

FUNCTIONAL TESTING AND DEVELOP CUSTOMER XPERIENCE
SOLUTION (CXS) TEST PROCEDURE FOR CUBIC ELECTRONIC SDN BHD

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA
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(CXS) Test Procedure For Cubic Electronic Sdn Bhd

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Specially dedicated to my beloved parent,
Hj.Ramly Bin Ismail and Hjh Wan Meriam Bte Wan Daud, family and fellow
friends, who had strongly encouraged and supported me in my entire journey of
learning.

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ABSTRACT

This thesis is about development of Customer Xperience Solution (CXS) testing procedure for Cubic Electronics Sdn Bhd. CXS product is related to hospitality industries. This product is a summaries of new technology that be upgrade from time by time based on the existing technology as a 'SET TOP BOXES'. In the industries, the specific and good testing procedures is important to guarantee the product has a quality when out to the market and also follow the specification. So, Cubic Industries Sdn Bhd need to develop a specific procedure to testing CXS product and the product must follow the specification that customer need. This product consists a few of unit board that will function to operate the system. That units means VIA CN700 Chipset Motherboard, Random Access Memory (RAM) Kingston 512MB DDR2, Network Interface Card DLINK 10/100MBPS, IR Receiver with Transmitter / IR RX / IR circuit board, television / desktop and Power Supply Bracket. The main objective of this thesis is to develop the best testing procedure that can applied for Cubic Industries Sdn Bhd. This procedures also can help to solve the problem that occur in testing field. Other than that, this project also is an exposure to a new technology that involve in hospitalities industries, entertainment and communications. The testing procedure will be developed focus on product display/video, network/server, remote control and audio. From the testing, the exposure focus is on how to apply the test the product and also the testing instrument that will be apply in the future. The research output will be the holistic test procedure that will be refer by technical personnel in future.

ABSTRAK

Tesis ini bertujuan membina prosedur pengujian kebolehfungsi pada produk yang dikenali sebagai 'Customer eXperience Solution (CXS)'. CXS ini merupakan produk yang berkait rapat dengan kemudahan dalam industri hospitaliti. Produk ini merupakan rumusan teknologi baru yang dinaik taraf dari masa ke semasa daripada teknologi yang terdapat pada alat 'SET UP BOX'. Dalam industri prosedur pengujian yang berkualiti sangat diperlukan bagi menjamin produk yang dikeluarkan dari kilang merupakan produk yang mengikut spesifikasi yang ditetapkan. Cubic Industries Sdn Bhd memerlukan prosedur spesifik untuk menguji produk CXS ini bagi menjamin produk yang dikeluarkan adalah betul-betul mengikut spesifikasi yang ditetapkan. Dalam produk ini, terdapat unit-unit yang utama yang memainkan peranan penting bagi mengoperasikan system CXS ini. Antara unit-unit utama ialah 'motherboard' jenis VIA CN700 Chipset Motherboard, Random Access Memory (RAM) jenis Kingston 512MB DDR2, Network Interface Card DLINK 10/100MBPS, IR Receiver with Transmitter / IR RX / IR circuit board, television / desktop dan Power Supply Bracket. Objektif utama projek ini adalah untuk membina prosedur terbaik dan tersusun bagi menyelesaikan masalah semasa proses pengujian dilakukan keatas produk yang ingin diuji. Selain itu, projek ini juga mendedahkan kepada teknologi baru dalam system komunikasi dan hiburan elektronik. Proses pengujian yang akan dilakukan ini akan tertumpu pada pengujian keatas paparan skrin, audio, rangkaian dan alat kawalan jauh. Daripada proses pengujian ini, ia akan mendedahkan kepada prosedur dan alatan-alatan pengujian yang digunakan untuk melakukan pengujian. Keluaran yang diperolehi dari kajian akan menjadi prosedur pengujian yang holistik yang akan dirujuk oleh kakitangan teknikal.

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LIST OF ABBREVIATION

ATSC	–	Advanced TV System Committee
BIOS	–	Basic Input Output System
BER	–	Bit Error Rate
CMOS	–	Complementary Metal-Oxide Semiconductor
CD	–	Compact Disk
CBR	–	Committed Bit Rate
Cr	–	Color red
Cb	–	Color blue
CB	–	Circuit Board
COFDM	–	Orthogonal Frequency Division Multiplexing
CXS	–	Customer Xperience Solution
CESB	–	Cubic Electronic Sdn Bhd
DOS	–	Disk Operating System
DVD	–	Digital Video Decoder
DTV	–	Digital TV
DRAM	–	Dynamic Random Access Memory
dB	–	decibel
FR	–	Frequency Response
IR	–	Infra Red
IP	–	Internet Protocol
IPTV	–	Internet Protocol Television
MTNL	–	Mahanagar Telephone Nigam Ltd
MPEG	–	Moving Picture Expert Group
MoU	–	Memorandum of Understanding
MAC	–	Medium Access Control
NIC	–	Network Interface Card

PC	–	Personal Computer
PAL	–	Phase Alternating Line
PnP	–	Plug and Play
PCB	–	Printed Circuit Board
PES	–	Packet Elementary Stream
QoS	–	Quality of Service
QoE	–	Quality of Experience
ROM	–	Random Access Memory
STB	–	Set – Top Box
SVS	–	Switched Video Service
SNR	–	Signal to Noise Ratio
SECAM	–	Sequential Colour With Memory
THD	–	Total Harmonic Distortion
TCP/IP	–	Transmission Control Protocol
UTeM	–	Universiti Teknikal Malaysia Melaka
UDP / RTP	–	User Datagram Protocol / Real Time Protocol
U.S	–	United States

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CHAPTER 1

INTRODUCTION

This chapter will be discussed about the introduction of this project. This part is important to elaborate the overall project. This chapter explained about the overview of this project, objective, product involved in this project, scope of project and problem statement. All the detail explanation of this part was showed below.

1.1 Overview

Universiti Teknikal Malaysia Melaka have signed the Memorandum of Understanding (MoU) with Cubic Electronic Sdn Bhd on ‘Smart Partnership’ between industry and public university on 30 July 2003. In the MoU, UTeM will join the company in research and development. Cubic Electronic Sdn Bhd needed a technical support from UTeM to make sure the development of the testing and assemble the product follow the specification of customers. This is an opportunity to gain the knowledge with industrial environment.

All kinds of devices or equipments nowadays, begins with the basic design from the basic theory and then all the weaknesses followed by improvement step-by-step. So this product is also do right the same reason which the improvement will be applied to bring the advantages to the user when using the Customer eXperience Solution (CXS). The problems occurs from the current product testing method and

procedure because the operator don't have a complete or detail references document to develop the test procedure. This problem will be improve soon is identified by covering some factors as using the suitable testing method and procedure for testing this product.

In general, this project is focus to develop and improve the test method and procedure. The test method will be more logical, more effective and reliable to the customer request. This project is about Functional Testing and Develop Customer eXperience Solution (CXS) test procedure for Cubic Electronic Sdn Bhd (CESB). This project gave more advantages to author to involve in real industries world. All of implementation part of this project was done in CESB factory. The most important element through this corporation is the industries can transfer their technology and expertise to share with institution. CESB benefited from this project through improvement their technique and found some new method for production testing by researching.

1.2 About Customer eXperience Solution (CXS) product

Customer eXperience Solution (CXS) or also called Selectv rich functionalities and capabilities are applicable to nearly all industries offering hospitality services to customers. Industries CXS are currently serving include Hotels, Resorts, Hospitals, Cruise Liners, Air Lines, Trains, Buses and Retail Outlets. CXS is an interactive infotainment and communication solution that transforms your in-room television into a powerful service delivery facility. CXS is designed and built by experts in the hospitality industry for the hospitality industry.



Figure 1.1 : CXS X-Cube

CXS provides the necessary ingredients for excellent service quality allowing you to leapfrog and stay ahead of competition. Understanding your guests, satisfy your guests' needs and wants through the indulgence of the 5 senses. The objective of CXS product was to developed the provide guest with unforgettable experience to create customer loyalty, create more channels of revenue and to reduce cost and improve overall efficiency of the Hotel. This product provide 6 categories of menu. That categories is :

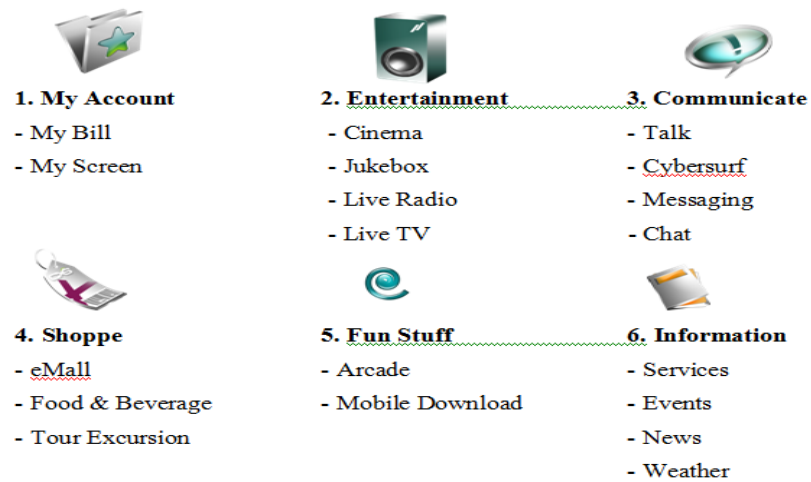


Figure 1.2 : Main Menu ItemDisk Operating System

This figure showed the overall system of this CXS system. This system involved the main component that connection with each other to completing the system.



Figure 1.3 : Overall System Architecture

1.3 Objective of Project

The objective of this project is to test the functional of Customer eXperience Solution (CXS) product and develop the test procedure for CXS. The functional of testing includes the performance of system, quality checking, analyses the output and assembly the product. Before develop the test procedure, the best testing method will be choose and the parameter will be test were define. Compare the result with the standard document and after that develop the CXS test procedure document for Cubic Electronics Sdn Bhd.

1.4 Scope of Project

Generally the main scope for this project can divide by three main scope of work. This scope involve is researching and choose the best method for testing related product as a CXS. After researched is done and the best method was chosed, author will designed and developed the test procedure for to propose to the CESB. This test procedure will be propose to the CESB for the first evaluation. After the proposed test procedure was approved, the test process will be run at CESB factory. After all the testing process was done completely, the test procedure was developed and after that the test procedure will be submitted to CESB again for second checked. This testing method provide a measurement for some parameter that related with CXS product. This method can give more accurate result for CESB when product were launch to market. Other scope is to understand the industrial standard practice such as IEEE standard.

1.5 Problem Statement

Nowadays Cubic Electronics Sdn Bhd done the testing but not follow the specific procedure and their customer request. The testing process only provide the visual test, inspection test, and quality check. The test procedure also does not follow the specification of their customer need. Because of this, more of this product was returned back from customer. The operator and technician don't have a reference

document during the testing occur. This testing is focus to the visual testing and the testing does not involve the specific parameter of this product.