EMC TEST REPORT	
EST REPORT NUMBER	CTA 2025AUT069
TEST REPORT DATE	16th June 2020
TEST REPORT VERSION	1.0
MANUFACTURER	BS Technotronics Private Limited
EUT NAME	BSTPL Voice box
EUT MODEL	TMSI-42
CONDITION OF EUT WHEN RECEIVED	Good
ISSUED TO	**BS Technotronics Private Limited,** House No. 9-5-20, 3rd Floor. S G R Colony, Beside Sub-Registrar Office. Champapet, Hyderabad - 500079, Telangana, India
ISSUED BY	**TARANG Lab** Wipro Limited, SJP2, Survey#70,77,78/8A, Dodda Kanelli, Sarjapur road, Bangalore. Karnataka. India - 560 035 Tel: +91-80-30292929 Fax: +91-80-30298200 Email: tarang.planet@wipro.com Web: www.wipro.com

AMENDMENT HISTORY

Amendment Number	Amendment Date	Author of Amendment	Previous Report Version	Previous Report Date
Amendment Details	Not Applicable			

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1 TEST REPORT SUMMARY

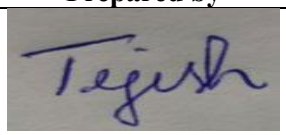
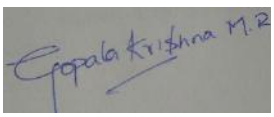
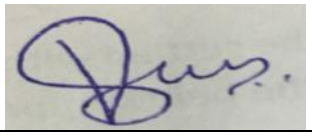
Applicant	BS Technotronics Private Limited,
Manufacturer	BS Technotronics Private Limited,
EUT Name	BSTPL Voice box
EUT Model	TMSI-42
EUT Serial Number	1
Date of receipt of test item	16 June 2020
EUT Category / Type of Equipment	Automotive/Table top
EUT Operating Voltage range	24V DC
EUT Operating Current(max)	1Ampere
Date of Test	16 June 2020
Venue of Test	Tarang Laboratory-EMC

Applicable Standard	Applicable Test	Frequency range/ Class/ Test level	Applicable port	Results-Criterion
ISO 7637-2 (Edition 3.0): 2011/ ISO 16750-2 (Edition 4.0): 2012	Transient Immunity Test on Power Line	Pulse 1, 2a, 2b, 3a, 3b/Test level: II Starting profile/ Test level: III Load Dump/ Test level: NA	Power Port	Refer Section 5.2.1.2

BSTPL-42 Voice box was tested by Tarang Lab as per the standards that are listed in the table above. Based on the observations during the test and interpretations by Tarang lab, results have been indicated. The test results produced in this report shall apply only to the above sample that has been tested under the specific conditions and modes of testing as described in the report. Other similar equipment may not necessarily reproduce same result due to production tolerances and measurement uncertainties. Any measurement uncertainties listed in this report are for information purpose only.

The results shall stand invalid, in case there are any modifications / additions / removals to the hardware or software or end use atmosphere to the product tested. This report shall not be modified or in any way revised unless it is expressly permitted and endorsed by Tarang lab, through a duly authorized representative. Particulars on Manufacturer / Supplier / Product configuration / performance criteria, given in this report, are based on the information given by the customer, along with test request. Tarang does not assume any responsibility for the correctness of such information for the above mentioned equipment under test.

Customer acknowledges that this is a test report and not a certificate to gain market access for the product. To gain market access, Customer needs appropriate clearance from the Government or authorized agency for the target market. For markets that allow self-declaration, customer needs to follow the procedure defined by the target market.

Prepared by	Reviewed by	Approved by
		

Tejes K	Gopal K	Venkatesha B S
EMC Test Engineer	Lead EMC Test Engineer	Functional Head

2 GENERAL INFORMATION

2.1 ACCREDITATION DETAILS

Following are the accreditation and listing details for Tarang.

Accreditation / Listing body	Registration / Company / Certificate Number
NABL, India	Certificate No: TC-5992 http://www.nabl-india.org/
Telecommunication Engineering Center (TEC)	No.1-1/2016-MRA/TEC

2.2 MEASUREMENT UNCERTAINTY

NA

3 INSTRUMENTATION AND CALIBRATION

3.1 TEST AND MEASURING EQUIPMENT

The list of following measuring equipment used for this testing conforms to the applicable standards. Performance of all test and measuring equipment including any accessories are checked periodically to ensure accuracy.

3.2 EQUIPMENT USED

Name of Equipment	Manufacturer	Model No.	Serial No.	Calibration Due
Oscilloscope	Agilent	MSOX3054A	MY51137988	03rd Nov 2020
High Voltage Passive Probes	PMK	PHV 1000	03	08th Mar 2021
Voltage Drop Simulator	EM Test	VDS 200N100	P1707193355	24th Jul 2020
Ultra Compact Simulator	EM Test	UCS 200N100	P1637184025	24th Jul 2020
Load Dump Generator	EM Test	LDN 200N	P1642185889	24th Jul 2020
Autowave Generator	EM Test	Autowave	P1635183502	NA

Table 1: List of equipment used for Transient Immunity test

3.3 SOFTWARE USED

Test Setup	Software Name	Software Developer	Software Version
Transient Immunity	iso.control	EM Test	5.5.6
Transient Immunity	autowave.control	EM Test	5.9.6

4 EUT INFORMATION

4.1 DESCRIPTION OF THE EUT

The BSTPL-42 Voice Box Installed in truck and passenger vehicle generate seven based audio alerts. Which will help the drivers to be in better control and avoid possible accidents and provides driver/passenger safety. The device can be interfaced to external device or accessories through RS-232ports. BSTPL has provision for stopping circular and polygonal geo fence and each geo fence can be tagged to particular voice files.

4.2 SOFTWARE AND FIRMWARE DETAILS

Hardware: BSTPL-42-V1.3
Software: VB_1.0.1

5 TEST DETAILS

5.1 EUT AND TEST SETUP

5.1.1 EUT CONFIGURATION DURING TEST

The EUT was powered ON by 24VDC power source and made operational. It was connected with UBS to RS 232 converter and a laptop, to monitor the functionalities before and after the test.

5.1.2 TEST SETUP DETAILS

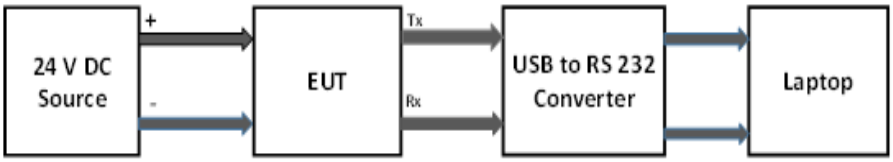


Figure 1: Block diagram of the EUT setup

5.1.3 ACCESSORIES/INTERFACES AND CABLE DETAILS

Sl. No	Name of Accessories	Make	Model No	Serial No
01	Laptop	Lenovo	81B0 (Lenovo V330-14IKB)	MP1E6N5Z

Table 2: List of Accessories used for testing

No	Cable /Name	No of Ports	Cable Color	Cable Length in meters	Power / Interconnection cable	Shielded / Unshielded
01	TX & RX Cable	01	Red & Black	1	Interconnecting cable	Unshielded
02	USB to RS 232 Cable	01	Silver	1	Interconnecting cable	Unshielded
03	Power Cable	01	Black	1	Power Cable	Unshielded

Table 3: List of cables connected to EUT

5.2 TEST RESULT AND TEST SETUP PHOTOS

5.2.1 AUTOMOTIVE TRANSIENT IMMUNITY TEST

5.2.1.1 TEST SPECIFICATION

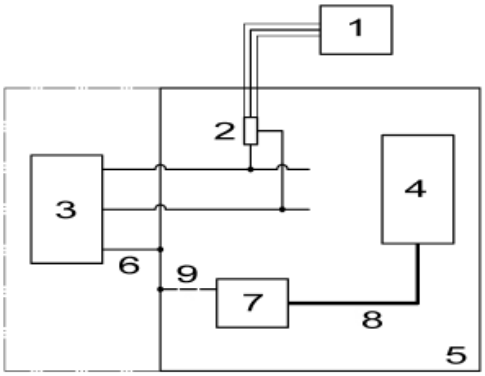
Test Standard	ISO 7637-2 (Edition 3.0):2011/ ISO 16750-2: (Edition 4.0):2012						
Test Procedure	ISO 7637-2 (Edition 3.0):2011/ISO 16750-2: (Edition 4.0):2012						
Applicability	Power Cables						
Test severity level	II					III	NA
Pulse Type	Pulse 1	Pulse 2a	Pulse 2b	Pulse 3a	Pulse 3b	Starting Profile	Load Dump
Source Impedance(Ω)	50	2	0 to 0.05	50	50	NA	1 to 8
Test level/ Voltage (V)	-300	+37	+20	-150	+150	+6	+123
Rise Time	1.5usec to 3µs	0.5us to 1µs	0.5ms to 1.5ms	3.5ns to 6.5ns	3.5ns to 6.5ns	30ms to 50ms	5ms to 10ms
Pulse Width	1ms	0.05ms	0.2ms	105ns to 195ns	105ns to 195ns	900ms to 1100ms	100ms to 350ms
Performance criterion required	As per ISO 7637-2 (Edition 3.0): 2011/ISO 16750-2: (Edition 4.0):2012						
Type of equipment	Table top						
Input Voltage	24 V DC						
Temperature	26.8 ºC						
Relative Humidity	58 %						
Tested By	Manikandan N						
Test Date	16 June 2018						

Note: The pulse 4 and 5a are removed in the latest version of ISO 7637-2 and now referred as per ISO 16750-2, as starting profile and load dump respectively.

5.2.1.2 DEVIATION FROM THE STANDARD

NA

5.2.1.3 TEST SETUP



a) Pulse adjustment

Key

1 oscilloscope or equivalent
2 voltage probe
3 test pulse generator
4 DUT disconnected
5 ground plane
6 DC power ground connection; maximum length for test pulse 3 is 100 mm
7 load simulator (connected to ground plane if required)
8 interconnect cable routed away from DUT power leads under test to avoid coupling
9 load simulator ground (if required)

Figure 2: Sample test setup

5.2.1.4 TEST PROCEDURE

The test procedure was in accordance with ISO 7637-2 (Edition 3.0): 2011/ISO 16750-2: (Edition 4.0):2012

The EUT was placed on elevated GRP (conductive table) at 0.9meter height as per standard. All the cables connected to the EUT (Power cables and Interconnecting cables) were isolated from the GRP using 5centimeter insulation support. The pulses were injected on EUT power port as defined in section 5.2.1.1

5.2.1.5 PERFORMANCE CRITERIA

Status I: The function performs as designed during and after the test.
Status II: The function does not perform as designed during the test, but returns automatically to normal operation after the test.
Status III: The function does not perform as designed during the test and does not return to normal operation without a simple driver/passenger intervention, such as turning off/on the DUT, or cycling the ignition switch after the disturbance is removed.
Status IV: The function does not perform as designed during and after the test and cannot be returned to proper operation without more extensive intervention, such as disconnecting and reconnecting the battery or power feed. The function shall not have sustained any permanent damage as a result of the testing.

5.2.1.6 TEST CONDITIONS

Pulse Type	EUT Input Voltage DC (V)	Source Impedance(Ω)	Test Voltage (V)	Observations
1	27	50	-300	I
2a	27	2	+37	I
2b	27	0 to0.05	+20	I
3a	27	50	-150	I
3b	27	50	+150	I
Starting Profile	27	NA	6	I
Load Dump	27	1 to 8	+123	I

I→ No malfunction was observed during the test, based on the parameters monitored.

5.2.1.7 TEST SETUP PHOTOS

Figure 3: Photograph of Automotive Transient Immunity test setup

5.2.1.8 TEST RESULT

Performance Criterion required	Status I
Parameter monitored during the test	The EUT loaded with the Pre-recorded voices. Voices will be played based on the sequence number/instructions received from RS232 port.
Observation	Refer Section 5.2.1.6
Conclusion	Meets the requirement as per standard

ANNEXURE I: EUT AND ACCESSORIES PHOTOGRAPHS

Figure 4: Photograph of EUT

Figure 5: Photograph of model number of EUT

Figure 6: Photograph of model number and serial number of Laptop

Figure 7: Photograph of Tx and Rx Cable

Figure 8: Photograph of USB to RS 232 Cable

ANNEXURE II: ANY OTHER ADDITIONAL INFORMATION

NA

ANNEXURE III: ACRONYMS

dB	Decibel
DC	Direct Current
EMC	Electromagnetic Compatibility
EMI	Electro Magnetic Interference
EUT	Equipment Under Test
GRP	Ground Reference Plane
Hz	Hertz
kHz, MHz, GHz	Kilo Hertz, Mega Hertz, Giga Hertz
kV	Kilo Volt
ms, ns,us	Milli second, nano second, micro second
NA	Not Applicable
TEC	Telecommunication Engineering Center
Tx	Transmitter
Rx	Receiver

END OF REPORT