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Cypress Semiconductor
Reliability Qualification Report

QTP# 202109 Version **

CYW43439KUBG

Qualification of CYW43439KUBG, Single-Chip IEEE 802.11 b/g/n MAC/Baseband/Radio with Integrated Bluetooth 5.2 Compliance 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:
Bak Lee Chan
Reliability Engineer

Reviewed By:
Yusaku Ohta
Reliability Manager

Approved By:
David Hoffman
Reliability Director

I. Product and Package Information

Product Description: CYW43439KUBG **Cypress Division:** IoT Division

Single-Chip IEEE 802.11 b/g/n MAC/Baseband/Radio with Integrated Bluetooth 5.2 Compliance

Package:	WLBGA	**QTP:**	202109		
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 Singapore				
Substrate/Leadframe:	N/A	**Die Attachment:**	N/A		
Lead Finish:	SAC-Q (SAC405 + 2% Bi + Ge/P)				
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

Die:	43432PMA2A	**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)	PPM	FIT
PLASTIC											
Sample Size	2716	2519	1559	1559							
Zero fails, Process ave. Ea	0 *	0	0	0	0.66	71	1	71			
Totals	**0**	**0**	**0**	**0**					**14269**	**0**	**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	(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
Temp Humidity Test	(Unbiased, 85°C/85% RH)	WLBGA [2]	77	1	0	0.00	500 hours
	(Unbiased, 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)
2) Results from Qual PQ03084, BCM4343WKUBG in 74 Ball WLBGA (4.91 x 2.91 x 0.55mm)

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	(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
Temp Humidity Test	(Unbiased, 85°C/85% RH)	JESD22-A101

IV. Revision History

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Document Title: Qualification of CYW43439KUBG

Rev.	Issue Date	ECN#	Originator	Description
**	3/16/2021	7105361	BAKC	Initial Release (QTP#202109).

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