

BRE Global Test Report

**Technical evaluation of the Tanda (UK) Limited TX7130
Conventional Reflective Beam Detector to EN 54-12:2002.**

Prepared for: Loss Prevention Certification Board

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1 Introduction

1.1 Object

The object of this evaluation was to assess the performance of the Tanda (UK) Limited TX7130 Conventional Reflective Beam Detector for compliance with the requirements of EN 54-12:2002.

1.2 Origin of request

The evaluation was undertaken for the Loss Prevention Certification Board (LPCB).

Details of the specific tests included in this report can be found in LPCB Test Schedule Number P100789/1.2.

1.3 Client

Loss Prevention Certification Board, Bucknalls Lane, Garston, Watford, WD25 9XX, United Kingdom

1.4 Applicant

Tanda (UK) Limited, Fourth Floor 30-31 Furnival Street, London, EC4A 1JQ, United Kingdom

1.5 Manufacturer

Tanda Technology Co., Ltd, F1/W.F3/F4/W.F5 Bldg.A1, Xinjianxing S&T Industrial Park, Fengxin Rd., New Guangming Dist., Shenzhen, Guangdong, 518107, China.



2 Equipment submitted

2.1 First submission

Equipment submitted for testing		
No.	Description	Receipt date
9	TX7130 Conventional Reflective Beam Detector	17/08/2015
3	Tanda Test Tool	17/08/2015
1	Handheld Programmer	17/08/2015
1	USB Stick	17/08/2015
2	Handheld Programmer	19/10/2015

2.2 Second submission

Equipment submitted for testing		
No.	Description	Receipt date
2	TX7130 Conventional Reflective Beam Detector Interface Boards - modified interface boards submitted due to Clause 12 Fast transient bursts failure. Refer to Section 7.2 for further information.	10/05/2016

3 Data submitted

Refer to document register(s) in the table below for details of the documentation submitted.

Data submitted for testing		
Model description	Document register ref No.	Issue No.
TX7130	11616	1

4 Photograph of equipment



Plate 1: TX7130

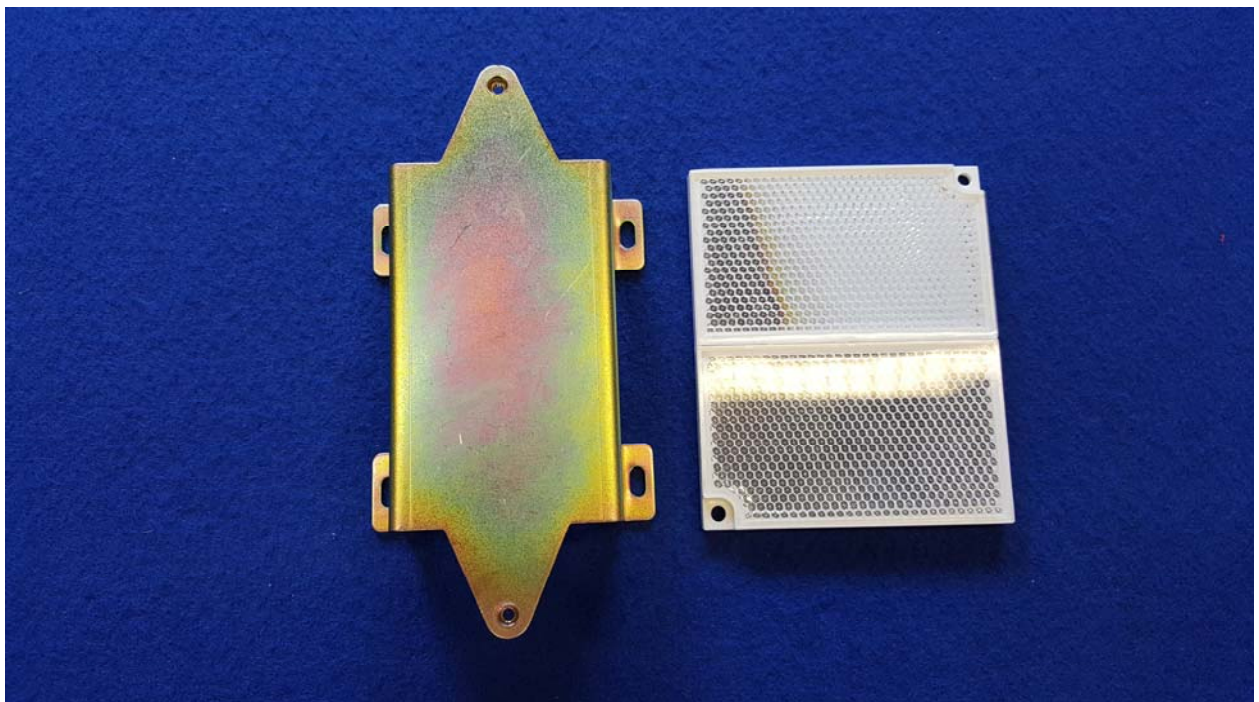


Plate 2: TX7130 bracket and TX7130-R reflector



Plate 3: Tanda programming tool and Tanda test tool



Model TX7130

5 Summary of EN 54-12 test results

Testing was conducted to the following programme. Listed below is a summary of the results.

EN 54-12:2002 Clause – Title/Test			Comments			Result
4.2 – Individual alarm indication						Pass
4.4 – Manufacturer's adjustments						Pass
4.5 – On-site adjustment						Pass
4.6 – Protection against ingress of foreign bodies						Pass
4.8 – Limit compensation						Pass
4.10 – Fault signalling						Pass
6.1 – Marking and Data			See Section 6.1 of this test report			Pass
6.2 – Documentation			See Section 6.2 of this test report			Pass
4.9 – Requirements for software controlled detectors			Refer to test report P100789-SW			Pass
			Maximum Response value C (dB)	Minimum Response value C (dB)	Ratio	Result
5.2 – Reproducibility (2.6dB)	(Ratio 1)	Mean RTV Crep 1.250	1.320	-	1.056	Pass
	(Ratio 2)		-	1.201	1.040	
5.2 – Reproducibility (3.8dB)	(Ratio 1)	Mean RTV Crep 1.668	1.867	-	1.119	Pass
	(Ratio 2)		-	1.523	1.095	
5.2 – Reproducibility (5.8dB)	(Ratio 1)	Mean RTV Crep 2.520	2.606	-	1.034	Pass
	(Ratio 2)		-	2.377	1.060	
5.3 – Repeatability			1.201	1.201	1.000	Pass
5.4 – Directional dependence**			See Section 6.4 of this test report			Pass
5.5 – Variation of supply parameters			1.253	1.201	1.044	Pass
5.6 – Rapid changes in attenuation			See Section 6.5 of this test report			Pass
5.7 – Slow changes in attenuation			1.320	1.133	1.165	Pass
5.8.1 – Optical path length dependence [#] (8m-20m)			1.253	1.201	1.043	Pass
5.8.2 – Optical path length dependence [#] (20m-40m)			1.253	1.253	1.000	Pass
5.8.3 – Optical path length dependence [¥] (40m-70m)			1.253	1.253	1.000	Pass
5.8.4 – Optical path length dependence [¥] (70m-100m)			1.253	1.405	1.121	Pass
5.9 – Fire sensitivity			See Section 6.6 of this test report			Pass
5.10 – Stray light			1.320	1.253	1.053	Pass
5.11 –Dry heat (operational)			1.201	1.201	1.000	Pass
5.12 – Cold (operational)			1.201	1.201	1.000	Pass
5.13 – Damp heat, steady state (operational)			1.320	1.201	1.099	Pass
5.14 – Damp heat, steady state (endurance)			1.253	1.201	1.043	Pass
5.15 – Vibration (endurance)			1.253	1.253	1.000	Pass



EN 54-12:2002 Clause – Title/Test	Comments			Result
5.16 a) – Electrostatic discharge (operational)	1.405	1.201	1.170	Pass
5.16 b) – Radiated EM fields (operational)	1.405	1.201	1.170	Pass
5.16 c) – Conducted disturbances (operational)	1.405	1.201	1.170	Pass
5.16 d) – Fast transient bursts (operational) *	1.201	1.405	1.170	Pass
5.16 e) – Slow voltage surge (operational)	1.201	1.201	1.000	Pass
5.17 – SO ₂ corrosion (endurance)	1.405	1.253	1.121	Pass
5.18 – Impact (operational)	1.523	1.253	1.215	Pass

*The requirements were met on the second submission. See Non Compliances section 7.1 and 7.2 for further details.

Testing commenced on the 21/12/15 and was completed on the 23/06/16.

**See Non compliances section 7.3 EN 54-12 Clause 5.4 Directional dependence.

Tested with 1 x mirror reflector.

‡ Tested with 4 x mirror reflector.



6 Summary of EN 54-12 key test data

6.1 Marking

6.1.1 Procedure

The requirements were assessed by inspection in accordance with Clause 6.1 of EN 54-12:2002.

6.1.2 Inspection

The assessment was based upon an inspection of label drawing number F7.203.000.11

Detector Marking	
Item	Details / Data Ref.
a) Standard number reference	EN 54-12
b) Name or trademark	Tanda (UK) Limited
c) Model designation	TX7130
d) Terminal designations	Terminals marked with D1, D2, S1, S2, HJ1, HJ2, GZ1, and GZ2. Terminal markings referred in the installation manual
e) Serial Number/ Batch Code and Software Version	Software: V1.0, Product code, I.D
f) minimum and maximum separation	8m ~ 100m

6.1.3 Assessment

The requirements of Clause 6.1 are met providing a label identical to that shown in label drawing number F7.203.000.11 is affixed to the detector in the position indicated by the manufacturer i.e. it is visible during installation and accessible during maintenance and is not placed on screws or other easily removable parts. The manufacturer did not use any symbols or abbreviations not in common use.



6.2 Data

6.2.1 Procedure

The requirements were assessed by inspection in accordance with Clause 6.2 of EN 54-12:2002.

6.2.2 Inspection

The Tanda (UK) Limited TX7130 Conventional Reflective Beam Detector was supplied with Installation Instructions reference 4050100256-Rev1.3 which gave sufficient technical, installation and maintenance data to enable correct installation and operation.

6.2.3 Assessment

The requirements of Clause 6.2 were met.



6.3 Reproducibility

6.3.1 Test procedure

The test was carried out in accordance with Clause 5.2 of EN 54-12:2002.

Reproducibility					
Specimen No	Serial No	Response Value C (dB)	Designated C _{min} and C _{max}	Ratio 1 C _{max} : C _{rep}	Ratio 2 C _{rep} : C _{min}
Sensitivity at 2.6dB					
1	SN01	1.320	C _{max}	1.056	1.040
2	SN02	1.320			
3	SN03	1.201	C _{min}		
4	SN04	1.201			
5	SN05	1.253			
6	SN06	1.201			
7	SN07	1.253			
Sensitivity at 3.8dB					
1	SN01	1.662		1.119	1.095
2	SN02	1.867	C _{max}		
3	SN03	1.662			
4	SN04	1.650			
5	SN05	1.650			
6	SN06	1.523	C _{min}		
7	SN07	1.662			
Sensitivity at 5.8dB					
1	SN01	2.606	C _{max}	1.034	1.060
2	SN02	2.557			
3	SN03	2.430			
4	SN04	2.557			
5	SN05	2.557			
6	SN06	2.377	C _{min}		
7	SN07	2.557			
Sensitivity at 2.6dB C _{rep} = 1.250		Sensitivity at 3.8dB C _{rep} = 1.668		Sensitivity at 5.8dB C _{rep} = 2.520	

Requirements : C_{max} : C_{rep} ≤ 1.33, C_{rep} : C_{min} ≤ 1.5, C_{min} ≥ 0.4 dB

6.3.2 Assessment

The requirements of Clause 5.2 were met.



6.4 Directional Dependence

6.4.1 Test procedure

The test was carried out in accordance with Clause 5.4 of EN 54-12:2002. The opposed components were separated at a maximum separation distance of 100m.

6.4.2 Measurements – Transmitter and Reflector

Directional dependence			
Specimen № 1		Maximum sensitivity 2.6dB	
Direction of rotation	Response time to 6dB filter (sec)	Manufacturers stated max angular misalignment	Result
Clockwise (as viewed from above)	00:08	0.4°	Pass
Counter - clockwise (as viewed from above)	00:08	0.4°	Pass
Rotation upwards with respect to normal pane	00:07	0.4°	Pass
Rotation downwards with respect to normal pane	00:08	0.4°	Pass

Requirements: No fault or alarm signal should be emitted within the manufacturer's stated angular tolerances.

An alarm signal must be emitted no more than 30 seconds after the introduction of the attenuator.

6.4.3 Comments

Both the transmitter and the Reflector were tested at the manufacturer's stated maximum angle of misalignment*.

See Non compliances section 7.3 EN 54-12 Clause 5.4 Directional dependence.

6.4.4 Assessment

The requirements of Clause 5.4 were met.



6.5 Rapid changes in attenuation – First submission

6.5.1 Test procedure

The test was carried out in accordance with Clause 5.6 of EN 54-12:2002. The opposed components were separated by 10m.

6.5.2 Measurements

Rapid changes in attenuation			
Specimen № 1	Minimum Sensitivity: 5.8dB		
Optical filter	Alarm signal	Fault signal	Time to alarm
6dB	Yes		00:21 seconds
10dB (-0, +3dB)	Yes	Yes	00:19 seconds

Requirements: Fire signals no more than 30s after the introduction of the 6dB filter.

Fire or fault signals no more than 60s after the introduction of the 10dB filter.

6.5.3 Assessment

The requirements of Clause 5.6 were met.



6.6 Fire sensitivity test - First Submission

6.6.1 Test procedure

The test was carried out in accordance with Clause 5.9 of EN 54-12:2002 with the opposed components separated by 5m.

6.6.2 Measurements

Fire sensitivity					
Specimens 6 and 7			Minimum sensitivity: 5.8dB		
Test fire	Specimen №	Time to alarm min : s	Fire parameters at alarm		
			Y_a	m_a dB/m	ΔT_a °C
TF 2 Smouldering pyrolysis fire (wood)	6	06:16	0.59	0.59	-
	7	06:16	0.59	0.59	-
TF 3 Glowing smouldering fire (cotton)	6	02:08	1.78	0.61	-
	7	02:08	1.78	0.61	-
TF 4 Open plastic fire (polyurethane)	6	01:13	1.59	0.33	4.5
	7	01:13	1.59	0.33	4.5
TF 5 Liquid fire (n-heptane)	6	00:38	1.61	0.39	13.1
	7	00:38	1.61	0.39	13.1

Requirements: The two specimens shall emit an alarm signal, in each fire test with $m_a < 0.7$ dB/m.

6.6.3 Comments

6.6.4 Assessment

The requirements of Clause 5.9 were met.



7 Non Compliances

7.1 EN50130-4:2011 Clause 12 Fast transient bursts

The requirements of EN 50130-4:2011 Clause 12 were not met on the first submission due to the fault indicator flickering during the 1kV transient test on the 24V fault and fire relay lines. Both the fault and fire operations failed to operate correctly during test conditions.

As a result of the failure the manufacturer requested that we repeat this test on a different sample.

As a result of the request the fast transient bursts test was repeated.

The requirements of Clause 12 were not met.

7.2 EN50130-4:2011 Clause 12 Fast transient bursts

The requirements of EN 50130-4:2011 Clause 12 were not met on the second submission due to the fault indicator flickering during the 1kV transient test on the 24V fault and fire relay lines. Both the fault and fire operations failed to operate correctly during test conditions.

As a result of the failure the manufacturer made the following modifications:
Modified the interface board program and added a software filter to reduce the time of entering the interrupt function.

As a result of the modifications made it was deemed necessary to repeat the following tests:

- Fast transient bursts

The requirements of Clause 12 were subsequently met on the second submission.

7.3 EN 54-12 Clause 5.4 Directional dependence

The requirements of Clause 5.4 were not met on the first submission due to the specimen emitting an alarm signal below the manufactures maximum misalignment angle of 0.5 degrees. (Document 4050100256 Rev 1.1)

As a result of the failure the manufacturer made the following modifications:
Modified the manual and the nameplate by changing the maximum optical direction deviation to 0.4 degrees. (Document 4050100256 Rev 1.3)

As a result of the modifications it was deemed unnecessary to repeat the directional dependence test.

The requirements of Clause 5.4 were subsequently met due to the modification.



8 Conclusion

The Tanda (UK) Limited TX7130 Conventional Reflective Beam Detector using an optical light beam met the requirements of tests specified in LPCB Test Schedule P100789/1.2 taken from EN 54-12:2002 on the first submission, with the exception of the following Clause EN 54-12 Clause 5.4 submission 1.

EN 54-12 Clause 5.4 was met on the second submission.

Note: This report must be regarded as a basic summary of the EMC tests performed and relates only to the test specimens listed herein. Further details are available from the EMC project file bearing the same job number and held by the EMC section.

It should be noted that where applicable EMC testing was conducted to both EN 50130-4:1995 + A1:1998 + A2:2003 and EN 50130-4:2011.

9 References

EN 54-12:2002. Fire detection and fire alarm systems Part 12: – Line detectors using an optical light beam – point detectors using scattered light, transmitted light or ionization. European Committee for Standardisation. CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels.

BRE Test Report: P100789-SW Software evaluation of the Tanda (UK) Limited TX7130 Conventional Reflective Beam Detector to the requirements of EN 54-12:2002 Clause 4.9.

P100789/1.2 Test schedule for the LPCB approval of the Tanda (UK) Limited TX7130 Conventional Reflective Beam Detector to EN 54-12:2002.

EN 50130-4:2011 Alarm systems Part 4: Electromagnetic compatibility – Product family standard: Immunity requirements for components of fire, intruder, hold up, CCTV, access control and social alarm systems. European Committee for Standardisation. CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels.

EN 50130-4:1995 + A1:1998 + A2:2003 Alarm systems Part 4: Electromagnetic compatibility – Product family standard: Immunity requirements for components of fire, intruder and social alarm systems. European Committee for Standardisation. CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels.



=====**Report Ends**=====