

Cypress Semiconductor Reliability Qualification Report

QTP# D3735e Version **

BCM43438KUBG

**Qualification of: BCM43438KUBG, Single-Chip IEEE 802.11 b/g/n
MAC/Baseband/Radio with Bluetooth 4.1 and an FM Receiver in
WLBGA (4.91 x 2.91 x 0.55mm) 63 Ball, Wafer Level Ball Grid Array
(WLBGA)**

**FOR ANY QUESTIONS ON THIS REPORT, PLEASE CONTACT
reliability@cypress.com or via a CYLINK CRM CASE**

Prepared By:
Francis Classe
Reliability Engineer

Reviewed By:
Francis Classe
Reliability Manager

Approved By:
David Hoffman
Reliability Director

I. Product and Package Information

Product Description: BCM43438KUBG **Cypress Division:** IoT Division
Single-Chip IEEE 802.11 b/g/n MAC/Baseband/Radio with Bluetooth 4.1 and an FM Receiver

Package: WLBGA	QTP: D3735e	
Description: (4.91 x 2.91 x 0.55mm) 63 Ball, Wafer Level Ball Grid Array (WLBGA)		Flammability: O2 Index:
Assembly: ASE Kaifa	Molding Compound: N/A	UL-V0 >28
Electrical Test: ASE 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: 3.0 V	Life Test Voltage: 3.5 V
Est. Field Power Dissipation: 300 mWatts	Est. Stress Power Dissipation: 87.5 mWatts
Est. Field Tj: 61.3 °C	Est. Stress Tj: 126.8 °C

Die: 43432PMA0-E	Die Size: 4.91 x 2.91 mm
Process: 40NM LP	Fab: SMIC-S2
Type: Bluetooth	Density: N/A

II. 40nm GLL/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	500 hrs	1000 hrs	Ea eV	TAF	VAF	OAF	MTTF (yrs)	Early Life	Inherent Life
PLASTIC											
Sample Size	2716	2519	1559	1559							
Zero fails, Process ave. Ea	0 *	0	0	0	0.66	71	1	71		88	8
Totals	0	0	0	0					14269	88	8

* - 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
Generic Reference Data:							
Early Life Failure Rate	125°C, Vddnom x 1.15	WLBGA ¹	96	3	0	0.00	24 Hours
HTOL (EL)	125°C, Vddnom x 1.15	WLBGA ¹	96	3	0	0.00	192 Hours
HTOL (IL)	125°C, Vddnom x 1.15	WLBGA ¹	96	3	0	0.00	500 Hours
HTOL (XL)	125°C, Vddnom x 1.15	WLBGA ¹	96	3	0	0.00	1000 Hours
High Temp Bake	(150°C)	WLBGA ²	77	1	0	0.00	500 Hours
	(150°C)	WLBGA ²	77	1	0	0.00	1000 Hours
ESD CDM	N/A	WLBGA ¹	3	1		Pass 300V	
ESD HBM	N/A	WLBGA ¹	3	1		Pass 1.25kV	
ESD MM	N/A	WLBGA ¹	3	1		Pass 50V	
Latch Up	125°C	WLBGA ¹	3	1		Pass 200mA	
Preconditioning	(PC5/245°C, +0°C/-5°C)	WLBGA ²	231	1		Passed Jedec L1	
Precon+Temp Cycle	-55°C/125°C	WLBGA ²	77	1	0	0.00	500 Cycles
	-55°C/125°C	WLBGA ²	77	1	0	0.00	1000 Cycles
Precon+uHAST	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	1000 hours

- Notes / Justification:**
- 1) Results from Qual I43432PMA0EKUBGT, BCM43438KUBG in 63 Ball WLBGA (4.91 x 2.91 x 0.55mm) - Same Product, Fab, Package Family, and Assembly Location
 - 2) Results from Qual PQ03084, BCM4343WKUBG in 74 Ball WLBGA (4.91 x 2.91 x 0.55mm) - Same Product, Fab, Package Family, and Assembly Location

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
HTOL (IL)	125°C, Vddnom x 1.15	JESD22-A108
HTOL (XL)	125°C, Vddnom x 1.15	JESD22-A108
Latch Up	125°C	JESD78 / AEC Q100-004
Precon+Temp Cycle	-55°C/125°C	JESD22-A104
Precon+uHAST	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: 002-18250

Document Title: QTP #D3735e: BCM43438KUBG, Single-Chip IEEE 802.11 b/g/n MAC/Baseband/Radio with Bluetooth 4.1 and an FM Receiver

Rev.	Issue Date	ECN#	Originator	Description
**	12/23/2016	5561411	FCCL	Initial Release.

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