

Bustec s.r.o.
Brn ěnská 1748/21B, 67801 Blansko, Czech republic

**APPLICATION FOR APPROVAL OF ESA
PURSUANT TO THE EC DIRECTIVE 72/245/EEC AS LAST
AMENDED 2009/19/EC**

**UNIFORM PROVISIONS CONCERNING THE APPROVAL OF
MOTOR VEHICLES WITH REGARD TO ELECTROMAGNETIC
COMPATIBILITY**

FOR ESA BUSTEC type BT 1

Blansko 12.3.2009

Ing. Rostislav Šebela

General Manager

CONTENTS

<u>General</u>	<u>3</u>
<u>Homologation</u>	<u>3</u>
<u>The use limitation</u>	<u>3</u>
<u>Supplement 1</u>	<u>4</u>

0. General

0.1 Mark (trade name of manufacturer):	Bustec
0.2 Type and general commercial description	BT 1 Passenger information system
0.3 Means of identification type if marked on the component/separate tech. unit	Letters and digits on manufacturer plate
0.3.1. Location of that marking	Rear side of the box on each unit
0.5 Name and address of manufacturer	Bustec s.r.o. Brn ěnská 1748/21B 678 01 Blansko, Czech Republic
0.7 In the case of components and separate technical units, location and method of affixing of the EC approval mark	Printed on the manufacturer's plate stuck to the box of the unit
0.8 Addresses of assembly plant(s)	Bustec s.r.o. Brn ěnská 1748/21B 678 01 Blansko, Czech Republic

1. This ESA shall be approved as a STU
2. Any restrictions of use and conditions for fitting: 24VDC, negative ground

Supplement 1

Description

Passenger information system BT 1 is determined for information of passengers about line number, route, destinations, stop and other facts concerning with transport in vehicles of the city and intercity public transport. The information is provided in visual way.

Passenger information system consist of :

- Control unit
- Destination signs (exterior)
- Next stop signs (interior)
- Route LCD signs (interior)

The individual components are fully compatible according to VDV 300 (IBIS).

Control unit BT 9XX

It is determined to control all devices compatible and connected to IBIS (VDV 300) busbar in both manual operation mode and automatical operation mode with autonomous position definition and time table check.

Destination signs BT 5XX

The signs are determined to indicate external information like line number, destination name, next stop name in direction out of the vehicle. The information field is formed by LEDs.

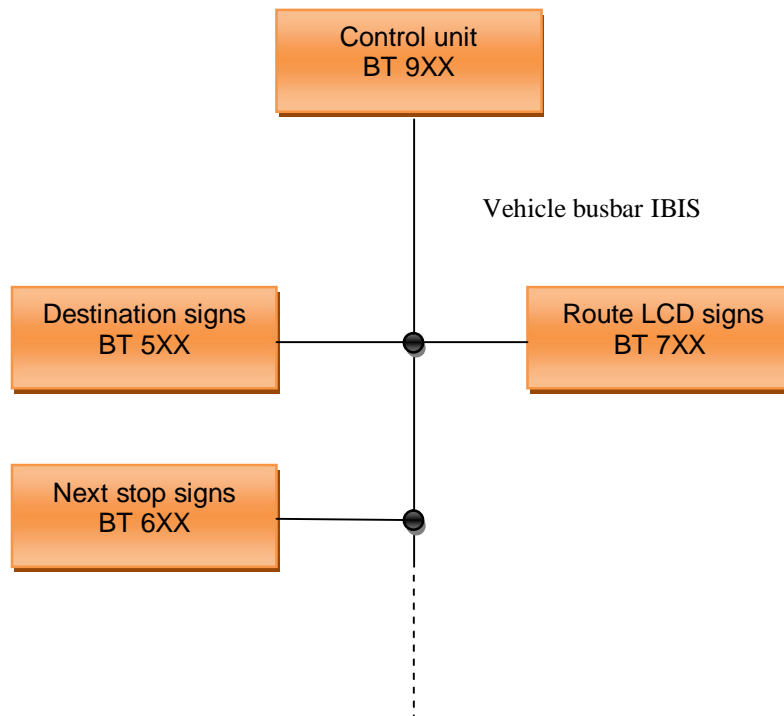
Route LCD signs BT 7XX

It is used to indicate interior information about route such as initial stop name, next stop names, destination name, line number, tariff zone, actual time and eventual other messages (advertisement) inside the vehicle. The information field is formed by LCD screen/monitor.

Next stop signs BT 6XX

The signs are used to indicate interior information like next stop name, destination name, line number and eventually other messages inside the vehicles. The information field is composed of LED matrixes.

General block diagram of passenger information system BT 1



Operation conditions :

Ambient temperature: -30°to +70°C
Relative humidity: max. 95% at 40°C
Air pressure : min. 70 kPa

Technical specification :

Supply voltage +24 Vdc +/- 30%
Interface vehicle busbar IBIS
Service interface EIA 485 (RS485)
Insulance resistance >20Mohms
>2 Mohms at 40°C, 95% humidity
Electrical resistance 500 Vef
Mechanical resistance a) vibration – 1 g_n
b) shock resistance - 10 g_n (without mechanical destruction 20 g_n)



Technical Report No.: 260022 – 09 – TAC
 EC Directive: 72/245/EEC*2009/19/EC
 Manufacturer: Bustec s.r.o.
 Type: BT1

TECHNICAL REPORT No. 260022 – 09 – TAC

Test according to the Directive of the European Parliament and of the Council
 on the approximation of the laws of the Member States relating to
**Suppression of radio interference (electromagnetic compatibility)
 of motor vehicles**

Directive 72/245/EEC of 6 July 1972
 including all amendments up to and including:
 Directive 2009/19/EC of 12 March 2009

Objectives: Document for issue of approval certificate

I. Technical data

- 0.1. Make (trade name of manufacturer): Bustec
- 0.2. Type: BT1
- 0.2.1. Components:
- control units types BT9xx
 - destination signs (exterior) types BT5xx
 - next stop signs (interior) types BT6xx
 - route LCD signs (interior) types BT7xx
- 0.3. Means of identification of type: letters and digits on manufacturer's plate
- 0.3.1. Location of that marking: rear side of the box of each unit
- 0.4. Category of vehicle: n/a
- 0.5. Name and address of manufacturer: Bustec s.r.o.,
 Brn nská 1748/21B,
 678 01 Blansko, Czech Republic
- 0.8. Address(es) of assembly plant(s): Bustec s.r.o.,
 Brn nská 1748/21B,
 678 01 Blansko, Czech Republic
- 0.9. Location of the approval mark: part of the manufacturer's plate

II. Test report

1. Test conditions

- 1.1. Test sample: set of components:
- control unit BT900.001
- destination sign (exterior)
BT519.09610.1D1M1C.BA
- next stop sign (interior)
BT600.1A1C.CC
- route LCD sign (interior)
BT717.4/3.M1.1AAAA
- 1.2. Test procedures used: tests executed according to certified procedures:
(1.3.) Measurement of high frequency disturbing electromagnetic fields and voltages, test of high frequency resistance and
(1.4.) Tests of impulse resistance of electronic devices. Measurement of disturbing impulse overvoltage emitted into the vehicle electrical system.
- 1.3. Measuring and test equipment: radiated interference measuring set:
test receiver ROHDE & SCHWARZ
ESCS 30 No. 100207,
log. periodical antenna SUNOL SCIENCES
JB 3 No. A012006.
Line impedance stabilisation network
ROHDE & SCHWARZ
ESH3-Z6 s.n. 847250/015.
Transient simulator for automotive electronics
EM TEST AG, type UCS 200 M
s.n. V0817103673
Scopemeter FLUKE 199C s.n. DM 8140090.
EMC test software ROHDE & SCHWARZ
EMC 32 (EMI measurement)
- 1.4. Testing conditions: indoor test, 21°C, 27,0VDC supply
- 1.5. Test track or site: EMC lab TÜV SÜD Auto CZ,
Novodvorská 994/138, 142 21 Prague 4,
Czech Republic.



2. Test results

Following numbering is according to Annex I of Directive 72/245/EEC*2009/19/EC
/marked in italic/

*6.6. Narrowband elmg. interference
 generated by ESA:*

See attachment page 1

*6.7. Immunity to electromagnetic
 radiation:*

Not tested.
 ESA without immunity-related function.

6.8. Immunity to transient disturbances:

Impulse type	Test level	Required status (at least)	Result status
1	III	D	B
2a	III	D	A
2b	III	D	A
3a/3b	III	D	A
4	III	D	B

6.9. Emission of conducted disturbances: No emissions found (electronic device)

3. Specimen submitted to test on: 2 April 2009

4. Date of test: 2 April 2009

III. Manufacturer's information folder Bustec s.r.o.
 5 pages total of 12 March 2009

IV. Attachments

Diagrams of measured narrowband
 interference & required limits: 1 page

Technical Report No.: 260022 – 09 – TAC
EC Directive.: 72/245/EEC*2009/19/EC
Manufacturer: Bustec s.r.o.
Type: BT1



The results presented above have been measured/found in the No. 1107 laboratory accredited by IA according to the ISO/IEC 17025 standard and relate only to the items tested. The final assessment exceeds the accreditation scope.

Measuring and test equipment and test site meet the requirements of the applicable legislation. This report must never be reproduced incomplete without a written permission of the testing laboratory.

V. **Final assessment**

The described sample

complies

with the requirements of Directive 72/245/EEC as last amended by
Directive 2009/19/EC
for issue of approval certificate.

This technical report consists of pages No. 1 to 4 and 1 page of attachment.

Zdeněk Hrdlička

Vilém Kunzl

Test executive

Officially recognized expert

Prague, 6 April 2009

Measured and required limit values of the narrowband interference

Horizontal and vertical antenna polarization

