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Item 4 (i) (iv) of the provisional agenda

1958 Agreement - Regulations

Other business – Any other business

Proposal for amendments to Regulation No. 10 (Electromagnetic compatibility)

Submitted by the expert from Belgium*

The text reproduced below was prepared by the expert from Belgium to amend Regulation No. 10 with prescriptions for trolleybuses. It is based on GRE-71-26 introduced at the seventy-first session of GRE. The modifications to the existing text of the Regulation are marked in bold for new or strikethrough for deleted characters.

* In accordance with the programme of work of the Inland Transport Committee for 2012–2016 (ECE/TRANS/224, para. 94 and ECE/TRANS/2012/12, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

I. Proposal

Insert a new Annex 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 1.3.

Detection mode: see reference limits diagrams of paragraph 1.3.

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 inevitable under maximum load conditions that the maximum emission level is produced) and the traction converter shall be under voltage, but not operating.

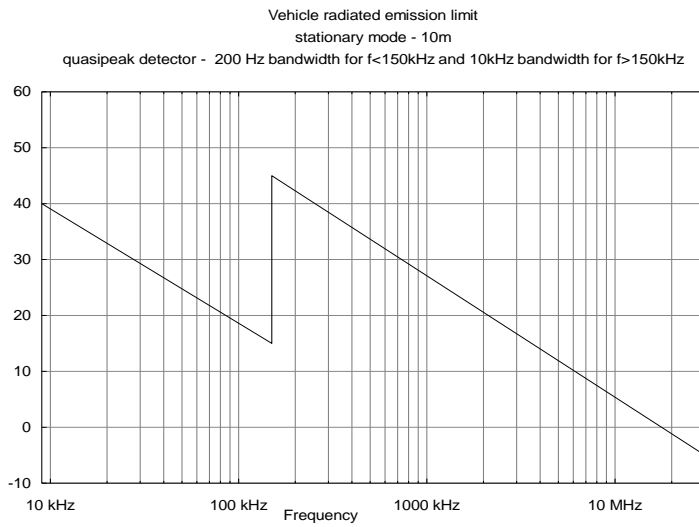
For the slow moving test, the speed shall be low enough to avoid arcing at or bouncing of the sliding contact and high enough to allow for electric braking. The recommended speed range is 20 ± 5 km/h. When passing the antenna the vehicle shall accelerate or decelerate with approximately 1/3 of its maximum 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

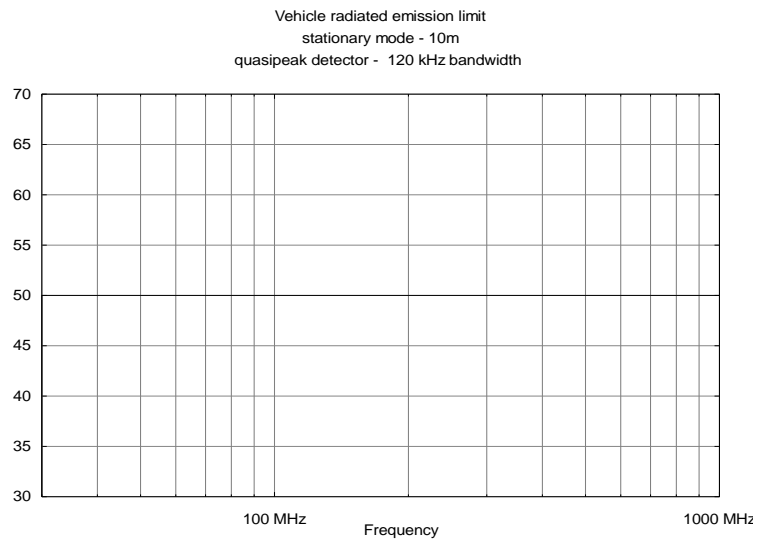
Antenna vehicle - overhead contact line separation 10 m

Limit H (dB μ A/m) at frequency F (MHz):	
0.009 – 0.150 MHz	0.150 – 30 MHz
$H = 40 - 20.46 \cdot \log (F / 0.009)$	$H = 45 - 21.73 \cdot \log (F / 0.15)$



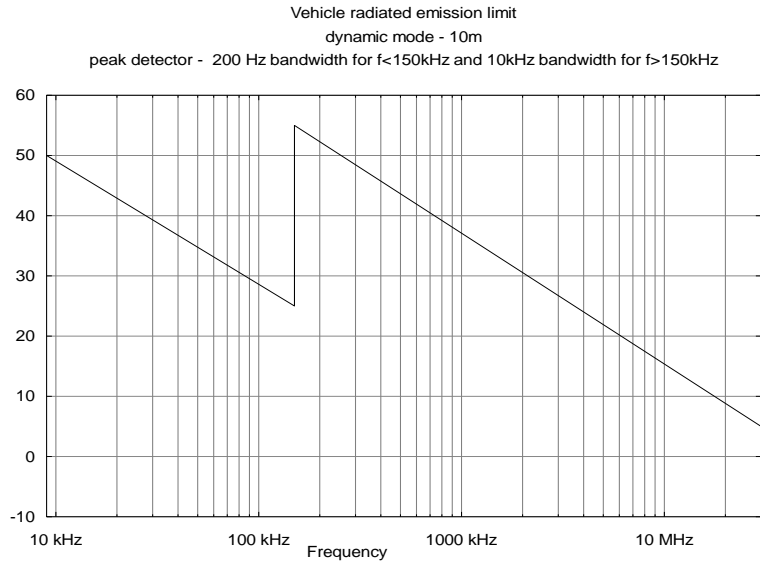
(b) Vehicle broadband reference limits
Antenna vehicle - overhead contact line separation 10 m

Limit E (dBμV/m) at frequency F (MHz):
30 – 1 000 MHz
E = 50



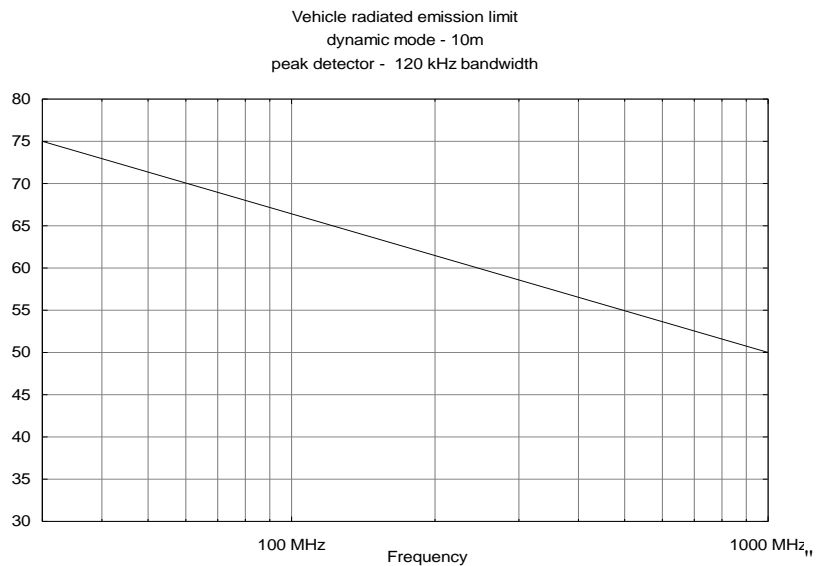
(c) **Vehicle broadband reference limits**
Antenna vehicle - overhead contact line separation 10 m

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 – 1 000 MHz
$E = 75 - 16.42 \cdot \log (F / 30)$



II. Justification

This text was originally prepared by the expert from Belgium for further amendments to Regulation No. 107 (General construction of buses and coach) to align the additional safety prescriptions for trolleybuses (Annex 12) with the corresponding electrical standards (see ECE/TRANS/WP.29/GRSG/2013/16). During the October 2013 session of the Working Party on General Safety Provisions (GRSG), it was pointed out that the prescriptions for electromagnetic compatibility of trolleybuses belong in Regulation No. 10. These prescriptions from the amended proposal for Regulation No. 107 (ECE/TRANS/WP.29/GRSG/2014/19) are now submitted to GRE for further action. GRE may consider inserting these requirements in a new Annex or any other appropriate place in Regulation No. 10.
