

# II1332 Seminar 1 Report

By Muttakin Karim

This report aims to examine a hypothetical scenario in which a company intends to develop a wireless communication system utilizing the STM32WB55 circuit by ST. The report highlights two pivotal aspects for consideration, namely: (i) defining a comprehensive set of requirements that the company must adhere to, and outlining how these requirements will be met; and (ii) determining how the company can ensure that these requirements are met early during the product development process.

Firstly, the development of such a system should consider the legal and regulatory requirements of countries where the product will be sold. In the European Union (EU), there are several standards that the company can consider. The most important one is the CE marking, which is mandatory for electronic products sold in the EU market [1]. This marking ensures that the product complies with directives such as electromagnetic compatibility (EMC) and the low voltage directive (LVD) [2].

To meet the EMC requirements of the EMC Directive, developers can minimize the generation of electromagnetic emissions, ensure that electronic equipment can withstand electromagnetic disturbances, and use shielding and filtering to reduce electromagnetic emissions and susceptibility [2]. The LVD can be met by conducting a risk assessment and carrying out tests [3].

In addition to these standards, the developers can also take into account the Radio Equipment Directive (RED) if the product is intended to have high-frequency wireless communication [1]. Manufacturers should look into the specific requirements for the type of product being developed to comply with RED [4]. This includes considering factors such as the type of wireless technology being used, the frequency bands being utilized, and the intended application of the product [4].

Based on the circuit diagram of the product, it does not seem to contain any hazardous elements. Therefore, the company can also comply with the Restriction of Hazardous Substances (RoHS) Directive. This directive is a legal requirement for certain types of products and ensures that the equipment does not contain substances that are hazardous to human health and the environment [1]. RoHS is an important regulatory framework, and all products sold in the EU must comply with this directive.

The above-mentioned standards help developers to understand the market before an electronic product is made. However, there is a standard that can benefit the entire industry from suppliers to producers, known as the IPC standard [1]. This standard enables stakeholders to understand the type of products that can be produced under current conditions [1].

To summarize, here is a list of directives and standards that the product in question can comply with:

- CE
- EMC

- LVD
- RED
- RoHS
- IPC

The second part of this report aims to determine how the company can ensure that the legal and regulatory requirements are met early during the product development process. One approach is to follow the concept of Design for Excellence (DfX), which aims to ensure that the final product meets the desired requirements early in the production process [1]. DfX includes several sub-categories, such as Design for Compliance (DfC), which takes into account various market-specific directives such as CE and FCC [1]. The developers could determine the target market and compile the necessary requirements for compliance. Additionally, they should research applicable regulations and standards based on product type and function [1].

Another aspect of DfX is Design for Sourcing (DfS), which considers the end product's costs, quality, lead-time, and lifespan [1]. This ensures that the sourced components are in line with RoHS standards and of good quality to meet the product's life cycle. Another important aspect of DfX is Design for Manufacturing (DfM), which helps to resolve various problems that may arise during manufacturing [1]. By reviewing the circuit's Gerber manufacturing file, it appears that the developers have taken DfM into account. They have clearly highlighted the different types of components to be used and how they will be mounted onto the chip, making it simple and easy for the circuit manufacturer to follow during the production process [1].

Furthermore, to achieve the desired product quality, one can also consider Design for Test (DfT) [1]. Products have requirements that must be fulfilled before being introduced to the market, and this approach enables it to perform various tests that are necessary to meet these requirements.

In conclusion, ensuring compliance with relevant directives and standards is crucial to the success of any electronic product development project. This requires careful planning and consideration of various factors such as target markets, product type and function, and applicable regulations. It is important to consider the concept of Design for Excellence (DfX), which can provide a framework for meeting these requirements early in the product development process. By considering the various sub-categories of DfX, such as Design for Compliance (DfC), Design for Sourcing (DfS), Design for Manufacturing (DfM), and Design for Test (DfT), developers can optimize the design of their product to meet the necessary requirements and ensure high-quality manufacturing and testing. By carefully considering these factors and utilizing the appropriate tools and methodologies, developers can maximize the chances of success for their electronic product development projects.

## References:

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