

Prüfbericht - Nr.: 14025300 001		Seite 1 von 7	
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Auftraggeber: <i>Client:</i>	geobra Brandstätter GmbH & Co. KG Brandstätterstraße 2-10 Postfach 12 60 90513 Zirndorf Germany		
Gegenstand der Prüfung: <i>Test Item:</i>	Short Range Device - RFID Toys (13.564MHz)		
Bezeichnung: <i>Identification:</i>	6766	Serien-Nr.: <i>Serial No.:</i>	Engineering sample
Wareneingangs-Nr.: <i>Receipt No.:</i>	00101210090-001	Eingangsdatum: <i>Date of Receipt:</i>	10.12.2010
Prüfört: <i>Testing Location:</i>	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: <i>Test Specification:</i>	FCC Part 15 Subpart C ANSI C63.4-2003 CISPR 22:1997		
Prüfergebnis: <i>Test Results:</i>	Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben genannter Prüfgrundlage. The above mentioned product was tested and passed .		
Prüflaboratorium: <i>Testing Laboratory:</i>	TÜV Rheinland Hong Kong Ltd. 9-10/F., Emperor International Square , 7 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong		
geprüft/ tested by:		kontrolliert/ reviewed by:	
28.03.2011	Mika Chan Project Engineer	28.03.2011	Sharon Li Project Manager
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>
Sonstiges: Other Aspects		FCCID: N2T6766	
Abkürzungen:	P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet	Abbreviations:	P(ass) = passed F(ail) = failed N/A = not applicable N/T = 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. <i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i>			

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Product information

The equipment under test (EUT) is a batteries operated RFID Toys operating at 13.564MHz. It consist of a farm plate and six RFID tag on different toy item(animal), which provide different interactive sound function whenever it place on the farm plate.

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	27-Apr-11
☒	Test Receiver	R & S	ESU26	100050	25-May-11
☒	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 amplifier 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	06-Feb-11

Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions measurements is $\pm 5.10\text{dB}$ (30MHz to 200MHz) and $\pm 5.08\text{dB}$ (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 : 23°C 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
132.945	32.7	43.5 / QP
298.415	28.3	46.0 / QP
366.236	27.1	46.0 / QP
Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
366.236	39.1	46.0 / QP
406.929	38.6	46.0 / QP
339.107	40.9	46.0 / QP
434.058	35.2	46.0 / QP
623.958	36.5	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 : 23°C
 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	13.449	> 13.110	13.677	< 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 : 23°C

Humidity : 50%

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
13.564	53.01	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	13.564352	-60	±1.3564412	Pass
-10	6	13.564416	+4	±1.3564412	Pass
0	6	13.564412	0	±1.3564412	Pass
10	6	13.564412	0	±1.3564412	Pass
20	6	13.564412	-	-	Reference
20	3.4	13.564428	+16	±1.3564412	Pass
30	6	13.564408	-4	±1.3564412	Pass
40	6	13.564412	0	±1.3564412	Pass
+50	6	13.564416	+4	±1.3564412	Pass

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

Verdict: Pass