limit applicable at measurement points |
|---|---|---|
| ≤ 400 kHz | 1 kHz | 0 dBm |
| > 400 kHz | 1 kHz | -27 dBm |

</td></tr>
<tr><td>Test procedure:</td><td>

The output of the EUT shall be connected to a spectrum analyser or equivalent measuring equipment.
The measurement shall be undertaken in zero span mode. The analyser's centre frequency shall be set to an offset from the operating centre frequency. These offset values and their corresponding RBW configurations are listed in Table 24.

**Table 24: RBW for Transient Measurement**

| Measurement points: offset from centre frequency | Analyser RBW | $RBW_{REF}$ |
|---|---|---|
| -0,5 x OCW - 3 kHz<br>0,5 x OCW + 3 kHz<br>Not applicable for OCW < 25 kHz | 1 kHz | 1kHz |
| ±12,5 kHz or ±OCW whichever is the greater | Max (RBW pattern 1, 3, 10 kHz) ≤ Offset frequency/6 (see note) | 1 kHz |
| -0,5 x OCW - 400 kHz<br>0,5 x OCW + 400 kHz | 100 kHz | 1 kHz |
| -0,5 x OCW -1 200 kHz<br>0,5 x OCW + 1 200 kHz | 300 kHz | 1 kHz |
| NOTE: Max (RBW pattern 1, 3, 10 kHz) means the maximum bandwidth that falls into the commonly implemented 1, 3, 10 kHz RBW filter bandwidth incremental pattern of spectrum analysers.<br>EXAMPLE: If OCW is 25 kHz then the RBW value corresponding to one OCW offset frequency is 3 kHz. The rest of the analyser settings are listed in Table 25, and if OCW is 250 kHz then the RBW value corresponding to one OCW offset frequency is 30 kHz. | | |

**Table 25: Parameters for Transient Measurement**

| Spectrum Analyser Setting | Value | Notes |
|---|---|---|
| VBW/RBW | 10 | At higher RBW values VBW may be clipped to its maximum value |
| Sweep time | 500 ms | |
| RBW filter | Gaussian | |
| Trace Detector Function | RMS | |
| Trace Mode | Max hold | |
| Sweep points | 501 | |
| Measurement mode | Continuous sweep | |
| NOTE: The ratio between the number of sweep points and the sweep time shall be the same ratio as above if different number of sweep points is used. | | |

The used modulation shall be D-M3. The analyser shall be set to the settings of Table 25 and a measurement shall be started for each offset frequency. The EUT shall transmit at least five D-M3 test signal. The peak value shall be recorded and the measurement shall be repeated at each offset frequency mentioned in Table 24.
The recorded power values shall be converted to power values measured in RBWREF by the formula in clause 4.3.10.1.

</td></tr>
<tr><td>Measurement Record:</td><td>Uncertainty: ± 1.5dB</td></tr>
<tr><td>Test Instruments:</td><td>Refer to section 6.0 for details</td></tr>
<tr><td>Test mode:</td><td>Refer to section 5.2 for details</td></tr>
<tr><td>Test results:</td><td>Pass</td></tr>
</table>

**Measurement Data**

Model: SR-2835DIM

| Frequency offset | Peak Power level (dBm) | Limit (dBm) | Result |
|---|---|---|---|
| $F_c$-0.5*OCW-1200kHz | -32.55 | -27 | Pass |
| $F_c$-0.5*OCW-400kHz | -41.78 | -27 | |
| $F_c$-OCW | -36.41 | 0 | |
| $F_c$-0.5*OCW-3kHz | -47.48 | 0 | |
| $F_c$+0.5*OCW+3kHz | -42.56 | 0 | |
| $F_c$+OCW | -38.84 | 0 | |
| $F_c$+0.5*OCW+400kHz | -40.54 | -27 | |
| $F_c$+0.5*OCW+1200kHz | -36.11 | -27 | |

Model: SR-2836D

| Frequency offset | Peak Power level (dBm) | Limit (dBm) | Result |
|---|---|---|---|
| $F_c$-0.5*OCW-1200kHz | -32.45 | -27 | Pass |
| $F_c$-0.5*OCW-400kHz | -41.14 | -27 | |
| $F_c$-OCW | -36.64 | 0 | |
| $F_c$-0.5*OCW-3kHz | -47.84 | 0 | |
| $F_c$+0.5*OCW+3kHz | -42.45 | 0 | |
| $F_c$+OCW | -38.21 | 0 | |
| $F_c$+0.5*OCW+400kHz | -40.54 | -27 | |
| $F_c$+0.5*OCW+1200kHz | -36.14 | -27 | |

### 7.2.8 Adjacent Channel Power

<table>
<tr><td>Test Requirement:</td><td>ETSI EN 300 220-2 Clause 4.3.7.2</td></tr>
<tr><td>Test Method:</td><td>ETSI EN 300 220-1 Clause 5.11</td></tr>
<tr><td>Limit:</td><td>Table 26: Adjacent channel power limits for transmitters with OCW ≤ 25 kHz
<table>
<tr><th></th><th></th><th>Adjacent Channel power integrated over 0,7 x OCW</th><th>Alternate Adjacent Channel power integrated over 0,7 x OCW</th></tr>
<tr><td rowspan="2">OCW < 20 kHz</td><td>Normal test conditions</td><td>-20 dBm</td><td>-20 dBm</td></tr>
<tr><td>Extreme test conditions</td><td>-15 dBm</td><td>-20 dBm</td></tr>
<tr><td rowspan="2">OCW ≥ 20 kHz</td><td>Normal test conditions</td><td>-37 dBm</td><td>-40 dBm</td></tr>
<tr><td>Extreme test conditions</td><td>-32 dBm</td><td>-37 dBm</td></tr>
</table></td></tr>
<tr><td>Test procedure:</td><td>Center frequency: The nominal operating frequency<br>RBW=100Hz<br>VBW>=3*RBW<br>Span:>=5*operating channel width<br>Trace detector: RMS<br>Trace mode: Max hold</td></tr>
<tr><td>Measurement Record:</td><td>Uncertainty: ± 1.5dB</td></tr>
<tr><td>Test Instruments:</td><td>Refer to section 6.0 for details</td></tr>
<tr><td>Test mode:</td><td>Refer to section 5.2 for details</td></tr>
<tr><td>Test results:</td><td>N/A (Not applicable for OCW ⩾25KHz)</td></tr>
</table>

### 7.2.9 Adaptive Power Control

| |
|---|
| Only used in 870,000 MHz to 875,800 MHz band equipment. |

### 7.2.10 TX Behaviour under Low-voltage Conditions

| | |
|---|---|
| Test Requirement: | ETSI EN 300 220-2 Clause 4.3.8 |
| Test Method: | ETSI EN 300 220-1 Clause 5.12 |
| Receiver setup: | RBW=30Hz, VBW=100Hz, Detector= peak |
| Limit: | Equipment Type: channelized equipment — Limit: limits stated in clause 8.1.4<br>Equipment Type: non-channelized equipment — Limit: 1>.within the assigned operating frequency band. And 2>.the radiated or conducted power is greater than the spurious emission limits |
| Test procedure: | 1. The carrier frequency shall be measured, where possible in the absence of modulation, with the transmitter connected to an artificial antenna.<br>2. A transmitter without a 50 Ω output connector may be placed in a test fixture connected to an artificial antenna.<br>3. The measurement shall be made under normal temperature and humidity conditions,<br>4. Transmitter shall power by a DC power source take place the original battery power source, the voltage from the test power source shall be reduced below the lower extreme test voltage limit towards zero.<br>5. Test the fundamental carrier frequency of the transmitter with nominal supply voltage<br>6. Whilst the voltage is reduced the carrier frequency shall be monitored.<br>7. transmitter shall be operated at the maximum rated carrier power level, under normal test conditions;<br>8. Record the woking frequency. |
| Measurement Record: | Uncertainty: ±1 x $10^{-7}$ |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

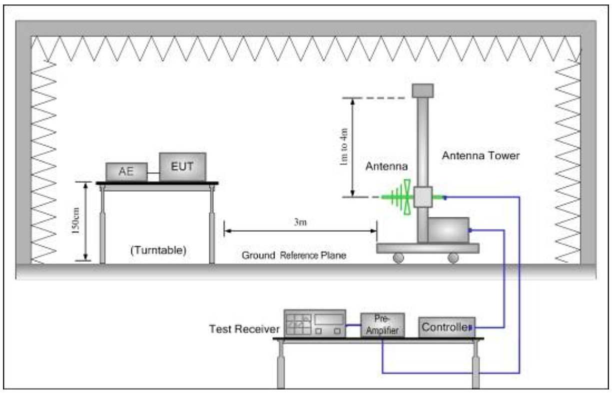
**Measurement Data:**

| Model: | **Voltage (DC)** | **Frequency spot (MHz)** | **Power (dBm)** | **Limit** | **Result** |
|---|---|---|---|---|---|
| SR-2835DIM | $V_{normal}$=3.0V | 869.50MHz | -4.20 | 869.40MHz to 869.65MHz | Pass |
| | $V_{extreme}$=2.7V | 869.51MHz | -5.27 | | |
| SR-2836D | $V_{normal}$=3.0V | 869.50MHz | -4.31 | | |
| | $V_{extreme}$=2.7V | 869.51MHz | -5.16 | | |

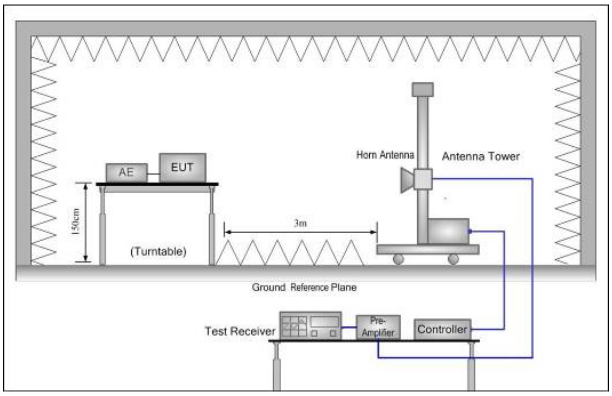
Remark:
1. The EUT is belong to non-channelized equipment.
2. $V_{extreme}$ is the lowest operation voltage.

### 7.2.11 Transmit spurious emissions

<table>
<tr><td>Test Requirement:</td><td>ETSI EN 300 220-2 Clause 4.2.2</td></tr>
<tr><td>Test Method:</td><td>ETSI EN 300 220-1 Clause 5.9</td></tr>
<tr><td>Receiver setup:</td><td>
Table 20: Parameters for TX Spurious Radiations Measurement
<table>
<tr><th>Operating Mode</th><th>Frequency Range</th><th>$RBW_{REF}$ (see note 2)</th></tr>
<tr><td rowspan="9">Transmit mode</td><td>9 kHz ≤ f < 150 kHz</td><td>1 kHz</td></tr>
<tr><td>150 kHz ≤ f < 30 MHz</td><td>10 kHz</td></tr>
<tr><td>30 MHz ≤ f < $f_c$ - m</td><td>100 kHz</td></tr>
<tr><td>$f_c$ - m ≤ f < $f_c$ - n</td><td>10 kHz</td></tr>
<tr><td>$f_c$ - n ≤ f < $f_c$ - p</td><td>1 kHz</td></tr>
<tr><td>$f_c$ + p < f ≤ $f_c$ + n</td><td>1 kHz</td></tr>
<tr><td>$f_c$ + n < f ≤ $f_c$ + m</td><td>10 kHz</td></tr>
<tr><td>$f_c$ + m < f ≤ 1 GHz</td><td>100 kHz</td></tr>
<tr><td>1 GHz < f ≤ 6 GHz</td><td>1 MHz</td></tr>
<tr><td colspan="3">NOTE 1: f is the measurement frequency.<br>$f_c$ is the Operating Frequency.<br>m is 10 x OCW or 500 kHz, whichever is the greater.<br>n is 4 x OCW or 100 kHz, whichever is the greater.<br>p is 2,5 x OCW.<br>NOTE 2: If the value of RBW used for measurement is different from $RBW_{REF}$, use bandwidth correction from clause 4.3.10.1.</td></tr>
</table>
</td></tr>
<tr><td>Test Frequency range:</td><td>25MHz to 6GHz</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency</th><th>Limit(operation)</th><th>Limit(standby)</th></tr>
<tr><td>47 MHz to 74 MHz<br>87.5 MHz to 118 MHz<br>174 MHz to 230 MHz<br>470 MHz to 790 MHz</td><td>4nW(-54dBm)</td><td>2nW(-57dBm)</td></tr>
<tr><td>Other frequencies below 1000 MHz</td><td>250nW(-36dBm)</td><td>2nW(-57dBm)</td></tr>
<tr><td>Above 1000 MHz</td><td>1uW(-30dBm)</td><td>20nW(-47dBm)</td></tr>
</table>
</td></tr>
<tr><td>Test setup:</td><td>
Below 1GHz




Above 1GHz
</td></tr>
</table>

| | |
|---|---|
| |  |
| Test procedure: | Substitution method was performed to determine the actual ERP emission levels of the EUT.<br>The following test procedure as below:<br>**Below 1GHz:**<br>1. On the test site as test setup graph above,the EUT shall be placed at the 1.5m support on the turntable and in the position closest to normal use as declared by the provider.<br>2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter.The output of the test antenna shall be connected to the measuring receiver.<br>3. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test.<br>4. The test antenna shall be raised and lowered from 1m to 4m until a maximum signal level is detected by the measuring receiver. Then the turntable should be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.<br>5. Repeat step 4 for test frequency with the test antenna polarized horizontally.<br>6. Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At the lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.<br>7. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends vertically polarized, and with the signal generator tuned to a particular test frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.<br>8. Repeat step 7 with both antennas horizontally polarized for each test frequency.<br>9. Calculate power in dBm into a reference ideal half-wave dipole antenna |

| | |
|---|---|
| | by reducing the readings obtained in steps 7 and 8 by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula:<br>ERP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBd)<br>where:<br>Pg is the generator output power into the substitution antenna.<br>**Above 1GHz:**<br>Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber, and the test antenna do not need to raise from 1 to 4m, just test in 1.5m height. |
| Measurement Record: | Uncertainty: ± 6dB |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

**Measurement Data**

Model: SR-2835DIM

| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Test Result |
|---|---|---|---|---|
| | polarization | Level(dBm) | | |
| 583.58 | Vertical | -84.25 | -54.00 | Pass |
| 673.88 | V | -84.27 | -54.00 | |
| 1280.00 | V | -58.40 | -30.00 | |
| 1930.00 | V | -58.08 | -30.00 | |
| 3060.00 | V | -58.55 | -30.00 | |
| 3980.00 | V | -57.33 | -30.00 | |
| 57.97 | Horizontal | -87.33 | -54.00 | |
| 100.07 | H | -91.64 | -54.00 | |
| 1510.00 | H | -60.32 | -30.00 | |
| 2675.00 | H | -58.71 | -30.00 | |
| 3630.00 | H | -58.32 | -30.00 | |
| 4435.00 | H | -55.86 | -30.00 | |
| **Tx in standby Mode** | | | | |
| N/A: Not applicable, since the spurious emission of the EUT is too weak to be detected.(≤-70dBm) | | | | |

Model: SR-2836D

| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Test Result |
|---|---|---|---|---|
| | polarization | Level(dBm) | | |
| 217.14 | Vertical | -88.97 | -54.00 | Pass |
| 596.64 | V | -84.58 | -54.00 | |
| 2930.00 | V | -57.93 | -30.00 | |
| 3415.00 | V | -55.98 | -30.00 | |
| 4265.00 | V | -56.83 | -30.00 | |
| 5575.00 | V | -51.08 | -30.00 | |
| 195.11 | Horizontal | -91.68 | -54.00 | |
| 518.60 | H | -85.26 | -54.00 | |
| 2575.00 | H | -59.51 | -30.00 | |
| 3210.00 | H | -56.60 | -30.00 | |
| 4720.00 | H | -55.99 | -30.00 | |
| 5460.00 | H | -52.43 | -30.00 | |
| **Tx in standby Mode** | | | | |
| N/A: Not applicable, since the spurious emission of the EUT is too weak to be detected.(≤-70dBm) | | | | |

## 7.3 Receiver Requirements

Receiver Classification, Table 1 of ETSI EN 300 220-1.

| Rx Class | Relevant Rx Clauses | Risk assessment of Rx performance |
|---|---|---|
| 1 | 8.3, 8.4, 8.5, 8.6 | Category 1 is a high performance level of receiver.<br>In particular to be used where the operation of a SRD may have inherent safety of human life implications. |
| 1.5 | 8.4, 8.6 | Category 1.5 is an improved performance level of receiver category 2. |
| 2 | | Category 2 is standard performance level of receiver. |
| 3 | 8.4, 8.6 | Category 3 is a low performance level of receiver.<br>Manufacturers have to be aware that category 3 receivers are not able to work properly in case of coexistence with some services such as a mobile radio service in adjacent bands. The manufacturer shall provide another mean to overcome the weakness of the radio link or accept the failure. |
| NOTE: The receiver category should be stated in both the test report and in the user's manual for the equipment. Receiver category 3 will be withdrawn after December 31st, 2018. | | |

**The EUT (Receiver part) belong to Category 2 with no Polite spectrum access function.**

### 7.3.1 Receiver sensitivity

Not applicable, since the test applied to Polite spectrum access equipment.

### 7.3.2 Clear Channel Assessment threshold

Not applicable, since the test applied to Polite spectrum access equipment.

### 7.3.3 Not applicable, since the test applied to Polite spectrum access equipment.

Not applicable, since the test applied to Polite spectrum access equipment.

### 7.3.4 Adaptive Frequency Agility

Not applicable, since the test applied to AFA quipment.

### 7.3.5 Adjacent channel selectivity

Not applicable, since the test applied to Category 1 equipment.

### 7.3.6 Receiver saturation at Adjacent Channel

Not applicable, since the test applied to Category 1 equipment.

### 7.3.7 Spurious response rejection

Not applicable, since the test applied to Category 1 equipment.

### 7.3.8 Behaviour at high wanted signal level

Not applicable, since the test applied to Category 1 equipment.

### 7.3.9 Bi-Directional Operation Verification

Not applicable, since this product is not support Bi-Directional operation function.

### 7.3.10 Blocking

| | |
|---|---|
| Test Requirement: | ETSI EN 300 220-2 Clause 4.4.2 |
| Test Method: | ETSI EN 300 220-1 clause 5.18 |

Limit:

**Table 43: Blocking level parameters for RX category 1**

| Requirement | Limits |
|---|---|
| | Receiver category 1 |
| Blocking at ±2 MHz from Centre Frequency | ≥ -20 dBm |
| Blocking at ±10 MHz from Centre Frequency | ≥ -20 dBm |
| Blocking at ±5 % of Centre Frequency or 15 MHz, whichever is the greater | ≥ -20 dBm |

**Table 42: Blocking level parameters for RX category 1.5**

| Requirement | Limits |
|---|---|
| | Receiver category 1.5 |
| Blocking at ±2 MHz from OC edge $f_{high}$ and $f_{low}$ | ≥ -43 dBm |
| Blocking at ±10 MHz from OC edge $f_{high}$ and $f_{low}$ | ≥ -33 dBm |
| Blocking at ±5 % of Centre Frequency or 15 MHz, whichever is the greater | ≥ -33 dBm |

**Table 41: Blocking level parameters for RX category 2**

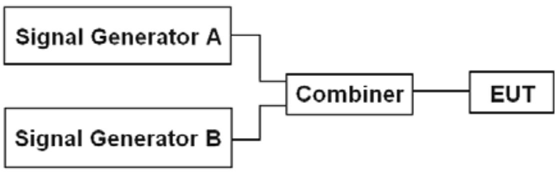
| Requirement | Limits |
|---|---|
| | Receiver category 2 |
| Blocking at ±2 MHz from OC edge $f_{high}$ and $f_{low}$ | ≥ -69 dBm |
| Blocking at ±10 MHz from OC edge $f_{high}$ and $f_{low}$ | ≥ -44 dBm |
| Blocking at ±5 % of Centre Frequency or 15 MHz, whichever is the greater | ≥ -44 dBm |

**Table 40: Blocking level parameters for RX category 3**

| Requirement | Limits |
|---|---|
| | Receiver category 3 |
| Blocking at ±2 MHz from OC edge $f_{high}$ and $f_{low}$ | ≥ -80 dBm |
| Blocking at ±10 MHz from OC edge $f_{high}$ and $f_{low}$ | ≥ -60 dBm |
| Blocking at ±5 % of Centre Frequency or 15 MHz, whichever is the greater | ≥ -60 dBm |

A = 10 log ($BW_{kHz}$ / 16 kHz) BW is the receiver bandwidth

Test setup:




Test procedure:

1. Two signal generators A and B shall be connected to the receiver via a combining network to the receiver antennaconnector.
2. Signal generator A shall be at the nominal frequency of the receiver, with normal modulation of the wanted signal. Signal generator B shall be unmodulated.
3. Measurements shall be carried out at frequencies of the unwanted signal at approximately ±2 MHz and ±10 MHz, avoiding those frequencies at which spurious responses occur.
4. Initially signal generator B shall be switched off and using signal generator A the level which still gives sufficient response shall be established, however, the level at the receiver input shall not be adjusted below the sensitivity limit given in clause 8.1.4. The output level of generator A shall then be increased by 3 dB.
5. Signal generator B is then switched on and adjusted until the wanted criteria (see clause 8.1.1) is just exceeded. With signal generator B settings unchanged the power into the receiver is measured by replacing the receiver with a power meter or spectrum analyzer. This

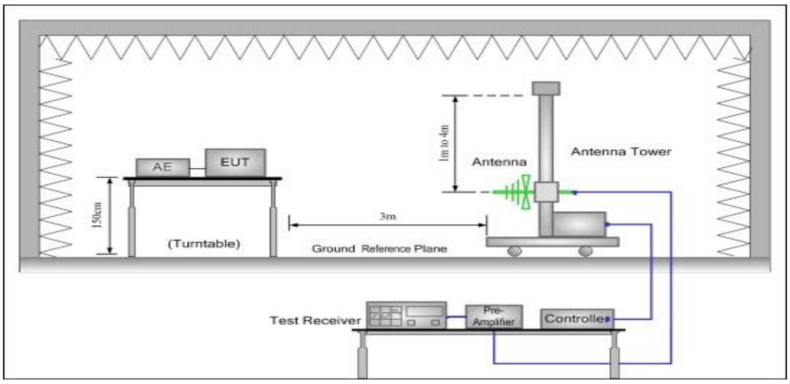
| | |
|---|---|
| | level shall be recorded. Alternatively, equipment having a dedicated or integral antenna may use a radiated measurement setup. For this, a test site from clause A.1 shall be selected and the requirements from clauses A.2 and A.3 apply.<br>6. Signal generators A and B together with a combiner shall be placed outside the anechoic chamber and a TX test antenna shall be placed with the EUT's antenna polarisation. The EUT shall be placed at the location of the turntable at the orientation of the most sensitive position. Generator A shall be set in order to reach the EUT sensitivity limit +3 dB.<br>7. The procedure shall be the same as for the conducted measurement. Bloking is the difference between signal generator B and signal generator A levels. |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

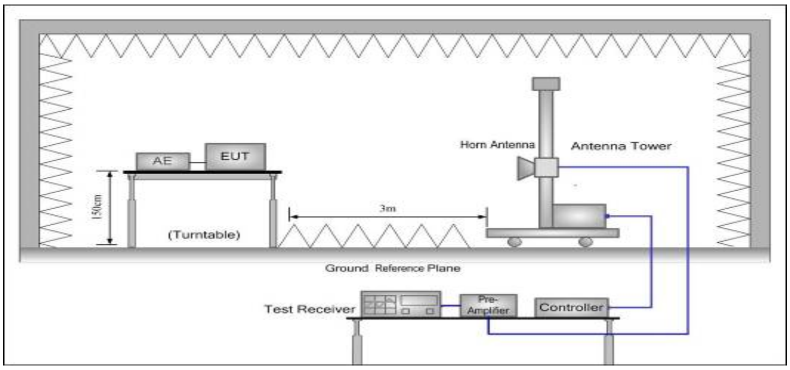
**Measurement data:**

| Frequency offset | Signal generator A level (dB) | Blocking level (dB) | Limit (dB) | Result |
|---|---|---|---|---|
| Flow-5% of Fc | -97.70 | -38 | -44.00 | Pass |
| Flow-10MHz | -97.70 | -36 | -44.00 | |
| Flow-2MHz | -97.70 | -47 | -69.00 | |
| FHigh+2MHz | -97.70 | -48 | -69.00 | |
| FHigh+10MHz | -97.70 | -37 | -44.00 | |
| FHigh+5% of Fc | -97.70 | -35 | -44.00 | |

Remark: The provider declared that the receiver bandwidth is 200kHz.

## 7.3.11 Spurious emissions

<table>
<tr><td>Test Requirement:</td><td>ETSI EN 300 220-2 Clause 4.2.2</td></tr>
<tr><td>Test Method:</td><td>ETSI EN 300 220-1 Clause 5.9.1.2</td></tr>
<tr><td>Receiver setup:</td><td>
Table 20: Parameters for TX Spurious Radiations Measurement
<table>
<tr><th>Operating Mode</th><th>Frequency Range</th><th>$RBW_{REF}$ (see note 2)</th></tr>
<tr><td>Transmit mode</td><td>9 kHz ≤ f < 150 kHz</td><td>1 kHz</td></tr>
<tr><td></td><td>150 kHz ≤ f < 30 MHz</td><td>10 kHz</td></tr>
<tr><td></td><td>30 MHz ≤ f < $f_c$ - m</td><td>100 kHz</td></tr>
<tr><td></td><td>$f_c$ - m ≤ f < $f_c$ - n</td><td>10 kHz</td></tr>
<tr><td></td><td>$f_c$ - n ≤ f < $f_c$ - p</td><td>1 kHz</td></tr>
<tr><td></td><td>$f_c$ + p < f ≤ $f_c$ + n</td><td>1 kHz</td></tr>
<tr><td></td><td>$f_c$ + n < f ≤ $f_c$ + m</td><td>10 kHz</td></tr>
<tr><td></td><td>$f_c$ + m < f ≤ 1 GHz</td><td>100 kHz</td></tr>
<tr><td></td><td>1 GHz < f ≤ 6 GHz</td><td>1 MHz</td></tr>
<tr><td colspan="3">NOTE 1: f is the measurement frequency.<br>$f_c$ is the Operating Frequency.<br>m is 10 x OCW or 500 kHz, whichever is the greater.<br>n is 4 x OCW or 100 kHz, whichever is the greater.<br>p is 2,5 x OCW.<br>NOTE 2: If the value of RBW used for measurement is different from $RBW_{REF}$, use bandwidth correction from clause 4.3.10.1.</td></tr>
</table>
</td></tr>
<tr><td>Test Frequency range:</td><td>25MHz to 6GHz</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency</th><th>Limit</th></tr>
<tr><td>Other frequencies below 1000 MHz</td><td>2nW(-57dBm)</td></tr>
<tr><td>Above 1000 MHz</td><td>20nW(-47dBm)</td></tr>
</table>
</td></tr>
<tr><td>Test setup:</td><td>
Below 1GHz


Above 1GHz


</td></tr>
<tr><td>Test procedure:</td><td>Substitution method was performed to determine the actual ERP emission</td></tr>
</table>

levels of the EUT.

The following test procedure as below:

**Below 1GHz:**

1. On the test site as test setup graph above,the EUT shall be placed at the 1.5m support on the turntable and in the position closest to normal use as declared by the provider.
2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter.The output of the test antenna shall be connected to the measuring receiver.
3. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test.
4. The test antenna shall be raised and lowered from 1m to 4m until a maximum signal level is detected by the measuring receiver. Then the turntable should be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
5. Repeat step 4 for test frequency with the test antenna polarized horizontally.
6. Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At the lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.
7. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends vertically polarized, and with the signal generator tuned to a particular test frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.
8. Repeat step 7 with both antennas horizontally polarized for each test frequency.
9. Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps 7 and 8 by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula:

   ERP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBd)

   where:

   Pg is the generator output power into the substitution antenna.

**Above 1GHz:**

Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber, and the test antenna do not need to raise from 1 to 4m, just test in 1.5m height.

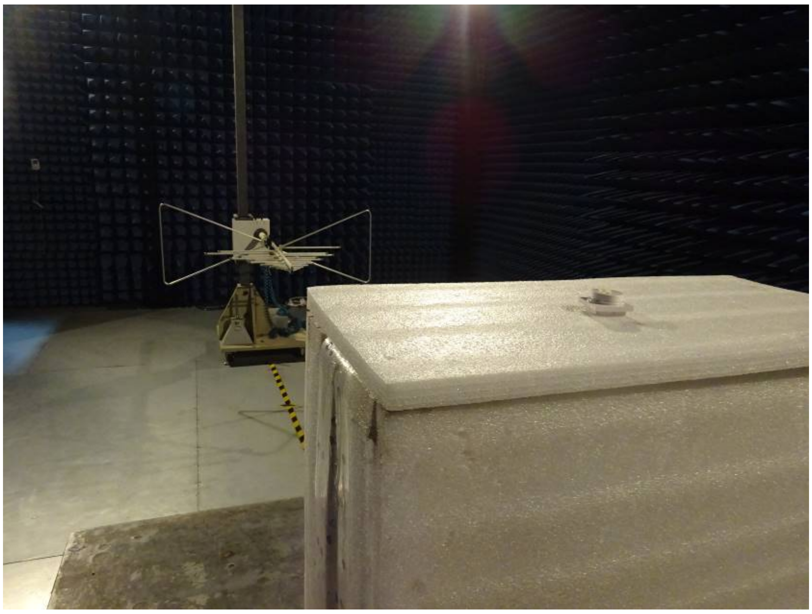
| Measurement Record: | Uncertainty: ± 6dB |
|---|---|
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

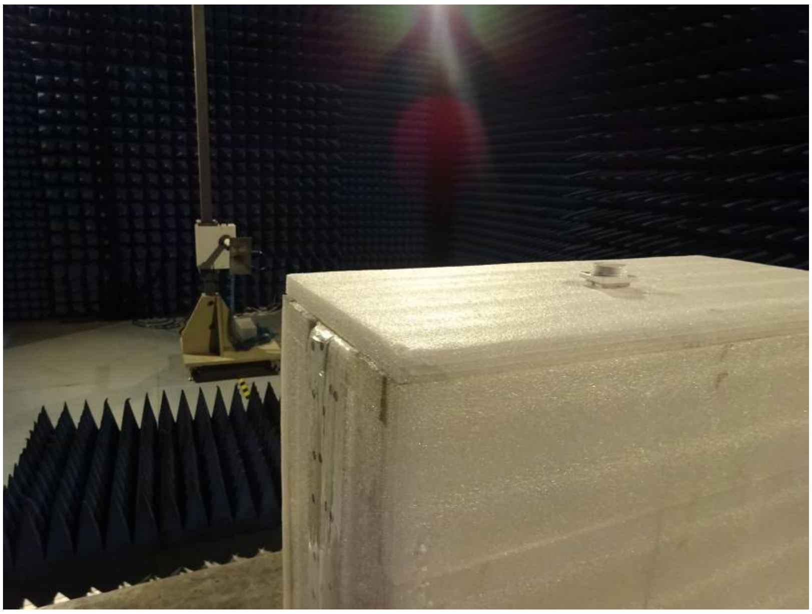
**Measurement Data**

| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Test Result |
|---|---|---|---|---|
| | polarization | Level(dBm) | | |
| 37.87 | Vertical | -68.03 | 2nW/ -57dBm below 1GHz, 20nW/ -47dBm above 1GHz. | Pass |
| 959.73 | V | -68.88 | | |
| 1059.00 | V | -60.34 | | |
| 2201.00 | V | -62.15 | | |
| 4504.00 | V | -61.73 | | |
| 8033.00 | V | -62.80 | | |
| 441.09 | Horizontal | -65.33 | | |
| 870.10 | H | -64.99 | | |
| 1420.00 | H | -64.30 | | |
| 2752.00 | H | -65.42 | | |
| 3945.00 | H | -61.95 | | |
| 5446.00 | H | -61.24 | | |

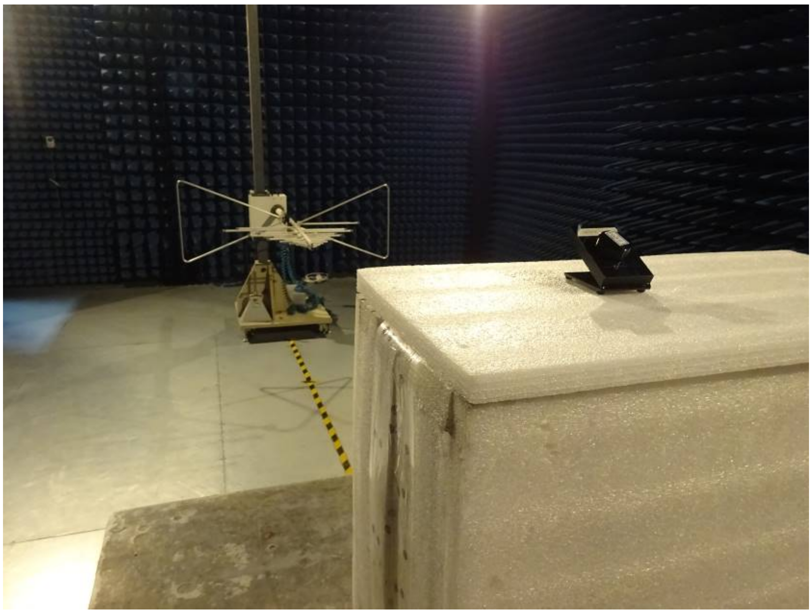
# 8 Test Setup Photo

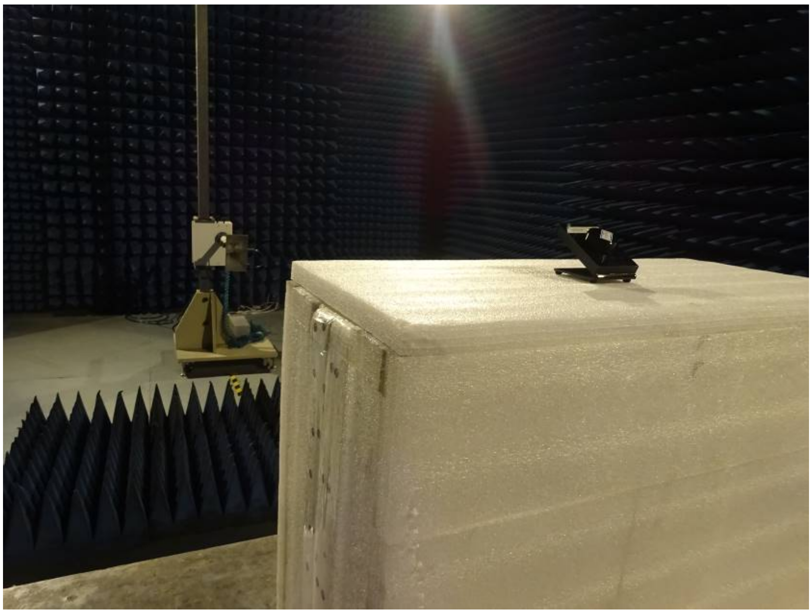
TX: Model: SR-2835DIM



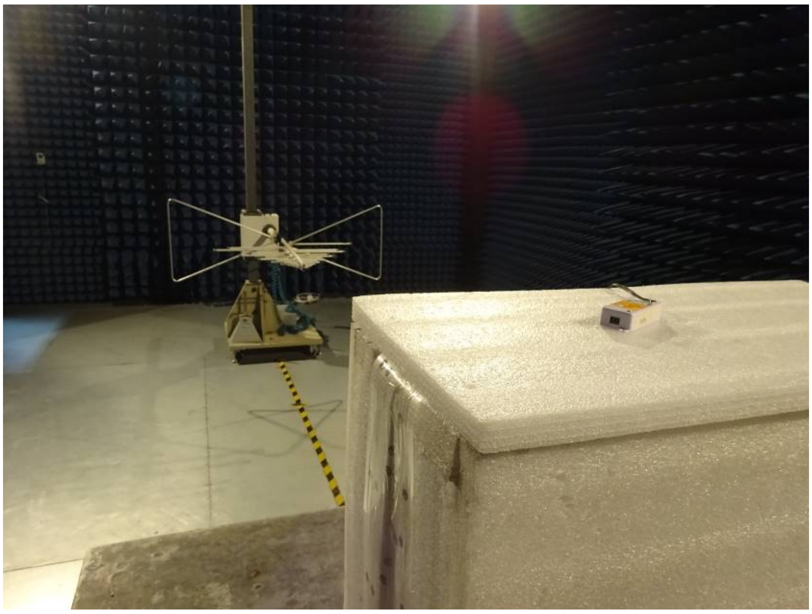


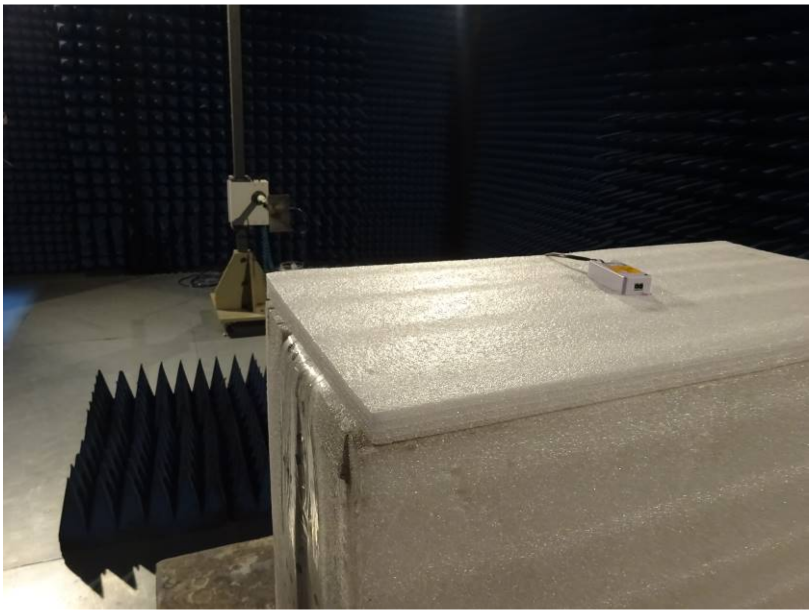
TX: Model: SR-2836D





RX:





## 9 EUT Constructional Details

Reference to the test report No. GTS201707000039E01

------End------