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Produkte
Products

Prüfbericht - Nr.: *Test Report No.:*	**14022739 001**	**Seite 1 von 14** *Page 1 of 14*
Auftraggeber: *Client:*	**Remotec Technology Ltd.** **Room 2907 – 2908** **Skyline Tower** **39 Wang Kwong Road** **Kowloon Bay, Kowloon, Hong Kong**	
Gegenstand der Prüfung: *Test Item:*	**Z-WAVE Enabled Universal Remote Control (908.4 MHz)**	
Bezeichnung: *Identification:*	**BW8330, BW8331, BW8340, BW8341, BW833A, HSK-100Z-US**	**Serien-Nr.:** *Serial No.:* **Engineering sample**
Wareneingangs-Nr.: *Receipt No.:*	**00091211075-002**	**Eingangsdatum:** *Date of Receipt:* **11.12.2009**
Prüfort: *Testing Location:*	**TÜV Rheinland Hong Kong Ltd.** 9th Floor, Emperor International Square, 7 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**	
Prüfergebnis: *Test Result:*	**Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).** *The test item passed the test specification(s).*	
Prüflaboratorium: *Testing Laboratory:*	**TÜV Rheinland Hong Kong Ltd.** 9th Floor, Emperor International Square, 7 Wang Tai Road, Kowloon Bay Kowloon, Hong Kong	

geprüft / *tested by:*			**kontrolliert** / *reviewed by:*		
05.01.2010	Ryan Chen Engineer		05.01.2010	Hugo Wan Project Manager	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges / *Other Aspects:*

FCC ID: M7N-BW8330

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*

Test Summary

20dB bandwidth

Result: Pass

Radiated Emission of Carrier Frequency

Result: Pass

Spurious Radiated Emissions

Result: Pass

Contents

General Remarks

Nil.

List of Test and Measurement Instruments

Hong Kong Productivity Council (Registration number: 90656)

Equipment	Manufacturer	Type	S/N	Cal Due Date
Semi-anechoic Chamber	Frankonia	Nil	Nil	27 Feb 10
EMI Test Receiver	Rohde & Schwarz	ESU8	100141	08 Sep 10
Biconical Antenna	Rohde & Schwarz	HK116	100242	22 May 10
Log.-Periodic Antenna	Rohde & Schwarz	HL223	841516/020	21 May 10
Horn Antenna	EMCO	3115	9002-3351	27 Feb 10
Coaxial Cable 50ohm	Rosenberger	RTK081-05S-05S-10m	LA2-001-10M / 002	15 May 10
Active Loop Antenna	EMCO	6502	9107-2651	20 Dec 09

General Product Information

Product Function and Intended Use

The equipment under test (EUT) is a remote control of a home automation system. It is able to control the wireless enabled equipment at the home. It uses 908.4MHz as a communication channel. There is only one frequency channel in this product.

FCC ID: M7N-BW8330

Model	Product description
BW8330, BW8331, BW8340, BW8341, BW833A, HSK-100Z-US	Z-WAVE Enabled Universal Remote Control

The four models listed in the above table are identical in construction including schematics, PCB layouts and electronic components except a change in top cabinet and rubber keypad silkscreen.

Model BW8330 was selected as a representative for testing.

Ratings and System Details

		Transmitter
Operating Frequencies	:	908.4MHz
Number of channels	:	1
Type of antenna	:	Integral antenna
Power supply	:	4.5VDC, 3 x AAA size batteries
Ports	:	Nil

Independent Operation Modes

The basic operation modes are:

- Control of home electrical product and audio visual products
- Others, please refer to user manual for further details

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

- none

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 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

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

20dB Bandwidth — Section 15.215(c)

RESULT: **Pass**

Test Specification	:	FCC Part 15 Section 15.215(c)
Detector Function	:	Peak
Measurement BW	:	100kHz
Supply Voltage	:	4.5V DC from batteries
Operating band	:	908MHz

Frequency (MHz)	20dB Bandwidth (MHz)	Frequency at 20dB BW closest to Band Edge (MHz)	Delta to Band Edge (MHz)
908.396	0.428	908.192	-6.192

For test results, please refer to Appendix 1.

Limit **Section 15.215(c)**

Frequency band (MHz)
902 – 928

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

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	:	4.5V DC from batteries

Polarization: Vertical

Frequency (MHz)	Field strength at 3m (dBµV/m)	Limit (dBµV/m)	Delta to Limit (dB)
908.415	82.0	94.0	-12.0

Polarization: Horizontal

Frequency (MHz)	Field strength at 3m (dBµV/m)	Limit (dBµV/m)	Delta to Limit (dB)
908.398	91.1	94.0	-2.9

Limit **Section 15.249(a)**

Frequency band (MHz)	Peak Emission	
	(µV/m)	(dBµV/m)
902 – 928	50,000	94.0

As shown in Section 15.35(b), for frequencies above 1000 MHz, the above field strength limits of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

Spurious Radiated Emissions — Section 15.249(a, c, d, e)

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	:	4.5V DC from batteries

Polarization: Vertical

Frequency (MHz)	Field strength at 3m (dBµV/m)	Detector (PK / AV)	Limit at 3m (dBµV/m)	Delta to Limit (dB)
1816.800	38.7	PK	74.0	-35.3
	32.5	AV	54.0	-21.5
*2725.200	43.4	PK	74.0	-30.6
	39.6	AV	54.0	-14.4
*3633.600	43.1	PK	74.0	-30.9
	34.3	AV	54.0	-19.7
*4542.000	44.6	PK	74.0	-29.4
	34.3	AV	54.0	-19.7
*5450.400	47.2	PK	74.0	-26.8
	37.1	AV	54.0	-16.9
6358.800	47.2	PK	74.0	-26.8
	36.8	AV	54.0	-17.2
*7267.200	48.4	PK	74.0	-25.6
	37.8	AV	54.0	-16.2
*8175.600	49.8	PK	74.0	-24.2
	39.3	AV	54.0	-14.7
*9084.000	49.5	PK	74.0	-24.5
	39.7	AV	54.0	-14.3

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Polarization: Horizontal

Frequency (MHz)	Field strength at 3m (dBµV/m)	Detector (PK / AV)	Limit at 3m (dBµV/m)	Delta to Limit (dB)
1816.800	40.9	PK	74.0	-33.1
	36.1	AV	54.0	-17.9
*2725.200	42.2	PK	74.0	-31.8
	38.7	AV	54.0	-15.3
*3633.600	43.7	PK	74.0	-30.3
	33.3	AV	54.0	-20.7
*4542.000	44.9	PK	74.0	-29.1
	33.9	AV	54.0	-20.1
*5450.400	46.6	PK	74.0	-27.4
	36.6	AV	54.0	-17.4
6358.800	47.3	PK	74.0	-26.7
	36.8	AV	54.0	-17.2
*7267.200	47.9	PK	74.0	-26.1
	38.1	AV	54.0	-15.9
*8175.600	48.2	PK	74.0	-25.8
	39.7	AV	54.0	-14.3
*9084.000	49.8	PK	74.0	-24.2
	40.0	AV	54.0	-14.0

Remark: (1) ' * ' indicates the frequency of the emissions fall into the restricted band as defined in Section 15.205(a). They comply with the radiated emission limits specified in Section 15.209.
(2) Emissions radiated outside the specified frequency bands, except for harmonics, were attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation
(3) From the lowest oscillator frequency 8MHz to 30MHz, there is no spurious emission found.

Limit **Section 15.249(a)**

Fundamental Frequency (MHz)	Field strength (AV) (µV/m)	Field strength (AV) (dBµV/m)	Measurement distance (m)
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.

Limit **Section 15.249(d)**

Emissions radiated outside of the specified frequency bands as listed in 15.249(a), except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

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 (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
30-88	100	20*log(100) = 40.00	3
88-216	150	20*log(150) = 43.52	3
216-960	200	20*log(200) = 46.02	3
960-2500	500	20*log(500) = 53.98	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.