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Cypress Semiconductor Reliability Qualification Report

QTP# D11021, D11021a Version **

BCM43362K / BCM43362SK

**Qualification of: BCM43362K / BCM43362SK, Single-Chip IEEE 802.11
b/g/n MAC/Baseband/Radio + SDIO in 69 Ball, Wafer Level Ball Grid
Array (WLBGA)**

FOR ANY QUESTIONS ON THIS REPORT, PLEASE CONTACT
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I.A. Product and Package Information

Product Description: BCM43362SKUBG **Cypress Division:** IoT Division
Single-Chip IEEE 802.11 b/g/n MAC/Baseband/Radio + SDIO

Package: WLBGA	QTP: D11021	
Description: (4.54 x 2.94 x 0.6mm) 69 Ball, Wafer Level Ball Grid Array (WLBGA)		Flammability: O2 Index:
Assembly: SPIL Taiwan	Molding Compound: N/A	UL-V0 >28
Electrical Test: SPIL Taiwan	Theta Ja / Psi Jt: 21 °C/W / 1 °C/W	
Substrate/Leadframe: N/A	Die Attachment: N/A	
Lead Finish: 95.5Sn / 4.0Ag / 0.5Cu	Bond Wire: N/A	
Comments:		

Est. Field Temperature: 55 °C	Life Test Temperature: 125 °C
Est. DC Field Current: 100 mA	Life Test Dynamic Current: 25 mA
Est. Field Voltage: 3.3 V	Life Test Voltage: 3.8 V
Est. Field Power Dissipation: 330 mWatts	Est. Stress Power Dissipation: 95 mWatts
Est. Field Tj: 61.9 °C	Est. Stress Tj: 126.9 °C

Die: 43362TA2-N	Die Size: 4.54 x 2.94 mm
Process: 65NM LP	Fab: TSMC-14
Type: Wireless	Density: N/A

I.B. Product and Package Information

Product Description: BCM43362KUBG **Cypress Division:** IoT Division
Single-Chip IEEE 802.11 b/g/n MAC/Baseband/Radio + SDIO

Package: WLPGA	QTP: D11021a	
Description: (4.54 x 2.94 x 0.6mm) 69 Ball, Wafer Level Ball Grid Array (WLPGA)		Flammability: O2 Index:
Assembly: SPIL Taiwan	Molding Compound: N/A	UL-V0 >28
Electrical Test: SPIL Taiwan	Theta Ja / Psi Jt: 21 °C/W / 1 °C/W	
Substrate/Leadframe: N/A	Die Attachment: N/A	
Lead Finish: 95.5Sn / 4.0Ag / 0.5Cu	Bond Wire: N/A	
Comments:		

Est. Field Temperature: 55 °C	Life Test Temperature: 125 °C
Est. DC Field Current: 100 mA	Life Test Dynamic Current: 25 mA
Est. Field Voltage: 3.3 V	Life Test Voltage: 3.8 V
Est. Field Power Dissipation: 330 mWatts	Est. Stress Power Dissipation: 95 mWatts
Est. Field Tj: 61.9 °C	Est. Stress Tj: 126.9 °C

Die: 43362TA2-N	Die Size: 4.54 x 2.94 mm
Process: 65NM LP	Fab: TSMC-14
Type: Wireless	Density: N/A

II. 65nm G/LP/RF Life Test Failure Rate Calculation

HTOL Stress Temperature - 125 °C

Failure Mechanism	Read Points / Test Results				Modeling Parameters @ 55°C					Avg. Failure Rate FITS @ 55°C, 60% Conf.	
	24 hrs	168 hrs	504 hrs	1000 hrs	Ea eV	TAF	VAF	OAF	MTTF (yrs)	Early Life	Inherent Life
PLASTIC											
Sample Size	3305	2755	2083	2083							
Zero fails, Process ave. Ea	0 *	0	0	0	0.7	73	1	73		76	6
Totals	0	0	0	0					19026	76	6

* Contributes to early life FITS

III. Summary of Stress Test Results

Stress Test	Stress Condition	Package Type	Sample Size	Num. of Lots	Num. of Fails	Failure Rate %	Comments
Data From Qualification D11021:							
Early Life Failure Rate	125°C, Vddnom x 1.15	WLBGA ¹	96	1	0	0.00	24 Hours
HTOL (EL)	125°C, Vddnom x 1.15	WLBGA ¹	96	1	0	0.00	192 Hours
ESD CDM	N/A	WLBGA ¹	3	1	Pass 200V		
ESD HBM	N/A	WLBGA ¹	3	1	Pass 1.25kV		
ESD MM	N/A	WLBGA ¹	3	1	Pass 65V		
Latch Up	125°C	WLBGA ¹	6	1	Pass 200mA		
Generic Reference Data:							
High Temp Bake	(150°C)	WLBGA ²	77	1	0	0.00	1000 Hours
Preconditioning	(PC5/245°C, +0°C/-5°C)	WLBGA ²	80	1	Passed Jedec L1		
	(PC5/245°C, +0°C/-5°C)	WLBGA ²	154	1	Passed Jedec L1		
Precon+Temp Cycle	(PC5/245°C, -55°C/125°C)	WLBGA ²	77	1	0	0.00	500 Cycles
	(PC5/245°C, -55°C/125°C)	WLBGA ²	77	1	0	0.00	1000 Cycles
Precon+uHAST	(PC5/245°C, Unbiased, 130°C/85% RH)	WLBGA ²	77	1	0	0.00	96 Hours
Unbiased Temp/Humidity	85°C/85%RH	WLBGA ²	77	1	0	0.00	500 hours
	85°C/85%RH	WLBGA ²	77	1	0	0.00	300 hours
	85°C/85%RH	WLBGA ²	77	1	0	0.00	1000 hours

Notes / Justification: 1) Results from Qual D11021, BCM43362SKUBG, 65NM LP Wireless in 69 Ball WLBGA (4.54 x 2.94 x 0.6mm)
 2) Results from Qual PQ03028, in 140 Ball WLBGA (4.51 x 5.31 x 0.6mm) - Same Package Family and Assembly Site

Preconditioning Flows: PC5 (JEDEC L1): Bake 125°C, 24hr => Soak @ 85°C/85%RH, 168hr => 3x Reflow

Reliability Tests Performed per Specification Requirements

Stress	Condition	Specification Reference
Early Life Failure Rate	125°C, Vddnom x 1.15	JESD22-A108 / AEC-Q100-008
ESD CDM	N/A	JS002 / AEC-Q100-011
ESD HBM	N/A	JS001 / AEC-Q100-002
ESD MM	N/A	JS001 / AEC-Q100-002
High Temp Bake	(150°C)	JESD22-A103
HTOL (EL)	125°C, Vddnom x 1.15	JESD22-A108
Latch Up	125°C	JESD78 / AEC Q100-004
Precon+Temp Cycle	(PC5/245°C, -55°C/125°C)	JESD22-A104
Precon+uHAST	(PC5/245°C, Unbiased, 130°C/85% RH)	JESD22-A118
Preconditioning	(PC5/245°C, +0°C/-5°C)	J-STD-020
Unbiased Temp/Humidity	85°C/85%RH	JESD22-A101

IV. Revision History

Document Number: 002-18261

Document Title: QTP #D11021/a: BCM43362K / BCM43362SK, Single-Chip IEEE 802.11 b/g/n
MAC/Baseband/Radio + SDIO

Rev.	Issue Date	ECN#	Originator	Description
**	12/21/2016	5562654	FCCL	Initial Release.

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