Evaluation of the RF exposure.

Measurements of the RF exposure from the EUT were made with the antenna connected to the antenna port. The measurements were made with a broadband non-directional Radiation Monitor, EMR-200, produced by the Wandel & Goltermann GmbH & Co.

The transmitting antenna is a product of the MAXRAD model MAX 8055, with a gain of 5 dBd.
The manufacturer produces these antennas tuned to 815 MHz, the antennas operate without any extra tuning in the frequency range of 806-866 MHz. The tuned frequency of the antenna was verified with a Network Analyzer, Hewlett Packard, Model 8753D.

The Radiation Monitor EMR-200 consists of a Radiation Meter and a few Probes of H- or E type – for measurement of either magnetic field strength or electric field strength (and/ or - power density) in the frequency range from 100 kHz to 18 GHz. For the measurements performed with the tested device a type 8 E-field probe was used, which is sensitive to the electro-magnetic fields in the frequency range up to 3 GHz, as the EUT irradiated in the frequency range of 806-824 MHz

The EMR-200 can be set to display the following options for a measuring signal:

- Instantaneous value of a signal,
- Maximum value of a signal;
- Average value of a measured signal over a six-minute period.

During the measurements, a power density of the device's radiation at each tested height point (from the range of 0 to 2 m) was averaged over a thirty-minute period, as is required by the FCC.

To comply with the FCC requirement concerning the Duty Cycle (which shall be equal to 50%), Duty Factor of the EUT was verified with the Spectrum Analyzer, Hewlett Packard, Model 8591E

The Radiation Monitor had calibration due date of 08/07/01;
The Spectrum Analyzer had calibration due date of 11/14/01;
The Network Analyzer had calibration due date of 03/26/01

Previous testing of the EUT's emissions performed at the RTL showed that conducted emissions had the same level for all three channels of the device (covering the frequency range of 806 MHz to 824 MHz). So, for measurement of the RF exposure the worst-case channel frequency was used at 815 MHz was used. (see above).

The test was performed per instructions from the FCC (Correspondence Reference Number is 18265, Confirmation Number – EA99427).
There were three configurations investigated and tested namely 1, 2, and 3 below.

1. Antenna was placed on the non-conductive surface, 80 cm from the ground.
   This set up represented an antenna placed on the window of a car (First set up).

2. Antenna was placed on the conductive surface, 80 cm from the ground.
   This set up represented an antenna placed on the trunk of the car* (Second set up).

3. Antenna was placed on the conductive surface 130 cm from the ground.
   This set up represented and antenna placed on the roof of the car* (Third set up).

*NOTE: Part of a car shape structure was placed on the wooden platform in-order to perform these tests.

Results of the measurements are shown below.

Probe height (m)	Power density, mW/cm^2		
	First case	Second case	Third case
2.0	**0.0004**	**0.0004**	**0.0012**
1.9	**0.0005**	**0.0005**	**0.0135**
1.8	**0.0006**	**0.0005**	**0.0247**
1.7	**0.0008**	**0.0008**	**0.0199**
1.6	**0.0115**	**0.0011**	**0.0156**
1.5	**0.0130**	**0.0120**	**0.0250**
1.4	**0.0145**	**0.0159**	**0.0610**
1.3	**0.0165**	**0.0080**	**0.1160**
1.2	**0.0190**	**0.0012**	**0.0640**
1.1	**0.0450**	**0.0330**	**0.0280**
1.0	**0.0760**	**0.0628**	**0.0075**
0.9	**0.0950**	**0.0943**	**0.0061**
0.8	**0.1050**	**0.1092**	**0.0042**
0.7	**0.0660**	**0.0750**	**0.0011**
0.6	**0.0261**	**0.0170**	**0.0007**
0.5	**0.0200**	**0.0150**	**0.0004**
0.4	**0.0155**	**0.0130**	**0.0002**
0.3	**0.0080**	**0.0070**	**0.0001**
0.2	**0.0013**	**0.0010**	**0.0001`**
0.1	**0.0009**	**0.0006**	**0.0000**
0.0	**0.0005**	**0.0004**	**0.0000**

The maximum level was found in the third case at the height of 1.3 m. It was 0.1160 mW/cm^2

The FCC limits for RF General Population/Uncontrolled Exposure, P_{lim} [mW/cm^2] in the frequency range of 300-1500 MHz is given as the follows:

$P_{lim} = f/1500$,
where f – is a frequency in MHz.

The expression gives a value of 0.543 mW/cm^2 as a limit for power density at the frequency of 815 MHz and a value of 0.537 mW/cm^2 - as a limit for power density at the frequency of 806 MHz.

These values for the power density limits are significantly higher than the RF exposure from the tested device. The EUT is compliant with the FCC's limit.