Prüfbericht - Nr.: Test Report No.	**14007815 003**		**Seite 1 von 12** Page 1 of 12
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	**Low Power Transmitter 915.00MHz FSK Module**		
Bezeichnung: Identification	**915.00MHz FSK Module**	**Serien-Nr.:** Serial No.	**Engineering sample**
Wareneingangs-Nr.: Receipt No.	**050506027-050506029**	**Eingangsdatum:** Date of receipt	**06.05.2005**
Prüfort: Testing location	**TÜV Rheinland Hong Kong Ltd.** Unit 8, 25th 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 C**		
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:		
15.06.2005	Hugo Wan		15.06.2005	Thomas Berns	
Datum Date	**Name** Name	**Unterschrift** Signature	**Datum** Date	**Name** Name	**Unterschrift** Signature

Sonstiges: **FCC ID S8K915M00**
Other Aspects

Abkürzungen:			Abbreviations:		
	OK, Pass, P	= entspricht Prüfgrundlage		OK, Pass, P	= passed
	Fail, F	= entspricht nicht Prüfgrundlage		Fail, F	= failed
	N/A	= nicht anwendbar		N/A	= not applicable
	NT	= nicht getestet		NT	= 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

Radiated Emission of Carrier Frequency

Result: Pass

Spurious Radiated Emissions

Result: Pass

Contents

General Remarks

Complementary Materials

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

Appendix 1: Test Setup
Appendix 2: EUT External Photo
Appendix 3: EUT Internal Photo
Appendix 4: FCCID Label, Block Diagram, Schematics and User manual.
Appendix 5: Measurement results

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
Signal Generator	Rohde & Schwarz	SMY 01	844146/023
Spectrum Analyzer	Rohde & Schwarz	FSP30	1093.4495K30

General Product Information

Product Function and Intended Use

The equipment under test (EUT) is a transmitter module which is planned to be used in a measurement instrument probe. The probe transmits the measurement value to a receiving unit by RF signal working in 915.00MHz FSK modulation, within the distance of 30 meters in an open air environment.

The tested module was put into a testing board provided by the manufacturer. There is a button on the board to control the ON/OFF of the modulation and the +/- 50kHz modulated frequency.

FCC ID S8K915M00

Model	Product description
915.00MHz FSK	**Transmitter Module**

Circuit Description

Transmitter module is a PCBA inside a shielding box. With 5 connection points, V+, GND, DATA, ENABLE, PA_ENABLE and RF_TYPE.

Ratings and System Details

		Transmitter
Operated Frequency	:	915.050, 914.950 MHz
Number of channels	:	2
Type of antenna	:	Integral type, Cupper wire soldered
Power supply	:	Battery operated range 3.5 – 9.0V
Ports	:	module port
Equipment Class	:	B
Rated maximum transmit power	:	5dBm

Independent Operation Modes

The basic operation modes are:

- Multi-function button: On / Off control, modulation frequency control

Submitted Documents

The submitted documents are listed as follow:

- Circuit diagram
- Block diagram
- User manual
- FCC ID label

Related Submittal(s) Grants

This is a single application for certification of the transmitter.

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 is a multi-function button to exercise the device into different modulation frequencies.

Special Accessories and Auxiliary Equipment

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

- Testing board provided by the manufacturer

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 C63.4-2003.

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

System Factor = CF + FA – PA.

Where FS = Peak Value of Field Strength in dBuV/m at 3 meters.
R = Peak 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.

Average value of FS = FS –Average factor.

Average Factor = 20 log duty cycle.

Test Results

Radiated Emission of Carrier Frequency — Section 15.249(a)

RESULT: **Pass**

Test Specification	:	FCC Part 15 Section 15.249(a)
Test Method	:	ANSI 63.4-2003
Measurement Location	:	Semi Anechoic Chamber
Measurement Distance	:	3m
Detector Function	:	Quasi-Peak
Measurement BW	:	120kHz
Supply Voltage	:	DC 3.0V
Channel under test	:	Channel 1 (+50kHz) with worst case emission.

Polarization: Vertical

Value	Frequency (MHz)	System Factor (dB)	Measured Field strength at 3m (QP) (dBuV/m)	Limit (dBuV/m)	Delta to Limit (dB)
Peak	915.0468	25.2	82.4	94.0	-11.6

Polarization: Horizontal

Value	Frequency (MHz)	System Factor (dB)	Measured Field strength at 3m (QP) (dBuV/m)	Limit (dBuV/m)	Delta to Limit (dB)
Peak	915.0468	25.2	87.5	94.0	-6.5

Limit **Section 15.249(a)**

Frequency band (MHz)	Peak Emission	
	(microvolt/meter)	dBµV/m
902 - 928	50	94.0

According to section 15.35(b), When average radiated emission measurements are specified, including emission measurement below 1000MHz, there also is limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated.

Spurious Radiated Emissions — Section 15.249(a)

RESULT: **Pass**

Test Specification	:	FCC Part 15 Section 15.249(a, c, d and e)
Test Method	:	ANSI 63.4-2003
Measurement Location	:	Semi Anechoic Chamber
Measurement Distance	:	3m
Detector Function	:	<1000MHz, Quasi-Peak >=1000MHz, Peak and Average
Measurement BW	:	<1000MHz, 120kHz >=1000MHz, 1MHz
Supply Voltage	:	DC 3.0V
Measuring Frequency Range	:	30-10,000MHz

Polarization: Vertical

Freq MHz	Reading dBuV	AF dB(1/m)	Cable att. dB	Pre–amp dB	Filter att. dB	Level dBuV/m	Limit/ Detector dBuV/m
1830.032	52.66	27.60	2.20	35.65	0.60	47.41	73.98/PK
1830.924	51.84	27.60	2.20	35.65	0.60	46.59	53.98/AV
*2744.980	57.14	28.60	2.49	34.35	0.35	54.23	73.98/PK
*2745.180	56.60	28.60	2.49	34.35	0.35	53.69	53.98/AV
3660.340	54.05	31.20	2.98	34.37	0.30	54.16	73.98/PK
3660.160	51.83	31.20	2.98	34.37	0.30	51.94	53.98/AV
*4574.940	44.19	32.40	3.34	33.18	0.36	47.11	73.98/PK
*4574.760	42.11	32.40	3.34	33.18	0.36	45.03	53.98/AV
5490.320	36.69	34.10	3.79	32.30	0.25	42.53	73.98/PK
5489.660	31.38	34.10	3.79	32.30	0.25	37.22	53.98/AV
6405.160	35.05	34.30	4.20	32.68	0.20	41.07	73.98/PK
6405.280	29.35	34.30	4.20	32.68	0.20	35.37	53.98/AV
*7320.700	31.05	37.10	4.56	34.15	0.18	38.74	73.98/PK
*7320.200	21.69	37.10	4.56	34.15	0.18	29.38	53.98/AV
*8235.220	31.33	39.20	4.87	33.61	0.37	42.16	73.98/PK
*8235.500	21.45	39.20	4.87	33.61	0.37	32.28	53.98/AV
*9150.660	32.86	37.40	5.32	34.00	0.33	41.91	73.98/PK
*9150.520	22.20	37.40	5.32	34.00	0.33	31.25	53.98/AV

Polarization: Horizontal

Freq MHz	Reading dBuV	AF dB(1/m)	Cable att. dB	Pre–amp dB	Filter att. dB	Level dBuV/m	Limit/ Detector dBuV/m
1829.880	51.93	27.60	2.20	35.65	0.60	46.68	73.98/PK
1830.120	51.19	27.60	2.20	35.65	0.60	45.94	53.98/AV
*2745.020	55.08	28.60	2.49	34.35	0.35	52.17	73.98/PK
*2745.120	54.25	28.60	2.49	34.35	0.35	51.34	53.98/AV
3660.140	49.36	31.20	2.98	34.37	0.30	49.47	73.98/PK
3660.120	45.91	31.20	2.98	34.37	0.30	46.02	53.98/AV
*4575.440	40.99	32.40	3.34	33.18	0.36	43.91	73.98/PK
*4574.820	37.69	32.40	3.34	33.18	0.36	40.61	53.98/AV
5489.980	33.49	34.10	3.79	32.30	0.25	39.33	73.98/PK
5489.860	26.02	34.10	3.79	32.30	0.25	32.04	53.98/AV
6405.480	32.55	34.30	4.20	32.68	0.20	38.57	73.98/PK
6404.520	25.34	34.30	4.20	32.68	0.20	31.36	53.98/AV
*7320.060	32.13	37.10	4.56	34.15	0.18	39.82	73.98/PK
*7320.560	21.89	37.10	4.56	34.15	0.18	29.58	53.98/AV
*8235.460	31.53	39.20	4.87	33.61	0.37	42.36	73.98/PK
*8235.500	22.08	39.20	4.87	33.61	0.37	32.91	53.98/AV
*9150.320	32.42	37.40	5.32	34.00	0.33	41.47	73.98/PK
*9150.100	22.72	37.40	5.32	34.00	0.33	31.77	53.98/AV

Remark: ‘ * ‘ indicates the frequency of the emissions fall into the restricted band.

Limit **Section 15.249(a)**

Frequency (MHz)	Field strength of harmonics (AV) (microvolt/meter)	Field strength of harmonics (AV) (dBμV/m)	Measurement distance (meters)
902-928 MHz	500	20*log(500) = 53.98	3

The radiated spurious emission measurement results were well below the limit as stated in 15.209 and 15.205. For details, please refer to Appendix 5 for measurement results.

Limit **Section 15.209**

Radiated emissions, which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209.

Limit for Radiated Emission under Section 15.209:

Frequency (MHz)	Field strength (microvolt/meter)	Field strength (dBμV/m)	Measurement distance (meters)
30-88	100	20*log(100) = 40.0	3
88-216	150	20*log(150) = 43.5	3
216-960	200	20*log(200) = 46.0	3
960-2500	500	20*log(500) = 54.0	3

The emission limits shown in the above table below 1000MHz are based on measurements employing a CISPR quasi-peak detector and above 1000 MHz are based on the measurements employing average and peak detectors.