

Produkte
Products

Prüfbericht - Nr.: 19660056 001		Seite 1 von 9	
<i>Test Report No.:</i>		<i>Page 1 of 9</i>	
Auftraggeber: <i>Client:</i>	The Kroger Co. 11450 Groom Road Blue Ash OH-45242 United States		
Gegenstand der Prüfung: <i>Test item:</i>	CC2530-CC2591 ZigBee MODULE		
Bezeichnung: <i>Identification:</i>	SREXRG	Serien-Nr.: <i>Serial No.</i>	Engineering Sample
Wareneingangs-Nr.: <i>Receipt No.:</i>	1803022504	Eingangsdatum: <i>Date of receipt:</i>	21.11.2013
Prüfart: <i>Testing location:</i>	Refer Page 4 of 9 for test facilities		
Prüfgrundlage: <i>Test specification:</i>	FCC Part 15, Subpart C ANSI C63.4-2003		
Prüfresultat: <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:	
05.01.2014	Vinay N Test Engineer		08.01.2014
			Raghavendra Kulkarni Manager
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>
			Name/Stellung <i>Name/Position</i>
			Unterschrift <i>Signature</i>
Sonstiges / Other Aspects:	FCC ID : PBR-SZMDLBR1		
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>			

Test Result Summary

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

This Module is originally certified with FCC ID: PBR-SZMDLBR1. With respect to the changes made in the module, Class 2 Permissive Changes are applied and hence only critical tests are performed as mentioned in the above table. Please Refer Operation description and changes as per C2PC letter for detailed information on changes made.

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List of Type and Measurement Instruments

TÜV Rheinland (India) Pvt. Ltd, Bangalore

List of Test and Measurement Instruments

Equipment	Manufacturer	Model	S/N	Calibration Due Date
EMI Test Receiver	Rohde &Schwarz	ESU 40	100288	04.10.2014
Hybrid Log Periodic antenna	ETS Lindgren	3142D	00081354	26.07.2014
Broadband Horn Antenna	Frankonia	HAX-18	HAX18-802	23.03.2014
Double-Ridged Waveguide Horn Antenna	ETS Lindgren	116794	00133356	01.09.2014
Emission Horn Antenna	ETS Lindgren	116706	00107323	24.08.2014
Active Loop Antenna	Frankonia	LAX-10	LAX-10-800	11.04.2014
Spectrum Analyser	Agilent Technologies	E4407B	US41192772	21.03.2014

Testing Facilities:

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

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General Product Information

Product Function and Intended Use

The SREXRG Module is designed to be used for ZigBee Wireless network applications. The Module is 2.4GHz ZigBee/802.15.4 Wireless device to be used with Host device to create low power Wireless network. The Module has RF Front end SoC to boost the RF Power level for range Extension. The module will be soldered on Host Board and will be powered through Host Board Power system. The module will transmit/receive data over the air. The module will communicate With Host CPU through SPI/UART interface and I/O pins.

Ratings and System Details

Operating Frequency	2400MHz – 2483.5MHz
No. of channels	16
Channel Spacing	5MHz
Modulation	DSSS(O-QPSK)
Transmitted Power	7.18 dBm
Data Rate	250 kbps
Antenna Type	PCB Inverted F Antenna
Number of antenna	1
Antenna Gain	3.27dBi
Supply Voltage	2.7V – 3.6V
Dimensions	Length: 38.1mm Width: 20.96 mm
Environmental	Operating : -30 deg C to 75 deg C.

Test Conditions:

Voltage: 3.3 V DC

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 on low, mid and high channel.

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
	26	2480

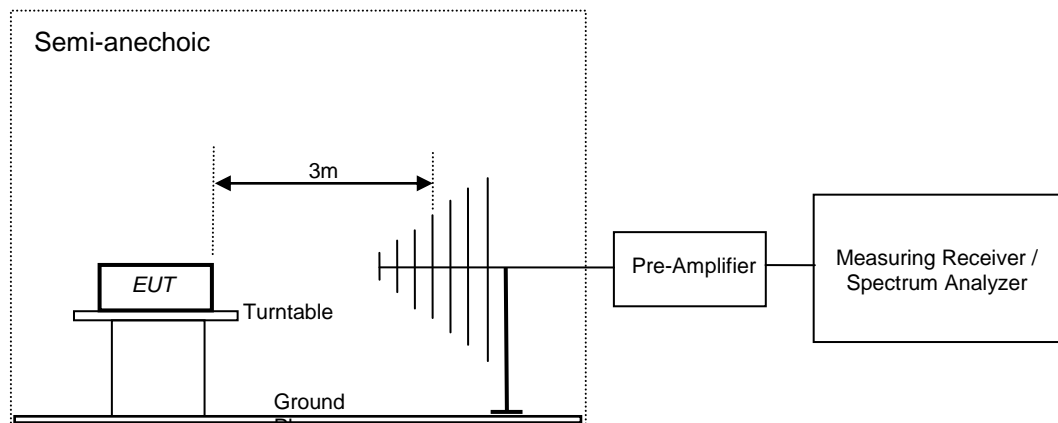
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Test Methodology

Radiated Emission Test

The radiated emission measurement was performed according to the procedures in ANSI C63.4-2003. 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

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 C63.4-2003
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 bellow 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:

There were no emissions found in the frequency range below 1GHz and hence they are not reported.

Fundamental Frequency (MHz)	Antenna Polarization	Spurious Emission (MHz)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2405	V	2390.0 (Pk)	39.39	74	-34.61
		2372.9 (Av)	27.17	54	-26.83
		2404.5 (Pk)	89.5	*	-
		2405.6 (Av)	84.49	*	-
		4809.0 (Pk)	58.75	74	-15.25
		4809.0 (Av)	45.1	54	-8.9
		7216.4 (Pk)	63.91	74	-10.09
		7216.5 (Av)	49.88	54	-4.12
	H	2405.6 (Pk)	41.36	74	-32.64
		2404.9 (Av)	28.22	54	-25.78
		2385.0 (Pk)	95.91	*	-
		2373.4 (Av)	90.6	*	-
		4808.9 (Pk)	59.18	74	-14.82
		4811.0 (Av)	46.2	54	-7.8
		7213.5 (Pk)	61.42	74	-12.58
		7216.4 (Av)	47.9	54	-6.1
2440	H	2440.4 (Pk)	90.85	*	-
		2440.1 (Av)	85.47	*	-
		4881.0 (Pk)	57.46	74	-16.54
		4880.9 (Av)	43.67	54	-10.33
		7318.3 (Pk)	64.39	74	-9.61
		7321.4 (Av)	50.59	54	-3.41
	V	2439.4 (Pk)	97.1	*	-
		2440.2 (Av)	92.39	*	-
		4881.0 (Pk)	58.38	74	-15.62
		4881.0 (Av)	44.97	54	-9.03
2480	V	7321.3 (Pk)	62.4	74	-11.6
		7321.5 (Av)	48.7	54	-5.3
		2479.3 (Pk)	92.47	*	-
		2479.3 (Av)	87.47	*	-
		2483.5 (Pk)	51.73	74	-22.27
		2483.5 (Av)	43.19	54	-10.81
		4961.0 (Pk)	58.29	74	-15.71
		4960.8 (Av)	45.46	54	-8.54
	H	7441.9 (Pk)	66.81	74	-7.19
		7441.2 (Av)	52.58	54	-1.42
		2480.4 (Pk)	98.87	*	-
		2480.2 (Av)	93.31	*	-
		2483.5 (Pk)	59.08	74	-14.92
		2483.5 (Av)	48.66	54	-5.34
4961.0 (Pk)	60.04	74	-13.96		
4961.0 (Av)	46.8	54	-7.2		
7443.2 (Pk)	64.52	74	-9.48		
7441.3 (Av)	50.42	54	-3.58		

* - --> Fundamental Frequency

Pk--> Peak Detector

Av--> Average Detector