STANDARD KEMAHIRAN PEKERJAAN KEBANGSAAN
(NATIONAL OCCUPATIONAL SKILL STANDARD)

STANDARD PRACTICE

EE-140-3:2012

OPERASI & PENYELENGGARAAN PENGHANTARAN SIARAN

BROADCAST TRANSMISSION OPERATION & MAINTENANCE

LEVEL 3

JPK

DEPARTMENT OF SKILLS DEVELOPMENT (DSD)

MINISTRY OF HUMAN RESOURCES (MOHR)

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STANDARD PRACTICE

NATIONAL OCCUPATIONAL SKILLS STANDARD (NOSS) FOR;

BROADCASTING TRANSMISSION OPERATION AND MAINTENANCE

LEVEL 3

1. INTRODUCTION

Broadcast Transmission Supervisor is responsible to directly supervise and coordinate the activities of broadcasting transmission end to end connectivity and equipment is set up correctly and is operating accordingly. A broadcast transmission supervisor also responsible to ensure that all transmission broadcasting equipment are maintain as required.

The broadcasting industries are a major growth sector in Malaysia and local organisation has been successful in establishing themselves as key player regionally. This evidently requires these progressive organisations to have a pool of adequately trained personnel. As such, skills in growth areas such as the Broadcasting Transmission are in high demand in Malaysia and there is a recognised need for a vendor independent mechanism that assesses the competence of participants in a practical manner to ensure that they are suitably qualified for industry.

The Malaysian Communications and Multimedia Commission is the regulator for the converging communications and multimedia industry responsible for technical regulation which includes efficient frequency spectrum assignment, the development and enforcement of technical codes and standards and the administration of numbering and electronic addressing.

At the time it was created its key role was the regulation of the communications and multimedia industry based on the powers provided for in the Malaysian Communications and Multimedia Commission Act (1998) and the Communications and Multimedia Act (1998). Pursuant to these Acts the role of the Malaysian Communications and Multimedia Commission is to implement and promote the Government's national policy objectives for the communications and multimedia sector. The Malaysian Communications and Multimedia Commission are also charged with overseeing the new regulatory framework for the converging industries of telecommunications, broadcasting and on-line activities.

Broadcasting is the distribution of audio and video content to a dispersed audience usually the general public via any audio or visual mass communications medium with the use of terrestrial transmitter, satellite or cable. All three delivery methods compete for audience viewing time. Direct To Home (DTH) is the term used to indicate TV transmission by satellite directly to the home or user.

Broadcasting is usually unidirectional form of transmission without any return path. However, the introduction of new technology such Hybrid TV or Internet Protocol (IP) TV (IPTV) using fibre optics has a return channel. This technology revolution has raised the broadcast industry to a higher level where interactivity is possible. This effectively means that the user can interact with the station and

with the content. A wide variety of new programmes such as reality shows which enable the interaction and participation of viewers at home and the TV studio.

The experts in this field can also pursue careers in other industries in Malaysia or internationally. They also can be exported to the international market due to the increasing need of experts in this field. Hence, the development of this NOSS is essential for the industry to have certain guidelines and standards based on the level of competencies that have been set by the industrial experts in this field.

The entry level for Broadcasting Transmission Supervisor personnel career is at Level 3. The justification is based on the nature of work that requires performing a broad range of varied work activities, performed in a variety of contexts, most of which are complex and non routine. There is considerable responsibility and autonomy and control or guidance of others is often required.

This NOSS provides first hand information to the workers regarding the telecommunication industry working environment. This NOSS also provides a career path and employment development for those involved in this industry.

Based on the workshop findings, it was decided that the minimum requirement for those interested to enrol this course are as follows:

- Logical
- Mathematic
- Basic IT knowledge
- Good eyes sight, not colour blind and good hearing
- Medically and physically fit to meet strength, endurance and manual dexterity
- Able to read, write and calculate
- Independent and alert

2. OCCUPATIONAL STRUCTURE

Broadcast Transmission Operation and Maintenance (Level 3) personnel comes under the sub-sector Transmission. Figure 1.1 and figure 1.2 show the structured career path and area of Broadcast Transmission Operation and Maintenance (Level 3) personnel.

The panel of industry expert had concluded that this job area start from tier 3 due to requirement of performing a broad range of varied work activities, performed in a variety of contexts, most of which are complex and non routine. There is considerable responsibility and autonomy and control or guidance of others is often required. To produce skilled workers in this industry, the needs for structured training are essential.

SECTOR	**ELECTRICAL & ELECTRONIC, TELECOMMUNICATION & BROADCASTING**
SUB SECTOR	**TRANSMISSION**
LEVEL/ AREA	**BROADCASTING TRANSMISSION OPERATION**
LEVEL 5	Broadcast Transmission Manager
LEVEL 4	Broadcast Transmission Assistant Manager
LEVEL 3	Broadcast Transmission Supervisor
LEVEL 2	No Level
LEVEL 1	No Level

Figure 1.1 Occupational Structures for Broadcasting Transmission

SECTOR	ELECTRICAL & ELECTRONIC, BROADCASTING & TELECOMMUNICATION
SUB SECTOR	**TRANSMISSION**
LEVEL/ AREA	**BROADCASTING TRANSMISSION OPERATION**
LEVEL 5	Broadcast Transmission Management
LEVEL 4	Broadcast Transmission Administration
LEVEL 3	Broadcast Transmission Operation & Maintenance
LEVEL 2	No Level
LEVEL 1	No Level

Figure 1.2 Occupational Area Structures for Broadcasting Transmission

3. DEFINITION OF COMPETENCY LEVEL

The NOSS is developed for various occupational areas. Candidates for certification must be assessed and trained at certain levels to substantiate competencies. Below is a guideline of each NOSS Level as defined by the Department of Skills Development, Ministry of Human Resources, Malaysia.

Malaysia Skills Certificate Level 1:	Competent in performing a range of varied work activities, most of which are routine and predictable.
Malaysia Skills Certificate Level 2:	Competent in performing a significant range of varied work activities, performed in a variety of contexts. Some of the activities are non routine and required individual responsibility and autonomy.
Malaysia Skills Certificate Level 3:	Competent in performing a broad range of varied work activities, performed in a variety of contexts, most of which are complex and non routine. There is considerable responsibility and autonomy and control or guidance of others is often required.
Malaysia Skills Diploma Level 4:	Competent in performing a broad range of complex technical or professional work activities performed in a wide variety of contexts and with a substantial degree of personal responsibility and autonomy. Responsibility for the work of others and allocation of resources is often present.
Malaysia Skills Advanced Diploma Level 5:	Competent in applying a significant range of fundamental principles and complex techniques across a wide and often unpredictable variety of contexts. Very substantial personal autonomy and often significant responsibility for the work of others and for the allocation of substantial resources features strongly, as do personal accountabilities for analysis, diagnosis, planning, execution and evaluation.

4. MALAYSIAN SKILL CERTIFICATION

This particular course can be enrolled by anybody who possesses high analytical thinking and has a basic in Mathematic and English. The justifications of the respective pre-requisite are based on the scope of work that requires certain of logical thinking, in order to fulfil the job scope requirement.

Candidates after being competent verified and fulfilled Malaysian Skill Certification requirements shall be awarded with Sijil Kemahiran Malaysia (SKM) at Level 3.

5. JOB COMPETENCIES

a) A *Broadcasting Transmission Operation & Maintenance* (Level 3) personnel shall be competent in performing the following **Core** competencies:-

- Broadcast Content Ingestion & Playout
- Broadcast Server Maintenance
- Network Supervision
- Continuity Suite Operation
- Audio & Video (AV) Test & Measurement
- Switching/ routing operation
- Broadcast Transmitter Operation & Maintenance
- Cabling Installation

6. WORKING CONDITIONS

Generally, most Broadcast Transmission Supervisor work for large or small telecommunication or broadcasting companies and are on-call for emergency situations. Some Broadcast Transmission Supervisor may also provide online or phone assistance to help customer or users try to resolve issues with switch, router, connections, equipment or other possible problematic issues. These support Broadcast Transmission Supervisor work at remote station & office environment. They also required to be able to work irregular hours and working under pressure and work in cold temperature environment (due the system operating requirement-24 hours). A good background in electronics, computers, ISPs and networking is considered an asset for this career. Personnel in this field of work also required to adhere to SLA, safety and security procedures because the working environment in telecommunication industry may lead to exposure to various accidents.

7. EMPLOYMENT PROSPECTS

Telecommunications is an important enabler for Malaysia to position itself at the international level. Employment growth in the telecommunication industry is significant and is always in demand.

Other related occupation with respect to employment opportunities are:

- Broadcasting Transmission Supervisor

Other related industries with respect to employment opportunities are:

- Telecommunications – Transmission (Wired/ Wireless)
- Broadcasting – Studio Production
- Broadcasting – Maintenance Unit
- Outside Broadcast Production
- Satellite Operation Centre
- ICT – Networking
- Telecommunications – Operation Centre (Control Centre)
- Public and Private Sector IT Department

8. TRAINING , INDUSTRIAL/PROFESSIONAL RECOGNITION , OTHER QUALIFICATIONS AND ADVANCEMENT

- Non (recognition)
- Training based on new technology/ equipment

9. SOURCES OF ADDITIONAL INFORMATION

- **Malaysia Communications and Multimedia Commission**
  63000 Cyberjaya,
  Selangor Darul Ehsan.
  Telephone: +603 8688 8000
  Facsimile: +603 8688 1000
  E-mail: ccd@cmc.gov.my
  Website: www.skmm.gov.my

- **Telekom Malaysia Berhad**
  Level 51, North Wing,
  Menara TM,
  Jalan Pantai Baru,
  50672 Kuala Lumpur
  Telephone: +603 2240 9494

- **Internet Assigned Numbers Authority (IANA)**
  12025 Waterfront Drive, Suite 300,
  Los Angeles CA 90094,
  United States of America.
  Telephone: +1 310 301 5800
  Facsimile: + 1 310 823 8649

- **International Telecommunication Union (ITU)**
  Place des Nations,
  1211 Geneva 20,
  Switzerland.
  Telephone: +41 22 730 5111
  Facsimile: +41 22 733 7256
  E-mail: itumail@itu.int
  Website: www.itu.int

- **Internet Engineering Task Force (IETF)**
  48377 Fremont Blvd.,
  Suite 17, Fremont,
  California 94538,
  United States of America
  Telephone: +1 510 492 4080
  Facsimile: +1 510 492 4001
  Website: www.ietf.org

10. APPROVAL DATE

The National Skills Development Board (MPKK), Ministry of Human Resources has agreed and endorsed this Standard on …….

11. ACKNOWLEDGEMENT

The Director General of DSD would like to extend his gratitude to the organisations and individuals who have been involved in developing this standard

12. COMMITTEE MEMBERS FOR DEVELOPMENT OF STANDARD PRACTICE (SP), COMPETENCY PROFILE CHART (CPC), COMPETENCY PROFILE (CP) PHASE 1 For

BROADCASTING TRANSMISSION OPERATION AND MAINTENANCE

LEVEL 3

PANEL		
1.	Mr. Hishamuddin bin Mohd Juki	Manager, Telekom Malaysia Berhad
2.	Mr. Mohd Zamri bin Harun	Technical Producer, View Image Sdn. Bhd.
3.	Mr. Zulkarnaen bin Mokhtar	Branding Manager, Al-Hijrah Media Corporation
4.	Mr. Jeewa a/l Vengadsalam	Assistant Director, Institut Penyiaran Tun Abdul Razak
5.	Mr. Mat Yatim bin Ali	Broadcast Technical Consultant, Broadcastsonic Sdn. Bhd.
6.	Mr. Mohd Yusri bin Mohd Yusof	Manager – Broadcast/SRS, Telekom Malaysia Berhad
7.	Mr. Mohd Shahrom bin Mohd Shariff	Head of Technical Division, View Image Sdn. Bhd.
8.	Mr. Zulkifli bin Abdul Rahim	Head Assistant Director (Quality Measurement), Radio Televisyen Malaysia
9.	Mrs. Rohana binti Buyong	TV Studio Engineer, Radio Televisyen Malaysia
10.	Mr. Khairul Izam bin Radzi	Head of Department, Multimedia University
FACILITATOR		
10.	Evarina binti Amiron	Pritec Academy Sdn Bhd
CO-FACILITATOR		
11.	Nurdiana binti Mohd Othman	Pritec Academy Sdn Bhd

13. COMMITTEE MEMBERS FOR DEVELOPMENT OF CURRICULUM OF COMPETENCY UNIT (CoCU) For

BROADCASTING TRANSMISSION OPERATION AND MAINTENANCE

LEVEL 3

PANEL		
1.	Mr. Hishamuddin bin Mohd Juki	Manager, Telekom Malaysia Berhad
2.	Mr. Mohd Zamri bin Harun	Technical Producer, View Image Sdn. Bhd.
3.	Mr. Zulkarnaen bin Mokhtar	Branding Manager, Al-Hijrah Media Corporation
4.	Mr. Jeewa a/l Vengadsalam	Assistant Director, Institut Penyiaran Tun Abdul Razak
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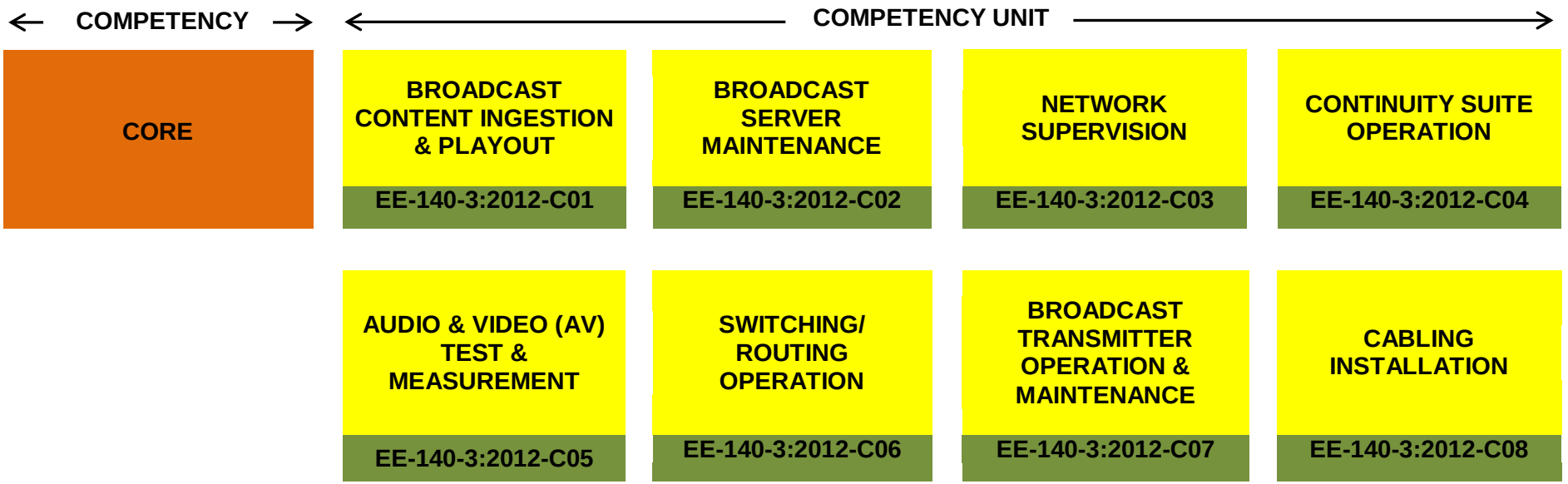
FACILITATOR		
10.	Evarina binti Amiron	Pritec Academy Sdn Bhd
CO-FACILITATOR		
11.	Nurdiana binti Mohd Othman	Pritec Academy Sdn Bhd

COMPETENCY PROFILE (CP)

COMPETENCY PROFILE CHART (CPC)

SECTOR	**ELECTRICAL & ELECTRONIC, TELECOMMUNICATION AND BROADCASTING**		
SUB SECTOR	**BROADCASTING TRANSMISSION**		
JOB AREA	**BROADCASTING TRANSMISSION OPERATION & MAINTENANCE**		
JOB LEVEL	**LEVEL 3**	**JOB AREA CODE**	**EE-140-3:2012**



COMPETENCY PROFILE (CP)

Sub Sector	**BROADCASTING TRANSMISSION**
Job Area	**BROADCASTING TRANSMISSION OPERATION & MAINTENANCE**
Level	**THREE (3)**

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
1. Broadcast Content Ingestion & Playout		The CU Title describes the competency of broadcast content ingestion He or She is the person to carry out daily recording / storage / ingestion and playout servers activities and monitoring for the smooth running of all servers for transmission. The personnel who are competent in the broadcast content ingestions must be able to prepare broadcast content ingestion requirements identifications, conduct broadcast content ingestion and produce content ingestion report The outcome of this competency is to produce skilled workforce who has the knowledge in the operations of video servers, capable of executing standard operating procedures for servers	1. Identify broadcast content ingestion and playout requirements 2. Conduct broadcast content ingestion and playout 3. Produce broadcast content ingestion and playout report	1.1 Company and/ or customer requirements on broadcast server operation activities is referred 1.2 Company policy interpreted according to company's procedures 1.3 Broadcast server operation schedule is referred 2.1 Broadcast server functionality checked in accordance with equipment manufacturer's manual 2.2 Content quality monitored in accordance with company's requirement 3.1 Broadcast server operation result obtained according to procedures 3.2 Report format identified 3.3 Report submitted to superior

COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
		playout /ingest workflow and has the capability of performing basic server maintenance .		
2. Broadcast Server Maintenance		The CU Title describes the competency of broadcast server maintenance He or She is the person to carry out maintaining the functionality of all playout / recording and storage servers for on-air operations. The personnel who are competent in the broadcast server maintenance must be able to prepare broadcast server maintenance requirement identifications, conduct broadcast server maintenance and produce broadcast server operation report The personnel who are competent in the broadcast server maintenance must be able to identify and check the performance of servers, capable of performing server debugging and maintenance procedures and shall be able to respond quickly to	1. Prepare broadcast server maintenance requirement identifications 2. Conduct broadcast server maintenance	1.1 Company and/ or customer requirements on broadcast server maintenance activities referred 1.2 Company procedure interpreted 1.3 Broadcast Server Maintenance schedule referred 1.4 Broadcast Server Maintenance checklist interpreted according to procedures 2.1 Broadcast server message or alarm log obtained 2.2 Server functionality checked according to manufacturer's manual 2.3 Broadcast server correction performed according to maintenance procedures 2.4 Broadcast server performance monitored. 2.5 Broadcast Server error issues resolved

COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
		emergency situations when necessary and possible. The outcome of this competency is to produce qualified, skilled workforce who has the knowledge in the operations of video servers, ability to define problems and collect data .Capable of performing maintenance, debugging and fast restoration of servers.	3. Produce broadcast server operation report	3.1 Result of broadcast server operation interpreted 3.2 Report on broadcast server operation produced and submitted to superior
3. Network Supervision		The CU Title describes the competency of network management He or She is the person to carry out network implementation and maintenance on site according to company's requirement, statutory body and standard operating procedure The personnel who are competent in the network management must be able to identify network management requirements, conduct network management activities and report network management monitoring activities.	1. Identify network supervision requirements 2. Conduct network supervision activities	1.1 Company procedures and technical specification on network operation activities referred as per requirements 1.2 Required tools identified according to project requirements 1.3 Network supervision schedule interpreted according to company's requirements 2.1 Traffic circuit monitored according to network diagram 2.2 Network supervision performed according to network diagram, SOP and company requirement

COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
		The outcome of this competency is to provide excellent services in network management to ensure network on site operated and well maintained according to company's requirement	3. Report network supervision activities	3.1 Network supervision report compiled 3.2 Network supervision activities report submitted to superior
4. Continuity Suite Operation		The CU Title describes the competency of continuity suite operation He or She is the person to carry out for the continuity and punctual play out of scheduled broadcast programming. The personnel who are competent in the continuity suite operation must be able to identify types of the daily programme workflow requirements, monitor the flow of the programme content continuously throughout the daily transmission and produce daily performance report The outcome of this competency is to produce skilled workforce who has the knowledge in controlling the broadcast automation playlist	1. Identify types of the daily programme workflow requirements 2. Monitor the flow of the programme content continuously throughout the daily transmission	1.1 Types of scheduling system determined 1.2 Program content from programme sector obtained such as : • Commercials • Features • Public announcement 2.1 Servers system operation monitored according to equipment organization procedure 2.2 Visual monitors operated according to equipment manufacturer's manual 2.3 Daily log of programme contents generated in accordance with company's requirement 2.4 Proper flow of programme content as per traffic schedule monitored

COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
		and capable of handling the on-air traffic management system.	3. Produce daily performance report	3.1 Daily performance report prepared and compiled 3.2 Daily report on scheduling submitted to superior
5. Audio and Video (AV) Test & Measurement		The CU Title describes the competency of audio and video test & measurement He or She is the person to carry out the assessment of all audio and video broadcast related equipment meets the quality control guidelines The personnel who are competent in the audio and video test & measurement must be able to prepare signal source and parameter requirements identifications, arrange incoming signal and out going signal testing requirements, monitor transmission and AV signal testing activities and prepare audio & video test & measurement report The outcome of this competency is to produce skilled workforce who has the knowledge and ability in	1. Prepare signal source and parameter requirements identifications 2. Arrange incoming signal and out going signal testing requirements 3. Monitor transmission and AV signal testing activities	1.1 Types of signals determined 1.2 Types of signal source identified 1.3 Testing equipment handling procedures interpreted 1.4 Testing equipment confirmed according to inventory list 1.5 AV testing equipment checked according to manufacturer's manual 2.1 AV equipment checked according to procedures 2.2 In and out signal testing checked against tester equipment 2.3 Quality of audio and video determined according to requirements 3.1 AV transmission signal tested 3.2 Signal quality checked against signal testing equipment 3.3 AV programs previewed

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
		set-up, operate, identify and maintain broadcast equipment .	4. Prepare audio and video test & measurement report	3.4 AV quality checked according to operation procedures 3.5 AV signal testing results established 3.6 Transmission signal confirmed 3.7 AV signal to begin preroll & transmitting observed 4.1 AV test and measurement report submitted to superior 4.2 AV system control report produce according to format
6. Switching/ Routing Operation		The CU Title describes the competency of switching/ routing operation He or She is the person who facilitates and fulfils the delivery and distribution of inbound and outbound signals for transmission. The personnel who are competent in the switching/ routing operation must be able to identify switching operation requirements, coordinate switching/ routing operations, carry out switching centre maintenance and produce daily performance report	1. Identify switching operation requirements	1.1 Switching plan/schedule interpreted 1.2 Routing/switching request interpreted 1.3 List of equipment needing servicing obtained as per checklist 1.4 Switching Centre records obtained according to procedures 1.5 Equipment service manual identified 1.6 Tools, equipment and material required determined according to maintenance requirements

COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
		The outcome of this competency is to produce skilled workforce who has the knowledge in the operations of routing systems , troubleshoots routing paths and equipment as well as capable of executing standard operating procedures in transmission workflow	2. Coordinate switching/ routing operations	2.1 Proper routing of programme material from source to destination carried out 2.2 Proper flow of programme content from source to destination ensured
			3. Carry out switching centre maintenance	3.1 Visual inspection on equipments carried out according to manufacturer's manual 3.2 Housekeeping activity carried out according to company's requirement 3.3 Fixed equipment maintenance carried out according to maintenance procedures 3.4 Annual maintenance audited as per company's requirements
			4. Produce daily performance report	4.1 Daily report prepared 4.2 Daily report submitted to superior
7. Broadcast Transmitter Operation & Maintenance		The CU Title describes the competency of broadcast transmitter operation & maintenance	1. Identify main modules and components of the broadcast transmitter equipments	1.1 Different transmission technologies determined 1.2 Broadcast transmitter operation and maintenance requirements/terminology determined

COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
		He or She is the person to carry out daily operation, maintenance, troubleshooting and undertake scheduled performance tests of broadcast transmitters. The personnel who are competent in the broadcast transmitter operation & maintenance must be able to identify main modules and components of the transmitter equipment, perform broadcast transmitter operation, perform maintenance works, monitor the performance of the radio or television transmitters, monitor broadcast transmitter maintenance works and produce daily performance report The outcome of this competency is to produce skilled workforce who are able to identify, operate, maintain, and rectify broadcast transmitter equipment.	2. Perform broadcast transmitter operation 3. Perform maintenance works	1.3 Types of components needing servicing as mentioned in transmitter equipment manual obtained 1.4 Components and equipments of transmitter listed out 1.5 Transmitter servicing schedule determined 1.6 Tools required for transmitter maintenance determined 2.1 Power Supply operating procedures determined 2.2 Transmitter Exciter Unit handled according to manufacturer's manual and organisation procedures 3.1 Daily maintenance by visual inspection of all equipments carried out 3.2 Weekly maintenance of vacuuming transmitter interior and air-filters carried out 3.3 Monthly maintenance in cleaning all equipments transmitter, air-conditioners, and power supply distribution boards carried out

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
				3.4 Annual maintenance of resetting levels of programme lines, audio and video levels, replacement of air-filters, gas filling for air-conditioners etc carried out
			4. Monitor the performance of the radio or television transmitters	4.1 Transmitter output power checked against power supply requirements 4.2 Transmitter modulation checked 4.3 VSWR (Voltage to standing wave ratio) level checked 4.4 Input voltage and current checked 4.5 Off-air transmission quality assessed
			5. Monitor broadcast transmitter maintenance works result	5.1 General cleanliness of the transmitter and ancillary equipment checked and corrected 5.2 Condition and cleanliness of the air-filter checked and replaced 5.3 Components with physical abnormalities such as overheating or burnt marks identified

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
			6. Produce daily performance report	5.4 Components with abnormalities such as overheating, burnt, noisy ball bearings etc replaced. 5.5 Programme lines, Audio and Video levels aligned and adjusted 6.1 Daily report submitted to superior 6.2 Report content prepared according to organisation procedures
8. Cabling installation		The CU Title describes the competency of cabling installation He or She is the person who is responsible to testing and troubleshooting and testing of wiring problems. The personnel who are competent in the cabling installation must be able to identify cabling installation and maintenance requirement, carry out cabling installation and maintenance equipment preparation, perform cabling installation, perform cabling	1. Identify cabling installation and maintenance requirement 2. Carry out cabling installation and maintenance equipment preparation	1.1 Installation and maintenance activities identified 2.1 Detail installation and maintenance information identified including :- • Cable list • Material list • Installation and maintenance procedure • Drawing and site information 2.2 Detail for installation and maintenance • Quantity • Condition • Specification

COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
		maintenance and produce cabling installation and maintenance report The outcome of this competency is to produce skilled workforce who can run new cabling in existing building, termination and testing of new cabling, test and troubleshoot of cable.		2.3 Cabling installation and maintenance manual obtained and interpreted 2.4 Jointing and termination material for cable obtained in accordance to requirement
			3. Perform cabling installation	3.1 Site safety assessment form filled in according to procedure 3.2 Installation specification listed 3.3 Site prepared for installation as per requirements 3.4 Optical time – domain reflector meter (OTDR) test conducted to detect point 3.5 Cable applied before be terminated to connector 3.6 Data transmission performance checked as per specification
			4. Perform cabling maintenance	4.1 Faulty installation materials identified and rectified according to procedure 4.2 Cabling installation materials checked against procedure 4.3 Cable dismantling activities checked against checklist
			5. Produce cabling installation & maintenance report	5.1 Cabling installation & maintenance report prepared and compiled

COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
				5.2 Cabling installation & maintenance report submitted to superior

CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	Broadcasting Transmission						
Job Area	Broadcasting Transmission Operation & Maintenance						
Competency Unit Title	Broadcast Content Ingestion & Playout						
Learning Outcome	The outcome of this competency is to enable the personnel to carry out the operations of server's playout / ingest workflow. Upon completion of this competency unit, trainees will be able to:- • Prepare broadcast content ingestion and playout requirements • Conduct broadcast content ingestion and playout • Produce broadcast content ingestion and playout report						
Competency Unit ID	**EE-140-3:2012-C01**	**Level**	3	**Training Duration**	121 hours	**Credit Hours**	12

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Identify broadcast content ingestion & playout requirements	i. Organisation procedure ii. Organisation policy i. Types of server iii. Broadcast server operation iv. Procedure to ingest programme content v. Ingestion system diagram vi. Ingest content file format			8 hours	Lecture	i. Programme content to be ingested or programme recording identified ii. Location of server identified iii. Server operation procedures identified iv. Ingestion work flow identified
		i. Determine organisation procedure to ingest and playout programme content		22 hours	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		ii. Determine organisation policy relevant to ingestion procedures and relevant personnel iii. Determine server operation iv. Determine programme content to ingest and playout v. Interpret ingestion and playout work flow vi. Determine types of ingest content file format	*Attitude:* i. Proactive in obtaining information and procedures relevant to ingestion and playout			
2. Conduct broadcast content ingestion and playout	i. Broadcast server functionality ii. Equipment manufacturer's manual iii. Ingestion procedure iv. Content quality filtering procedures			10 hours	Lecture, E-learning & Self-paced	i. Server equipment operated according to manufacturer's manual operating procedures

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	v. File format conversion procedures					ii. Programme content ingested to server iii. Content quality filtered
		i. Conduct file format conversion ii. Apply server equipment manufacturer's manual operating procedures iii. Apply ingestion system and playout work flow procedures iv. Ingest programme content to server v. Execute content quality filtering	*Attitude:* i. Proactive and precise in conducting broadcast content ingestion and playout ii. Handle tools and equipment with care	47 hours	Demonstration, Observation & Scenario Based Training (SBT)	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			Safety: i. Adhere to local safety regulation bodies requirements			
3. Produce broadcast content ingestion and playout report	i. Procedure to prepare broadcast content ingestion report ii. Report standard format based on company's requirements iii. Report writing technique			6 hours	Lecture	i. Procedures to prepare broadcast content ingestion report followed ii. Broadcast content ingestion activities summarised in report
		i. Determine procedure to prepare broadcast content ingestion report ii. Determine format and contents to prepare report iii. Prepare broadcast content ingestion report		28 hours	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			Attitude: i. Precise in providing information in report ii. Adhere to report submission dateline			

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information 01.02 Document information, procedures or processes 01.03 Utilise basic IT application 01.04 Analyse information 01.06 Utilise word processor to process information 01.07 Utilise database applications to locate and process information 01.08 Utilise spreadsheets applications to locate and process information 02.01 Interpret and follow manuals, instructions and SOP's 02.03 Communicate clearly 02.04 Prepare brief reports and checklist using standard forms 02.06 Write memos and letters 02.10 Prepare reports and instructions 03.01 Apply cultural requirements to the workplace 03.02 Demonstrate integrity and apply ethical practices 03.03 Accept responsibility for own work and work area 03.04 Seek and act constructively upon feedback about performance 03.05 Demonstrate safety skills 03.08 Develop and maintain a cooperation within work group 03.16 Identify and assess client / customer needs 04.01 Organise own work activities 04.02 Set and revise own objectives and goals 04.03 Organise and maintain workplace 04.04 Apply problem solving strategies 05.01 Implement project / work plans 05.02 Inspect work done and / or in progress 06.01 Understand system 06.02 Comply with and follow chain of command 06.03 Identify and highlight problems 06.05 Analyse technical systems 06.06 Monitor and correct performance of systems	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Multitasking and prioritizing 5. Self-discipline 6. Teamwork 7. Learning Skill 8. Leadership

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Ingestion and Playout SOP	1:1
2. Ingestion and Playout Contents	1:1
3. Server and Server Manual	1:10
4. Ingestion & Playout Tools	1:1
5. Encoding / Transcoding System	1:1
6. Automated Quality Monitoring Tools	1:1

REFERENCES

1. Robin Blair, 1999. Digital Technique in Broadcasting Transmission. Focal Press. ISBN - 0240803663
2. John Watkinson, 2001. Convergence in Broadcast and Communication Media. Focal Press. ISBN – 0240515099, ISBN – 9780240515090
3. Walter Y. Chen, July 11, 2003, Home Networking Basis : Transmission Environments and Wired/ Wireless Protocols, ISBN -13 : 978-0130165114
4. Technical Monograph on file based transfer system. Asia Pacific Broadcasting Unit – 2012 (IPPTAR)
5. Asia-Pacific Broadcasting Union and Tuan Abdul Razak Broadcasting & Information Institute, Malaysia; February 2012

CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	Broadcasting Transmission						
Job Area	Broadcasting Transmission Operation & Maintenance						
Competency Unit Title	Broadcast Server Maintenance						
Learning Outcome	The outcome of this competency is to enable the personnel to carry out server maintenance activities. Upon completion of this competency unit, trainees will be able to:- • Prepare broadcast server maintenance requirements identification • Conduct broadcast server maintenance • Produce broadcast server maintenance report						
Competency Unit ID	**EE-140-3:2012-C02**	**Level**	3	**Training Duration**	122 hours	**Credit Hours**	12

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Prepare broadcast server maintenance requirements identification	i. Local safety regulation bodies requirements ii. Organisation / customer requirements iii. Broadcast server maintenance schedule iv. Types of server maintenance form v. Server operation vi. Organisation procedure			8 hours	Lecture	i. Types of server maintenance forms identified ii. Customer requirements listed out iii. Broadcast server maintenance schedule obtained iv. Location of server identified
		i. Determine local safety regulation bodies requirements		24 hours	Demonstration, Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		ii. Determine organisation / customer requirements iii. Refer broadcast server maintenance schedule iv. Determine server maintenance form v. Determine organisation procedure vi. Determine server location vii. Determine type of maintenance equipment	*Attitude:* i. Proactive and comprehensive in identifying server maintenance requirements			
2. Conduct broadcast server maintenance	i. Server functionality ii. Broadcast server message / alarm log iii. Broadcast server maintenance procedures iv. Broadcast server error v. Maintained server test			16 hours	Lecture, E-learning & Self-paced	i. Server functionality identified ii. Broadcast server message / alarm log interpreted

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	procedures					
		i. Determine server functionality ii. Interpret broadcast server message / alarm log iii. Apply broadcast server maintenance procedures iv. Resolve broadcast server issues v. Test maintained server functionality	*Attitude:* i. Thorough in conducting server maintenance ii. Handle maintenance tools and equipment with care and according to procedures *Safety:* i. Adhere to Electrical safety regulation	40 hours	Demonstration, Observation & Scenario Based Training (SBT)	iii. Broadcast server maintenance procedures applied iv. Maintained server functionality checked

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
3. Produce broadcast server maintenance report	i. Procedure to prepare broadcast server maintenance report ii. Report standard format based on organisation's requirements iii. Report writing technique			6 hours	Lecture	i. Procedures to prepare broadcast maintenance report applied ii. Broadcast maintenance activities summarised in report
		i. Determine procedure to prepare broadcast maintenance report ii. Determine format and contents to prepare report iii. Prepare broadcast server maintenance report	*Attitude:* i. Accurate in providing information and action relevant to maintenance activities ii. Adhere to report submission dateline	28 hours	Demonstration, Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information 01.02 Document information, procedures or processes 01.03 Utilise basic IT application 01.04 Analyse information 01.06 Utilise word processor to process information 01.07 Utilise database applications to locate and process information 01.08 Utilise spreadsheets applications to locate and process information 02.01 Interpret and follow manuals, instructions and SOP's 02.03 Communicate clearly 02.04 Prepare brief reports and checklist using standard forms 02.06 Write memos and letters 02.10 Prepare reports and instructions 03.01 Apply cultural requirements to the workplace 03.02 Demonstrate integrity and apply ethical practices 03.03 Accept responsibility for own work and work area 03.04 Seek and act constructively upon feedback about performance 03.05 Demonstrate safety skills 03.08 Develop and maintain a cooperation within work group 03.16 Identify and assess client / customer needs 04.01 Organise own work activities 04.02 Set and revise own objectives and goals 04.03 Organise and maintain workplace 04.04 Apply problem solving strategies 05.01 Implement project / work plans 05.02 Inspect work done and / or in progress 06.01 Understand system 06.02 Comply with and follow chain of command 06.03 Identify and highlight problems 06.05 Analyse technical systems	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Multitasking and prioritizing 5. Self-discipline 6. Teamwork 7. Learning Skill 8. Leadership

Core Abilities	Social Skills
06.06 Monitor and correct performance of systems	

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Organisation Procedures On Maintenance 2. Server 3. Server Maintenance Tools	1:1 1:10 1:1

REFERENCES

1. Robin Blair, 1999. Digital Technique in Broadcasting Transmission. Focal Press. ISBN - 0240803663
2. John Watkinson, 2001. Convergence in Broadcast and Communication Media. Focal Press. ISBN – 0240515099, ISBN – 9780240515090
3. Walter Y. Chen, July 11, 2003, Home Networking Basis : Transmission Environments and Wired/ Wireless Protocols, ISBN -13 : 978-0130165114
4. Benny bing, 1st edition – June 15, 2002, Wireless Local Area Networks : The New Wireless Revolution, ISBN – 13 : 978-0471224747
5. Hans van den Berg, Geert Heijenk, Evgeny Osipov, Dirk Staehle, 1st edition, june 12, 2009, Wired/ Wireless Internet Communication : 7th International Conference, WWIC 2009, Enschede, The Netherlands, May 27-29 2009, Proceedings (Lecture Notes Networks and Telecomunications), ISBN-13 : 978-3642021176
6. Asia-Pacific Broadcasting Union and Tuan Abdul Razak Broadcasting & Information Institute, Malaysia; February 2012

CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	Broadcasting Transmission						
Job Area	Broadcasting Transmission Operation & Maintenance						
Competency Unit Title	Network Supervision						
Learning Outcome	The outcome of this competency is to enable personnel to carry out network supervision to ensure network on site operated and well maintained according to organisation's requirement. Upon completion of this competency unit, trainees will be able to:- • Identify network supervision requirements • Conduct network supervision activities • Report network supervision monitoring activities						
Competency Unit ID	**EE-140-3:2012-C03**	**Level**	3	**Training Duration**	126 hours	**Credit Hours**	12

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Identify network supervision requirements	i. Local safety regulation bodies requirements ii. Company procedures iii. Technical specification iv. Network operation v. Network location vi. Network equipment inventory vii. Network supervision schedule viii. Types of network			8 hours	Lecture	i. Location of network identified ii. Material inventory obtained iii. Company procedures obtained iv. Technical specification obtained v. Types of network listed

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		i. Determine local safety regulation bodies requirements ii. Determine company procedure iii. Refer technical specification iv. Determine network operation v. Determine network location vi. Determine types of network vii. Interpret network supervision schedule	*Attitude:* i. Proactive in identifying network requirements *Safety:* i. Follow work procedures	28 hours	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
2. Conduct network supervision activities	i. Network operating requirements ii. Network equipment manual iii. Network diagram iv. Traffic circuit			16 hours	Lecture, E-learning & Self-paced	i. Network operating requirements interpreted ii. Network diagram interpreted iii. Traffic circuit monitored iv. Network performance monitored
		i. Update network information (if required) ii. Execute network operation according to network specification iii. Execute network supervision activities according to schedule iv. Monitor network performance	*Attitude:* i. Meticulous in supervising network performance *Safety:* i. Follow network equipment handling instructions	40 hours	Demonstration, Observation & Scenario Based Training (SBT)	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
3. Report network supervision monitoring activities	i. Procedure to prepare network supervision report ii. Report standard format based on company's requirements iii. Report writing techniques			6 hours	Lecture	i. Procedures to prepare network supervision report applied ii. Network supervision activities summarised in report
		i. Determine procedure to prepare network supervision report ii. Determine format and contents to prepare report iii. Prepare Network Supervision activities report	*Attitude:* i. Proactive and accurate in providing information and action ii. Adhere to report submission dateline	28 hours	Demonstration, Observation	

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information 01.02 Document information, procedures or processes 01.03 Utilise basic IT application 01.04 Analyse information 01.06 Utilise word processor to process information 01.07 Utilise database applications to locate and process information 01.08 Utilise spreadsheets applications to locate and process information 02.01 Interpret and follow manuals, instructions and SOP's 02.03 Communicate clearly 02.04 Prepare brief reports and checklist using standard forms 02.06 Write memos and letters 02.10 Prepare reports and instructions 03.01 Apply cultural requirements to the workplace 03.02 Demonstrate integrity and apply ethical practices 03.03 Accept responsibility for own work and work area 03.04 Seek and act constructively upon feedback about performance 03.05 Demonstrate safety skills 03.08 Develop and maintain a cooperation within work group 03.16 Identify and assess client / customer needs 04.01 Organise own work activities 04.02 Set and revise own objectives and goals 04.03 Organise and maintain workplace 04.04 Apply problem solving strategies 05.01 Implement project / work plans 05.02 Inspect work done and / or in progress 06.01 Understand system 06.02 Comply with and follow chain of command 06.03 Identify and highlight problems 06.05 Analyse technical systems 06.06 Monitor and correct performance of systems	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Multitasking and prioritizing 5. Self-discipline 6. Teamwork 7. Learning Skill 8. Leadership

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Work order sample	1:1
2. Floor Plan Layout / Diagrams	1:1
3. Measuring Equipment	1:1
4. Wireless Access Point	1:10
5. Wireless Client Card	1:10
6. Terminal	1:1
7. Network Cable	As required
8. Serial Cable	As required

REFERENCES

1. Benny bing, 1st Edition – June 15, 2002, Wireless Local Area Networks : The New Wireless Revolution, ISBN – 13 : 978-0471224747
2. Walter Y. Chen, July 11, 2003, Home Networking Basis : Transmission Environments and Wired/ Wireless Protocols, ISBN -13 : 978-0130165114
3. Robin Blair, 1999. Digital Technique in Broadcasting Transmission. Focal Press. ISBN – 0240803663
4. John Watkinson, 2001. Convergence in Broadcast and Communication Media. Focal Press. ISBN – 0240515099, ISBN – 9780240515090
5. Asia-Pacific Broadcasting Union and Tuan Abdul Razak Broadcasting & Information Institute, Malaysia; February 2012

CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	Broadcasting Transmission						
Job Area	Broadcasting Transmission Operation & Maintenance						
Competency Unit Title	Continuity Suite Operation						
Learning Outcome	The outcome of this competency is to enable the personnel to carry out broadcast automation playlist control and capable of handling the on-air traffic management system. Upon completion of this competency unit, trainees will be able to:- • Identify types of the daily programme workflow requirements • Monitor the flow of the programme content continuously throughout the daily transmission • Produce daily performance report						
Competency Unit ID	**EE-140-3:2012-C04**	**Level**	3	**Training Duration**	186 hours	**Credit Hours**	18

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Identify types of the daily programme workflow requirements	i. Scheduling system ii. Program sector iii. Types of program content • Commercials • Features • Public announcement			12 hours	Lecture	i. Scheduling system referred ii. Program sector identified iii. Types of program content listed
		i. Determine scheduling system ii. Determine program sector iii. Confirm types of program content		40 hours	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			Attitude: i. Keep the document neat and tidy *Safety:* i. Follow work procedures ii. Follow proper work instructions			
2. Monitor the flow of the programme content continuously throughout the daily transmission	i. Company' s requirement ii. Server system operation iii. Visual monitor operation iv. Daily log programme v. Flow of programme vi. Traffic schedule vii. Over riding scheduled event (when required – irregular circumstances) viii. Types of irregular circumstances during transmission such as:- • System failure • Disasters • Ad hoc crossover			22 hours	Lecture, E-learning & Self-paced	i. Company's requirement listed ii. Server system operation determined iii. Visual monitor function determined iv. Programme daily log produced v. Programme content flow referred vi. Traffic schedule obtained

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		i. Refer company's requirement ii. Execute server system operation monitoring iii. Review visual monitors iv. Check daily log programme contents v. Follow programme content flow vi. Refer traffic schedule vii. Switch over/ over ride to next scheduled event viii. Determine occurrence of irregular circumstances	*Attitude:* i. Meticulous in monitoring the flow of the programme content continuously throughout the daily transmission ii. Calm and compose and be able to work under pressure iii. Alert to emergency situation	52 hours	Demonstration, Observation & Scenario Based Training (SBT)	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			Safety: i. Work area safety awareness			
3. Produce daily performance report	i. Procedure to prepare daily performance report ii. Report standard format based on company's requirements iii. Report writing technique			20 hours	Lecture	i. Procedures to write daily performance report followed ii. Daily performance compiled
		i. Determine procedure to prepare daily performance report ii. Determine format and contents to prepare report iii. Prepare daily performance report	*Attitude:* i. Proactive in provide information and action ii. Adhere to report submission dateline	40 hours	Demonstration & Observation	

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information 01.02 Document information, procedures or processes 01.03 Utilise basic IT application 01.04 Analyse information 01.06 Utilise word processor to process information 01.07 Utilise database applications to locate and process information 01.08 Utilise spreadsheets applications to locate and process information 02.01 Interpret and follow manuals, instructions and SOP's 02.03 Communicate clearly 02.04 Prepare brief reports and checklist using standard forms 02.06 Write memos and letters 02.10 Prepare reports and instructions 03.01 Apply cultural requirements to the workplace 03.02 Demonstrate integrity and apply ethical practices 03.03 Accept responsibility for own work and work area 03.04 Seek and act constructively upon feedback about performance 03.05 Demonstrate safety skills 03.08 Develop and maintain a cooperation within work group 03.16 Identify and assess client / customer needs 04.01 Organise own work activities 04.02 Set and revise own objectives and goals 04.03 Organise and maintain workplace 04.04 Apply problem solving strategies 05.01 Implement project / work plans 05.02 Inspect work done and / or in progress 06.01 Understand system 06.02 Comply with and follow chain of command 06.03 Identify and highlight problems 06.05 Analyse technical systems 06.06 Monitor and correct performance of systems	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Multitasking and prioritizing 5. Self-discipline 6. Teamwork 7. Learning Skill 8. Leadership

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Traffic schedule	1:1
2. Company policy	1:1
3. Visual and Audio monitoring tools	1:1
4. Communication tools	1:1
5. Continuity suite system	1:10

REFERENCES

1. Robin Blair, 1999. Digital Technique in Broadcasting Transmission. Focal Press. ISBN - 0240803663
2. John Watkinson, 2001. Convergence in Broadcast and Communication Media. Focal Press. ISBN – 0240515099, ISBN – 9780240515090
3. Walter Y. Chen, July 11, 2003, Home Networking Basis : Transmission Environments and Wired/ Wireless Protocols, ISBN -13 : 978-0130165114
4. Asia-Pacific Broadcasting Union and Tuan Abdul Razak Broadcasting & Information Institute, Malaysia; February 2012

CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	Broadcasting Transmission						
Job Area	Broadcasting Transmission Operation & Maintenance						
Competency Unit Title	Audio and Video (AV) Test & Measurement						
Learning Outcome	The outcome of this competency is to enable the personnel to carry out broadcast equipment audio & video (AV) test and measurement. Upon completion of this competency unit, trainees will be able to:- • Prepare signal source and parameter requirements identification • Arrange incoming signal and out going signal testing requirements • Monitor transmission and AV signal testing activities • Prepare audio and video test & measurement report						
Competency Unit ID	**EE-140-3:2012-C05**	**Level**	3	**Training Duration**	294 hours	**Credit Hours**	29

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Prepare signal source and parameter requirements identification	i. Location of inventory list ii. Procedure of developing inventory list iii. Test equipment type, purpose, location and usage iv. Types of signal v. Location of signal source			12 hours	Lecture	i. Type of signal testing identified ii. Location of test equipments identified iii. Inventory List of required test equipments compiled iv. Types of signal listed v. Types of signal source identified
		i. Determine type of test to be undertaken ii. Determine type of		38 hours	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		test equipments iii. Determine location of test equipments iv. Categorize and document test equipment according to type, function, location. v. Determine types of signal vi. Determine types of signal source				

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
2. Arrange incoming signal and out going signal testing requirements	i. Fundamentals of electricity ii. Fundamentals of electrical test equipments iii. Repair techniques iv. PAL B/G broadcast standards v. ITU 601/ 656 digital broadcast recommendation vi. Digital signal testing methods such as : • Eye diagram • Lightning display vii. Equipment handling and adjustment techniques			22 hours	Lecture, E-learning & Self-paced	i. Audio Visual Test Equipment identified ii. Audio Visual Test Equipment inspected iii. Audio Visual Test Equipment handled according to manual iv. Audio Visual Test Equipment rectified v. AV transmission signal identified
		i. Determine test equipment to be checked. ii. Determine test equipment location. iii. Determine test equipment condition. iv. Determine connection to power supply and AV signal generator. v. Fix equipment and connections in case		62 hours	Demonstration, Observation & Scenario Based Training (SBT)	vi. AV transmission signal level evaluated. vii. AV transmission signal adjusted. viii. AV transmission signal typed ascertained.

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		of failure. vi. Determine AV signal to be adjusted. vii. Determine proper connection of AV signal generator to test equipment. viii. Determine type of AV signal for quality assessment. ix. Determine normal AV signal levels used for broadcasting. x. Handle test equipment xi. Assess and adjust AV signals level.	*Attitude:* i. Meticulous in arranging incoming signal and out going signal testing ii. Handle tools, equipment and materials with care iii. Ensure work area cleanliness			ix. AV transmission signal level evaluated x. AV transmission signal adjusted. xi. AV transmission quality determined.

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			Safety: i. Comply with local safety regulatory bodies ii. Wear appropriate Personal Protective Equipment (PPE) iii. Follow equipment manual iv. Work area safety awareness			
3. Monitor transmission and AV signal testing activities	i. AV Transmission signal ii. Signal quality iii. Audio and Video programme iv. Audio and Video quality			23 hours	Lecture	i. AV Transmission testing procedure followed ii. Signal testing equipment listed out iii. Transmission signal interpreted iv. AV quality
		i. Execute AV transmission testing ii. Confirm signal		65 hours	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		quality using signal testing equipment iii. Check AV programmes iv. Apply AV quality check procedure v. Interpret AV signal testing result vi. Check transmission signal vii. Establish AV signal to begin preroll & transmitting	*Attitude:* i. Meticulous in monitoring transmission and AV signal testing ii. Handle tools, equipment and materials with care iii. Ensure work area cleanliness *Safety:* i. Comply with local safety regulatory bodies ii. Wear appropriate Personal Protective			checked v. Signal quality verified

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			Equipment (PPE) iii. Follow equipment manual iv. Work area safety awareness			
4. Prepare audio and video test & measurement report	i. Procedure to prepare audio and video test & measurement report ii. Report standard format based on company's requirements iii. Report writing technique			18 hours	Lecture	i. Procedures to write audio and video test & measurement report followed ii. Audio and video test & measurement report compiled
		i. Determine procedure to prepare audio and video test & measurement report ii. Determine format and contents to prepare report iii. Prepare audio and video test & measurement report	*Attitude:* i. Proactive in	54 hours	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			provide information and action ii. Adhere to report submission dateline			

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information 01.02 Document information, procedures or processes 01.03 Utilise basic IT application 01.04 Analyse information 01.06 Utilise word processor to process information 01.07 Utilise database applications to locate and process information 01.08 Utilise spreadsheets applications to locate and process information 02.01 Interpret and follow manuals, instructions and SOP's	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Multitasking and prioritizing 5. Self-discipline 6. Teamwork 7. Learning Skill

Core Abilities	Social Skills
02.03 Communicate clearly 02.04 Prepare brief reports and checklist using standard forms 02.06 Write memos and letters 02.10 Prepare reports and instructions 03.01 Apply cultural requirements to the workplace 03.02 Demonstrate integrity and apply ethical practices 03.03 Accept responsibility for own work and work area 03.04 Seek and act constructively upon feedback about performance 03.05 Demonstrate safety skills 03.08 Develop and maintain a cooperation within work group 03.16 Identify and assess client / customer needs 04.01 Organise own work activities 04.02 Set and revise own objectives and goals 04.03 Organise and maintain workplace 04.04 Apply problem solving strategies 05.01 Implement project / work plans 05.02 Inspect work done and / or in progress 06.01 Understand system 06.02 Comply with and follow chain of command 06.03 Identify and highlight problems 06.05 Analyse technical systems 06.06 Monitor and correct performance of systems	8. Leadership

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Inventory list	1:1
2. Test equipment	1:1
3. Company procedure	1:1
4. Electrical test equipment	1:1
5. PAL B/G broadcast standards.	1:1
6. ITU 601/ 656 digital broadcast recommendation	1:1

7. AES/ EBU digital audio standards	1:1

REFERENCES

1. Robin Blair, 1999. Digital Technique in Broadcasting Transmission. Focal Press. ISBN - 0240803663
2. John Watkinson, 2001. Convergence in Broadcast and Communication Media. Focal Press. ISBN – 0240515099, ISBN – 9780240515090
3. Asia-Pacific Broadcasting Union and Tuan Abdul Razak Broadcasting & Information Institute, Malaysia; February 2012

CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	Broadcasting Transmission						
Job Area	Broadcasting Transmission Operation & Maintenance						
Competency Unit Title	Switching/ Routing Operation						
Learning Outcome	The outcome of this competency is to enable the personnel to carry out the operations of routing systems , troubleshoots routing paths and equipment as well as capable of executing standard operating procedures in transmission workflow . Upon completion of this competency unit, trainees will be able to:- • Identify switching operation requirements • Coordinate switching/ routing operations • Carry out switching centre maintenance • Produce daily performance report						
Competency Unit ID	**EE-140-3:2012-C06**	**Level**	3	**Training Duration**	148 hours	**Credit Hours**	14

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Identify switching operation requirements	i. Routing systems operation procedure ii. Systems diagram iii. Switching plan/ schedule iv. List of switching equipment v. Switching equipment service manual			9 hours	Lecture	i. Switching system diagram interpreted ii. Switching plan/ schedule obtained iii. Switching equipment service manual obtained iv. Routing system operation procedure
		i. Determine switching plan/ schedule ii. Determine system diagram		21 hours	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		iii. Determine routing systems operation procedure iv. Interpret systems diagram v. Determine switching operation equipment vi. Determine list of switching equipment	*Attitude:* i. Meticulous in determining switching operation requirements			obtained
2. Coordinate switching/ routing operations	i. Company's requirement ii. AV Quality check procedures iii. Manufacturer's manual iv. Flow of programme content v. Programme material			12 hours	Lecture	i. Organization procedures listed ii. Programme content filtered iii. Data ingested to server iv. Programme content received through satellite/terrestrial link v. Audio and Video quality checked
		i. Determine company's requirement ii. Obtain manufacturer's manual iii. Apply AV quality		24 hours	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		check procedures iv. Refer flow of programme content v. Check proper routing of programme material from source to destination	*Attitude:* i. Meticulous in coordinating transmission switching centre operation ii. Handle tools and equipment with care *Safety:* i. Work area safety awareness ii. Follow tools and equipment manual			

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
3. Carry out switching centre maintenance	i. Network layout diagram ii. Types of transmission switching equipment iii. Switch / router maintenance			16 hours	Lecture	i. Audio and Video quality error monitored ii. Audio and Video quality error resolved
		i. Interpret network layout diagram ii. Utilize transmission switching maintenance equipment iii. Conduct switching/ routing operation maintenance iv. Rectify error on Audio and Video quality	*Attitude:* i. Meticulous in executing transmission switching maintenance ii. Handle tools, equipment and materials with care iii. Ensure work	32 hours	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			area cleanliness *Safety:* i. Comply with local safety regulatory bodies ii. Aware electric shock hazard iii. Avoid Electrostatic Discharge (ESD) iv. Follow equipment manual v. Work area safety awareness			
4. Produce daily performance report	i. Daily performance report format ii. Procedure to write daily performance report			6 hours	Lecture	i. Daily performance report prepared correctly according format
		i. Apply procedure to write daily performance report ii. Prepare report according to daily performance report format	*Attitude:* i. Proactive in	28 hours	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			provide information and action ii. Adhere to report submission dateline			

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information 01.02 Document information, procedures or processes 01.03 Utilise basic IT application 01.04 Analyse information 01.06 Utilise word processor to process information 01.07 Utilise database applications to locate and process information 01.08 Utilise spreadsheets applications to locate and process information 02.01 Interpret and follow manuals, instructions and SOP's 02.03 Communicate clearly 02.04 Prepare brief reports and checklist using standard forms 02.06 Write memos and letters 02.10 Prepare reports and instructions 03.01 Apply cultural requirements to the workplace 03.02 Demonstrate integrity and apply ethical practices 03.03 Accept responsibility for own work and work area 03.04 Seek and act constructively upon feedback about performance 03.05 Demonstrate safety skills 03.08 Develop and maintain a cooperation within work group 03.16 Identify and assess client / customer needs	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Multitasking and prioritizing 5. Self-discipline 6. Teamwork 7. Learning Skill 8. Leadership

Core Abilities	Social Skills
04.01 Organise own work activities 04.02 Set and revise own objectives and goals 04.03 Organise and maintain workplace 04.04 Apply problem solving strategies 05.01 Implement project / work plans 05.02 Inspect work done and / or in progress 06.01 Understand system 06.02 Comply with and follow chain of command 06.03 Identify and highlight problems 06.05 Analyse technical systems 06.06 Monitor and correct performance of systems	

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Systems diagram	1:1
2. Switching plan/ schedule	1:1
3. Switching equipment service manual	1:1
4. Company's procedures	1:1
5. Manufacturer's manual	1:1
6. Router	1:10
7. Router control panel	1:10

REFERENCES

1. Robin Blair, 1999. Digital Technique in Broadcasting Transmission. Focal Press. ISBN - 0240803663
2. John Watkinson, 2001. Convergence in Broadcast and Communication Media. Focal Press. ISBN – 0240515099, ISBN – 9780240515090

3. Walter Y. Chen, July 11, 2003, Home Networking Basis : Transmission Environments and Wired/ Wireless Protocols, ISBN -13 : 978-0130165114
4. Asia-Pacific Broadcasting Union and Tuan Abdul Razak Broadcasting & Information Institute, Malaysia; February 2012

CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	Broadcasting Transmission						
Job Area	Broadcasting Transmission Operation & Maintenance						
Competency Unit Title	Broadcasting Transmitter Operation & Maintenance						
Learning Outcome	The outcome of this competency is to enable the personnel to identify, operate, maintain, rectify broadcast transmitter equipment. Upon completion of this competency unit, trainees will be able to:- • Identify main modules and components of the broadcast transmitter equipments. • Perform broadcast transmitter operation • Perform maintenance works • Monitor the performance of the radio or television transmitters • Monitor broadcast transmitter maintenance works result • Produce daily performance report						
Competency Unit ID	**EE-140-3:2012-C07**	**Level**	3	**Training Duration**	375 hours	**Credit Hours**	37

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Identify main modules and components of the broadcast transmitter equipments.	i. Location of main modules and components. ii. Function of main modules and components. iii. Technical characteristics of main modules and components.			15 hours	Lecture	i. Location of main modules and components identified. ii. Function of main modules and components ascertained. iii. Technical characteristics of main modules and
		i. Determine location of main modules and		39 hours	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		components. ii. Determine function of main modules and components. iii. Determine technical characteristics of main modules and components.	*Attitude:* i. Meticulous in determining main modules and components ii. Responsible to the documents required			components ascertained.
2. Perform broadcast transmitter operation	i. Fundamentals of electricity. ii. Fundamentals of electrical test equipments. iii. Exciter Unit manual. iv. Power Amplifier manual. v. Organisation SOP			20 hours	Lecture	i. Power Supply Switch identified, inspected and enabled. ii. Exciter Unit identified inspected and enabled. iii. Power Amplifier identified, inspected and enabled.
		i. Determine switch condition. ii. Determine Exciter location. iii. Determine Exciter		68 hours	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		condition. iv. Switches-on Exciter. v. Determine Power Amplifier location. vi. Determine Power Amplifier condition. vii. Handle transmitter equipment as per stipulated times.	*Attitude:* i. Meticulous in executing broadcast transmitter operation ii. Handle tools and equipment with care *Safety:* i. Wear area safety awareness ii. Follow tools and equipment manual			iv. Transmitter stop time ascertained and disabled.
3. Perform transmitter maintenance works	i. Maintenance log which include : • Daily • Weekly • Monthly ii. Transmitter interior and air-filter vacuuming technique			20 hours	Lecture	i. Maintenance daily log produced ii. Transmitter interior and air-filter vacuuming technique

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	iii. Equipment transmitter, air-conditioners and power supply cleaning method iv. Programme lines v. Audio and Video levels vi. Air-filter, gas filling and air conditioners replacement technique					applied iii. Equipment transmitter, air-conditioners and power supply cleaning method identified iv. Air-filter, gas filling and air conditioners replacement technique identified
		i. Interpret maintenance log according to flowchart ii. Execute Transmitter interior and air-filter vacuuming according to correct technique iii. Execute air-conditioners and power supply cleaning according to correct method iv. Reset levels of programme lines and audio & video levels v. Apply air-filter, gas filling and air conditioners replacement technique		52 hours	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			Attitude: i. Meticulous in maintaining equipment ii. Handle tools, equipment and materials with care iii. Ensure work area cleanliness *Safety:* i. Comply with local safety regulatory bodies ii. Aware electric shock hazard iii. Follow equipment manual iv. Work area safety awareness			
4. Monitor the performance of the radio or television transmitters	i. Location of measuring device ii. Organisation Meter reading Forms iii. VSWR (Voltage to standing wave ratio) label position			24 hours	Lecture	i. Transmitter output power ascertained ii. Transmitter modulation level ascertained

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		i. Determine location of measuring device. ii. Determine power is selected. iii. Determine modulation is selected. iv. Determine VSWR (Voltage to standing wave ratio) is selected. v. Determine Voltage or Current is selected.	*Attitude:* i. Meticulous in monitoring performance radio or television transmitter ii. Handle tools, equipment and materials with care iii. Ensure work area cleanliness *Safety:* i. Comply with local safety regulatory	56 hours	Demonstration & Observation	iii. Transmitter VSWR (Voltage to standing wave ratio) level ascertained. iv. Transmitter Voltage and Current ascertained. v. Transmitter maintenance form filled

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			bodies ii. Aware electric shock hazard iii. Follow equipment manual iv. Work area safety awareness			
5. Monitor broadcast transmitter maintenance works result	i. General cleanliness level ii. Condition and cleanliness of the air-filter iii. Physical component condition and abnormalities			12 hours	Lecture	i. General cleanliness level listed out ii. Component physical abnormalities resolved iii. Programme lines, audio and video levels rearranged
		i. Check transmitter and ancillary equipment general cleanliness ii. Confirm air-filter condition and cleanliness iii. Confirm physical components condition and abnormalities resolved		34 hours	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			Attitude: i. Meticulous in monitoring work results ii. Handle tools, equipment and materials with care iii. Ensure work area cleanliness *Safety:* i. Comply with local safety regulatory bodies ii. Aware electric shock hazard iii. Follow equipment manual iv. Work area safety awareness			

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
6. Produce daily performance report	i. Organisation meter reading forms ii. Procedure to record in forms iii. Report writing technique			8 hours	Lecture	i. Meter readings collected ii. Meter readings recorded and compiled iii. Transmitter performance ascertained.
		i. Determine location of forms ii. Obtain relevant forms iii. Record meter readings in relevant form vi. Prepare daily performance report	*Attitude:* i. Proactive in provide information and action ii. Meticulous in writing IP network devices maintenance report iii. Adhere to submission dateline	27 hours	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information 01.02 Document information, procedures or processes 01.03 Utilise basic IT application 01.04 Analyse information 01.06 Utilise word processor to process information 01.07 Utilise database applications to locate and process information 01.08 Utilise spreadsheets applications to locate and process information 02.01 Interpret and follow manuals, instructions and SOP's 02.03 Communicate clearly 02.04 Prepare brief reports and checklist using standard forms 02.06 Write memos and letters 02.10 Prepare reports and instructions 03.01 Apply cultural requirements to the workplace 03.02 Demonstrate integrity and apply ethical practices 03.03 Accept responsibility for own work and work area 03.04 Seek and act constructively upon feedback about performance 03.05 Demonstrate safety skills 03.08 Develop and maintain a cooperation within work group 03.16 Identify and assess client / customer needs 04.01 Organise own work activities 04.02 Set and revise own objectives and goals	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Multitasking and prioritizing 5. Self-discipline 6. Teamwork 7. Learning Skill 8. Leadership

Core Abilities	Social Skills
04.03 Organise and maintain workplace 04.04 Apply problem solving strategies 05.01 Implement project / work plans 05.02 Inspect work done and / or in progress 06.01 Understand system 06.02 Comply with and follow chain of command 06.03 Identify and highlight problems 06.05 Analyse technical systems 06.06 Monitor and correct performance of systems	

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Test and measuring Equipments.	1 : 5
2. Exciter Unit Manual.	1 : 1
3. Power Amplifier Manual.	1 : 1
4. Organisation Standard Operating Procedures (SOP)	1 : 1
5. Maintenance Log	1 : 1
6. Transmitter Equipment	1 : 5
7. Organisation Meter Reading Forms	1 : 1

REFERENCES

1. Robin Blair, 1999. Digital Technique in Broadcasting Transmission. Focal Press. ISBN - 0240803663
2. John Watkinson, 2001. Convergence in Broadcast and Communication Media. Focal Press. ISBN – 0240515099, ISBN – 9780240515090
3. Walter Y. Chen, July 11, 2003, Home Networking Basis : Transmission Environments and Wired/ Wireless Protocols, ISBN -13 : 978-0130165114
4. Asia-Pacific Broadcasting Union and Tuan Abdul Razak Broadcasting & Information Institute, Malaysia; February 2012

CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	Broadcasting Transmission						
Job Area	Broadcasting Transmission Operation & Maintenance						
Competency Unit Title	Cabling Installation						
Learning Outcome	The outcome of this competency is to enable the personnel to running new cabling in existing building, termination and testing of new cabling, test and troubleshoot of cable. Upon completion of this competency unit, trainees will be able to:- • Identify cabling installation and maintenance requirement • Carry out cabling installation and maintenance equipment preparation • Perform cabling installation • Perform cabling maintenance • Produce cabling installation & maintenance report						
Competency Unit ID	**EE-140-3:2012-C08**	**Level**	3	**Training Duration**	228 hours	**Credit Hours**	23

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Identify cabling installation and maintenance requirement	i. Installation and maintenance procedure ii. Types of cable iii. Site location iv. Cabling installation and maintenance tools requirement			14 hours	Lecture	i. Site location determined ii. Types of cable identified iii. Cabling installation and maintenance procedure
		i. Interpret cabling installation and maintenance procedure ii. Determine types of cable		28 hours	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		iii. Determine cabling installation and maintenance tools	*Attitude:* i. Meticulous in identifying cabling installation and maintenance requirement ii. Keep the document neat and tidy *Safety:* i. Follow work procedures ii. Follow proper work instructions			
2. Carry out cabling installation and maintenance equipment preparation	i. Cabling procedures ii. Cabling tools and equipment iii. Cabling checklist			10 hours	Lecture	i. Site access permission acquired ii. Cabling tools and equipment prepared according to requirement iii. Cabling procedures followed
		i. Apply cabling procedures ii. Obtain cabling tools and equipment according to checklist iii. Obtain site access permission		32 hours	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			Attitude: i. Meticulous in preparing installation and maintenance equipment *Safety:* i. Follow proper work instructions			
3. Perform cabling installation	i. Layout drawing ii. Types of cable iii. Procedure to acquire layout drawing iv. Procedure to carry out cable installation which include : • Join cable • Laying cable according to cable layout • Cable termination (depending on type) • Continuity test v. Method of cable identification vi. Cable accessories and equipments			20 hours	Lecture	i. Cable accessories and equipment identified ii. Cable jointing and termination determined iii. Procedure of cable laying followed iv. Procedure to carry out cable installation followed v. Cable installed according to project requirement

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		i. Setup safe working area ii. Interpret layout drawing iii. Carry out cable laying according to procedure : • Cable route • Length of cable iv. Execute cable laying and installation v. Execute cable termination and jointing vi. Test cable functionality vii. Determine cable accessories and equipment viii. Determine cable jointing and termination details such as : • Size • Number of core • Length • Distance • Date of jointing ix. Carry out housekeeping practice		40 hours	Demonstration & Observation	vi. Functionality of cable tested

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			Attitude: i. Wear appropriate Personal Protective Equipment (PPE) ii. Adhere to standard safety procedure iii. Handle equipment with care iv. Peruse layout drawing v. Meticulous in laying cable *Safety:* i. Follow equipment manual for installation networks ii. Wear appropriate safety gear			

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
4. Perform cabling maintenance	i. Types of maintenance for cabling which include : • Routine • Corrective ii. Procedure to rectify faulty on cables iii. Various type of cable maintenance such as : • Physical inspection • General cleanliness of cable • Connectivity test & measurement iv. Maintenance form for cabling maintenance activity			18 hours	Lecture	i. Troubleshooting activities carried out correctly according to procedures ii. Maintenance of cable performed according to requirements iii. Maintenance form filled in correctly according to format
		i. Determine types of cable maintenance ii. Determine faulty on cables iii. Dismantle cable from termination point iv. Rectify faulty on cables		34 hours	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			Attitude: i. Wear appropriate Personal Protective Equipment (PPE) ii. Adhere to standard safety procedure iii. Handle equipment with care *Safety:* i. Follow equipment manual on maintenance activities			
5. Produce cabling installation & maintenance report	i. Work checklist ii. Recording procedure iii. Testing report format			6 hours	Lecture	i. Cable installation checklist filled up ii. Report prepared correctly according to format
		i. Record work checklist ii. Determine procedure to write cabling installation and maintenance report activities iii. Prepare installation & maintenance report according to format		26 hours	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			Attitude: i. Proactive in provide information and action ii. Meticulous in writing IP network devices maintenance report iii. Adhere to submission dateline			

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information 01.02 Document information, procedures or processes 01.03 Utilise basic IT application 01.04 Analyse information 01.06 Utilise word processor to process information 01.07 Utilise database applications to locate and process information 01.08 Utilise spreadsheets applications to locate and process information 02.01 Interpret and follow manuals, instructions and SOP's 02.03 Communicate clearly 02.04 Prepare brief reports and checklist using standard forms 02.06 Write memos and letters 02.10 Prepare reports and instructions 03.01 Apply cultural requirements to the workplace 03.02 Demonstrate integrity and apply ethical practices 03.03 Accept responsibility for own work and work area 03.04 Seek and act constructively upon feedback about performance 03.05 Demonstrate safety skills 03.08 Develop and maintain a cooperation within work group 03.16 Identify and assess client / customer needs 04.01 Organise own work activities 04.02 Set and revise own objectives and goals 04.03 Organise and maintain workplace 04.04 Apply problem solving strategies 05.01 Implement project / work plans 05.02 Inspect work done and / or in progress 06.01 Understand system 06.02 Comply with and follow chain of command 06.03 Identify and highlight problems 06.05 Analyse technical systems 06.06 Monitor and correct performance of systems	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Multitasking and prioritizing 5. Self-discipline 6. Teamwork 7. Learning Skill 8. Leadership

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Cable	1 : 1
2. Cable tester	1 : 5
3. Hand tools	1 : 1
4. Wrench set	1 : 5
5. Winch	1 : 1
6. Rope	1 : 1
7. Pulley	1 : 1
8. Insulation tape	1 : 1
9. Putty	1 : 1
10. Tagging	1 : 1
11. Cable tie	1 : 1
12. Feeder clamp	1 : 1
13. Multimeter	1 : 5
14. Stationeries	1 : 1
15. Checklist	1 : 1
16. Fiber optic splicing equipment	1 : 10
17. Personal Protective Equipment (PPE)	1 : 1

REFERENCES

1. Robin Blair, 1999. Digital Technique in Broadcasting Transmission. Focal Press. ISBN - 0240803663
2. John Watkinson, 2001. Convergence in Broadcast and Communication Media. Focal Press. ISBN – 0240515099, ISBN – 9780240515090
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CONTACT HOURS DISTRIBUTION FOR
BROADCASTING TRANSMISSION OPERATION & MAINTENANCE - LEVEL 3

CU CODE	CU TITLE	WORK ACTIVITIES	RELATED KNOWLEDGE (30%)	APPLIED SKILLS (70%)	HOURS	ASSESSMENT (KA & PA)	TOTAL HOURS
	BROADCAST CONTENT INGESTION AND PLAYOUT	Prepare broadcast content ingestion and playout requirements	8	22	30	7	121
		Conduct broadcast content ingestion and playout	10	47	57	17	
		Produce broadcast content ingestion and playout report	6	28	34	10	
	BROADCAST SERVER MAINTENANCE	Prepare broadcast server maintenance requirement	8	24	32	9	122
		Conduct broadcast server maintenance	16	40	56	16	
		Produce broadcast server operation report	6	28	34	10	
	NETWORK SUPERVISION	Identify network supervision requirements	8	28	36	10	126
		Conduct network supervision activities	16	40	56	16	
		Report network supervision activities	6	28	34	10	
	CONTINUITY SUITE OPERATION	Identify types of the daily programme workflow requirements	12	40	52	15	186
		Monitor the flow of the programme content continuously throughout the daily transmission	22	52	74	22	
		Produce daily performance report	20	40	60	18	
	AUDIO & VIDEO TEST & MEASUREMENT	Prepare signal source and parameter requirements	12	38	50	15	294
		Arrange incoming signal and out going signal testing requirements	22	62	84	25	
		Monitor transmission and AV signal testing activities	23	65	88	26	
		Prepare audio and video test & measurement report	18	54	72	21	
	SWITCHING/ ROUTING OPERATION	Identify switching operation requirements	9	21	30	9	148
		Coordinate switching/ routing operations	12	24	36	10	
		Carry out switching centre maintenance	16	32	48	14	
		Produce daily performance report	6	28	34	10	
	BROADCAST TRANSMITTER OPERATION & MAINTENANCE	Identify main modules and components of the broadcast transmitter equipments	15	39	54	16	375
		Perform broadcast transmitter operation	20	68	88	26	
		Perform maintenance works at the due time	20	52	72	21	
		Monitor the performance of the radio or television transmitters	24	56	80	24	

CU CODE	CU TITLE	WORK ACTIVITIES	RELATED KNOWLEDGE (30%)	APPLIED SKILLS (70%)	HOURS	ASSESSMENT (KA & PA)	TOTAL HOURS
		Monitor broadcast transmitter maintenance works result	12	34	46	13	
		Produce daily performance report	8	27	35	10	
	CABLING INSTALLATION	Identify cabling installation and maintenance requirement	14	28	42	12	228
		Carry out cabling installation and maintenance equipment preparation	10	32	42	12	
		Perform cabling installation	20	40	60	18	
		Perform cabling maintenance	18	34	52	15	
		Produce cabling installation & maintenance report	6	26	32	10	
TOTAL HOURS			**423**	**1177**	**1600**	**467**	**1600**

* Total hours include theory (attending lectures, discussion, tutoring and assessment hours) and practical (observing instructor demonstration, practice, visits including students continuous and assessment hours).