

Produkte
Products

Prüfbericht - Nr.: 19660156 001		Seite 1 von 11	
<i>Test Report No.:</i>		<i>Page 1 of 11</i>	
Auftraggeber: <i>Client:</i>		The Kroger Co. 11450 Grooms Rd. Blue Ash, OH 45242 United States	
Gegenstand der Prüfung: <i>Test item:</i>		G3HHA0 ZigBee Retail Handheld	
Bezeichnung: <i>Identification:</i>	HHG3	Serien-Nr.: <i>Serial No.</i>	Engineering Sample
Wareneingangs-Nr.: <i>Receipt No.:</i>	1803062119	Eingangsdatum: <i>Date of receipt:</i>	28.01.2015
Prüfort: <i>Testing location:</i>		Refer Page 4 of 11 for test facilities	
Prüfgrundlage: <i>Test specification:</i>		FCC Part 15, Subpart C ANSI C63.4-2009	
Prüfergebnis: <i>Test Result:</i>		Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>The test items passed the test specification(s).</i>	
Prüflaboratorium: <i>Testing Laboratory:</i>		TÜV Rheinland (India) Pvt. Ltd. 82/A, 3rd Main, West Wing, Electronic City Phase 1 Hosur Road, Bangalore – 560 100. India	
geprüft / tested by:		kontrolliert / reviewed by:	
02.02.2015 Vinay N Sr.Engineer 		03.02.2015 Raghavendra Kulkarni Sr.Manager 	
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>
Sonstiges / Other Aspects:		FCC ID: PBR-SZHHG3 Contains FCC ID: PBR-SZMDLNR1	
Abkürzungen:		Abbreviations:	
P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet		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>			

Test Result Summary

Clause	Test Item	Result
FCC 15.209	Spurious Radiated Emissions	Pass
FCC 15.205	Restricted Bands of Operation	Pass

Note:

The Product Contains FCC approved modules (FCC ID: PBR-SZMDLNR1) and hence the module related tests are excluded.

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List of Test and Measurement Instruments

TÜV Rheinland (India) Pvt. Ltd, Bangalore

List of Test and Measurement Instruments

Equipment	Manufacturer	Model	S/N	Calibration Due Date
EMI Receiver	Rohde & Schwarz	ESU 40	100288	20/06/15
Broadband Antenna	Frankonia	ALX-4000	ALX-4000-806	22/06/15
Double-Ridged Guide Antenna	ETS	3117	00133356	22/06/15
Double-Ridged Waveguide Horn Antenna	ETS	3116B	125945	22/06/15

Testing Facilities:

- 1) TÜV Rheinland (India) Private Limited
No. 108, West Wing
Electronic city Phase I
Bangalore – 560100

General Product Information

Product Function and Intended Use

SRHHG3 has two Zigbee modules mounted on it. These ZigBee Modules are used for wireless data communication with other ZigBee device. It also has RGB graphic LCD, Keypad, Mic, Speaker, vibrating motor and Barcode scanner for user interface. User can scan barcode using Laser scanner and receive all information about product over wireless ZigBee network. And can able to see on RGB graphic LCD. Using Keypad we can able to add/remove item in cart list. Device can be use as walkie-talkie by using mic and speaker.

Ratings and System Details

Operating Frequency	2400MHz – 2483.5MHz
No. of channels	15
Channel Spacing	5MHz
Modulation	DSSS
Data Rate	250 kbps
Antenna Type	PCB inverted F antenna
Number of antenna	Two (One on each module)
Antenna Gain	3.27dBi Max
Supply Voltage	3.7V DC (Rechargeable Battery)
Dimensions	Height: 142 mm Width: 73 mm Depth: 28 mm
Environmental	Temp: 5-45 °C (41-113 °F) Humidity: 20-80% RHG

Test Conditions:

Voltage: 3.27 V DC Battery Supply

Environmental conditions:

Temperature: +23 °C **RH:** 62%

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Test Set-up and Operation Mode

Principle of Configuration Selection

Transmission was enabled with highest possible duty cycle with both modules in low channel, high channel, and all both modules in two different channels.

Test Operation and Test Software

Test software was used to enable the transmission with highest possible duty cycle and channels in 2.4 GHz band on the EUT for the tests in this report.

Special Accessories and Auxiliary Equipment

- None

Countermeasures to achieve EMC Compliance

- None

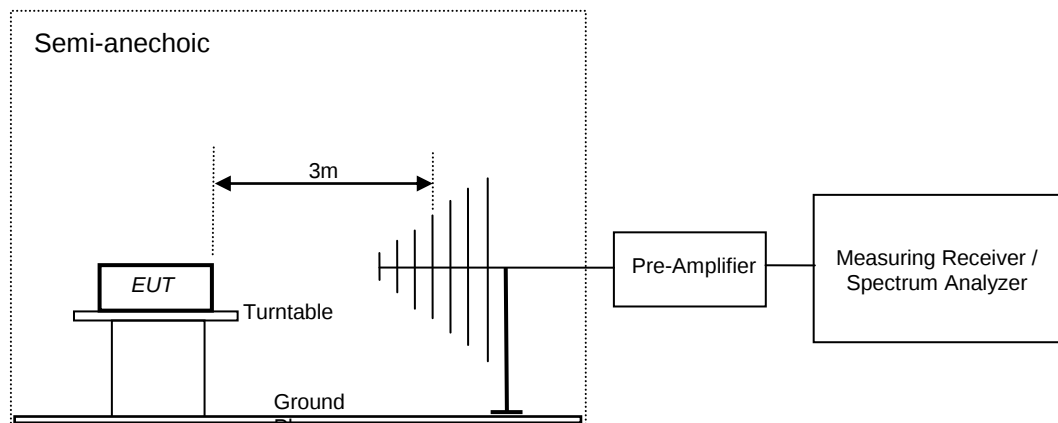
Table of carrier frequencies

Frequency Band	Channel No.	Frequency (MHz)
2400-2483.5 MHz	11	2405
	12	2410
	13	2415
	14	2420
	15	2425
	16	2430
	17	2435
	18	2440
	19	2445
	20	2450
	21	2455
	22	2460
	23	2465
	24	2470
	25	2475

Test Methodology

Radiated Emission Test

The radiated emission measurement was performed according to the procedures in ANSI C63.4-2009. The equipment under test (EUT) was placed at the middle of the 80 cm high turntable, and the EUT is 3 meters far from the measuring antenna. The turntable was rotated 360° for obtaining the maximum emission. The height of the measuring antennas was 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. The measurement above 1000MHz was performed by horn antenna. The measurement below 30MHz was performed by loop antenna. The EUT was rotated around the X-, Y-, and Z-Axis and the results from worst case axis are recorded.



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Test Results

Maximum transmitted output power

The product contains two Zigbee modules. Below are the maximum transmitted output power levels of individual modules.

Module 1→1.29mW

Module 2→1.29mW

The total In-Band power is

$(1.29+1.29) \text{ mW} = 2.58\text{mW} = 4.11\text{dBm}$ which is less than the compliance limit 27dBm (3dB down from 30dBm as the modules are correlated)

Power Spectral Density

The product contains two Zigbee modules. Below are the maximum power spectral density levels of individual modules.

Module 1→0.11mW

Module 2→0.11mW

The total In-Band power is

$(0.11+0.11) \text{ mW} = 0.22\text{mW} = -6.57\text{dBm}$ which is less than the compliance limit 5dBm (3dB down from 8dBm as the modules are correlated)

Spurious Radiated Emissions and Restricted Bands of Operation**Section 15.209 and 15.205****Result****Pass**

Test Specification	FCC Part 15 Section 15.209 & 15.205
Test Method	ANSI C63.4-2009
Measurement Location	Semi Anechoic Chamber
Measuring Distance	3m
Detection	QP for frequency below 1GHz, Peak and Average for frequency above 1GHz
Requirement	As per the limits mentioned in the below table

Limit for Radiated Emission of Section 15.209:

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Field strength ($\text{dB}\mu\text{V/m}$)	Distance of Measurement (m)
0.009 – 0.490	2400/F(kHz)	48.50 – 13.80	300*
0.490 – 1.705	24000/F(kHz)	33.80 – 23.00	30*
1.705 -30	30	29.54	30*
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Remark: * the limit shows in the table above of frequency range 0.009 – 0.490, 0.490 – 1.705 MHz and 1.705-30MHz is at 300 meter, 30 meter and 30 meter range respectively, which corresponds to 88, 50 – 53.80, 53.80 – 43.00 and 49.5dB $\mu\text{V/m}$ at 3m range by extrapolation calculation and the measurement of loop antenna.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.

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Test result:

Frequency below 1GHz

No emissions found in this frequency range.

Frequency above 1GHz

Fundamental Frequency (MHz)	Antenna Polarization	Spurious Emission (MHz)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Test Configuration 1: Both modules operating at low channel					
2405	V	2405.60(Pk)	87.36	*	-
		2405.10(Av)	82.04	*	-
		2386.10(Pk)	40.47	74	-33.53
		2388.70(Av)	27.76	54	-26.24
		4810.00(Pk)	49.69	74	-24.31
		4809.70(Av)	37.14	54	-16.86
		7213.50(Pk)	57.75	74	-16.25
		7213.90(Av)	45.05	54	-8.95
	H	2405.5(Pk)	95.48	*	-
		2405(Av)	89.19	*	-
		2387.9(Pk)	49.91	74	-24.09
		2389.6(Av)	28.56	54	-25.44
		4809.8(Pk)	49.78	74	-24.22
		4810(Av)	39.79	54	-14.21
		7213.1(Pk)	58.08	74	-15.92
		7215.1(Av)	45.45	54	-8.55
Test Configuration 2: Both modules operating at high channel					
	V	2480.50(Pk)	88.99	*	-
		2480.10(Av)	82.34	*	-
		2483.50(Pk)	46.64	74	-27.36
		2483.50(Av)	36.04	54	-17.96
		4959.20(Pk)	50.46	74	-23.54
		4959.80(Av)	37.98	54	-16.02
	H	2480.30(Pk)	97.51	*	-
		2480.10(Av)	91.78	*	-
		2483.50(Pk)	56.86	74	-17.14
		2483.50(Av)	45.18	54	-8.82
		4961.10(Pk)	51.82	74	-22.18
		4959.80(Av)	40.38	54	-13.62

Test Configuration 3: Both modules operating in different channels					
Module1 2405 Module2 2480	V	2404.50(Pk)	86.11	*	-
		2405.20(Av)	81.58	*	-
		2382.60(Pk)	44.89	74	-29.11
		2390.00(Av)	27.8	54	-26.2
		2480.50(Pk)	88.15	*	-
		2480.10(Av)	82.07	*	-
		2483.50(Pk)	46.33	74	-27.67
		2483.50(Av)	37.51	54	-16.49
		4809.80(Pk)	48.89	74	-25.11
		4811.00(Av)	36.67	54	-17.33
		4958.90(Pk)	50.49	74	-23.51
		4961.00(Av)	37.08	54	-16.92
	H	2405.50(Pk)	95.22	*	-
		2405.10(Av)	89.78	*	-
		2389.80(Pk)	45.87	74	-28.13
		2390.00(Av)	28.9	54	-25.1
		2479.50(Pk)	97.65	*	-
		2480.10(Av)	92.44	*	-
		2483.50(Pk)	56.15	74	-17.85
		2483.60(Av)	44.64	54	-9.36
		4810.40(Pk)	49.76	74	-24.24
		4810.00(Av)	38.35	54	-15.65
		4959.1(Pk)	50.62	74	-23.38
		4961.1(Av)	38.54	54	-15.46

* → Fundamental Frequency

Pk → Peak Detector

Av → Average Detector