

**Prüfbericht - Nr.:** 14043777 001

Test Report No.:

Seite 1 von 14

Page 1 of 14

**Auftraggeber:** MGA ENTERTAINMENT (H.K.) LIMITED  
**Client:**  
 6th Floor, YHC TOWER  
 1 Sheung Yuet Road  
 Kowloon Bay  
 Hong Kong

**Gegenstand der Prüfung:** Bluetooth Low Energy and RFID Kitchen  
**Test Item:**

**Bezeichnung:** XHW641183-1 **Serien-Nr.:** **Engineering sample**  
**Identification:** **Serial No.:**

**Wareneingangs-Nr.:** A000344860-003 **Eingangsdatum:** 14.04.2016  
**Receipt No.:** **Date of Receipt:**

**Prüfort:** TÜV Rheinland Hong Kong Ltd.  
**Testing Location:**  
 8/F, First Group Centre, 14 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong  
**Hong Kong Productivity Council**  
 HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong

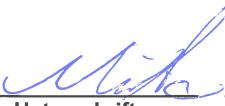
**Zustand des Prüfgegenstandes bei Anlieferung:** Test samples are not damaged and suitable  
**Condition of test item at delivery:** for testing

**Prüfgrundlage:** FCC Part 15 Subpart C  
**Test Specification:** RSS-210 Issue 8  
 RSS-Gen Issue 4  
 RSS 102 Issue 5  
 ANSI C63.10-2013

**Prüfergebnis:** Das vorstehend beschriebene Gerät wurde geprüft und entspricht  
**Test Results:** obengenannter Prüfgrundlage.  
 The above mentioned product was tested and **passed**.

**Prüflaboratorium:** TÜV Rheinland Hong Kong Ltd.  
**Testing Laboratory:** 8 - 10/F., Goldin Financial Global Square, 7 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong

**geprüft/ tested by:**
**kontrolliert/ reviewed by:**

11.07.2016	Mika Chan Project Manager		11.07.2016	Sharon Li Department Manager	
Datum Date	Name/Stellung Name/Position	Unterschrift Signature	Datum Date	Name/Stellung Name/Position	Unterschrift Signature

**Sonstiges:** FCC ID: LU9XHW6411831  
**Other Aspects:** IC: 4504A-XHW6411831

**Abkürzungen:** P(ass) = entspricht Prüfgrundlage  
 F(all) = entspricht nicht Prüfgrundlage  
 N/A = nicht anwendbar  
 N/T = nicht getestet

**Abbreviations:** P(ass) = passed  
 F(all) = 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.  
 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.

## Table of Content

	Page
<b>Cover Page</b> .....	1
<b>Table of Content</b> .....	<b>2</b>
<b>Product information</b> .....	4
Submitted documents.....	4
Independent Operation Modes .....	4
Related Submittal(s) Grants .....	4
Remark .....	4
<b>Test Set-up and Operation Mode</b> .....	5
Principle of Configuration Selection .....	5
Test Operation and Test Software.....	5
Special Accessories and Auxiliary Equipment.....	5
Countermeasures to achieve EMC Compliance.....	5
<b>Test Methodology</b> .....	6
Radiated Emission .....	6
Field Strength Calculation.....	6
<b>Test Setup Diagram</b> .....	7
<b>List of Test and Measurement Instruments</b> .....	9
<b>Measurement Uncertainty</b> .....	9
<b>Results FCC Part 15 – Subpart C / RSS-247 Issue 1</b> .....	10
FCC 15.203 – Antenna Requirement 1.....	Pass..... 10
FCC 15.204 – Antenna Requirement 2.....	N/A..... 10
RSS-Gen 6.3 – External Control.....	Pass..... 10
RSS-Gen 8.3 – Antenna Requirement .....	Pass..... 10
FCC 15.207/ RSS-Gen 8.8 – Conducted Emission on AC Mains.....	N/A..... 11
FCC 15.209 / RSS-Gen 8.9 – Radiated Emissions (30MHz to 1GHz) .....	Pass..... 11
FCC 15.215 (c) – 20 dB Bandwidth .....	Pass..... 12
RSS-Gen 6.6 – Occupied Bandwidth .....	Pass..... 12
FCC 15.225 (a-d) / RSS-210 A2.6 (a-d) – Radiated Emission .....	Pass..... 13
FCC 15.225 (e) / RSS-210 A2.6 – Frequency Tolerance .....	Pass..... 14

<b>Appendix 1 – Test protocols .....</b>	<b>3 pages</b>
<b>Appendix 2 – Test setup Photos .....</b>	<b>2 pages</b>
<b>Appendix 3 – Photo documentation .....</b>	<b>12 pages</b>
<b>Appendix 4 – Label, Operational Descriptions, Block Diagram, Schematics, User Manual ..</b>	<b>16 pages</b>
<b>Appendix 5 – RF Exposure Information .....</b>	<b>3 pages</b>

## Product information

The equipment under test (EUT) is a RFID (13.56 MHz) kitchen toy with Bluetooth Low Energy Transceiver operating at 2.4GHz. It is used to link up with tablet to play cooking game Apps.. It operates at the frequency range 2402 – 2480MHz. It has an integral PCB antenna and It is powered by 6.0VDC.

The equipment with two loop antennas operating in switched mode by which at any moment in time only one antenna is used.

FCC ID: LU9XHW6411831 / IC: 4504A-XHW6411831

Models	Product description
XHW641183-1	Bluetooth low energy and RFID Kitchen

## Submitted documents

Circuit Diagram  
Block Diagram  
Bill of material  
User manual  
Label

## Independent Operation Modes

The basic operation modes are:

- Transmitting mode.

For further information refer to User Manual

## Related Submittal(s) Grants

This is a composite device, for BLE portion please refer to test report No. 14043773 001.

## Remark

This is a composite device, simultaneous transmission was investigated and no new emissions were found.

The test results in this test report are only relevant to the tested sample and does not involve any assessment in the production.

## 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.

- Special software is provided by the applicant to set the device to operate in a fixed frequency channel and maximum RF output power level. The setting of the maximum RF output power shall be fixed on the final product.
- Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate.

### Special Accessories and Auxiliary Equipment

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

- none

Supporting equipment:

- DC power supply model: Manson NP-9615 (provide by TUV)

### Countermeasures to achieve EMC Compliance

- none

## Test Methodology

### Radiated Emission

The radiated emission measurements were performed according to the procedures in ANSI C63.10-2013.

The equipment under test (EUT) was placed at the middle of the 80 cm and 1.5m 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 particular parts 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:

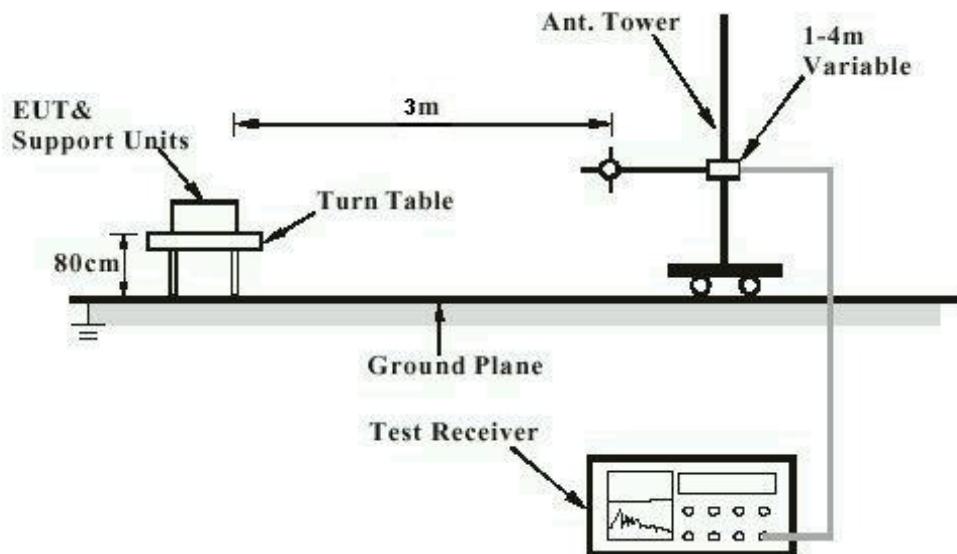
$$FS = R + AF + CF + FA - PA$$

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.

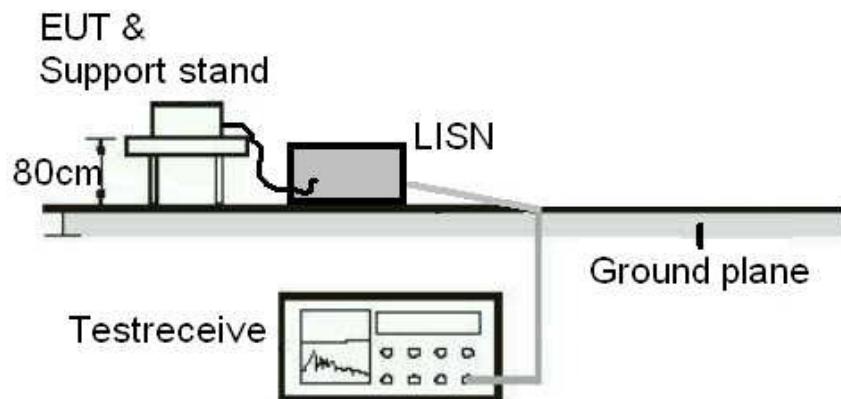
## Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test

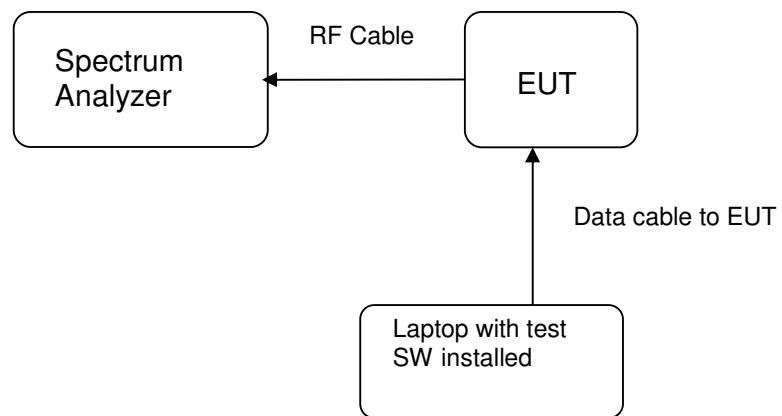


Note: Measurements above 1 GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)



**Diagram of Equipment Configuration for Antenna-port Conducted Measurement (if applicable)**



## List of Test and Measurement Instruments

**Hong Kong Productivity Council (Registration number: 90656)**

### Radiated Emission

Equipment	Manufacturer	Type	Cal. Date	Due Date
Semi-anechoic Chamber	Frankonia	Nil	14-Apr-15	25-Apr-17
New Fully Ancheonic Chamber	TDK	N/A	15-Apr-15	19-Apr-17
Cable	Hubersuhner	SUCOFLEX 104	31-Mar-14	31-Mar-18
Test Receiver	R & S	ESU26	12-Feb-15	07-Dec-16
Bi-conical Antenna	R & S	HK116	1-Sep-15	1-Sep-17
Log Periodic Antenna	R & S	HL223	1-Sep-15	1-Sep-17
Coaxial cable	Harbour	LL335	10-Jun-14	10-Jun-18
Microwave amplifier 0.5-26.5GHz, 25dB gain	HP	83017A	17-Jul-14	17-Jul-16
High Pass Filter (cutoff freq. =1000MHz)	Trilithic	23042	28-Oct-15	28-Oct-17
Horn Antenna	EMCO	3115	26-Aug-15	26-Aug-17
Active Loop Antenna	EMCO	6502	17-May-15	15-Aug-16

### TÜV Rheinland Hong Kong Ltd

### Radio Test

Equipment	Manufacturer	Type	Cal. Date	Due Date
Spectrum Analyzer	R & S	FSP30	12-Jan-15	12-Jan-2017

### AC Mains Conducted Emission

Equipment	Manufacturer	Type	Cal. Date	Due Date
Test Receiver	R & S	ESR3	22-Oct-15	22-Oct-16
LISN	R & S	ENV216	05 Feb 15	19-Jan-17
EMC32	R & S	v9.12	N/A	N/A

## 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 / RSS-247 Issue 1

FCC 15.203 – Antenna Requirement 1		Pass
<b>FCC Requirement:</b> No antenna other than that furnished by the responsible party shall be used with the device		
<b>Results:</b>	a) Antenna type: b) Manufacturer and model no: c) Peak Gain:	Integral loop antenna N/A 0.0 dBi
<b>Verdict:</b>	Pass	
FCC 15.204 – Antenna Requirement 2		N/A
<b>FCC Requirement:</b> An intentional radiator may be operated only with the antenna with which it is authorized. If an antenna is marketed with the intentional radiator, it shall be of a type which is authorized with the intentional radiator.		
<b>Results:</b>	Only one integral antenna can be used.	
<b>Verdict:</b>	N/A	
RSS-Gen 6.3 – External Control		Pass
<b>IC Requirement:</b> The device shall not have any external controls accessible to the user that enable it to be adjusted, selected or programmed to operate in violation of the limits prescribed in the applicable RSS.		
<b>Results:</b>	The device does not have any transmitter external controls accessible to the user that can be adjusted and operated in violation of the limits of this standard.	
<b>Verdict:</b>	Pass	
RSS-Gen 8.3 – Antenna Requirement		Pass
<b>IC Requirement:</b> When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer.		
<b>Results:</b>	a) Antenna type: b) Manufacturer c) model no d) Gain with reference to an isotropic radiator:	Fixed Integral loop antenna N/A N/A 0 dBi
<b>Verdict:</b>	Pass	

<b>FCC 15.207/ RSS-Gen 8.8 – Conducted Emission on AC Mains</b>	<b>N/A</b>
---	------------

There is no AC power input or output ports on the EUT.

<b>FCC 15.209 / RSS-Gen 8.9 – Radiated Emissions (30MHz to 1GHz)</b>	<b>Pass</b>
--	-------------

Test Specification : ANSI C63.10-2013  
 Mode of operation : TX 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

<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
132.945	32.7	43.5 / QP
298.415	28.3	46.0 / QP
366.236	27.1	46.0 / QP

Horizontal Polarization

<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
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.

<b>FCC 15.215 (c) – 20 dB Bandwidth</b>		<b>Pass</b>										
<b>Requirement:</b> 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 C63.10-2013 Mode of operation : TX Mode RBW/VBW : 10KHz/30KHz Supply voltage : DC6V, 4 X AA size batteries Temperature : 23°C Humidity : 50%												
<b>Results:</b> For test protocols refer to Appendix 1, page 2.												
<table border="1"> <thead> <tr> <th>Frequency (MHz)</th> <th>20 dB left (MHz)</th> <th>Limit (MHz)</th> <th>20 dB right (MHz)</th> <th>Limit (MHz)</th> </tr> </thead> <tbody> <tr> <td>13.564</td> <td>13.449</td> <td>&gt; 13.110</td> <td>13.677</td> <td>&lt; 14.010</td> </tr> </tbody> </table>		Frequency (MHz)	20 dB left (MHz)	Limit (MHz)	20 dB right (MHz)	Limit (MHz)	13.564	13.449	> 13.110	13.677	< 14.010	
Frequency (MHz)	20 dB left (MHz)	Limit (MHz)	20 dB right (MHz)	Limit (MHz)								
13.564	13.449	> 13.110	13.677	< 14.010								
<b>RSS-Gen 6.6 – Occupied Bandwidth</b>		<b>Pass</b>										
<b>Requirement:</b> When the occupied bandwidth limit is not stated in the applicable RSS or reference measurement method, the transmitted signal bandwidth shall be reported as the 99% emission bandwidth, as calculated or measured.												
Test Specification : ANSI C63.10-2013 Mode of operation : TX Mode RBW/VBW : 10KHz/30KHz Supply voltage : DC6V, 4 X AA size batteries Temperature : 23°C Humidity : 50%												
<b>Results:</b> For test protocols refer to Appendix 1, page 2.												
<b>Occupied Bandwidth (99%) :</b> 628 KHz												

<b>FCC 15.225 (a-d) / RSS-210 A2.6 (a-d) – Radiated Emission</b>		<b>Pass</b>
<b>Field Strength Calculation</b>		
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.		
<b>Requirement:</b> <ul style="list-style-type: none"> <li>(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).</li> <li>(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).</li> <li>(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).</li> <li>(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 § FCC 15.209 / 30 microvolts/m (29.5 dB<math>\mu</math>V/m) at 30 m (69.5 dBuV /m at 3 meters with extrapolation factor of 40 dB/decade).</li> </ul>		
<b>Test Specification</b> : ANSI C63.10-2013 <b>Mode of operation</b> : TX Mode <b>Detector</b> : peak detector <b>Temperature</b> : 23°C <b>Humidity</b> : 50%		
<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
13.564	53.01	124.0 / PK
<b>Results:</b> For test Results plots refer to Appendix 1, page 3.		
<b>Verdict:</b> Pass		

FCC 15.225 (e) / RSS-210 A2.6 – Frequency Tolerance					Pass
<b>Requirement:</b> 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 : ANSI C63.10-2013 Mode of operation : TX 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
<b>Results:</b> The measured peak frequency is within +/- 0.01% of the fundamental frequency.					
<b>Verdict:</b> Pass					