

Prepared (also subject responsible if other)		No.		
EUALDNI Linhai Duanmu		105 63-2031 Uen		
Approved	Checked	Date	Rev	Reference
BNEWKIK [Jon Ji]		2020-06-23	Y	

Given under confidence.
May not be spread outside your company.

General quality requirements on components

1 Scope

1.1 Application

This specification 105 63-2031 Uen prescribes the general quality requirements for components (electronic parts and electro-mechanic parts) to be used in equipment manufactured by Ericsson or external certified Electronic Manufacturing Services (EMS). Specific requirements for component classes are given in individual component class quality specifications, e.g. 105 63-RYT Uen for microcircuits. If such a specification is applicable it is referred to in the product specification and used for RFQ.

The object of the specification, 105 63-2031 Uen is to prescribe general requirements on the design, manufacturing and quality of components that are not mentioned in the General Purchase Agreement (GPA). If no General Purchase Agreement (GPA) exists, respective purchasing department shall be contacted. This document including exemptions is a part of the agreed specification in accordance with the Specific Purchase Agreement (SPA).

Prepared (also subject responsible if other)		No.		
EUALDNI Linhai Duanmu		105 63-2031 Uen		
Approved	Checked	Date	Rev	Reference
BNEWKIK [Jon Ji]		2020-06-23	Y	

1.1.1 **Table of Contents**

1	Scope	1
1.1	Application	1
1.2	General information	3
1.3	Purchasing documents	3
2	Requirements on design	4
2.1	Design for reliability	4
2.2	Data and models	5
2.3	Product package design	5
2.4	Design modifications	5
2.5	Materials	5
2.6	Terminals	6
2.7	Producibility	6
2.8	Safety	6
2.9	Design for environment	7
3	Requirements on manufacturing	7
3.1	General	7
3.2	Storage of materials	7
3.3	Rework	8
3.4	Traceability and marking of components	8
3.5	Manufacturing site	9
3.6	Packaging for transport	9
4	Requirements on quality assurance	10
4.1	Quality assurance procedures	10
4.2	Quality alert	10
4.3	Improvement program	10
5	Required quality level	10
6	References	11
6.1	Ericsson documents	11
6.2	Other documents	12
7	Document revision information	12
8	12	

Prepared (also subject responsible if other)		No.	
EUALDNI Linhai Duanmu		105 63-2031 Uen	
Approved	Checked	Date	Rev
BNEWKIK [Jon Ji]		2020-06-23	Y
		Reference	

1.1.2 Procurement

This document is used as a part of the product specification for components as agreed upon in the SPA. The latest available revision of 105 63-2031 Uen shall be referred to in the agreement. The latest revision is available from http://tracy.ericsson.net/instructions/docs/component/General_quality_requirements_on_components_10563-2031.pdf or through the respective purchasing departments.

1.1.3 Qualification

The purpose of the Ericsson internal qualification process is to ensure that purchased components meet the necessary requirements. Evaluation is to be done for the following areas: Commercial, technical (Manufacturer's process), application, reliability (process, package and component), producibility and material content.

1.2 General information

1.2.1 Ericsson component designation system

NNN... .. defines a component class, e.g. microcircuits (RYT... ..).
NNN xxx ... defines a component type, e.g. PROM (RYT 118 ...).
NNN xxx xxx/x defines a component, e.g. 2M16 FLASH (RYT 118 6152/6).
The word "component" is used synonymously with "product" (purchased).

1.2.2 Reliability

To integrate reliability driven consideration into system design process the supplier is obliged to support with component data that is required for reliability and thermal management upon request. This includes qualification test reports.

1.2.3 Correspondence

Questions regarding the use of this document in connection with an individual purchase order must be addressed to the respective purchasing departments.

1.3 Purchasing documents

The purchase orders should reflect the requirements agreed upon in the SPA but leaves some flexibility for changes in special cases. Other documents related to purchase are given in figure 1.

Prepared (also subject responsible if other) EUALDNI Linhai Duanmu		No. 105 63-2031 Uen	
Approved BNEWKIK [Jon Ji]	Checked	Date 2020-06-23	Rev Y
		Reference	

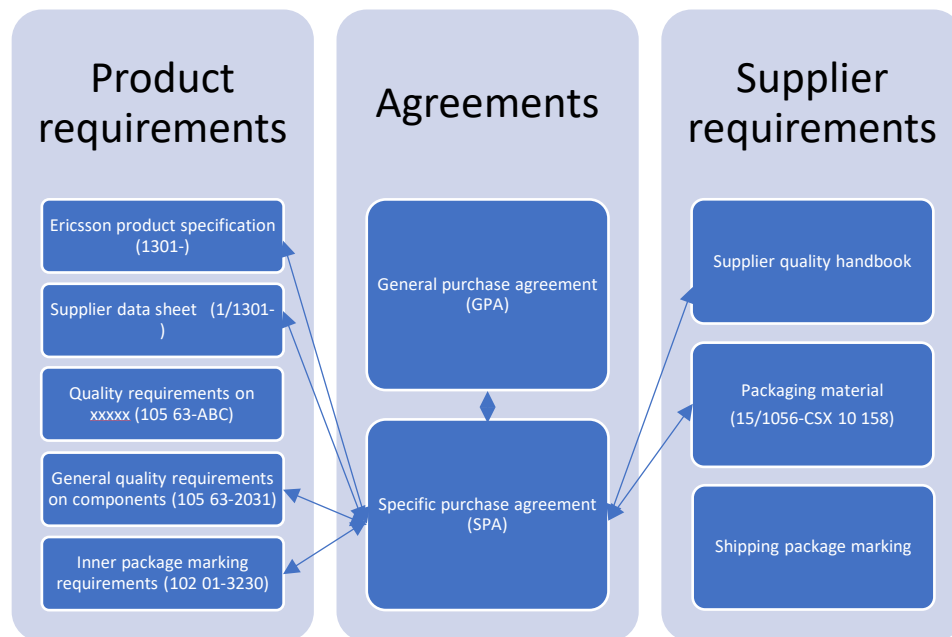


Figure 1. Overview of purchasing documents

2 Requirements on design

2.1 Design for reliability

2.1.1 General

It is assumed that the Manufacturer will design the component according to common practice.

The Manufacturer is obliged to have documented general minimum requirements on lifetime and failure rate as a part of his/her release system.

2.1.2 Mission profile

The use environment and traffic load depend on the application; therefore no general mission profile can be given. It is a mutual responsibility to secure that components are qualified to a defined mission profile from Ericsson or from the supplier in way that estimations to similar cases can be done.

2.1.3 ESD sensitivity

The component must be designed to withstand ESD according to either the requirements specified in each individual component class quality specification, or to a classification done by the Manufacturer. Standards classified by the Manufacturer must be in accordance to JEDEC or IEC.

Prepared (also subject responsible if other)		No.		
EUALDNI Linhai Duanmu		105 63-2031 Uen		
Approved	Checked	Date	Rev	Reference
BNEWKIK [Jon Ji]		2020-06-23	Y	

2.2 Data and models

IBIS models for functional simulation shall be provided when requested. Routines and results from the model verification must be documented.

Mechanical information like 3D STEP model and datasheet shall be provided. The manufacturer must secure the accuracy and consistency of STEP model's and datasheets.

2.3 Product package design

The package must be robust, possible to handle with or without suitable tools and if applicable designed for automatic mounting.

2.4 Design modifications

The Manufacturer shall provide information about major changes in choice of materials, design, manufacturing process or testing procedures of components in accordance with the PCN (Product Change Notification) procedure. For microcircuits, the procedure described in JESD 46 shall apply. For other market standard devices, a corresponding PCN standard shall be used. Should there be no corresponding standard, JESD 46 shall apply to the extent possible.

For custom or semi-custom components, the routines described in the [Supplier Quality handbook](#) shall apply.

Notifications, or any acceptance thereof, shall in no case limit the Manufacturer's responsibility for the conformity of the applicable component to the Product Specification, Quality Specification or for the general quality of the component in question.

The PCNs must be traceable for 5 years after its issuing date.

Ericsson PCN/LTB mailbox: pcn.ltb@ericsson.com

2.5 Materials

2.5.1 Metals

External metal surfaces (including terminals) must be corrosion resistant according to the requirements stated in the product specification, or in the individual component class quality specification. Whiskers mitigation practice according to JP002 (or comparable standard) shall be implemented. Components shall fulfill class 2 when tested according to JESD-201A.

2.5.2 Other materials

External parts, elements or coatings including marking on components delivered according to this specification must not be nutrient to fungus. And when properly handled, they must not, blister, crack, outgas, soften or exhibit defects that affect storage, operation or environmental capabilities in a negative way.

Prepared (also subject responsible if other)		No.		
EUALDNI Linhai Duanmu		105 63-2031 Uen		
Approved	Checked	Date	Rev	Reference
BNEWKIK [Jon Ji]		2020-06-23	Y	

2.6 Terminals

Terminal material must conform to the requirements of shape and mechanical stability according to the product specification or each individual component class quality specification and should constitute a reliable metallic combination together with the plating.

Protrusions and growths on leads must not occur and are cause for rejection. All types of plating must be designed or treated to avoid such occurrence at any time during normal operation, manufacturing, shipment or storage. Partial bridging between leads, including solder trapped in cracks, is also cause for rejection. Partly uncovered copper areas and minor cracks in the plating are considered as cosmetic deviations and accepted from a reliability point of view if the solderability requirements are fulfilled. Gold plating may be used only if stated in the relevant Product specification or if the plating has a thickness of less than 20nm.

2.6.1 Solderability

Components delivered for soldering must meet IPC/ECA J-STD-002 or another similar standard. The requirements must still be met after 1 year of storage (30°C, 60% RH) after delivery.

2.7 Producibility

The components for surface mount soldering delivered for use in Ericsson products must fulfill the requirements in J-STD-020 regarding soldering heat and moisture resistance. This applies also to surface mount compatible components (e.g. components for pin-in-paste). For components needing special care during soldering J-STD-075 can be used for qualification but Ericsson will still classify components according to J-STD-020.

Components that will be wave soldered or soldered with soldering iron shall at least fulfill "Resistance to soldering temperature for through-hole mounted devices", JESD22-B106C, i.e. solder dip 10 s at 260°C.

Components intended for wave soldering may use a heat shielding comparable to a normal PCB during the test.

2.8 Safety

2.8.1 Self-ignition

Components must not ignite even if they are faulty. Flammability testing must be performed according to specified tests in each individual component class quality specification or in the product specification.

If no component standard exists or if the component standard has no flammability requirement, the requirement is to fulfill minimum Flammability of UL94 Class V-0.

Prepared (also subject responsible if other)		No.		
EUALDNI Linhai Duanmu		105 63-2031 Uen		
Approved	Checked	Date	Rev	Reference
BNEWKIK [Jon Ji]		2020-06-23	Y	

2.8.2 Toxic materials

A component containing toxic materials must be marked according to relevant national rules.

Unmarked components must not have any toxic effect when handled, used or disposed of.

2.9 Design for environment

The aim for the Design for Environment requirements is to minimize the product's impact on the environment, reduce cost for end of life treatment and meet customer and legal requirements.

2.9.1 Materials declaration

The materials content of Ericsson products, packaging and purchased products (components) must be declared according to the format IPC -1752A.

Changes in the material composition must be handled according to the established PCN procedure.

Components defined as Low halogen or "halogen free" shall fulfill the guidelines in JS709.

2.9.2 List of banned and restricted substances

The component delivered for use in Ericsson products must comply with the Ericsson List of banned and restricted substances, 2/00021-FAU10404. The list can be downloaded from https://www.ericsson.com/4aa901/assets/local/about-ericsson/sustainability-and-corporate-responsibility/documents/the_ericsson_lists_of_banned_and_restricted_substances.pdf.

3 Requirements on manufacturing

3.1 General

Components must be manufactured, processed and tested in accordance with good engineering, production and inspection practices.

Connecting leads must not be broken, bent or mutilated in any way that could be detrimental to the intended use of the components. Attention must also be given to the accuracy of dimensions, marking, cleaning and removal of foreign materials.

3.2 Storage of materials

All components and other materials used for production must be stored in a way that does not affect or reduce quality or functional properties of manufactured components.

Prepared (also subject responsible if other)		No.		
EUALDNI Linhai Duanmu		105 63-2031 Uen		
Approved	Checked	Date	Rev	Reference
BNEWKIK [Jon Ji]		2020-06-23	Y	

3.2.1 Storage of LTB material

Special attention must be paid to storage of material that is no longer possible to manufacture or buy.

3.2.1.1 Storage Maintenance plan

The quality of the stored material must be checked regularly for degradation in performance or manufacturability. The manufacturer shall make an analysis of known degradation mechanisms in the context of the planned storage time as a base for the maintenance plan.

3.3 Rework

All rework procedures must ensure that the components have the same quality as the ordinary process.

3.4 Traceability and marking of components

3.4.1 Traceability

The Manufacturer must maintain traceability of components concerning place of manufacturing and quality assurance data release of the finished product. The Manufacturer must, as a minimum requirement, be able to identify all manufactured lots that are related to a specific date code, or delivery to Ericsson, or external certified Electronic Manufacturing Services (EMS). Traceability data must be maintained for at least 5 years.

3.4.2 Marking

Each component should be marked according to the following:

1. Ericsson product number or Manufacturer's product designation as specified in the relevant product specification, unless otherwise specified in the purchase order.
2. Manufacturer's name or trademark.
3. Date of manufacture, preferably year and week in a six-digit code (e.g. 201103), according to ISO 8601 or other codes as agreed upon.
4. Country of Origin (e.g. "Made in" followed by full English country name)
5. Manufacturing site
6. Lead-free marking according to J-STD-609, (reference 6.2.5) when applicable
7. If the component contains toxic materials, this must be clearly marked.

If marking of the component is not possible, there must be an agreement of procedures between the Manufacturer and Ericsson.

Prepared (also subject responsible if other)		No.		
EUALDNI Linhai Duanmu		105 63-2031 Uen		
Approved	Checked	Date	Rev	Reference
BNEWKIK [Jon Ji]		2020-06-23	Y	

3.5 Manufacturing site

No general requirement on the choice of manufacturing site (factory, country etc.) is set by this specification. It is, however, the responsibility of the Manufacturer to make sure by internal qualification and audit that all manufacturing sites produce components of at least the same quality as earlier approved.

3.6 Packaging for transport

This document only deals with packaging materials used close to the component e.g. trays, reels and moisture barrier bag. The method of packaging for transport must ensure that all specified requirements are met, when components are received at Ericsson or external certified Electronic Manufacturing Services (EMS). See [102 01-3230](#), reference 6.1.6.

Shipment (outer) packaging is covered in [15/1056-CSX 101 58](#).

3.6.1 Marking of transportation package

Individual boxes inside (inner boxes/reels) the transportation package must be marked according to below and to what is stated in reference 6.1.6.

1. ESD sensitivity according to IEC TR 61340-5-2 paragraph 4.9.
2. Human Vital Safety according to International standard UL 969.
3. Lead-free marking according to J-STD-609 (only on component packaging) or marking with lead-free symbol/label.
4. Recycling symbol in accordance with ISO 11469

3.6.2 Component orientation in quantity package

Components in quantity packages must be consistently orientated in accordance with EIA-481, reference 6.2.4.

3.6.3 Protection against ESD

All ESD sensitive components must be protected against electrostatic discharges.

All carriers and other packaging materials must be of semi-conducting type or "antistatic treated" to avoid ESD damage. They must neither cause ESD damage to other components.

3.6.4 Moisture sensitive devices

All components that are susceptible to moisture exposure before soldering must be classified, packaged, handled and labeled according to J-STD-020 and J-STD-033.

Prepared (also subject responsible if other)		No.	
EUALDNI Linhai Duanmu		105 63-2031 Uen	
Approved	Checked	Date	Rev
BNEWKIK [Jon Ji]		2020-06-23	Y
		Reference	

4 Requirements on quality assurance

4.1 Quality assurance procedures

The Manufacturer must have an established and documented Quality Assurance System.

4.2 Quality alert

Quality problems on components detected after delivery that may cause production or field problems must be reported to Ericsson immediately by an email sent to: g.alert.component.technology@ericsson.com or pcn.ltb@ericsson.com.

4.3 Improvement program

Quality agreement is a settlement regarding levels of quality assurance between Ericsson and the Manufacturer. The main objective is to achieve quality improvement on a co-operative basis. Paragraph 4.3.1 gives some examples on improvement areas that can be defined in the quality agreement.

4.3.1 Quality and reliability improvement

Improvement activities in the following areas are essential to fulfill Ericsson's expectations.

1. AOQ (Average Outgoing Quality).
2. Early Life Failure Rate for the first one year of operation.
3. The Required Life Time dependent on major failure mechanisms.
4. Long Time Failure Rate in typical service.

4.3.2 Statistical analysis

The Manufacturer is responsible for developing and improving Statistical Process Control. On request the Manufacturer must provide Ericsson with Process Control Data in order to show process stability and improvement.

In general Ericsson expects processes and critical parameters to be on at least 3 sigma capability level.

5 Required quality level

The Manufacturer must have documented quality levels for delivered components. The level of early failures must be kept to a minimum by process control and if necessary by screening. Targets for yield, capability and rejected level (PPM) must be defined and documented.

Prepared (also subject responsible if other)		No.		
EUALDNI Linhai Duanmu		105 63-2031 Uen		
Approved	Checked	Date	Rev	Reference
BNEWKIK [Jon Ji]		2020-06-23	Y	

6 References

6.1 Ericsson documents

- 6.1.1 Product specification, 1301-NNN xxx xxx Uen
- 6.1.2 Type specifications, 1301-NNN xxx Uen
- 6.1.3 Class Specifications, 1301-NNN Uen
- 6.1.4 Individual component class quality specification, 105 63-NNN Uen
- 6.1.5 The Ericsson list of banned and restricted substances, 2/00021-FAU10404
- 6.1.6 Specific label and marking requirements for Component- & PCB packages, [102 01-3230](#)
- 6.1.7 [Ericsson Supplier Quality handbook](#)
- 6.1.8 Packaging material design for inbound products [15/1056-CSX 101 58](#)

Prepared (also subject responsible if other)		No.	
EUALDNI Linhai Duanmu		105 63-2031 Uen	
Approved	Checked	Date	Rev
BNEWKIK [Jon Ji]		2020-06-23	Y
		Reference	

- 6.2 Other documents**
- 6.2.1 **International human vital safety standard, UL 969**
- 6.2.2 **Component marking standard, ISO 8601**
- 6.2.3 **Outer shipping container bar code label standard, EIA-556**
- 6.2.4 **8mm through 200mm embossed carrier taping and 8mm & 12mm punched carrier taping of surface mount components for automatic handling, EIA-481**
- 6.2.5 **Marking and Labeling of Components, PCBs and PCBAs to Identify Lead (Pb), Pb-Free and Other Attributes. J-STD-609**
- 6.2.6 **Moisture/Reflow Sensitivity Classification for Nonhermetic Solid State Surface Mount Devices, IPC/Jedec J-STD-020**
- 6.2.7 **Handling, Packing, Shipping and Use of Moisture/Reflow Sensitive Surface Mount Devices. IPC/JEDEC J-STD-033**
- 6.2.8 **Resistance to soldering temperature for through-hole mounted devices, JESD22-B106C**
- 6.2.9 **Current Tin Whiskers Theory and Mitigation Practices Guideline, JP002**
- 6.2.10 **Environmental Acceptance Requirements for Tin Whisker Susceptibility of Tin and Tin Alloy Surface Finishes, JESD-201A**
- 6.2.11 **A Guideline for Defining "Low-Halogen" Solid State Devices, JS709**
- 6.2.12 **Classification of Non-IC Electronic Components for Assembly Processes EIA/IPC/JEDEC J-STD-075**
- 6.2.13 **UL94 Tests for flammability of plastic materials for parts in devices and appliances**
- 6.2.14 **IPC/ECA J-STD-002 Solderability Tests for Component Leads, Terminations, Lugs, Terminals and Wires**
- 6.2.15 **IEC TR 61340-5-2, Protection of electronic devices from electrostatic phenomena – User guide**

7 Document revision information

	Description
A	New document.
B	This new revision results from comments by Vendors on rev A. 2.2: Rephrased 2.4.2: Rephrased 2.6.2 Changed to unmarked component shall give no toxic effect. 3.6.1: The time between date codes shall be minimized. Changed to 3 date codes in inner box.

Prepared (also subject responsible if other) EUALDNI Linhai Duanmu		No. 105 63-2031 Uen	
Approved BNEWKIK [Jon Ji]	Checked	Date 2020-06-23	Rev Y
		Reference	

	Components from different Vendors are not allowed in the same shipment.
C	This new revision results from comments by Manufacturers on rev B. The documents and standards valid today regarding requirements on component quality are added. Paragraphs for Acceptance criteria, Last time buy, Environmental aspects, Inspection, Ship-to-stock/Ship-to-line are removed. These requirements are included in the General Purchase Agreement (GPA). See also change markings.
D	2.7.1: The text is changed to be valid as a requirement for lead-free soldering. Minor changes and corrections according to change markings.
E	3.2.1: Requirements for storage of LTB material added.
F	Minor linguistically changes added. 2.7.1: Requirement specification on soldering revised. The text is changed from "for lead-free soldering" to "on soldering". 3.6: Data for quantity packages moved to paragraph. 3.6.2 Paragraph 3.6.2 added. 6.2: Reference EIA-481 added.
G	3.6.2 Reference changed from EIA-481 to Ericsson document 1056-2605.
H	2.4.1 New definition of whiskers 2.7.3 New text about banned and restricted list 3.4.2 Lead-free marking of component, JESD97 3.6.1 Lead-free marking of inner packaging material, JESD97
J	2.3.1 PCN/LTB mailbox 2.7.1 Backwards compatibility 2.7.3 Simplified reference to banned and restricted list 3.6.1 Added text about use of lead-free symbol 3.6.4 Added requirement about moisture sensitivity handling

Prepared (also subject responsible if other)		No.		
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BNEWKIK [Jon Ji]		2020-06-23	Y	

K	2.3 Removed 2.3.1. Text clarified and put under 2.3 2.7.1 Reference to J-STD-020 instead of 1058-2357 and some additions to cover backwards compatibility and hole mounting
L	2.4.1 Jedec references regarding whiskers are used instead of iNEMI 2.5 Terminal requirements added. Same as 105 63-RYT 2.7.1 Reference to JESD-075 for soldering heat resistance added 2.7.2 Reference to JP-709 for definition of "Halogen free" 2.7.3 Reference to the new "Banned and restricted substances" list 3.4.2 Changed reference to JESD-609 4.2.2 Added text on process capability expectations
M	2.6.1 Flammability according to UL94 V-0 2.7.2 Material declarations according to IPC -1752A 3.4.2 Additions regarding marking 3.6.2 Reference only to EIA-481 6 Reference list updated
N	2.2 IBIS models and mechanical models added 2.6.1 IPC/ECA J-STD-002 added as a general req. 3.6.1 Added marking on reel 4.2 Quality alert routine added
S	Document changed to be used for more types of purchased material than electronics and electro-mechanics. A new table of content is the main difference
T	Alignment with new marking document for packaging. Changes in 3.6.1 and in the references
U	Removed coverage of black-box and mechanical products. Now targeting Electronics and Electromechanics. 1.2.2 Clear statement on the need for data exchange for reliability estimations. 1.3 Update of the description on specification relations. 2.1 Included a general paragraph about mission profile. 3.6 Simplified the packaging and marking requirements.
V	1.1.2 update link to 10563-2031. 3.6 update link to 102 01-3230 and 15/1056-CSX 101 58. 2.9.2 update link to List of banned and restricted substances
Y	3.6 update link to 102 01-3230