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TECHNICAL REPORT



Flexible printed circuit boards (FPCBs) R Method to decrease signal loss by using noise suppression materials (standards.iteh.ai)

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IEC Central Office	Tel.: +41 22 919 02 11
3, rue de Varembé	Fax: +41 22 919 03 00
CH-1211 Geneva 20	info@iec.ch
Switzerland	www.iec.ch

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FLEXIBLE PRINTED CIRCUIT BOARDS (FPCBs) – METHOD TO DECREASE SIGNAL LOSS BY USING NOISE SUPPRESSION MATERIALS

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The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
91/1284/DTR	91/1309/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

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INTRODUCTION

In recent years, since the use of smart phones, and other mobile and display devices has increased significantly, the supply of FPCBs has also been largely extended. Specifically, since the FPCB devices seek high speed performance, the requirements with respect to electromagnetic interference (EMI) suppression in the devices has also grown in importance. Therefore, FPCBs used inside smart phones employ noise suppression materials (NSMs) to solve EMI problems, as shown in Figure 1.



Figure 1 – Bare/shield FPCB

However, an application of noise suppression materials (NSMs) for FPCBs reaches the limit concerning the problem of incrementation of signal loss. Therefore, FPCB and NSMs manufacturers need to analyse signal loss variations of FPCBs shielded by NSMs, as shown in Figure 2.



Figure 2 – Increment of signal loss using NSMs

As FPCBs are used with high frequency, the problem of signal loss becomes more significant. As the user of FPCBs has a demand for the lowest value of signal loss by using NSMs, suppliers of FPCBs have to anticipate an appropriate design in order to achieve an adequate signal loss value.

FLEXIBLE PRINTED CIRCUIT BOARDS (FPCBs) – METHOD TO DECREASE SIGNAL LOSS BY USING NOISE SUPPRESSION MATERIALS

1 Scope

This Technical Report specifies a guideline for improvement of signal loss by using noise suppression materials (hereafter referred to as NSMs) for FPCBs.

This Technical Report also indicates a measuring method of signal loss variations of FPCBs using NSMs using network analyzer equipment. In addition, this method only measures the value of the signal loss variation by using NSMs for FPCBs. This report, however, neither determines nor indicates the structure or material of FPCBs.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62333-1:2006, Noise suppression sheet for digital devices and equipment – Part 1: Definitions and general properties tandards.iteh.ai)

3 Test guideline

e <u>IEC TR 63018:2015</u> https://standards.iteh.ai/catalog/standards/sist/e8f2efd6-7b58-4f8b-8a75-5a377b4dbe1b/iec-tr-63018-2015

3.1 Apparatus

3.1.1 Network analyzer

A network analyzer is utilized to identify signal loss data at a specific frequency range of FPCBs.

3.1.2 Block diagram for signal loss measuring

Figure 3 indicates one of the examples of the network analyzer setup.



Figure 3 – Signal loss test system

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3.2 Test specimen

3.2.1 Structure

Test specimens shall be designed by two structures, i.e. with and without NSMs in one FPCB board. The part without using NSMs is called bare FPCB. The part using NSMs is called shield FPCB, as shown in Figure 4. This test coupon shall also be designed as two types in order to have an object of comparison. The first design shall be composed of one bare FPCB with one shield FPCB. A design of this structure allows to compare the bare FPCB with the shield FPCB, as shown in Figure 4 a. The second design shall be composed of one bare FPCB with two over shield FPCBs. This structure allows to compare the bare FPCB with the two over shield FPCBs, as shown in Figure 4 b.



Figure 4 b – Test specimen for comparing one bare FPCB with two over shield FPCBs

Figure 4 – Schematic diagram for two type of test specimen

The test specimen shall be divided into two halves with one board (bare FPCB and shield FPCB) for equitable estimation with the same Cu line (LW1, LW1'...). This structure has the merit of uniformly measuring at once a bare and a shield FPCB under the same conditions.