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MATRIX / COMPLIANCE

Input to checklist for MRR

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Reference	TEC-MSP
Issue/Revision	ESA-TECMSP-MX-014192
Date of Issue	1.0
Status	21/02/2020
	Approved



APPROVAL

Title Input to checklist for MRR	
Issue Number 1	Revision Number 0
Author Stan Heltzel	Date 21/02/2020
Approved By	Date of Approval
Thomas Rohr, HoS TEC-MSP	

CHANGE LOG

Reason for change	Issue Nr.	Revision Number	Date

CHANGE RECORD

Issue Number 1	Revision Number 0		
Reason for change	Date	Pages	Paragraph(s)

DISTRIBUTION

Name/Organisational Unit	
PCB/SMT WG CNES, A Bonzi ACB, M Van de Slyeke Ciretec, T Goujon Invotec, H Swarbrick Systronic, J Gerault TESAT, M Jonek	Airbus DS, P E Goutorbe KDA, S Lerdahl, T Lund Leonardo, D Gallibariggio OHB, A Hannes RUAG, M Soderholm Sodern, M Nguyen TAS, J-M Guiraud, L Sollecchia SENER, A Prieto



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1 SCOPE AND PURPOSE

This guideline document provides input to the checklist for the Manufacturing Readiness Review (MRR) for Printed Circuit Boards (PCB). This document can be used in addition to the example checklist described in Annex G of ECSS-Q-ST-70-12.

The checklist is expected to contribute to a consistent assessment of PCB design, procurement and manufacture during the MRR.

The checklist is intended for:

- a) the PCB manufacturer and
- b) the procurement authority

to be used in preparation of and during the MRR.

This document lists requirements and recommendations from ECSS-Q-ST-70-12 and ECSS-Q-ST-70-60 that are relevant for the MRR.

2 ABBREVIATIONS

AD	Applicable Document
C	Compliant
DR	Design Review
DRC	Design Rule Check
ECSS	European Cooperation for Space Standardisation
ESA	European Space Agency
MPCB	Materials and Processes Control Board
MRR	Manufacturing Readiness Review
M&P	Materials and Processes
NA	Not applicable
NC	Non-compliant
PC	Partial compliant
PCB	Printed Circuit Board
RD	Reference Document
RFA	Request for Approval
RFD	Request for Deviation
RFW	Request for Waiver
RFx	RFA/RFD/RFW

3 DOCUMENTS

No	Reference	Document Title
AD01	ECSS-Q-ST-70-12C	Space Product Assurance – Design of PCBs
AD02	ECSS-Q-ST-70-60C	Space Product Assurance – Qualification and procurement of PCBs
AD03	ESA-TECMSP-MO-11532	ECSS standards for PCB qualification and procurement

No	Reference	Document Title
RD01	ESA-TECMSP-MX-11528	Short check list to ECSS-Q-ST-70-60 for PCB manufacturers
RD02	ESA-TECMSP-MX-011320	Checklist for ENIG, ENEPIG, ENIPIG surface finish on PCBs
RD03	ESA-TECMSP-MX-012940	Checklist for PCB review in MPCBs
RD04	ESA-TECMSP-MX-11559	Comprehensive checklist to ECSS-Q-ST-70-60 for PCB manufacturers

No	Document Title
Annex 1	Input to checklist for MRR (excel file)
Annex 2	Example MRR checklist from Annex G of ECSS-Q-ST-70-12C (pdf file)



4 INSTRUCTIONS FOR USING THE CHECKLIST

Requirement 5.2i of ECSS-Q-ST-70-12C specifies that the PCB manufacturer shall issue the MRR checklist to the procurement authority. In addition, the latter may also issue its own checklist. In addition, it is the responsibility of the procurement authority to list the review items, as this is specified in requirement 5.2b.

The excel list in annex 1 of the present document is provided to the PCB manufacturer and procurement authority for implementation into their own MRR checklist. This document is used in addition to the example checklist that is described in ECSS-Q-ST-70-12 (annex G) and included for completeness as annex 2 with the present document.

The checklist contains 130 line item numbers (column A) to be verified. Running item number 1 is omitted to keep the numbering in column A equal to the excel line item number, for consistent referencing.

The specification and clause from which the line item originates is indicated in column B and C. The referenced specification is one of the applicable documents AD1, AD2 or AD3. Column D indicates if the line item is a requirement (as per the originating specification) or a recommendation. This is also indicated by the consistent use of “shall” and “should”, as normal for ECSS standards. Permissions are included using “may”. Fourteen line items are indicated as “modified”, which is done to better describe the role and responsibilities of the PCB manufacturer as relevant for the MRR.

Items from the applicable documents that are relevant to the following 6 topics have been included. The topics are listed in Column F to enable categorization of the requirements.

- review items, as per the original ECSS
- additional review, which are items to be reviewed but not specified as review items by the ECSS
- DRC - design rule check
- coupons
- inspections
- documentation

Column G provides an opportunity to record the response from PCB manufacturer and procurement authority.

It is worth recalling clause 4.3 of ECSS-Q-ST-70-12 on reliability of design. It is not good practice if the designer uses this checklist as a capability list. Several checklist items are included that can raise the risk to a level that requires a shared responsibility between PCB manufacturer and procurement authority, as described in the note of requirement 6.2.6c of ECSS-Q-ST-70-60.