-SQA-SCOTTISH QUALIFICATIONS AUTHORITY

HIGHER NATIONAL UNIT SPECIFICATION

GENERAL INFORMATION

-Unit Number- **8540227**

-Superclass- **XM**

-Title- **RADIO BROADCASTING SYSTEMS**

-DESCRIPTION-

GENERAL COMPETENCE FOR UNIT: Explaining the features of radio data systems and the technology involved in transmission and reception of such services.

OUTCOMES

1. explain the operation of a Stereo Multiplex Radio System;

2. explain the operation and features of Radio Data Systems (RDS);

3. explain the functional aspects of the Enhanced Other Networks (EON);

4. explain the operation and features of Digital Audio Broadcasting (DAB).

CREDIT VALUE: 1 HN Credit

ACCESS STATEMENT: Access to this unit is at the discretion of the centre. However, it would be beneficial if the candidate had prior knowledge of radio techniques and operations as evidenced by the following HN unit:

8540187 Telecommunications Fundamentals
8540197 Communication Principles: Modulation and Demodulation.
8540317 Radio Communication Circuits

or similar qualifications or experience.

For further information contact: Committee and Administration Unit, SQA, Hanover House, 24 Douglas Street, Glasgow G2 7NQ.

Additional copies of this unit may be purchased from SQA (Sales and Despatch section). At the time of publication, the cost is £1.50 (minimum order £5.00).

HIGHER NATIONAL UNIT SPECIFICATION

STATEMENT OF STANDARDS

UNIT NUMBER: 8540227

UNIT TITLE: RADIO BROADCASTING SYSTEMS

Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

OUTCOME

1. EXPLAIN THE OPERATION OF A STEREO MULTIPLEX RADIO SYSTEM

PERFORMANCE CRITERIA

(a) The principles of the GE/Zenith pilot tone system are clearly and correctly explained.
(b) The complete stereo broadcasting system is clearly and correctly described by means of a block diagram.

RANGE STATEMENT

Multiplex signal: M and S signals; pilot tone; stereophonic sub-carrier; composite stereo spectrum; frequency deviation; bandwidth; transmitter carrier frequency range; phase relationship; pre-emphasis.

Stereo system: transmitter block diagram; receiver block diagram.

EVIDENCE REQUIREMENTS

Written and graphical evidence to demonstrate the candidate's ability to describe and explain the main features of the GE/Zenith stereo system.

OUTCOME

2. EXPLAIN THE OPERATION AND FEATURES OF RADIO DATA SYSTEMS (RDS)

PERFORMANCE CRITERIA

(a) The justification and planning provision for an RDS are clearly and correctly explained.
(b) The main programme-related and auto-tuning features of an RDS are clearly and correctly explained.
(c) The RDS encoding equipment is clearly and correctly explained by means of a block diagram.

RANGE STATEMENT

Planning provision: programme service; programme identification; alternative frequency; other networks; clock time; equipment and systems design.

Programme features: programme type (PTY); radiotext (RT); programme identification (PI); alternative frequency (AF).

RDS encoder: RDS modulator; data assembler; Nicam-3 data interface; RDS decoder; modulator; demodulator.

EVIDENCE REQUIREMENTS

Written and graphical evidence to demonstrate the candidate's ability to describe and explain the main features of a radio data system.

OUTCOME

3. EXPLAIN THE FUNCTION ASPECTS OF ENHANCED OTHER NETWORKS (EON)

PERFORMANCE CRITERIA

(a) The requirement of EON in support of RDS is correctly and clearly explained.
(b) The EON feature is clearly and correctly explained.
(c) The mechanisms of Vectored Traffic Announcements and EON Linkage Information are clearly and correctly explained.

RANGE STATEMENT

Support facilities: updating of AF lists; pool memory.

EON features: method A for AF; mapped method for AF; 14A and 14B information groups; pool memory.

EVIDENCE REQUIREMENTS

Written and graphical evidence to demonstrate the candidate's ability to describe and explain the main feature of the Enhanced Other Systems.

OUTCOME

4. EXPLAIN THE OPERATION AND FEATURES OF DIGITAL AUDIO BROADCASTING (DAB)

PERFORMANCE CRITERIA

(a) Compare the features of DAB with existing stereo radio services clearly and comprehensively.
(b) Explain the key technologies used in DAB clearly and correctly.

RANGE STATEMENT

Features: access to services; fading; distortion; noise; use of bandwidth.

Technologies: compression (Eureka 147 system); masking effect; coded orthogonal frequency (COFDM).

EVIDENCE REQUIREMENTS

Written evidence in the form of an integrative essay to demonstrate the candidate's understanding of DAB.

MERIT To gain a pass in this unit, a candidate must meet the standards set out in the outcomes, performance criteria, range statements and evidence requirements.

To achieve a merit in this unit, a candidate must demonstrate a superior or more sophisticated level of performance. This may be demonstrated by:

(i) research of the material in greater detail;
(ii) a superior understanding of radio broadcasting systems.

ASSESSMENT

In order to achieve this unit, candidates are required to present sufficient evidence that they have met all the performance criteria for each outcome within the range specified. Details of these requirements are given for each outcome. The assessment instruments used should follow the general guidance offered by the SQA assessment model and an integrative approach to assessment is encouraged. (See references at the end of support notes).

Accurate records should be made of the assessment instruments used showing how evidence is generated for each outcome and giving marking schemes and/or checklists, etc. Records of candidates' achievements should be kept. These records will be available for external verification.

SPECIAL NEEDS

Proposals to modify outcomes, range statements or agreed assessment arrangements should be discussed in the first place with the external verifier.

HIGHER NATIONAL UNIT SPECIFICATION

SUPPORT NOTES

UNIT NUMBER: 8540227

UNIT TITLE: RADIO BROADCASTING SYSTEMS

SUPPORT NOTES: This part of the unit specification is offered as guidance. None of the sections of the support notes is mandatory.

NOTIONAL DESIGN LENGTH: SQA allocates a notional design length to a unit on the basis of time estimated for achievement of the stated standards by a candidate whose starting point is as described in the access statement. The notional design length for this unit is 40 hours. The use of notional design length for programme design and timetabling is advisory only.

PURPOSE This unit is intended to give the candidate a knowledge of the latest developments in radio broadcasting data systems. It presents the candidate with the current and future operational standards as adopted by the broadcasting union and would be beneficial to candidates who intend to follow a career in radio broadcasting.

CONTENT/CONTEXT Corresponding to outcomes:

Outcome 1

The M refers to the monophonic or L + R signal while the S signal refers to the L-R or stereophonic signal.
BBC broadcasting standards should be adhered to and these may be obtained from Broadcasting House in London.
The block diagram may be given and the candidate asked to explain each block.

Outcome 2

Main network transmitters and transmitter control data. Computer Hardware. RDS origination computer. Service numbers. Timecode data. Local radio traffic flag changes.

Outcome 3

Procedure for updating EON information. The use of suitable time constants to maintain an accurate data base. Pool memory as applied to a pre-programmed regional service.

Outcome 4

No receiver details are available because the market is in the development stage and not the consumer stage. Advantages of coded orthogonal frequency division multiplexing - phasing and interference due to reflections.

APPROACHES TO GENERATING EVIDENCE Information may be obtained from organisations such as the BBC in London and bibliographical references, some of which are included below from the European Broadcasting Union (EBU).

Specifications of the radio data system RDS for VHF/FM sound broadcasting - EBU document Tech 3244 March 1984.

EBU document Tech 3244 Supplement 4 1989

EBU document Tech 3260 1990

RDS - The Technical Realisation of a New Broadcast Service-Lewis, Parnall and Robinson.

Information on Digital Analogue Broadcasting may be obtained form the following: M Gleave, Engineering Advisor, Portland House, London W1A.

ASSESSMENT PROCEDURES All assessments are of a written type and can be implemented by means of an extended answer assessment or by an easy type submission.

PROGRESSION There is no specific progression to other HN units from this unit.

REFERENCES

1. Guide to unit writing.
2. For a fuller discussion on assessment issues, please refer to SQA's Guide to Assessment.
3. Information for centres on SQA's operating procedures is contained in SQA's Guide to Procedures.
4. For details of other SQA publications, please consult SQA's publications list.