Signal Penetration towards Wooden Building Construction Materials

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Abstract – This paper emphasize on the effect of mobile signal penetration towards wooden building construction materials in Malaysia. The results of signal strength measurement at frequency 900MHz in the anechoic chamber with different types of wooden building construction materials and thickness is presented. The objectives of these experiments are to identify the types of wooden building materials in Malaysia that have significant impact into signal penetration and determine the effect of the identified wooden materials thickness towards signal penetration into building materials. This paper also report on the anechoic chamber and experiment setup that is used in the experiment.

1. Introduction

Wood has become an important commodity in human life. It has been used in most of human life especially as a construction material and also as a source of energy. In Malaysia woods can be mainly divided into four main categories; heavy hardwoods, medium hardwoods, light hardwood and softwood. Another type of wood base that used as a construction material is plywood. Table 1-4 shows some examples of the wood in each category and Table 5 shows the plywood characteristics [1-3].

Table 1: Heavy Hardwood

Type of wood	Wood description
Balau/Selagan Batu (*Shorea spp.)*	Used in all forms of heavy construction, bridges, piling, beams, wharves, and others.
Belian (*Eusideroxylon zwageri*)	Used in heavy construction, marine piling, boat construction, shaves, fence posts, heavy-duty industrial flooring, and vehicle bodywork.
Merbau (*Intsia palembanica, I. bijuga*)	The growth ring figure and deep colour makes it an attractive wood for decorative work including interior finishing, and others.

Table 2: Medium Hardwood

Type of wood	Wood description
Kempas (*Koompassia malaccensis*)	Used in heavy construction, railway sleepers, transmission posts, beams, piling, joists, bridges, fence posts, wharves, parquet and strip flooring, paneling, heavy-duty furniture and pallets, boxes, crates and tool handles.
Kapur (*Dryobalanops spp.*)	Used in heavy and medium construction, heavy-duty flooring, joists, beams, furniture, rafters, tool handles, door and window frames, pallets, boxes and crates.
Keruing (*Dipterocarpus spp.*)	Used in heavy and general building construction, bridges, framework of wagons and wagon flooring, railway sleepers, container flooring, truck bodywork, and transmission posts.

Table 3: Light Hardwood

Type of wood	Wood description
Nyatoh (*Palaquium*)	Popularly used for furniture and high class decorative interior finishing and cabinet-making, strip and parquet flooring, and others.
Sepetir (*Sindora spp., Copaifera palustris.*)	Suitable for furniture, cabinet making, and plywood manufacture. It is highly valued as a decorative timber and used in interior finishing, joinery, paneling, high class cabinets and furniture.
Meranti *(Shorea spp.)*	A wide variety of uses including light construction, furniture, joinery, interior fittings, door and window frames, paneling, partitions, utility flooring, boat construction, fancy doors, veneer and plywood.

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