



Prüfbericht - Nr.: Test Report No.	14010165 001	Seite 1 von 10 Page 1 of 10	
Auftraggeber: Applicant	Testo Instruments (Shenzhen) Co., Ltd. 3-5/F., 19 Building Xili Industrial Zone, Xili Town, Nanshan District Shenzhen P.R. China		
Gegenstand der Prüfung: Test item	Temperature Measurement Instrument with Receiver Module		
Bezeichnung: Identification	testo 110	Serien-Nr.: Serial No.	Engineering sample
Wareneingangs-Nr.: Receipt No.	041223001-010	Eingangsdatum: Date of receipt	23.12.2004
Prüfört: Testing location	TÜV Rheinland Hong Kong Ltd. Unit 8, 25 th Floor, Skyline Tower, 39 Wang Kwong Road, Kowloon Bay Kowloon, Hong Kong Hong Kong Productivity Council HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong		
Prüfgrundlage: Test specification	FCC Part 15, Subpart B		
Prüfergebnis: Test Result	Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben genannter Prüfgrundlage. The above mentioned product was tested and passed .		
geprüft / tested by:		kontrolliert / reviewed by:	
01.08.2005 Hugo Wan 		01.08.2005 Thomas Berns 	
Datum Date	Name Name	Unterschrift Signature	Datum Date
Sonstiges: FCC ID: S8K915M00R			
Other Aspects			
Abkürzungen:	OK, Pass, P Fail, F N/A NT	= entspricht Prüfgrundlage = entspricht nicht Prüfgrundlage = nicht anwendbar = nicht getestet	Abbreviations: OK, Pass, P Fail, F N/A NT
			= passed = failed = not applicable = not tested
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicate in extracts. This test report does not entitle to carry any safety mark on this or similar products.			

Test Summary

Spurious Radiated Emissions

Result: Pass

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General Remarks

Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix 1: Test Results

Appendix 2: Test Setup

Appendix 3: EUT External Photo

Appendix 4: EUT Internal Photo

Appendix 5: FCCID Label, Block Diagram, Schematics and User manual.

List of Test and Measurement Instruments

Kind of Equipment	Manufacturer	Type	S/N
Test Receiver	Rohde & Schwarz	ESVS30	842807/009
Biconical Antenna	Rohde & Schwarz	HK116	841489/015
Log.-Periodic Antenna	Rohde & Schwarz	HL223	841516/017
Double Ridge Horn Antenna	EMCO	3115	9002-3351
Double Ridge Horn Antenna	EMCO	3115	9002-3347
Signal Generator	Rohde & Schwarz	SMY 01	844146/024

General Product Information

Product Function and Intended Use

The equipment under test (EUT) is a compact measuring instrument for measuring temperatures. The EUT was designed for the food industry and laboratories applications. Optional it is possible for the user to insert a receiver module. The receiver module enables the EUT to receive wireless data from a remote sensor (transmitter).

Test was conducted on the EUT with receiver module incorporated.

FCC ID: S8K915M00R

Model	Product description
testo 110	Temperature measuring instrument

Operational Description

The receiver module uses Manchester coding. The details of the communication protocol is listed as follow:

- Positive edge means 1, negative edge means 0.
- Data bit rate: 4.2k data bit/s
- Receiving sequence is LS byte first and LS bit

Pin assignment of the receiver module:

- pin 1: V+(Power Supply)
- pin 2: GND
- pin 3: DATA_CLK
- pin 4: DATA
- pin 5: RF_TYPE

Ratings and System Details

	Receiver
Frequency range	: 915.00MHz
Modulation	: FSK (fc +/- 50kHz)
Frequency accuracy	: +/- 30kHz
Number of channels	: 1
Type of antenna	: Integral antenna
Power supply	: Battery operated 9V
Ports	: Plug-in measuring probes can be connected via the probe socket on the head of the instrument.
Protection Class	: III

Independent Operation Modes

The basic operation modes are:

- Power: On and Off
- Temperature measurement through the receiver module.

For further information refer to User Manual

Submitted Documents

The submitted documents are listed as follow:

- Circuit diagram
- Block diagram
- User manual
- Label artwork

Related Submittal(s) Grants

This is a single application for certification of the Receiver.

Test Set-up and Operation Mode

Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

Test Operation and Test Software

Test operation should refer to test methodology.

- There was no special software to exercise the device.

Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

- none

Countermeasures to achieve EMC Compliance

The test sample, which has been tested, contained the noise suppression parts as described in the Circuit Diagram or the Technical Construction File. No additional measures were employed to achieve compliance.

Test Methodology

Radiated Emission

The radiated emission measurements were performed according to the procedures in ANSI C63.4-2001.

The equipment under test (EUT) was placed at the middle of the 80 cm height turntable, and the turntable is 3 meters far from the measuring antenna. During the testing, the EUT was operated standalone and arranged for maximum emissions. The EUT was tested in three orthogonal planes.

The investigation is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.

All radiated tests were performed at an antenna to EUT with 3 meters distance, unless stated otherwise in section 7.1.1 and 7.1.2 of this test report.

Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

$$FS = R + AF + CF + FA - PA$$

Where FS = Field Strength in dBuV/m at 3 meters.

R = Reading of Spectrum Analyzer in dBuV.

AF = Antenna Factor in dB.

CF = Cable Attenuation Factor in dB.

FA = Filter Attenuation Factor in dB.

PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.

Test Results

Spurious Radiated Emissions

Section 15.109

RESULT:

Pass

Test Specification : FCC Part 15 Section 15.109
 Test Method : ANSI 63.4-2001
 Measurement Location : Semi Anechoic Chamber
 Measurement Distance : 3m
 Detector Function : Quasi Peak
 Measurement BW : 100 kHz
 Supply Voltage : DC 9V
 Measuring Frequency Range : 30-10 000MHz

Polarization: Vertical

Frequency	Reading	Antenna Factor	Attenuation of cable	Field strength at 3m	Limit at 3m	Delta to Limit
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
876.740	0.30	22.40	2.70	25.40	46.02	-20.62
934.520	0.40	22.40	2.70	25.50	46.02	-20.52

There is no peak found from 1GHz to 10GHz. For test results refer to Appendix 1, page 1-6

Polarization: Horizontal

Frequency	Reading	Antenna Factor	Attenuation of cable	Field strength at 3m	Limit at 3m	Delta to Limit
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
934.520	0.10	22.40	2.70	25.20	46.02	-20.82

There is no peak found from 1GHz to 10GHz. For test results refer to Appendix 1, page 1-6

Limit

Section 15.109

The field strength of radiated emissions from unintentional radiators at a distance of 3 meters :

Frequency (MHz)	Field strength (microvolts/meter)	Field strength (dB μ V/m)	Measurement distance (meters)
30-88	100	$20 \cdot \log(100) = 40.0$	3
88-216	150	$20 \cdot \log(150) = 43.5$	3
216-960	200	$20 \cdot \log(200) = 46.0$	3
Above 960	500	$20 \cdot \log(500) = 54.0$	3