Continental Compliance 868LTE/UE

Owner’s manual & user guide

800MHz LTE/4G user equipment out of band interference simulator for 865 to 870MHz SRD testing
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Your 868LTE / UE simulator

In the box:

- This user guide
- 868MHz antenna
  (Connect to simulator with finger tightness only)
- AC to DC power supply, wall adaptor for your country & 3m DC extension

Interference simulator

- DC power supply
- Push on / push off
- Antenna socket

CCL 868LTE/UE User Guide rev 2.0
Optional accessories available for 868LTE / UE

Directional coupler

(Connect SMA plugs using little more than finger tightness only or a maximum of 0.5 Nm)

10dB SMA attenuator

50 ohm SMA to SMA cable
Simulator output

The 868LTE/UE antenna radiates a broad band signal (Gaussian white noise) at a precise level, from 865 MHz to 870 MHz, simulating out of band emissions (spectral splash) from 800 MHz LTE user equipment (UE).

The radiation from the simulator antenna is very much lower than from actual LTE equipment. Simulated interference tests representing LTE user equipment at up to 60m can be achieved by using the look up table provided on page 7, spacing the 868LTE/UE within 1 metre of your short range device (SRD) antenna.

For example, a spacing of 1m between the 868LTE/UE and your product simulates actual LTE user equipment operating at approximately 60 metres distance. 10cm simulates LTE UE operating at 6 metres distance.

The simulator field strength used to calculate the spacing is based on the LTE equipment regulatory limits for emissions in the SRD band. This is a worst case assumption, but when considering the use of multiple LTE equipment, it becomes a more common place scenario.

Simulation conversion factors for LTE UE emissions under the regulatory limit are also provided.
Test configuration

Orientate the simulator antenna to be in line with your SRD product antenna. Adjust the spacing as detailed in the next section of the manual.

If the SRD antenna is internal to the product, carry out several tests to establish the worst case performance reduction when the simulator is turned on.

Place the simulator antenna in line with each edge of the SRD case in turn to find the worst case result.
Testing your product

- Screw the antenna to the simulator RF output socket using finger tightness only.

- Connect the power supply DC plug into the simulator and turn the power on at the AC wall socket. (An optional fit 3m DC extension cable is supplied for longer reach if required).

- The spacing you set between the simulator antenna and the SRD product antenna controls the strength of the interference signal.

Use the following table to set the required spacing.

<table>
<thead>
<tr>
<th>Simulator to SRD spacing</th>
<th>LTE UE to SRD simulated distance*</th>
</tr>
</thead>
<tbody>
<tr>
<td>10cm</td>
<td>6m</td>
</tr>
<tr>
<td>20cm</td>
<td>12m</td>
</tr>
<tr>
<td>40cm</td>
<td>24m</td>
</tr>
<tr>
<td>80cm</td>
<td>48m</td>
</tr>
<tr>
<td>1m</td>
<td>60m</td>
</tr>
</tbody>
</table>

*If you wish to apply a scenario where the LTE UE emissions in the SRD band are lower than the mandatory regulatory limit, divide the second column ‘simulated distance’ by a factor of 3 for each 10dB step below the limit. E.g. 20dB under the limit, 40cm spacing gives 2.7m simulated. (Check www.rfdesignuk.com/LTE.htm for updates on LTE UE limits).

- Collect SRD range test results in a typical user environment and typical mode of use with the simulator powered down. For example, man down, personal attack or Social Alarm testing would include operation of the SRD transmitter at ground level.

- Re-test with the simulator powered on (red led illuminated) and at the required spacing from the SRD antenna to simulate the LTE UE spacing of interest.
868LTE / UE conducted test accessories

For SRD with a 50 ohm conducted antenna port, hardware accessory options provide for direct coupling of the interference, whilst combining with the wanted signals delivered by the SRD antenna or a development lab signal generator. How to connect the (-10dB) directional coupler accessory:

You will need to supply SMA cables to connect your SRD product hardware and antenna to the simulator coupler.

The simulator coupler is specified for inputs up to 1W in the SRD band and is compatible with 868MHz SRD transceivers.

The interference power coupled to the SRD under test is -56dBm/MHz. By placing the 10dB attenuator (supplied) in line with the simulator / coupler cable, the level can be adjusted to -66dBm/MHz.

These levels correspond to LTE user equipment operated at 5m and 16m from the SRD product respectively. (As described on page 7, divide the simulated distances by 3 for 10dB reduction of the LTE UE emissions).
## Technical specification

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of operation</td>
<td>865 MHz to 870 MHz</td>
</tr>
<tr>
<td>Output signal</td>
<td>Gaussian noise</td>
</tr>
<tr>
<td>Output level</td>
<td>-46.5dBm/Mhz, ±1.5dB at 868 MHz</td>
</tr>
<tr>
<td>Excess noise ratio</td>
<td>67.5dB ENR at 868 MHz</td>
</tr>
<tr>
<td>Output flatness</td>
<td>Better than ±1.5dB</td>
</tr>
<tr>
<td>Output impedance</td>
<td>50 ohms</td>
</tr>
<tr>
<td>Output return loss (on)</td>
<td>&gt;13dB from 865 MHz to 870 MHz</td>
</tr>
<tr>
<td>All out of band signals</td>
<td>&lt;-75dBm/MHz &lt;857 MHz, &gt;880 MHz</td>
</tr>
<tr>
<td>868LTE/UE+ output level</td>
<td>-56dBm/MHz at SRD coupler port, 58dB ENR</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>+5°C minimum, +40°C maximum</td>
</tr>
<tr>
<td>Power supply (simulator jack)</td>
<td>+11.5v to +20.0v @ 80mA. Reverse protection provided.</td>
</tr>
<tr>
<td>Universal AC power supply</td>
<td>100v to 240v, 50Hz or 60Hz</td>
</tr>
</tbody>
</table>

### EMC performance

Meets Class B conducted and radiated emissions limits and immunity requirements for CE mark attachment. The supplied AC power supply meets all EMC and safety requirements for CE mark attachment.

### Regulatory

CE mark tests and declarations completed.