Prüfbericht - Nr.: *Test Report No.:*	**14026903 001**	**Seite 1 von 7** *Page 1 of 7*

Auftraggeber: *Client:*	**geobra Brandstätter GmbH & Co. KG** **Brandstätterstraße 2-10** **Postfach 12 60** **90513 Zirndorf** **Germany**
Gegenstand der Prüfung: *Test Item:*	**Short Range Device - RFID Toys (13.56MHz)**
Bezeichnung: *Identification:*	**5134** **Serien-Nr.:** *Serial No.:* **01**
Wareneingangs-Nr.: *Receipt No.:*	**00110524043-001** **Eingangsdatum:** *Date of Receipt:* **24.05.2011**
Prüfort: *Testing Location:*	**TÜV Rheinland Hong Kong Ltd.** 8/F., Niche Centre, 14 Wang Tai 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** **ANSI C63.4-2003** **CISPR 22:1997**
Prüfergebnis: *Test Results:*	**Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben genannter Prüfgrundlage.** The above mentioned product was tested and **passed**.
Prüflaboratorium: *Testing Laboratory:*	**TÜV Rheinland Hong Kong Ltd.** 9-10/F., Emperor International Square , 7 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong

geprüft/ *tested by:*

Datum *Date*	Name/Stellung *Name/Position*	Unterschrift *Signature*
14.06.2011	Mika Chan Project Engineer	

kontrolliert/ *reviewed by:*

Datum *Date*	Name/Stellung *Name/Position*	Unterschrift *Signature*
14.06.2011	Sharon Li Project Manager	

Sonstiges: **FCCID: N2T5134**
Other Aspects

Abkürzungen:				*Abbreviations:*			
	P(ass)	=	*entspricht Prüfgrundlage*		*P(ass)*	=	*passed*
	F(ail)	=	*entspricht nicht Prüfgrundlage*		*F(ail)*	=	*failed*
	N/A	=	*nicht anwendbar*		*N/A*	=	*not applicable*
	N/T	=	*nicht getestet*		*N/T*	=	*not tested*

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Product information

The equipment under test (EUT) is a batteries operated RFID Toys operating at 13.56MHz. It consist of a pirate island and seven RFID tags on different symbol coins. The RFID tags and 5 yellow flames (5 LEDs) perform as a kind of password combination to open the door.

Submitted documents

Circuit Diagram
Block Diagram
Bill of material
User manual

List of Test and Measurement Instruments

	Equipment used	Manufacturer	Model No.	S/N	Due Date
☒	Semi-anechoic Chamber	Frankonia	Nil	Nil	25-May-12
☒	Test Receiver	R & S	ESU40	100190	26-May-12
☒	Bi-conical Antenna	R & S	HK116	100242	13-Apr-12
☒	Log Periodic Antenna	R & S	HL223	841516/020	13-Apr-12
☒	Coaxial cable 50ohm	Rosenberger	RTK081-05S-05S-10m	LA2-001-10M / 001	08 Dec 11
☒	Microwave amplifer 0.5-26.5GHz, 25dB gain	HP	83017A	3950M00241	03-Oct-11
☒	High Pass Filter (cutoff freq. =1000MHz)	Trilithic	23042	9829213	30-Oct-11
☒	Horn Antenna	EMCO	3115	9002-3351	16-Apr-12
☒	Spectrum Analyser	R & S	FSP 30	100416	17-Sep-12
☒	Active Loop Antenna	EMCO	6502	9107-2651	19-Apr-12

Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions measurements is ±5.10dB (30MHz to 200MHz) and ±5.08dB (200MHz to 1000MHz).

Results FCC Part 15 – Subpart C

Subclause 15.203 – Antenna Information	**Pass**
Requirement:	No antenna other than that furnished by the responsible party shall be used with the device
Results:	Permanent attached antenna
Verdict:	Pass

Subclause 15.204 – Antenna Information	**Pass**
Requirement:	Provide information for every antenna proposed for the use with the EUT
Results:	a) Antenna type: PCB Antenna b) Manufacturer and model no: N.A. c) Gain with reference to an isotropic radiator: 0 dBi
Verdict:	Pass

Subclause 15.209 – Radiated Emissions (30MHz to 1GHz) **Pass**

Test Specification : ANSI C63.4 – 2003
Mode of operation : Operating mode
Supply voltage : DC6V, 4 X AA size batteries
Measurement distance : 3 meters
Detector : Quasi-Peak detector for frequency below 1000MHz except for frequency bands 9-90KHz and 110-490KHz. Average detector for frequency bands 9-90KHz, 110-490KHz and above 1000MHz.
Temperature : 23ºC
Humidity : 50%

Requirement: The emissions from an intentional radiator shall not exceed the field strength levels specified in the table mentioned in section 15.209.

Vertical Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
40.689	29.4	40.0 / QP
54.252	26.3	40.0 / QP

Horizontal Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
94.941	32.5	43.5 / QP
135.630	28.5	43.5 / QP
149.193	36.2	43.5 / QP
203.445	31.7	43.5 / QP
447.580	29.3	46.0 / QP

Verdict:	Pass

Remark: There is no spurious emission found between 9kHz to 30 MHz.

Subclause 15.215 (c) – 20 dB Bandwidth	**Pass**
Requirement:	The intentional radiators must be designed to ensure that the 20dB bandwidth of the emission, is contained within the frequency band designated in the rule section under which the equipment is operated.

Test Specification : ANSI C63.4 – 2003
Mode of operation : Operating mode
RBW/VBW : 10KHz/10KHz
Supply voltage : DC6V, 4 X AA size batteries
Temperature : 23ºC
Humidity : 50%

Results: For test protocols refer to Appendix 1, page 2.

Frequency (MHz)	20 dB left (MHz)	Limit (MHz)	20 dB right (MHz)	Limit (MHz)
13.564	13.541	> 13.110	13.593	< 14.010

Subclause 15.225 (a-d) – Radiated Emission **Pass**

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:

MR = R + AF + CF + FA – PA

Where MR = Measurement Results 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.

Requirement:

(a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters (124 dBuV /m at 3 meters with extrapolation factor of 40 dB/decade).

(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters (90.5 dBuV /m at 3 meters with extrapolation factor of 40 dB/decade).

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters (80.5 dBuV /m at 3 meters with extrapolation factor of 40 dB/decade).

(d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

Test Specification : FCC Part 15 Subpart A – Subclause 15.31
Mode of operation : Operating mode
Detector : quasi-peak detector
Temperature : 23ºC
Humidity : 50%

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
13.564	56.86	124.0 / QP

Results: For test Results plots refer to Appendix 1, page 3.

Verdict: Pass

Subclause 15.225 (e) – Frequency Tolerance **Pass**

Requirement: The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C in 10 degrees C steps at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage or battery end point at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

Test Specification : FCC Part 15 Subpart A – Subclause 15.31
Mode of operation : Operating mode
Detector : Peak
RBW/VBW : 30 Hz / 30 Hz

Temp. (°C)	Supply Voltage (V)	Frequency (MHz)	Tolerance (Hz)	Limit (KHz)	Verdict
-20	6	13.562900	+220	±1.3563120	Pass
-10	6	13.562980	+140	±1.3563120	Pass
0	6	13.563020	+100	±1.3563120	Pass
10	6	13.563100	+20	±1.3563120	Pass
20	6	13.563120	-	-	Reference
20	2.4 **(Battery end point)**	13.563080	+40	±1.3563120	Pass
30	6	13.563160	-40	±1.3563120	Pass
40	6	13.563200	-80	±1.3563120	Pass
+50	6	13.563240	-120	±1.3563120	Pass

Results: The measured peak frequency is within +/- 0.01% of the fundamental frequency.

Verdict: Pass