

## **Proposal for further amendments to Regulation No. 10 (Electromagnetic Compatibility)**

The text reproduced below was originally prepared by the expert from Belgium for the proposal for further amendments to Regulation No. 107 to align the additional safety prescriptions for trolleybuses (Annex 12) with the corresponding electrical standards (see ECE/TRANS/WP.29/GRSG/2013/16). During discussion in the October 2013 session of GRSG it appeared that some Contracting Parties are of the opinion that the prescriptions for electromagnetic compatibility of trolleybuses belong in Regulation No. 10. So these prescriptions are taken out of the amended proposal (ECE/TRANS/WP.29/GRSG/2014/19) and are proposed here for consideration by GRE for further actions.

The modifications to the current text of the Regulation are marked in bold for new and strikethrough for deleted characters.

### **I. Proposal**

*Insert new paragraphs to read:*

- "1. The trolleybus shall undergo an EMC-test suited for vehicles supplied from overhead conducting lines.**
- 1.1. Measuring conditions:**
  - Lateral distance of antenna to the middle of the test track: 10 m**
  - Vertical distance of antenna to the ground:**
    - H-field antenna: 1 – 2 m**
    - E-field antenna: 2.5 – 3.5 m**
  - Measuring time: 50 ms**
  - Frequency range / bandwidth: see limit diagrams of paragraph 3.11.3.**
  - Detection mode: see reference limits diagrams of paragraph 3.11.3.**
- 1.2. Operating conditions of the vehicle for measuring**
  - The trolleybus shall be tested while stationary and at slow moving speed. During the stationary test, the auxiliary converters shall operate (it is not inevitably under maximum load conditions that the maximum emission level is produced) and the traction converter shall be under voltage but not operating.**
  - For the slow moving test, the speed shall be low enough to avoid arcing at or bouncing of the sliding contact and high enough to allow for electric braking. The recommended speed range is  $20 \pm 5$  km/h. When passing the antenna the vehicle shall accelerate or decelerate with approximately 1/3 of its maximum tractive effort within the given speed range."**
- 1.3. Reference limits for emission of the vehicle for type approval are as specified in the following diagrams:**

**(a) Vehicle broadband reference limits**  
**Antenna vehicle - overhead contact line separation 10 m**

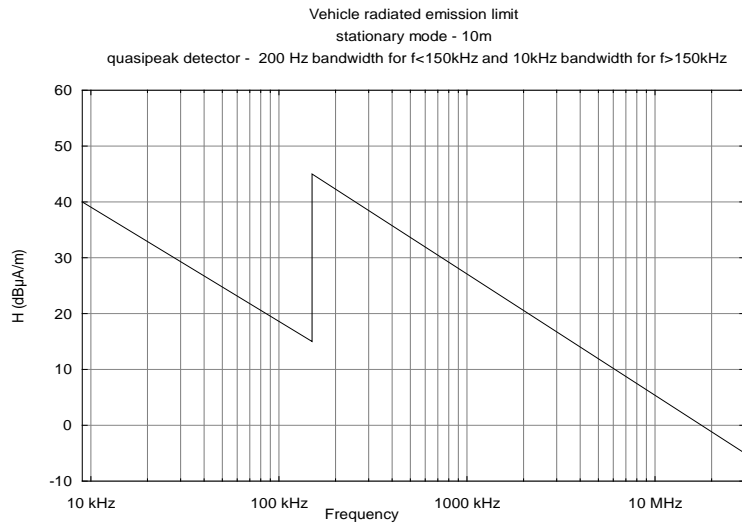
**Limit H (dBμA/m) at frequency F (MHz):**

**0.009 – 0.150 MHz**

**0.150 – 30 MHz**

$$H = 40 - 20.46 \cdot \log ( F / 0.009 )$$

$$H = 45 - 21.73 \cdot \log ( F / 0.15 )$$

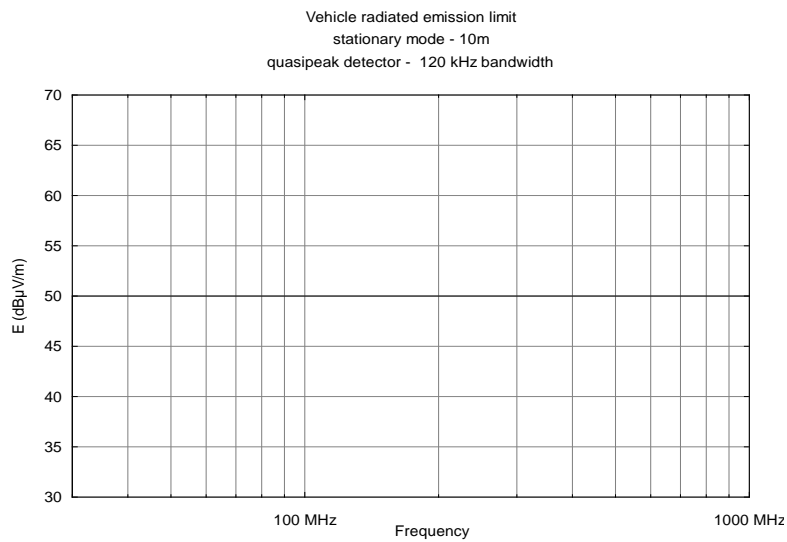


**(b) Vehicle broadband reference limits**  
**Antenna vehicle - overhead contact line separation 10 m**

**Limit E (dBμV/m) at frequency F (MHz):**

**30 – 1000 MHz**

$$E = 50$$



**(c) Vehicle broadband reference limits**  
**Antenna vehicle - overhead contact line separation 10 m**

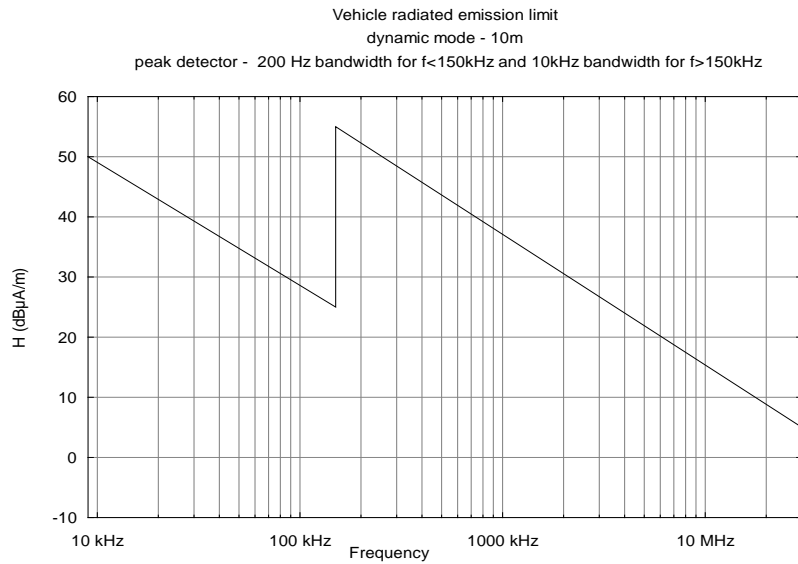
**Limit H (dBμA/m) at frequency F (MHz):**

**0.009 – 0.150 MHz**

**0.150 – 30 MHz**

$$H = 50 - 20.46 \cdot \log ( F / 0.009 )$$

$$H = 55 - 21.73 \cdot \log ( F / 0.15 )$$

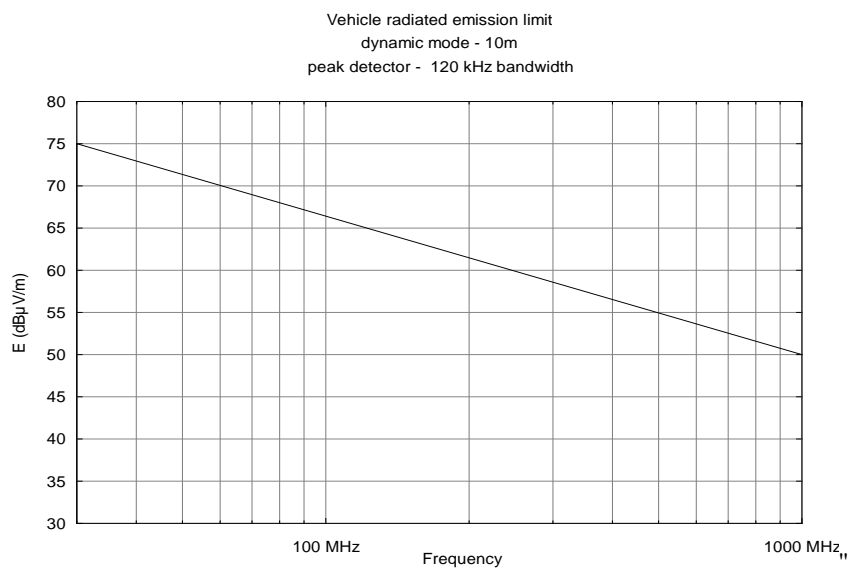


**(d) Vehicle broadband reference limits**  
**Antenna vehicle - overhead contact line separation 10 m**

**Limit E (dBμV/m) at frequency F (MHz)**

**30 – 1000 MHz**

$$E = 75 - 16.42 \cdot \log ( F / 30 )$$



## II. Justification

The requirements for shock and vibration should be deleted (because there is no direct link with the safety of the trolleybus) [of Regulation No. 107] and replaced by requirements for Electro-Magnetic Compatibility (EMC) [in Regulation No. 10]; see also [EN50121/IEC62236](#).

*Note by the secretariat:* GRE may consider inserting these requirements within a new Annex or any other appropriate place in UN Regulation No. 10.

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