

**APPENDIX 1.5 A TO SOUTH AFRICAN CIVIL AVIATION
TECHNICAL STANDARDS (SA-CATS)**

**SYLLABUS OF THEORETICAL KNOWLEDGE FOR
THE GENERAL RADIOTELEPHONY OPERATOR'S CERTIFICATE EXAMINATION
(AEROPLANE AND HELICOPTER).**

IMPORTANT NOTES TO THIS SYLLABUS:

1. This appendix specifies the theoretical aspects required to be known for the General Radiotelephony Operator's Certificate examination.
2. Candidates should be aware of the requirements of SA-CATS 61.01.10 (11)(d) and (e).
3. All aspects in this examination are applicable to both the aeroplane and helicopter categories. This is indicated with an "X" in the "A & H" category column.
4. Candidates are expected to be familiar with all acronyms and abbreviations contained in Part 1 (Subpart 1) of the Regulations prior to attempting this examination subject. Candidates will not be directly evaluated on this aspect in the examinations.
5. Candidates are to ensure that they use the most recent amendments to the Regulations, Technical Standards and other technical documentation when preparing for the examinations, unless otherwise specified.
6. The suggested study material to be used when preparing for this examination is communicated by Aeronautical Information Circular (AIC) and also posted on the Authority's website where deemed appropriate. This study material is assumed to be the default source material used by candidates and is therefore not referred to in this syllabus. Where reference material clarity is required or additional source material is to be used for specific syllabus aspects, this is stipulated in the relevant portion of the syllabus. Candidates are nevertheless free to use any material they wish in order to ensure their comprehension of the mandated subject matter and to comply with the prescribed theoretical knowledge requirements.
7. Refer to Appendix 2.0 A for the Syllabus of Theoretical Knowledge for the Commercial Pilot Licence.
8. Refer to Appendix 2.0 C for the Syllabus of Theoretical Knowledge for the Instrument Rating.

ASPECT NUMBER	SYLLABUS ASPECT	CATEGORY APPLICABILITY
		A & H
GR1	BASIC RADIO THEORY	
	a. Electromagnetic waves	X
	- frequency, wave length, cycle, phase, amplitude	X
	- frequency bands	X
	- sidebands, double sideband, single sideband,	X
	- band width	X
	- carrier wave, modulation, demodulation	X
	- amplitude modulation	X
	- frequency modulation	X
	- pulse modulation	X
	b. Antennas	X
	- characteristics	X
	- polarisation	X
	- polar diagram	X

	- types of antennas	X
	c. Wave propagation	X
	- ground waves	X
	- direct waves	X
	- sky waves	X
	- ionosphere, critical angle, skip distance	X
	- dead space, refraction	X
	- fading	X
	- factors affecting propagation (reflection, absorption, attenuation, coastline, mountain, static)	X
GR2	PRINCIPLES OF RADIO OPERATION	
	a. Basic principles of operation of VHF radios	X
	b. VHF Frequency Band	X
	c. Factors affecting reception and transmission range of VHF radios	X
	d. Basic principles of operation of HF radios	X
	e. HF Frequency Band	X
	f. Factors affecting reception and transmission range of HF radios	X
GR3	AIRSPACE	
	a. Air traffic services	X
	- Objectives of air traffic services	X
	- Air traffic control services, advisory service in flight information service, alerting service aerodrome flight information service	X
	b. ICAO airspace classification and associated air traffic services	X
	c. Airspace structure	X
	- Flight Information Regions (FIR's)	X
	- Controlled airspace (Aerodrome traffic zones, Control zones, Terminal control areas, Control areas, Airways)	X
	- Avoidance of unauthorized entry into controlled airspace	X
	- Uncontrolled airspace (Aerodrome traffic areas, Flight information routes, Advisory airspace, Danger, Restricted and Prohibited areas, Special Rules Areas)	X
	d. Recognition of airspace/ classes of airspace on aeronautical charts	X
GR4	SA CIVIL AVIATION REGULATIONS PART 91 AS FOLLOWS: (Including Technical Standards)	
	a. Recall: Mandatory radio communication in controlled airspace	X
	b. Recall: Mandatory radio communication in advisory airspace	X
	c. Recall: Compliance with rules of air and air traffic control clearances and instructions	X
	d. Explain:Signals	X

GR5	RADIOTELEPHONY PHRASEOLOGY AND PROCEDURES	
	a. Time – purpose and use of Universal Time Co-ordinated (UTC)	X
	b. Visually identify Morse code with the use of morse code tables	X
	c. Standard speech abbreviations (words and phrases)	X
	d. ATU / ATS call signs	X
	e. Test procedures and readability scale	X
	f. Listening out requirements and establishing of contact	X
	g. Acknowledgement of receipt	X
	h. Corrections and repetitions	X
	i. Radiotelephony phraseology common to all ATS units	X
	j. Categories of messages and order of priority	X
	k. Relaying messages for other stations	X
	l. Traffic Information Broadcast by Aircraft (TIBA) procedures (from RSA AIP):	X
	- Explain the purpose and content of a TIBA radio call	X
	- Explain the TIBA procedure	X
	- Recall the frequencies to be used in a TIBA call (excluding dedicated frequencies listed for aerodromes without ATSU's)	X
	m. Describe the IATA Inflight Broadcast Procedure (IFBP) in the AFI region	X
	n. Explain briefly how to obtain relevant weather information (the use of ATIS)	X
	o. Explain briefly how to make appropriate weather reports (PIREPS)	X
	p. Explain the practical use of a transponder and associated radio procedures	X
	- Radar terminology	X
	- Knowledge and use	X
	- Emergency codes	X
	q. Describe TCAS/ ACAS phraseology	X
	r. Describe the meaning and use of the following “Q” codes (QDM, QDR, QFE, QNE, QNH, QTF)	X
GR6	WAKE TURBULENCE	
	a. Describe the different categories	X
	b. Describe separation and phraseology	X
	c. Application	X
GR7	FILING OF FLIGHT PLANS & SEARCH AND RESCUE (SAR)	
	a. Applicability and filing requirements	X
	b. Procedures for the submission of a flight plan	X
	c. Completion of flight plans	X

	d. The application of Search and rescue (SAR) elements	X
	- Describe the 3 SAR phases	X
	- Methods of indicating SAR on a flight plan	X
	- Methods of cancelling SAR	X
GR8	EMERGENCY AND URGENCY PHRASEOLOGY AND PROCEDURES	
	a. Identification and interception of aircraft	X
	- Explain the principles to be observed during an interception	X
	- Explain the action by an intercepted aircraft	X
	- Radio communication during interception	X
	- Visual interception signals	X
	b. Explain the 5 golden rules for aircraft subject to an emergency	X
	c. Explain the use of VHF Direction-finding equipment (VDF) (Procedure to obtain bearings, headings and position from ATC / FIS)	X
	d. Describe the procedures and signals to be used in the following cases:	X
	- An aircraft observing another aircraft in distress	X
	- An aircraft intercepting a distress call	X
	e. Recall the frequencies to be guarded by search aircraft during SAR action:	X
	- 500 kHz / 2182 kHz / 8364 kHz / 121.5 Mhz / 243 Mhz	X
	f. Distress communications: MAYDAY calls	X
	- Explain the meaning and purpose of a MAYDAY call	X
	- Explain when a MAYDAY call is required	X
	- Describe the contents of a MAYDAY call	X
	- Recall dedicated frequencies	X
	- Describe the cancellation of MAYDAY	X
	g. Urgency communications: PAN calls	X
	- Explain the meaning and purpose of a PAN call	X
	- Explain when a PAN call is required	X
	- Describe the contents of a PAN call	X
	- Recall dedicated frequencies	X
	- Describe the cancellation of a PAN call	X
	h. Emergency Locator Transmitter (ELT)	X
	- Identify the frequencies allocated to ELT devices	X
	- Explain the correct use of and rules for activation of an ELT	X
	i. Survivor action after crash or forced landing:	X

	- Identify the Ground / Air emergency signalling codes	X
	- Describe the Ground / Air visual signal codes	X
GR9	RADIO COMMUNICATIONS FAILURE (RCF)	
	a. Explain the basic fault-finding actions following suspected RCF	X
	b. Describe RCF procedures (VFR in VMC)	X
	c. Explain the procedure for transmitting blind	X

1. MOTIVATION

- 2.1 The Technical Standards governing certain licence requirements (specifically those for the CPL) require an examination towards the General Certificate of Proficiency in Radiotelephony (Aeronautical) to be passed. This is typically stipulated as below.
This example is an extract from SA-CATS 61.05.1 (Requirements for Commercial Pilot Licence (Aeroplane)):
"4. Radio Telephony (2)
Applicants for a General Radio Certificate shall pass a theoretical General Radio Examination at an approved CAA examination centre. The training syllabus for a General Radio Certificate is contained in Appendix 1.5a to Document SA-CATS 61."
- 2.2 Currently, this examination is not administered as a distinct, separate assessment, but integrated with the CPL / IR examination set. This practice is not ideal, because it allows elements unique to radiotelephony to remain unchecked.
- 2.3 Part 61.11 was revised and approved by CARCom in January 2014. The revised subpart 11 makes provision for a single-paper examination towards the Instrument rating examination, due to become effective on 2015-08-01. This provision necessitated changes to the Technical Standards pertaining to the examinations, including the removal of certain IR-specific aspects from the CPL syllabus.
- 2.4 The General Radiotelephony examination is common to both the CPL and IR exams and is the ideal platform from which to evaluate practical R/T elements.
- 2.5 The SA-CATS state the following in terms of theoretical knowledge requirements (for example):
"61.05.1 REQUIREMENTS FOR COMMERCIAL PILOT LICENCE (AEROPLANE)
4. Radio Telephony
(1) To be eligible for the RTC a candidate must prove his knowledge of the ITU (International Telecommunications Union), and CAA requirements in both written and oral tests."
- 2.6 The ITU exam requirement does not distinguish between IFR and VFR aspects, but addresses equipment use privileges. The current content of Appendix 1.5 A is inadequate in its present form because of these and several other deficiencies:
- The line between IFR and VFR aspects is blurred in terms of the actual radiotelephony evaluation.
 - It is impossible to remove all flight rules aspects from the syllabus, but no IFR aspects should be addressed. It is not fair to a VFR CPL candidate to be assessed on IFR aspects. This is not the intention of the Radio exam.
 - This examination should be focussed accurately on radiotelephony and closely related topics.
- 2.7 It has been attempted to simplify the syllabus and clarify required aspects as much as possible. Isolated elements duplicated in other relevant syllabi (e.g. Appendix 2.0 A CPL) will be removed from the latter as soon as feasible in the future.