Cypress Semiconductor
Reliability Qualification Report

QTP# D19131 Version **

BCM43143KMLG

Qualification of: BCM43143KMLG, Single Chip IEEE 802.11 b/g/n MAC/PHY/Radio with USB/SDIO Host Interface in QFN (7 x 7 x 0.9mm) 56 Contact, Quad Flat No Lead Package (QFN)

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

Product Description: BCM43143KMLG **Cypress Division:** IoT Division
Single Chip IEEE 802.11 b/g/n MAC/PHY/Radio with USB/SDIO Host Interface

Package: QFN **QTP:** D19131
Description: (7 x 7 x 0.9mm) 56 Contact, Quad Flat No Lead Package (QFN)
Flammability: UL-V0 **O2 Index:** >28
Assembly: SPIL Taiwan **Molding Compound:** Hitachi CEL-9240HF
Electrical Test: Stats ChipPac Singapore **Theta Ja / Psi Jt:** 18 °C/W / 8.8 °C/W
Substrate/Leadframe: Copper Leadframe **Die Attachment:** Sumitomo 1033-BF
Lead Finish: 100% Sn **Bond Wire:** 0.7 CuPd
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: 60.3 °C **Est. Stress Tj:** 126.5 °C

Die: 43143HB0D **Die Size:** 3.67 x 3.00 mm
Process: 40NM LP **Fab:** SMIC-S2
Type: Wireless **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
Data From Qualification D19131:							
Early Life Failure Rate	125°C, Vddnom x 1.15	QFN [1]	96	1	0	0.00	24 Hours
HTOL (EL)	125°C, Vddnom x 1.15	QFN [1]	96	1	0	0.00	192 Hours
HTOL (IL)	125°C, Vddnom x 1.15	QFN [1]	96	1	0	0.00	500 Hours
HTOL (XL)	125°C, Vddnom x 1.15	QFN [1]	96	1	0	0.00	1000 Hours
ESD CDM	N/A	QFN [1]	3	1	Pass 500V		
ESD HBM	N/A	QFN [1]	3	1	Pass 2kV		
ESD MM	N/A	QFN [1]	3	1	Pass 100V		
Latch Up	125°C	QFN [1]	3	1	Pass 200mA		
Generic Reference Data:							
High Temp Bake	(150°C)	QFN [2]	77	1	0	0.00	500 Hours
	(150°C)	QFN [2]	77	1	0	0.00	1000 Hours
Preconditioning	(PC2/260°C, +0°C/-5°C)	QFN [2]	260	1	Passed Jedec L3		
	(PC2/260°C, +0°C/-5°C)	QFN [3]	340	1	Passed Jedec L3		
Precon+Temp Cycle	-55°C/125°C	QFN [2]	77	1	0	0.00	500 Cycles
	-55°C/125°C	QFN [2]	77	1	0	0.00	1000 Cycles
	-55°C/125°C	QFN [3]	77	1	0	0.00	500 cycles
	-55°C/125°C	QFN [3]	77	1	0	0.00	1000 cycles
Precon+HAST	130°C/85% RH	QFN [3]	76	1	0	0.00	96 hours
Precon+Steam Pressure	121°C/100%RH/29.7 psia	QFN [2]	77	1	0	0.00	96 Hours
	121°C/100%RH/29.7 psia	QFN [2]	77	1	0	0.00	168 Hours
	121°C/100%RH/29.7 psia	QFN [3]	77	1	0	0.00	96 hours
	121°C/100%RH/29.7 psia	QFN [3]	77	1	0	0.00	168 hours

Notes / Justification: 1) Results from Qual D19131, BCM43143KMLG, 40NM LP Wireless in 56 Contact QFN (7 x 7 x 0.9mm)

2) Results from Qual PQ03323, BCM43143KMLG in 56 Contact QFN (7 x 7 x 0.9mm) - Same Package, Product, and Process Technology from the Same Assembly Site

3) Results from Qual PQ02549, BCM43602KML1G in 92 Contact QFN (12 x 9 x 0.9mm) - Same Package and Process Technology from the Same Assembly Site

Preconditioning Flows: PC2 (JEDEC L3): Bake 125°C, 24hr => Soak @ 30°C/60%RH, 192hr => 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+HAST	130°C/85% RH	JESD22-A110
Precon+Steam Pressure	121°C/100%RH/29.7 psia	JESD22-A102
Precon+Temp Cycle	-55°C/125°C	JESD22-A104
Preconditioning	(PC2/260°C, +0°C/-5°C)	J-STD-020
Preconditioning	(PC2/260°C, +0°C/-5°C)	J-STD-020 / EIAJ ED-4701-100 Method 104

IV. Revision History

Document Number: 002-18221

Document Title: QTP #D19131: BCM43143KMLG, Single Chip IEEE 802.11 b/g/n MAC/PHY/Radio with USB/SDIO Host Interface

Rev.	Issue Date	ECN#	Originator	Description
**	12/15/2016	5555740	FCCL	Initial Release.

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