Amendment to

ELECTROMAGNETIC EMISSIONS TEST REPORT

ACCORDING TO FCC CFR 47 PART 15 SUBPART B, PART 90 SUBPART I

for

Tadiran Telematics

EQUIPMENT UNDER TEST:

Vehicle location unit, model TULIP-US

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ACCREDITED
839.01
Electrical

1.1 Output power measurements

1.1.1 Test procedure

Narrowband modulating signal was used.

The EUT was set up as shown in Figure 1.1.1. The measurements were made with spectrum analyzer.

The 7.76 W power output was calculated according to formula

$$\mathbf{P = P_{SA} + Att_{ext}},$$

where P_{SA} = 8.33 dBm,

Att_{ext} = 30.6 dB,

$$P = 8.33 \text{ dBm} + 30.6 \text{ dB} = 38.93 \text{ dBm} = 7.76 \text{ W}.$$

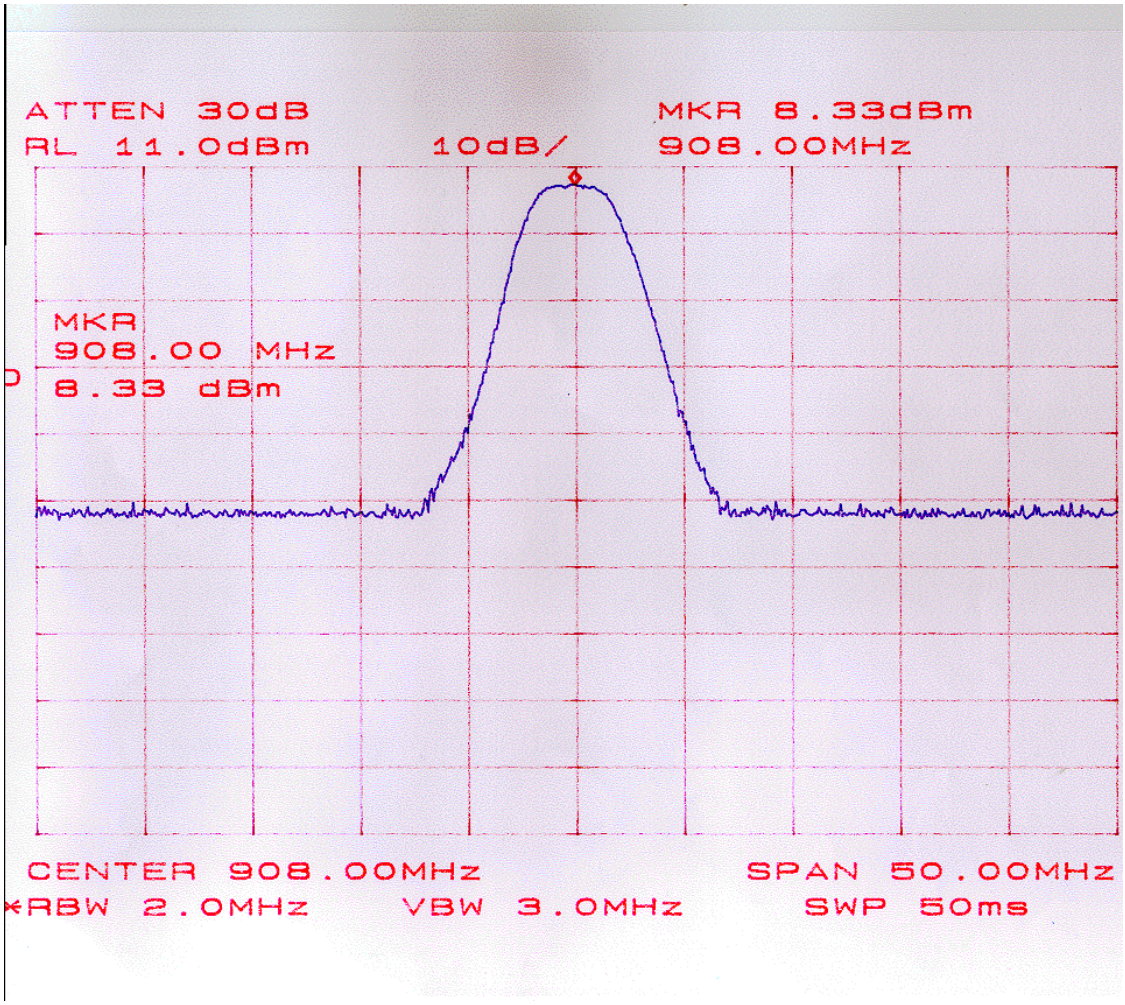
Test results are shown in Plot 1.1.1.

Reference numbers of test equipment used

HL 0025	HL 0056	HL 0872

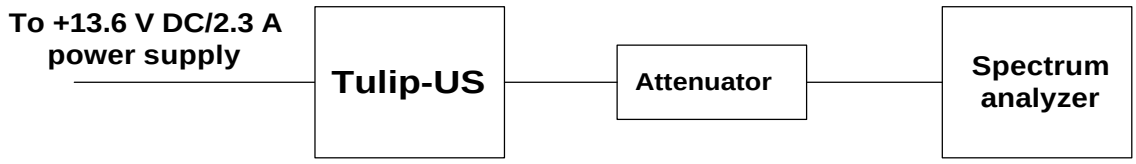
Full description is in Appendix A.

Plot 1.1.1
Output power measurement



External attenuation = 30.6 dB.

Figure 1.1.1
Output power measurement test setup



1.2 Occupied bandwidth measurements according to FCC part 90 paragraph 209

1.2.1 General

According to paragraph 90.209 (5) the maximum authorized bandwidth for multilateration LMS operations shall be 5.75 MHz in the 904.00 – 909.75 MHz band.

1.2.2 Test procedure

Narrowband modulating signal was used.

The measurements were performed using spectrum analyzer.

The occupied bandwidth was measured as a frequency band between points where power envelope of carrier, modulated with normal signal, drops 23 dB below unmodulated carrier.

Measured occupied bandwidth was 3.50 MHz.

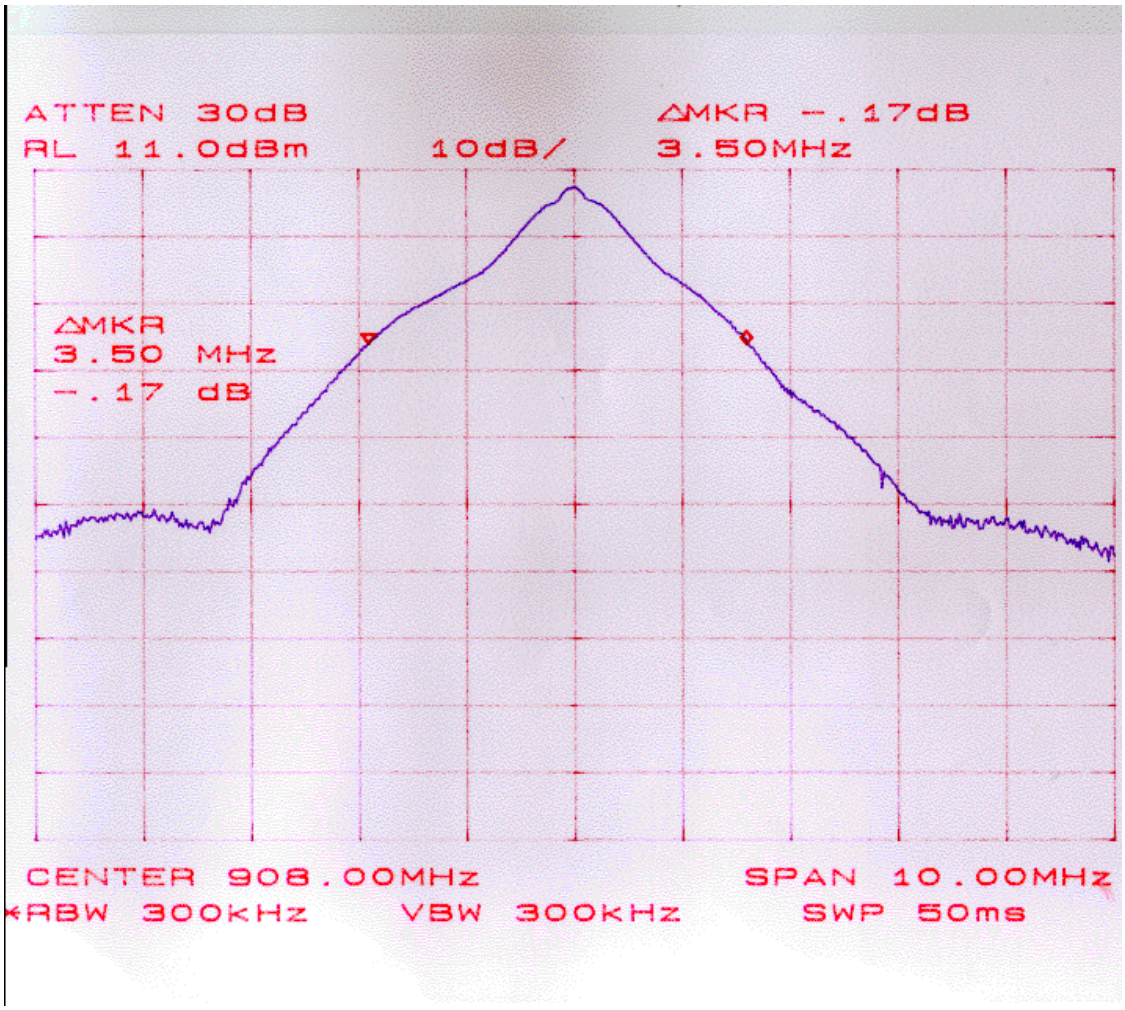
The test result is shown in Plot 1.2.1.

Reference numbers of test equipment used

HL 0025	HL 0056	HL 0872

Full description is in Appendix A.

Plot 1.2.1
Occupied bandwidth measurements test result



1.3 Emission mask according to FCC part 90 paragraph 210

1.3.1 General

As the measured bandwidth was more than 50 kHz, the emission mask according to 90.210 (k) (1) was used.

In any 100 kHz band, the center frequency of which is removed from the center of authorized sub-band by more than 50 percent of the authorized bandwidth, the power of emissions shall be attenuated below the transmitter output power, as specified by the following equation, but in no case less than 31 dB:

$$A = 16 + 0.4\,(D - 50) + 10 \log B,$$

where
A is attenuation (in decibels) below the maximum permitted output power level;
B is the authorized bandwidth in megahertz;
D is displacement of the center frequency of the measurement bandwidth from the center frequency of the authorized sub-band, expressed as a percentage of the authorized bandwidth B.
Attenuation greater than 66 dB is not required.

1.3.2 Test procedure

Maximum permitted output power level is 30 W as specified in 90.205j. Hence the mask is expressed in attenuation below 30 W level.

B = 5.75 MHz is the authorized band (904.0 to 909.75 MHz);
F_0 is the center of the assigned band;
31 dB point refers to 68.5% displacement (3.939 MHz);
66 dB point refers to 156% displacement (8.97 MHz).

The mask is shown in Figure 1.3.1, test results in Plot 1.3.1.

The calculated mask expressed in attenuation versus emitted power is shown in Figure 1.3.2.

Hence attenuation more than 66 dB is not required, the same limit was applied to spurious emissions throughout the following frequency ranges: 9 kHz to 897.905 MHz and 915.845 MHz to 10 GHz (according to paragraph 2.1057, a1).

Spurious emissions were compared with the limit, expressed as follows:

$$P_{\text{lim spur}} = P_{\text{lim}} - \text{Att}_{\text{lim}} - \text{Att}_{\text{ext}},$$

where

P_{lim} = 30 W = 44.7 dBm;

Att_{lim} = 66 dB – attenuation versus carrier (requirement according to standard);

Att_{ext} = - external attenuation.

$$P_{\text{lim spur}} = 44.7 \text{ dBm} - 66 \text{ dB} - \text{Att}_{\text{ext}} = -21.3 \text{ dBm} - \text{Att}_{\text{ext}}.$$

Test results are shown in Plots 1.3.2 to 1.3.15.

Reference numbers of test equipment used

HL 0025	HL 0053	HL 0056	HL 0507	HL 0872

Full description is in Appendix A.