

Moisture Sensitivity Level for Laird Connectivity Products

All Products

Application Note

v1.1

1 INTRODUCTION

This document will define the moisture sensitivity level (MSL) specification for all products supplied by Laird Connectivity. Where the MSL is identified in a product's specification it will take precedence over the listed value within this document.

2 BACKGROUND

Semiconductor devices are delivered in smaller and smaller packages. Configurations like fine pitch Ball Grid Arrays (FBGA) and fine pitch leaded devices have become vulnerable to damage caused by expansion of absorbed moisture in the package when reflowed.

When heated through a reflow cycle, the expansion of trapped moisture can cause delamination of the plastic from the silicon and result in separation of the connections from the semiconductor to the external leads or balls. This is called the "popcorn" effect. The result is damaged, non-operational devices in a PCB assembly.

To help in preventing this effect, the IPC created a specification IPC-M-109 (Moisture-sensitive Component Standards and Guideline manual) to provide guidelines for the handling, storage and use of moisture sensitive components. Laird Connectivity utilizes this standard for its products moisture sensitivity.

3 IPC-M-109 SPECIFICATION

The IPS standard provides many guidelines for packaging and handling of components. It requires that all components are packaged in a sealed, antistatic, moisture barrier bag with a desiccant and moisture indicator included with the components.

These guidelines include defined levels of classification that provide allowable periods of time for which the components can be outside of the sealed moisture barrier bags before being reflowed. If this period is exceeded, the components are required to be baked to remove the potential excess moisture. The defined moisture sensitivity levels are shown in [Table 1: MSL Levels](#).

Table 1: MSL Levels

#	Period	Conditions (Temp/RH)
1	Unlimited	≤30°C/85%
2	1 Year	≤30°C/60%
2a	4 weeks	≤30°C/60%
3	168 hours	≤30°C/60%
4	72 hours	≤30°C/60%
5	48 hours	≤30°C/60%
5a	24 hours	≤30°C/60%
6	Mandatory Bake before use	≤30°C/60%

4 MSL LEVEL FOR PRODUCTS

The following defines the product MSL levels for all Laird Connectivity products:

- Solder down modules: Level 4 (72 hours)
- Plugin Modules: Level 1 (Unlimited)
- Packaged products: No listed MSL

The rationale behind these definitions are as follows:

- **Solder down modules** are the ones most impacted by MSL and as such must have the strictest storage and handling specifications to remove the likelihood of “popcorning” during assembly (Moving). This gives any CM using the part the best guidance for use and lowest risk of issues. These devices are packaged in MSL packaging.
- **Plugin modules**, because they do not require to be soldered down or go through a reflow cycle, but are integrated into assemblies, are Level 1. These devices are packaged in MSL packaging.
- **Packaged product, Development Kits, and Antennas** are neither subject to a reflow cycle or placed in other electronic assemblies but function “out-of-the-box”, in which case the MSL sensitivity level has no meaning to these products. We should not apply or provide an MSL as we do not package these devices accordingly (desiccant and sealed bags).

5 MSL LEVEL BY PRODUCT FAMILY

The following table provides guidance on the MSL level each of the Laird Connect product families would fall under. Any exceptions are noted.

5.1 Wi-Fi

MSL Level	Product Family	Part Number
Level 4	45 Series	SSD45N, WH-SSD45N
	50 Series	SSD50NBT, WH-SSD50NBT
	60 Series	ST60-SIPT, ST60-SIPT-Q
	LWB	450-0148, 450-152, 450-0159
	LWB5	450-0162, 450-0168, 450-169
	LWB+	453-00083C, 453-00083R, 453-00084C, 453-00084R, 453-00085C, 453-00085R
	LWB5+	453-00045C, 453-00045R, 453-00046C, 453-00046R, 453-00047C, 453-00047R
	EWB	453-00012C, 453-0012R, 453-00013C, 453-00013R, 453-00014C, 453-00014R, 453-00030, 453-00031
Level 1	45 Series	MSDN45N, WH-MSD45N, WH-IB45, WH-IB45-IL, PH45N, WH-WB45NBT, WH-PCI45
	50 Series	WH-M2SD50NBT, WH-M2US50NBT, WH-MSD50NBT, WH-SSE50N, WH-WB50NBT, 453-00107
	60 Series	ST60-2230C, ST60-2230C-Q ST60-2230C-P, ST60-2230C-PU, ST60-2230C-SS, ST60-2230C-U, ST60-2230C-UU
	LWB5+	453-00048, 453-00049
N/A	LWB5+	453-00137, 453-00137B

5.2 SOM

MSL Level	Product Family	Part Number
Level 4	60 Series SOM	453-00003, 453-00004
	Summit SOM 8M Plus	453-00070, 453-00071, 453-00072

5.3 BT

MSL Level	Product Family	Part Number
Level 4	BL5340 Series	453-00052C, 453-00052R, 453-00053C, 453-00053R
	BL653 μ Series	453-00059C, 453-00059R, 453-00060C, 453-00060R
	BL653 Series	453-00039C, 453-00039R, 453-00041C, 453-00041R
	BL654PA	453-00020C, 453-00020R, 453-00021C, 453-00021R
	BL654	451-00001, 451-00001C, 451-00002, 451-00002C,
	BL652	BL652-SA-01, BL652-SA-01-T/R, BL652-SC-01, BL652-SC-01-T/R
	BL600	BL600-SA, BL600-SC, BL600-ST
	BL651	453-00005, 453-00005C, 453-00006, 453-00006C
	Sable-x/Sable-x-R2	450-0119C, 450-0119R, 450-0144C, 450-0144R, 450-0177C, 450-0177R, 450-0178C, 450-0178R
	BT900 Series	BT900-SA-03, BT900-SC-03
	BT850	BT850-SA, BT850-ST
	BT860	BT860-SA, BT860-ST
	BT830	BT830-SA-01, BT830-SA-01-T/R, BT830-ST-01-T/R
	BT800	BT800-02, BT800-02-T/R, BT800-ST-01-T/R
	BTM4x1	BTM441-03, BTM443-03, BTM411-03
	BT7x0	BT730-SA-01, BT730-SC-01, BT740-SA-02, BT740-SC-02
	BISMS02BI	BISMS02BI-01
	TiWi-uB1 Series	450-0103C, 459-0103R, 450-0106C, 450-0106R
	TiWi-uB2 Series	450-0104, 450-0104R,
Level 3	Lyra Series	453-00090C, 453-00090R, 453-00091C, 453-00091R
Level 1	TRBLU23	TRBLU2300200-07-01
N/A	BT900	BT900-US-03
	BL654	451-00003, 451-00004
	BT850	BT851
	BT800	BT820-02
	BRBLU03	BRBLU03-01A0-03

5.4 IoT

MSL Level	Product Family	Part Number
N/A	RG1xx	450-0190, 450-0191, 455-00028, 455-00054, 455-00055, 455-00056, 455-00057, 455-00102, RG186, RG191,
	IG60	455-00006, 455-00008, 455-00076, 455-00081, 455-00084, 455-00085, 455-00088, 455-00089
	MG100	450-00011-K1, 450-00038-K1, 450-00039-K1, 450-00054-K1
	Sentrius RS1xx Sensor	455-00001, 455-00002, 455-00040, 455-00041, 455-00059 to 455-00065, 455-00097, 455-00100, 455-00103 to 455-00111
	Sentrius BT510 Sensor	450-00048B, 455-00058B, 455-00083
	Sentrius BT710 Sensor	450-00059B, 450-00122B, 450-00123B, 450-124B
	Sentrius BT6x0 Sensor	450-00121-K1, 450-00136B
Level 1	Pinnacle 100	453-00010, 453-00011
	RG1xx	RG186-M2, RG191-M2

5.5 RAMP

MSL Level	Product Family	Part Number
Level 4	AC4790	AC4790-1x1
	AC4490	AC4490-1x1
	RM1xx	RM186-SM, RM191-SM
	RM024	RM024-S125-C-30, RM024-S10-C-30
Level 1	AC4790	AC4790LR-1000M, AC4790-1000M, AC4790-200M
	AC4490	AC4490-1000M, AC4490-200M, AC4490LR-1000M
	LT1110	PRM240-02
	RM024	RM024-P125-C-30, RM024-P10-C-30
N/A	CL4490	CL4490-1000-232, CL4490-1000-SP, CL4490-1000-485, CL4490-1000-485-SP, CL4490-1000-PRO, CL4490-1000-PRO-SP
	CL4790	CL4790-1000-232, CL4790-1000-SP, CL4790-1000-485, CL4790-1000-485-SP

5.6 Development Kits

MSL Level	Product Family	Part Number
N/A	All development kits	N/A

5.7 Antennas

MSL Level	Product Family	Part Number
N/A	All antenna	N/A

Note: In the case where an MSL value is defined within a products specification, that value will take precedence over the value shown in the above table.

6 REVISION HISTORY

Version	Date	Notes	Contributor(s)	Approver
1.0	18 Feb 2022	Initial Release	Dave Drogowski	Andrew Ross
1.1	23 Jan 2023	Updates to Lyra and 70 Series	Dave Drogowski	Jonathan Kaye