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Annex Reference	ENVIRONMENTAL PROTECTION  Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 1 Reference  Definition	<p><b>INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES</b></p> <p><b>PART I. DEFINITIONS, NOMENCLATURE: SYMBOLS AND UNITS</b></p> <p><i>Aeroplane.</i> A power-driven heavier-than-air aircraft, deriving its lift in flight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference  Definition	<p><i>Aircraft.</i> Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference  Definition	<p><i>Associated aircraft systems.</i> Those aircraft systems drawing electrical/pneumatic power from an auxiliary power unit during ground operations.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 1 Reference  Definition	<b>Auxiliary power unit (APU).</b> A self-contained power unit on an aircraft providing electrical/pneumatic power to aircraft systems during ground operations or in flight, separate from the propulsion engine(s).	Article 9(2) of Reg. (EU)201 8/1139	No Difference		
Chapter 1 Reference  Definition	<b>Bypass ratio.</b> The ratio of the air mass flow through the bypass ducts of a gas turbine engine to the air mass flow through the combustion chambers calculated at maximum thrust when the engine is stationary in an international standard atmosphere at sea level.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference  Definition	<b>Derived version of a helicopter.</b> A helicopter which, from the point of view of airworthiness, is similar to the noise certificated prototype but incorporates changes in type design which may affect its noise characteristics adversely.  <i>Note 1.— In applying the Standards of this Annex, a helicopter that is based on an existing prototype but which is considered by the certifying authority to be a new type design for airworthiness purposes shall nevertheless be considered as a derived version if the noise source characteristics are judged by the certifying authority to be the same as the prototype.</i>  <i>Note 2.— “Adversely” refers to an increase of more than 0.30 EPNdB in any one of the noise certification levels for helicopters certificated according to Chapter 8 and 0.30 dB(A) in the certification level for helicopters certificated according to Chapter 11.</i>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 1 Reference  Definition	<p><b>Derived version of an aeroplane.</b> An aeroplane which, from the point of view of airworthiness, is similar to the noise certificated prototype but incorporates changes in type design which may affect its noise characteristics adversely.</p> <p><i>Note 1.— Where the certifying authority finds that the proposed change in design, configuration, power or mass is so extensive that a substantially new investigation of compliance with the applicable airworthiness regulations is required, the aeroplane should be considered to be a new type design rather than a derived version.</i></p> <p><i>Note 2.— “Adversely” refers to an increase of more than 0.10 dB in any one of the noise certification levels unless the cumulative effects of changes in type design are tracked by an approved procedure in which case “adversely” refers to a cumulative increase in the noise level in any one of the noise certification levels of more than 0.30 dB or the margin of compliance, whichever is smaller.</i></p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference  Definition	<p><b>External equipment (helicopter).</b> Any instrument, mechanism, part, apparatus, appurtenance, or accessory that is attached to or extends from the helicopter exterior but is not used nor is intended to be used for operating or controlling a helicopter in flight and is not part of an airframe or engine.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference  Definition	<p><b>Helicopter.</b> A heavier-than-air aircraft supported in flight chiefly by the reactions of the air on one or more power-driven rotors on substantially vertical axes.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 1 Reference  Definition	<b>Human performance.</b> Human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference  Definition	<b>Powered-lift.</b> A heavier-than-air aircraft capable of vertical take-off, vertical landing, and low-speed flight, which depends principally on engine-driven lift devices or engine thrust for the lift during these flight regimes and on non-rotating aerofoil(s) for lift during horizontal flight.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference  Definition	<b>Recertification.</b> Certification of an aircraft with or without a revision to its certification noise levels, to a Standard different to that to which it was originally certificated.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference  Definition	<b>Self-sustaining powered sailplane.</b> A powered aeroplane with available engine power which allows it to maintain level flight but not to take off under its own power.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference  Definition	<b>State of Design.</b> The State having jurisdiction over the organization responsible for the type design.	Article 9(2) of Reg. (EU)201 8/1139	No Difference		

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Chapter 1 Reference          <b>Definition</b>	<b>State of Registry.</b> The State on whose register the aircraft is entered.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference          <b>Definition</b>	<b>Subsonic aeroplane.</b> An aeroplane incapable of sustaining level flight at speeds exceeding flight Mach number of 1.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference          <b>Definition</b>	<b>Tilt-rotor.</b> A powered-lift capable of vertical take-off, vertical landing, and sustained low-speed flight, which depends principally on engine-driven rotors mounted on tiltable nacelles for the lift during these flight regimes and on non-rotating aerofoil(s) for lift during high-speed flight.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference          <b>Definition</b>	<b>Type Certificate.</b> A document issued by a Contracting State to define the design of an aircraft, engine or propeller type and to certify that this design meets the appropriate airworthiness requirements of that State.  <i>Note.— In some Contracting States a document equivalent to a Type Certificate may be issued for an engine or propeller type.</i>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 1 Reference 1.1  Standard	<b>NOMENCLATURE: SYMBOLS AND UNITS</b>  <i>Note.— Many of the following definitions and symbols are specific to aircraft noise certification. Some of the definitions and symbols may also apply to purposes beyond aircraft noise certification.</i> <b>1.1 Velocity</b>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference 1.2  Standard	<b>1.2 Time</b>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference 1.3  Standard	<b>1.3 Indices</b>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference 1.4  Standard	<b>1.4 Noise metrics</b>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 1 Reference 1.5  Standard	1.5 Calculation of PNL and tone correction	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference 1.6  Standard	1.6 Flight path geometry	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference 1.7  Standard	1.7 Miscellaneous	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 1 Reference 1.1  Standard	<b>PART II. AIRCRAFT NOISE CERTIFICATION</b>  <b>CHAPTER 1. ADMINISTRATION</b>  1.1 The provisions of 1.2 to 1.6 shall apply to all aircraft included in the classifications defined for noise certification purposes in Chapters 2, 3, 4, 5, 6, 8, 10, 11, 12, 13 and 14 of this part where such aircraft are engaged in international air navigation.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference 1.2  Standard	1.2 Noise certification shall be granted or validated by the State of Registry of an aircraft on the basis of satisfactory evidence that the aircraft complies with requirements that are at least equal to the applicable Standards specified in this Annex.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference 1.3  Standard	1.3 If noise recertification is requested, it shall be granted or validated by the State of Registry of an aircraft on the basis of satisfactory evidence that the aircraft complies with requirements that are at least equal to the applicable Standards specified in this Annex. The date used by a certifying authority to determine the recertification basis shall be the date of acceptance of the first application for recertification.	Article 9(2) of Reg. (EU)2018/1139	No Difference		





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Chapter 1 Reference 1.4  Standard	1.4 The documents attesting noise certification shall be approved by the State of Registry and shall be required by that State to be carried on the aircraft.  <i>Note.— See Annex 6, Part I, 6.13, concerning the translation into English of documents attesting noise certification.</i>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 1 Reference 1.5  Standard	<p>1.5 The documents attesting noise certification for an aircraft shall provide at least the following information:</p> <p>Item 1. Name of State.</p> <p>Item 2. Title of the noise document.</p> <p>Item 3. Number of the document.</p> <p>Item 4. Nationality or common mark and registration marks.</p> <p>Item 5. Manufacturer and manufacturer's designation of aircraft.</p> <p>Item 6. Aircraft serial number.</p> <p>Item 7. Engine manufacturer, type and model.</p> <p>Item 8. Propeller type and model for propeller-driven aeroplanes.</p> <p>Item 9. Maximum take-off mass in kilograms.</p> <p>Item 10. Maximum landing mass, in kilograms, for certificates issued under Chapters 2, 3, 4, 5, 12 and 14 of this Annex.</p> <p>Item 11. The chapter and section of this Annex according to which the aircraft was certificated.</p> <p>Item 12. Additional modifications incorporated for the purpose of compliance with the applicable noise certification Standards.</p> <p>Item 13. The lateral/full-power noise level in the corresponding unit for documents issued under Chapters 2, 3, 4, 5, 12 and 14 of this</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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	<p>Annex.</p> <p>Item 14. The approach noise level in the corresponding unit for documents issued under Chapters 2, 3, 4, 5, 8, 12, 13 and 14 of this Annex.</p> <p>Item 15. The flyover noise level in the corresponding unit for documents issued under Chapters 2, 3, 4, 5, 12 and 14 of this Annex.</p> <p>Item 16. The overflight noise level in the corresponding unit for documents issued under Chapters 6, 8, 11 and 13 of this Annex.</p> <p>Item 17. The take-off noise level in the corresponding unit for documents issued under Chapters 8, 10 and 13 of this Annex.</p> <p>Item 18. Statement of compliance, including a reference to Annex 16, Volume I.</p> <p>Item 19. Date of issuance of the noise certification document.</p> <p>Item 20. Signature of the officer issuing it.</p>				
<p>Chapter 1</p> <p>Reference</p> <p>1.6</p> <p>Standard</p>	<p>1.6 Item headings on the noise certification documents shall be uniformly numbered in Arabic numerals, as indicated in 1.5, so that on any noise certification document the number will, under any arrangement, refer to the same item heading, except where the information in Items 1 through 6 and Items 18 through 20 is given in the certificate of airworthiness, in which case the numbering system of the certificate of airworthiness according to Annex 8 shall prevail.</p>	<p>Article 9(2) of Reg. (EU)2018/1139</p>	<p>No Difference</p>		



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Chapter 1 Reference 1.7  Standard	1.7 An administrative system for implementation of noise certification documentation shall be developed by the State of Registry.  <i>Note.— See Attachment G for guidance on the format and structure of noise certification documentation.</i>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference 1.8  Standard	1.8 Contracting States shall recognize as valid a noise certification granted by another Contracting State provided that the requirements under which such certification was granted are at least equal to the applicable Standards specified in this Annex.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference 1.9  Standard	1.9 A Contracting State shall suspend or revoke the noise certification of an aircraft on its register if the aircraft ceases to comply with the applicable noise Standards. The State of Registry shall not remove the suspension of a noise certification or grant a new noise certification unless the aircraft is found, on reassessment, to comply with the applicable noise Standards.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 1 Reference 1.10  Standard	<p>1.10 The amendment of this volume of the Annex to be used by a Contracting State shall be that which is applicable on the date of submission to that Contracting State for:</p> <p>a) a Type Certificate in the case of a new type; or</p> <p>b) approval of a change in type design in the case of a derived version; or</p> <p>c) in either case, under an equivalent application procedure prescribed by the certifying authority of that Contracting State.</p> <p><i>Note.— As each new edition and amendment of this Annex becomes applicable (according to Table A of the Foreword) it supersedes all previous editions and amendments.</i></p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 1 Reference 1.11  Standard	<p>1.11 Unless otherwise specified in this volume of the Annex, the date to be used by Contracting States in determining the applicability of the Standards in this Annex shall be the date the application for a Type Certificate was submitted to the State of Design, or the date of submission under an equivalent application procedure prescribed by the certifying authority of the State of Design.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 1 Reference 1.12  Standard	<p>1.12 For derived versions where the provisions governing the applicability of the Standards of this Annex refer to “the application for the certification of the change in type design”, the date to be used by Contracting States in determining the applicability of the Standards in this Annex shall be the date the application for the change in type design was submitted to the Contracting State that first certified the change in type design, or the date of submission under an equivalent application procedure prescribed by the certifying authority of the Contracting State that first certified the change in type design.</p> <p><i>Note 1.— Unless otherwise specified in this volume of the Annex, the edition of the Environmental Technical Manual (Doc 9501), Volume I — Procedures for the Noise Certification of Aircraft, to be used as guidance on the use of acceptable means of compliance and equivalent procedures by a Contracting State should be that which is in effect on the date the application for a Type Certificate or the change in type design is submitted to that Contracting State.</i></p> <p><i>Note 2.— The means of compliance and the use of equivalent procedures are subject to the acceptance of the certifying authority of the Contracting State.</i></p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 1 Reference 1.13  Standard	1.13 An application shall be effective for the period specified in the designation of the airworthiness regulations appropriate to the aircraft type, except in special cases where the certificating authority accepts an extension of this period. When this period of effectivity is exceeded, the date to be used in determining the applicability of the Standards in this Annex shall be the date of issue of the Type Certificate or approval of the change in type design, or the date of issue of approval under an equivalent procedure prescribed by the State of Design, less the period of effectivity.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 2 Reference 2.1.1  Standard	<p><b>CHAPTER 2. SUBSONIC JET AEROPLANES — Application for Type Certificate submitted before 6 October 1977</b></p> <p><b>2.1 Applicability</b></p> <p><i>Note.— See also Chapter 1, 1.10, 1.11, 1.12 and 1.13.</i></p> <p>2.1.1 The Standards of this chapter shall be applicable to all subsonic jet aeroplanes for which the application for a Type Certificate was submitted before 6 October 1977, except those aeroplanes:</p> <ul style="list-style-type: none"> <li>a) requiring a runway length of 610 m or less at maximum certificated mass for airworthiness; or</li> <li>b) powered by engines with a bypass ratio of 2 or more and for which a certificate of airworthiness for the individual aeroplane was first issued before 1 March 1972; or</li> <li>c) powered by engines with a bypass ratio of less than 2 and for which the application for a Type Certificate was submitted before 1 January 1969, and for which a certificate of airworthiness for the individual aeroplane was first issued before 1 January 1976.</li> </ul> <p>----- With no stopway or clearway.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		





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Chapter 2 Reference 2.1.2  Standard	2.1.2 The maximum noise levels of 2.4.1 shall apply except for derived versions for which the application for certification of the change in type design was submitted on or after 26 November 1981, in which case the maximum noise levels of 2.4.2 shall apply.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 2 Reference 2.1.3  Standard	2.1.3 Notwithstanding 2.1.1 and 2.1.2, it may be recognized by a Contracting State that the following situations for jet aeroplanes, and propeller-driven aeroplanes over 8 618 kg maximum certificated take-off mass on its registry do not require demonstration of compliance with the provisions of the Standards of Annex 16, Volume I:  a) gear down flight with one or more retractable landing gear down during the entire flight;  b) spare engine and nacelle carriage external to the skin of the aeroplane (and return of the pylon or other external mount); and  c) time-limited engine and/or nacelle changes, where the change in type design specifies that the aeroplane may not be operated for a period of more than 90 days unless compliance with the provisions of Annex 16, Volume I, is shown for that change in type design. This applies only to changes resulting from a required maintenance action.	Article 9(2) of Reg. (EU)201 8/1139	No Difference		



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Chapter 2 Reference 2.2  Standard	<b>2.2 Noise evaluation measure</b>  The noise evaluation measure shall be the effective perceived noise level in EPNdB as described in Appendix 1.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 2 Reference 2.3  Standard	<b>2.3 Noise measurement points</b>  An aeroplane, when tested in accordance with the flight test procedures of 2.6, shall not exceed the noise levels specified in 2.4 at the following points:  a) <i>lateral noise measurement point</i> : the point on a line parallel to and 650 m from the runway centre line, or extended runway centre line, where the noise level is a maximum during take-off;  b) <i>flyover noise measurement point</i> : the point on the extended centre line of the runway and at a distance of 6.5 km from the start of roll; and  c) <i>approach noise measurement point</i> : the point on the ground, on the extended centre line of the runway, 120 m (394 ft) vertically below the 3° descent path originating from a point 300 m beyond the threshold. On level ground this corresponds to a position 2 000 m from the threshold.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 2 Reference 2.4.1  Standard	<p><b>2.4 Maximum noise levels</b></p> <p>2.4.1 The maximum noise levels of those aeroplanes covered by 2.1.1, when determined in accordance with the noise evaluation method of Appendix 1, shall not exceed the following:</p> <p>a) <i>at lateral and approach noise measurement points:</i> 108 EPNdB for aeroplanes with maximum certificated take-off mass of 272 000 kg or over, decreasing linearly with the logarithm of the mass at the rate of 2 EPNdB per halving of the mass down to 102 EPNdB at 34 000 kg, after which the limit remains constant;</p> <p>b) <i>at flyover noise measurement point:</i> 108 EPNdB for aeroplanes with maximum certificated take-off mass of 272 000 kg or over, decreasing linearly with the logarithm of the mass at the rate of 5 EPNdB per halving of the mass down to 93 EPNdB at 34 000 kg, after which the limit remains constant.</p> <p><i>Note.— See Attachment A for equations for the calculation of maximum permitted noise levels as a function of take-off mass.</i></p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 2 Reference 2.4.2  Standard	<p>2.4.2 The maximum noise levels of those aeroplanes covered by 2.1.2, when determined in accordance with the noise evaluation method of Appendix 1, shall not exceed the following:</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 2 Reference 2.4.2.1  Standard	2.4.2.1 <i>At lateral noise measurement point</i>  106 EPNdB for aeroplanes with maximum certificated take-off mass of 400 000 kg or over, decreasing linearly with the logarithm of the mass down to 97 EPNdB at 35 000 kg, after which the limit remains constant.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 2 Reference 2.4.2.2  Standard	2.4.2.2 <i>At flyover noise measurement point</i>  a) <i>Aeroplanes with two engines or less</i>  104 EPNdB for aeroplanes with maximum certificated take-off mass of 325 000 kg or over, decreasing linearly with the logarithm of the mass at the rate of 4 EPNdB per halving of mass down to 93 EPNdB, after which the limit remains constant.  b) <i>Aeroplanes with three engines</i>  As a) but with 107 EPNdB for aeroplanes with maximum certificated take-off mass of 325 000 kg or over  <i>or</i>  as defined by 2.4.1 b), whichever is the lower.  c) <i>Aeroplanes with four engines or more</i>  As a) but with 108 EPNdB for aeroplanes with maximum certificated take-off mass of 325 000 kg or over  <i>or</i>  as defined by 2.4.1 b), whichever is the lower.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 2 Reference 2.4.2.3  Standard	<p>2.4.2.3 <i>At approach noise measurement point</i></p> <p>108 EPNdB for aeroplanes with maximum certificated take-off mass of 280 000 kg or over, decreasing linearly with the logarithm of the mass down to 101 EPNdB at 35 000 kg, after which the limit remains constant.</p> <p><i>Note.— See Attachment A for equations for the calculation of maximum permitted noise levels as a function of take-off mass.</i></p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 2 Reference 2.5  Standard	<p><b>2.5 Trade-offs</b></p> <p>If the maximum noise levels are exceeded at one or two measurement points:</p> <ul style="list-style-type: none"> <li>a) the sum of excesses shall not be greater than 4 EPNdB, except that in respect of four-engined aeroplanes powered by engines with a bypass ratio of 2 or more and for which the application for a certificate of airworthiness for the prototype was accepted, or another equivalent prescribed procedure was carried out by the certifying authority, before 1 December 1969, the sum of any excesses shall not be greater than 5 EPNdB;</li> <li>b) any excess at any single point shall not be greater than 3 EPNdB; and</li> <li>c) any excesses shall be offset by corresponding reductions at the other point or points.</li> </ul>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 2 Reference <b>2.6.1.1</b>  <b>Standard</b>	<p><b>2.6 Test procedures</b></p> <p>2.6.1 Take-off test procedure</p> <p>2.6.1.1 Average take-off thrust shall be used from the start of take-off to the point at which a height of at least 210 m (690 ft) above the runway is reached, and the thrust thereafter shall not be reduced below that thrust which will maintain a climb gradient of at least 4 per cent.</p> <p>-----</p> <p>. Take-off thrust representative of the mean characteristics of the production engine.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 2 Reference <b>2.6.1.2</b>  <b>Standard</b>	<p>2.6.1.2 A speed of at least V2 + 19 km/h (V2 + 10 kt) shall be attained as soon as practicable after lift-off and be maintained throughout the take-off noise certification test.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 2 Reference <b>2.6.1.3</b>  <b>Standard</b>	<p>2.6.1.3 A constant take-off configuration selected by the applicant shall be maintained throughout the take-off noise certification demonstration test except that the landing gear may be retracted.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 2 Reference <b>2.6.2.1</b>  <b>Standard</b>	<p>2.6.2 Approach test procedure</p> <p>2.6.2.1 The aeroplane shall be stabilized and following a 3° ± 0.5° glide path.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Annex Reference	ENVIRONMENTAL PROTECTION  Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 2 Reference 2.6.2.2  Standard	2.6.2.2 The approach shall be made at a stabilized airspeed of not less than 1.3 VS + 19 km/h (1.3 VS + 10 kt) with thrust stabilized during approach and over the measuring point and continued to a normal touchdown.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 2 Reference 2.6.2.3  Standard	2.6.2.3 The configuration of the aeroplane shall be with maximum allowable landing flap setting.  <i>Note.— Guidance material on the use of equivalent procedures is provided in the Environmental Technical Manual (Doc 9501), Volume I — Procedures for the Noise Certification of Aircraft.</i>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 3 Reference 3.1.1  Standard	<p><b>CHAPTER 3.</b></p> <p><b>3.1 Applicability</b></p> <p><i>Note 1.— See also Chapter 1, 1.10, 1.11, 1.12 and 1.13.</i></p> <p><i>Note 2.— See Attachment E for guidance on interpretation of these applicability provisions.</i></p> <p>3.1.1 The Standards of this chapter shall, with the exception of those propeller-driven aeroplanes specifically designed and used for agricultural or firefighting purposes, be applicable to:</p> <p>a) all subsonic jet aeroplanes, including their derived versions, other than aeroplanes which require a runway length of 610 m or less at maximum certificated mass for airworthiness, for which the application for a Type Certificate was submitted on or after 6 October 1977 and before 1 January 2006; and</p> <p>b) all propeller-driven aeroplanes, including their derived versions, of over 8 618 kg maximum certificated take-off mass, for which the application for a Type Certificate was submitted on or after 1 January 1985 and before 1 January 2006.</p> <p>----- With no stopway or clearway.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		





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Chapter 3 Reference 3.1.2  Standard	<p>3.1.2 Notwithstanding 3.1.1, it may be recognized by a Contracting State that the following situations for jet aeroplanes, and propeller-driven aeroplanes over 8 618 kg maximum certificated take-off mass on its registry do not require demonstration of compliance with the provisions of the Standards of Annex 16, Volume I:</p> <ul style="list-style-type: none"> <li>a) gear down flight with one or more retractable landing gear down during the entire flight;</li> <li>b) spare engine and nacelle carriage external to the skin of the aeroplane (and return of the pylon or other external mount); and</li> <li>c) time-limited engine and/or nacelle changes, where the change in type design specifies that the aeroplane may not be operated for a period of more than 90 days unless compliance with the provisions of Annex 16, Volume I, is shown for that change in type design. This applies only to changes resulting from a required maintenance action.</li> </ul>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 3 Reference 3.2.1  Standard	<p><b>3.2 Noise measurements</b></p> <p>3.2.1 Noise evaluation measure</p> <p>The noise evaluation measure shall be the effective perceived noise level in EPNdB as described in Appendix 2.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 3 Reference 3.3.1  Standard	<p><b>3.3 Noise measurement points</b></p> <p>3.3.1 Reference noise measurement points</p> <p>An aeroplane, when tested in accordance with these Standards, shall not exceed the noise levels specified in 3.4 at the following points:</p> <p>a) <i>lateral full-power reference noise measurement point</i></p> <p>1) for jet-powered aeroplanes: the point on a line parallel to and 450 m from the runway centre line, where the noise level is a maximum during take-off;</p> <p>2) for propeller-driven aeroplanes: the point on the extended centre line of the runway 650 m vertically below the climb-out flight path at full take-off power, as defined in 3.6.2. Until 19 March 2002, the requirement for lateral noise in 3.3.1 a) 1) shall alternatively be permitted;</p> <p><i>Note.— For aeroplanes specified in 3.1.1 b) for which the application for a Type Certificate was submitted before 19 March 2002, the lateral noise requirement specified in 3.3.1 a) 1) is permitted as an alternative.</i></p> <p>b) <i>flyover reference noise measurement point</i>: the point on the extended centre line of the runway and at a distance of 6.5 km from the start of roll;</p> <p>c) <i>approach reference noise measurement point</i>: the point on the ground, on the extended centre line of the runway, 2 000 m from the threshold. On level</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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	ground this corresponds to a position 120 m (394 ft) vertically below the 3° descent path originating from a point 300 m beyond the threshold.				
Chapter 3 Reference 3.3.2.1  Standard	3.3.2 Test noise measurement points  3.3.2.1 If the test noise measurement points are not located at the reference noise measurement points, any corrections for the difference in position shall be made in the same manner as the corrections for the differences between test and reference flight paths.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 3 Reference 3.3.2.2  Standard	3.3.2.2 Sufficient lateral test noise measurement points shall be used to demonstrate to the certificating authority that the maximum noise level on the appropriate lateral line has been clearly determined. For jet-powered aeroplanes simultaneous measurements shall be made at one test noise measurement point at a symmetrical position on the other side of the runway. In the case of propeller-driven aeroplanes, because of their inherent asymmetry in lateral noise, simultaneous measurements shall be made at each and every test noise measurement point at a symmetrical position (within ±10 m parallel with the axis of the runway) on the opposite side of the runway.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 3 Reference 3.4.1  Standard	3.4 Maximum noise levels  3.4.1 The maximum noise levels, when determined in accordance with the noise evaluation method of Appendix 2, shall not exceed the following:	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 3 Reference 3.4.1.1  Standard	3.4.1.1 <i>At the lateral full-power reference noise measurement point</i>  103 EPNdB for aeroplanes with maximum certificated take-off mass, at which the noise certification is requested, of 400 000 kg and over and decreasing linearly with the logarithm of the mass down to 94 EPNdB at 35 000 kg, after which the limit remains constant.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 3 Reference 3.4.1.2  Standard	3.4.1.2 <i>At flyover reference noise measurement point</i>  a) <i>Aeroplanes with two engines or less</i>  101 EPNdB for aeroplanes with maximum certificated take-off mass, at which the noise certification is requested, of 385 000 kg and over and decreasing linearly with the logarithm of the aeroplane mass at the rate of 4 EPNdB per halving of mass down to 89 EPNdB, after which the limit is constant.  b) <i>Aeroplanes with three engines</i>  As a) but with 104 EPNdB for aeroplanes with maximum certificated take-off mass of 385 000 kg and over.  c) <i>Aeroplanes with four engines or more</i>  As a) but with 106 EPNdB for aeroplanes with maximum certificated take-off mass of 385 000 kg and over.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 3 Reference 3.4.1.3  Standard	3.4.1.3 <i>At approach reference noise measurement point</i>  105 EPNdB for aeroplanes with maximum certificated take-off mass, at which the noise certification is requested, of 280 000 kg or over, and decreasing linearly with the logarithm of the mass down to 98 EPNdB at 35 000 kg, after which the limit remains constant.  <i>Note.— See Attachment A for equations for the calculation of maximum permitted noise levels as a function of take-off mass.</i>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 3 Reference 3.5  Standard	<b>3.5 Trade-offs</b>  If the maximum noise levels are exceeded at one or two measurement points:  a) the sum of excesses shall not be greater than 3 EPNdB;  b) any excess at any single point shall not be greater than 2 EPNdB; and  c) any excesses shall be offset by corresponding reductions at the other point or points.	Article 9(2) of Reg. (EU)201 8/1139	No Difference		
Chapter 3 Reference 3.6.1.1  Standard	<b>3.6 Noise certification reference procedures</b>  3.6.1 General conditions  3.6.1.1 The reference procedures shall comply with the appropriate airworthiness requirements.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 3 Reference 3.6.1.2  Standard	3.6.1.2 The calculations of reference procedures and flight paths shall be approved by the certificating authority.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 3 Reference 3.6.1.3  Standard	3.6.1.3 Except in conditions specified in 3.6.1.4, the take-off and approach reference procedures shall be those defined in 3.6.2 and 3.6.3, respectively.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 3 Reference 3.6.1.4  Standard	3.6.1.4 When it is shown by the applicant that the design characteristics of the aeroplane would prevent flight being conducted in accordance with 3.6.2 and 3.6.3, the reference procedures shall: a) depart from the reference procedures defined in 3.6.2 and 3.6.3 only to the extent demanded by those design characteristics which make compliance with the procedures impossible; and b) be approved by the certificating authority.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 3 Reference 3.6.1.5  Standard	<p>3.6.1.5 The reference procedures shall be calculated under the following reference atmospheric conditions:</p> <ul style="list-style-type: none"> <li>a) atmospheric pressure at sea level of 1 013.25 hPa, decreasing with altitude at a rate defined by the ICAO Standard Atmosphere;</li> <li>b) ambient air temperature at sea level of 25°C, decreasing with altitude at a rate defined by the ICAO Standard Atmosphere (i.e. 0.65°C per 100 m);</li> <li>c) constant relative humidity of 70 per cent;</li> <li>d) zero wind;</li> <li>e) for the purpose of defining the reference take-off profiles for both take-off and lateral noise measurements, the runway gradient is zero; and</li> <li>f) the reference atmosphere in terms of temperature and relative humidity is considered to be homogeneous (i.e. ambient temperature 25°C and relative humidity 70 per cent) for the purpose of calculating: <ul style="list-style-type: none"> <li>1) the reference sound attenuation rate due to atmospheric absorption; and</li> <li>2) the reference speed of sound used in the calculation of the reference sound propagation geometry.</li> </ul> </li> </ul> <p><i>Note 1.— Details for calculating the variation of reference atmospheric pressure with altitude are given in the section of the Environmental Technical Manual (Doc 9501), Volume I — Procedures for the Noise Certification of Aircraft, concerning the ICAO Standard Atmosphere.</i></p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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	<i>Note 2. —The characteristics of the ICAO Standard Atmosphere are provided in the Manual of the ICAO Standard Atmosphere (extended to 80 kilometres (262 500 feet) (Doc 7488/3).</i>				





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Chapter 3 Reference 3.6.2  Standard	<p>3.6.2 Take-off reference procedure</p> <p>Take-off reference flight path shall be calculated as follows:</p> <p>a) average engine take-off thrust or power shall be used from the start of take-off to the point where at least the following height above runway level is reached:</p> <p>1) aeroplanes with two engines or less — 300 m (984 ft);</p> <p>2) aeroplanes with three engines — 260 m (853 ft);</p> <p>3) aeroplanes with four engines or more — 210 m (689 ft);</p> <p>b) upon reaching the height specified in a) above, the thrust or power shall not be reduced below that required to maintain:</p> <p>1) a climb gradient of 4 per cent; or</p> <p>2) in the case of multi-engined aeroplanes, level flight with one engine inoperative;</p> <p>whichever thrust or power is greater;</p> <p>c) for the purpose of determining the lateral full-power noise level, the reference flight path shall be calculated on the basis of using full take-off power throughout without a thrust or power reduction;</p> <p>d) the speed shall be:</p> <p>1) for those aeroplanes for which the applicable airworthiness requirements define <math>V_2</math>, the</p>	Article 9(2) of Reg. (EU)201 8/1139	No Difference		



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	<p>all-engines operating take-off climb speed selected by the applicant for use in normal operation, which shall be at least <math>V_2 + 19</math> km/h (<math>V_2 + 10</math> kt) but not greater than <math>V_2 + 37</math> km/h (<math>V_2 + 20</math> kt) and which shall be attained as soon as practicable after lift-off and be maintained throughout the take-off noise certification test. The increment applied to <math>V_2</math> shall be the same for all reference masses of an aeroplane model unless a difference in increment is substantiated based on performance characteristics of the aeroplane.</p> <p><i>Note.— <math>V_2</math> is defined in accordance with the applicable airworthiness requirements.</i></p> <p>2) for those aeroplanes for which the applicable airworthiness requirements do not define <math>V_2</math>, the take-off speed at 15 m (50 ft) plus an increment of at least 19 km/h (10 kt) but not greater than 37 km/h (20 kt), or the minimum climb speed, whichever speed is greater. This speed shall be attained as soon as practicable after lift-off and be maintained throughout the take-off noise certification test.</p> <p><i>Note.— Take-off speed at 15 m (50 ft) and minimum climb speed are defined in accordance with the applicable airworthiness requirements.</i></p> <p>e) a constant take-off configuration selected by the applicant shall be maintained throughout the take-off reference procedure except that the landing gear may be retracted. Configuration shall be interpreted as meaning the conditions of the systems and centre of gravity position and shall include the position of lift augmentation devices used, whether the APU is</p>				



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	<p>operating, and whether air bleeds and power off-takes are operating;</p> <p>f) the mass of the aeroplane at the brake release shall be the maximum take-off mass at which the noise certification is requested; and</p> <p>g) the average engine shall be defined by the average of all the certification compliant engines used during the aeroplane flight tests up to and during certification when operated to the limitations and procedures given in the flight manual. This will establish a technical standard including the relationship of thrust/power to control parameters (e.g. N1 or EPR). Noise measurements made during certification tests shall be corrected to this standard.</p> <p><i>Note.— Take-off thrust/power used shall be the maximum available for normal operations as scheduled in the performance section of the aeroplane flight manual for the reference atmospheric conditions given in 3.6.1.5.</i></p>				



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Chapter 3 Reference 3.6.3  Standard	<p>3.6.3 Approach reference procedure</p> <p>The approach reference flight path shall be calculated as follows:</p> <ul style="list-style-type: none"> <li>a) the aeroplane shall be stabilized and following a 3° glide path;</li> <li>b) a steady approach speed of <math>V_{REF} + 19</math> km/h (<math>V_{REF} + 10</math> kt), with thrust or power stabilized, shall be maintained over the measurement point;</li> </ul> <p><i>Note.— In airworthiness terms <math>V_{REF}</math> is defined as the “reference landing speed”. Under this definition reference landing speed means “the speed of the aeroplane, in a specified landing configuration, at the point where it descends through the landing screen height in the determination of the landing distance for manual landings”.</i></p> <ul style="list-style-type: none"> <li>c) the constant approach configuration as used in the airworthiness certification tests, but with the landing gear down, shall be maintained throughout the approach reference procedure;</li> <li>d) the mass of the aeroplane at the touchdown shall be the maximum landing mass permitted in the approach configuration defined in 3.6.3 c) at which noise certification is requested; and</li> <li>e) the most critical (that which produces the highest noise level) configuration with normal deployment of aerodynamic control surfaces including lift and drag producing devices, at the mass at which certification is requested shall be used. This configuration includes all those items listed in 5.2.5 of Appendix 2 that will contribute to the noisiest continuous state</li> </ul>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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	at the maximum landing mass in normal operation.				
Chapter 3 Reference 3.7.1  Standard	<b>3.7 Test procedures</b>  3.7.1 The test procedures shall be acceptable to the airworthiness and noise certifying authority of the State issuing the certificate.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 3 Reference 3.7.2  Standard	3.7.2 The test procedures and noise measurements shall be conducted and processed in an approved manner to yield the noise evaluation measure designated as effective perceived noise level, EPNL, in units of EPNdB, as described in Appendix 2.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 3 Reference 3.7.3  Standard	3.7.3 Acoustic data shall be adjusted by the methods outlined in Appendix 2 to the reference conditions specified in this chapter. Adjustments for speed and thrust shall be made as described in Section 8 of Appendix 2.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 3 Reference 3.7.4  Standard	3.7.4 If the mass during the test is different from the mass at which the noise certification is requested, the necessary EPNL adjustment shall not exceed 2 EPNdB for take-offs and 1 EPNdB for approaches. Data approved by the certifying authority shall be used to determine the variation of EPNL with mass for both take-off and approach test conditions. Similarly the necessary EPNL adjustment for variations in approach flight path from the reference flight path shall not exceed 2 EPNdB.	Article 9(2) of Reg. (EU)201 8/1139	No Difference		



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Chapter 3 Reference 3.7.5  Standard	3.7.5 For the approach conditions the test procedures shall be accepted if the aeroplane follows a steady glide path angle of $3^\circ \pm 0.5^\circ$ .	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 3 Reference 3.7.6  Standard	3.7.6 If equivalent test procedures different from the reference procedures are used, the test procedures and all methods for adjusting the results to the reference procedures shall be approved by the certifying authority. The amounts of the adjustments shall not exceed 16 EPNdB on take-off and 8 EPNdB on approach, and if the adjustments are more than 8 EPNdB and 4 EPNdB, respectively, the resulting numbers shall be more than 2 EPNdB below the noise limits specified in 3.4.  <i>Note.— Guidance material on the use of equivalent procedures is provided in the Environmental Technical Manual (Doc 9501), Volume I — Procedures for the Noise Certification of Aircraft.</i>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 3 Reference 3.7.7  Standard	3.7.7 For take-off, lateral, and approach conditions, the variation in instantaneous indicated airspeed of the aeroplane shall be maintained within $\pm 3$ per cent of the average airspeed between the 10 dB-down points. This shall be determined by reference to the pilot's airspeed indicator. However, when the instantaneous indicated airspeed varies from the average airspeed over the 10 dB-down points by more than $\pm 5.5$ km/h ( $\pm 3$ kt), and this is judged by the certifying authority representative on the flight deck to be due to atmospheric turbulence, then the flight so affected shall be rejected for noise certification purposes.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 4 Reference 4.1.1  Standard	<p><b>CHAPTER 4.</b></p> <p><b>4.1 Applicability</b></p> <p><i>Note.— See also Chapter 1, 1.10, 1.11, 1.12 and 1.13.</i></p> <p>4.1.1 The Standards of this chapter shall, with the exception of those aeroplanes which require a runway length of 610 m or less at maximum certificated mass for airworthiness or propeller-driven aeroplanes specifically designed and used for agricultural or firefighting purposes, be applicable to:</p> <ul style="list-style-type: none"> <li>a) all subsonic jet aeroplanes and propeller-driven aeroplanes, including their derived versions, with a maximum certificated take-off mass of 55 000 kg and over for which the application for a Type Certificate was submitted on or after 1 January 2006 and before 31 December 2017;</li> <li>b) all subsonic jet aeroplanes, including their derived versions, with a maximum certificated take-off mass of less than 55 000 kg for which the application for a Type Certificate was submitted on or after 1 January 2006 and before 31 December 2020;</li> <li>c) all propeller-driven aeroplanes, including their derived versions, with a maximum certificated take-off mass of over 8 618 kg and less than 55 000 kg, for which the application for a Type Certificate was submitted on or after 1 January 2006 and before 31 December 2020; and</li> <li>d) all subsonic jet aeroplanes and all propeller-driven</li> </ul>	Article 9(2) of Reg. (EU)2018/1139	No Difference		





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	<p>aeroplanes certificated originally as satisfying Annex 16, Volume I, Chapter 3 or Chapter 5, for which recertification to Chapter 4 is requested.</p> <p><i>Note.— Guidance material on applications for recertification is provided in the Environmental Technical Manual (Doc 9501), Volume I — Procedures for the Noise Certification of Aircraft.</i></p> <p>-----</p> <p>. With no stopway or clearway.</p>				
Chapter 4 Reference 4.1.2  Standard	<p>4.1.2 Notwithstanding 4.1.1, it may be recognized by a Contracting State that the following situations for jet aeroplanes and propeller-driven aeroplanes over 8 618 kg maximum certificated take-off mass on its registry do not require demonstration of compliance with the provisions of the Standards of Annex 16, Volume I:</p> <ul style="list-style-type: none"> <li>a) gear down flight with one or more retractable landing gear down during the entire flight;</li> <li>b) spare engine and nacelle carriage external to the skin of the aeroplane (and return of the pylon or other external mount); and</li> <li>c) time-limited engine and/or nacelle changes, where the change in type design specifies that the aeroplane may not be operated for a period of more than 90 days unless compliance with the provisions of Annex 16, Volume I, is shown for that change in type design. This applies only to changes resulting from a required maintenance action.</li> </ul>	Article 9(2) of Reg. (EU)201 8/1139	No Difference		



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Chapter 4 Reference 4.2.1  Standard	<b>4.2 Noise measurements</b>  4.2.1 Noise evaluation measure  The noise evaluation measure shall be the effective perceived noise level in EPNdB as described in Appendix 2.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 4 Reference 4.3.1  Standard	<b>4.3 Reference noise measurement points</b>  4.3.1 An aeroplane, when tested in accordance with these Standards, shall not exceed the maximum noise level specified in 4.4 of the noise measured at the points specified in Chapter 3, 3.3.1 a), b) and c).	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 4 Reference 4.3.2  Standard	<b>4.3.2 Test noise measurement points</b>  The provisions of Chapter 3, 3.3.2, relating to test noise measurement points shall apply.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 4 Reference 4.4.1  Standard	<b>4.4 Maximum noise levels</b>  4.4.1 The maximum permitted noise levels are defined in Chapter 3, 3.4.1.1, 3.4.1.2 and 3.4.1.3, and shall not be exceeded at any of the measurement points.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 4 Reference 4.4.1.1  Standard	4.4.1.1 The sum of the differences at all three measurement points between the maximum noise levels and the maximum permitted noise levels specified in Chapter 3, 3.4.1.1, 3.4.1.2 and 3.4.1.3, shall not be less than 10 EPNdB.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 4 Reference 4.4.1.2  Standard	4.4.1.2 The sum of the differences at any two measurement points between the maximum noise levels and the corresponding maximum permitted noise levels specified in Chapter 3, 3.4.1.1, 3.4.1.2 and 3.4.1.3, shall not be less than 2 EPNdB.  <i>Note.— See Attachment A for equations for the calculation of maximum permitted noise levels as a function of take-off mass.</i>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 4 Reference 4.5  Standard	<b>4.5 Noise certification reference procedures</b>  The noise certification reference procedures shall be as specified in Chapter 3, 3.6.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 4 Reference 4.6  Standard	<b>4.6 Test procedures</b>  The test procedures shall be as specified in Chapter 3, 3.7.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 4 Reference 4.7  Standard	<b>4.7 Recertification</b>  For aeroplanes specified in 4.1.1 c), recertification shall be granted on the basis that the evidence used to determine compliance with Chapter 4 is as satisfactory as the evidence associated with aeroplanes specified in 4.1.1 a) and b).	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 5 Reference 5.1.1  Standard	<p><b>CHAPTER 5. PROPELLER-DRIVEN AEROPLANES OVER 8 618 kg — Application for Type Certificate submitted before 1 January 1985</b></p> <p><b>5.1 Applicability</b></p> <p><i>Note 1.— See also Chapter 1, 1.10, 1.11, 1.12 and 1.13.</i></p> <p><i>Note 2.— See Attachment E for guidance on interpretation of these applicability provisions.</i></p> <p>5.1.1 The Standards defined hereunder are not applicable to:</p> <p>a) aeroplanes requiring a runway length of 610 m or less at maximum certificated mass for airworthiness;</p> <p>b) aeroplanes specifically designed and used for firefighting purposes; and</p> <p>c) aeroplanes specifically designed and used for agricultural purposes.</p> <p>----- . With no stopway or clearway.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 5 Reference 5.1.2  Standard	5.1.2 The Standards of this chapter shall be applicable to all propeller-driven aeroplanes, including their derived versions, of over 8 618 kg maximum certificated take-off mass for which either the application for a Type Certificate was submitted on or after 6 October 1977 and before 1 January 1985.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 5 Reference 5.1.3  Standard	5.1.3 The Standards of Chapter 2, with the exception of Sections 2.1 and 2.4.2, shall be applicable to propeller-driven aeroplanes of over 8 618 kg for which the application for a Type Certificate was submitted before 6 October 1977 and which are either:  a) derived versions for which the application for certification of the change in type design was submitted on or after 6 October 1977; or  b) individual aeroplanes for which a certificate of airworthiness was first issued on or after 26 November 1981.  <i>Note.— The Standards in Chapters 2 and 3 although developed previously for subsonic jet aeroplanes are considered suitable for application to other aeroplane types regardless of the type of power installed.</i>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 5 Reference 5.1.4  Standard	<p>5.1.4 Notwithstanding 5.1.2 and 5.1.3, it may be recognized by a Contracting State that the following situations for jet aeroplanes, and propeller-driven aeroplanes over 8 618 kg maximum certificated take-off mass on its registry do not require demonstration of compliance with the provisions of the Standards of Annex 16, Volume I:</p> <ul style="list-style-type: none"> <li>a) gear down flight with one or more retractable landing gear down during the entire flight;</li> <li>b) spare engine and nacelle carriage external to the skin of the aeroplane (and return of the pylon or other external mount); and</li> <li>c) time-limited engine and/or nacelle changes, where the change in type design specifies that the aeroplane may not be operated for a period of more than 90 days unless compliance with the provisions of Annex 16, Volume I, is shown for that change in type design. This applies only to changes resulting from a required maintenance action.</li> </ul>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 5 Reference 5.2.1  Standard	<p><b>5.2 Noise measurements</b></p> <p>5.2.1 Noise evaluation measure</p> <p>The noise evaluation measure shall be the effective perceived noise level in EPNdB as described in Appendix 2.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 5 Reference 5.3.1  Standard	<p><b>5.3 Noise measurement points</b></p> <p>5.3.1 Reference noise measurement points</p> <p>An aeroplane, when tested in accordance with these Standards, shall not exceed the noise levels specified in 5.4 at the following points:</p> <p>a) <i>lateral reference noise measurement point</i>: the point on a line parallel to and 450 m from the runway centre line, or extended runway centre line, where the noise level is a maximum during take-off;</p> <p>b) <i>flyover reference noise measurement point</i>: the point on the extended centre line of the runway and at a distance of 6.5 km from the start of roll; and</p> <p>c) <i>approach reference noise measurement point</i>: the point on the ground, on the extended centre line of the runway, 2 000 m from the threshold. On level ground this corresponds to a position 120 m (394 ft) vertically below the 3° descent path originating from a point 300 m beyond the threshold.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 5 Reference 5.3.2.1  Standard	<p>5.3.2 Test noise measurement points</p> <p>5.3.2.1 If the test noise measurement points are not located at the reference noise measurement points, any corrections for the difference in position shall be made in the same manner as the corrections for the differences between test and reference flight paths.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		





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Chapter 5 Reference 5.3.2.2  Standard	5.3.2.2 Sufficient lateral test noise measurement points shall be used to demonstrate to the certificating authority that the maximum noise level on the appropriate lateral line has been clearly determined. Simultaneous measurements shall be made at one test noise measurement point at a symmetrical position on the other side of the runway.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 5 Reference 5.3.2.3  Standard	5.3.2.3 The applicant shall demonstrate to the certificating authority that during flight test, lateral and flyover noise levels were not separately optimized at the expense of each other.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 5 Reference 5.4  Standard	<p><b>5.4 Maximum noise levels</b></p> <p>The maximum noise levels, when determined in accordance with the noise evaluation method of Appendix 2, shall not exceed the following:</p> <ul style="list-style-type: none"> <li>a) <i>at lateral reference noise measurement point:</i> 96 EPNdB constant limit for aeroplanes with maximum take-off mass, at which the noise certification is requested, up to 34 000 kg and increasing linearly with the logarithm of aeroplane mass at the rate of 2 EPNdB per doubling of mass from that point until the limit of 103 EPNdB is reached, after which the limit is constant;</li> <li>b) <i>at flyover reference noise measurement point:</i> 89 EPNdB constant limit for aeroplanes with maximum take-off mass, at which the noise certification is requested, up to 34 000 kg and increasing linearly with the logarithm of aeroplane mass at the rate of 5 EPNdB per doubling of mass from that point until the limit of 106 EPNdB is reached, after which the limit is constant; and</li> <li>c) <i>at approach reference noise measurement point:</i> 98 EPNdB constant limit for aeroplanes with maximum take-off mass, at which the noise certification is requested, up to 34 000 kg and increasing linearly with the logarithm of aeroplane mass at the rate of 2 EPNdB per doubling of mass from that point until the limit of 105 EPNdB is reached, after which the limit is constant.</li> </ul> <p><i>Note.— See Attachment A for equations for the calculation of maximum permitted noise levels as a function of take-off mass.</i></p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 5 Reference 5.5  Standard	<b>5.5 Trade-offs</b>  If the maximum noise levels are exceeded at one or two measurement points:  a) the sum of excesses shall not be greater than 3 EPNdB;  b) any excess at any single point shall not be greater than 2 EPNdB; and  c) any excesses shall be offset by corresponding reductions at the other point or points.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 5 Reference 5.6.1.1  Standard	<b>5.6 Noise certification reference procedures</b>  5.6.1 General conditions  5.6.1.1 The reference procedures shall comply with the appropriate airworthiness requirements.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 5 Reference 5.6.1.2  Standard	5.6.1.2 The calculations of reference procedures and flight paths shall be approved by the certifying authority.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 5 Reference 5.6.1.3  Standard	5.6.1.3 Except in conditions specified in 5.6.1.4, the take-off and approach reference procedures shall be those defined in 5.6.2 and 5.6.3, respectively.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 5 Reference 5.6.1.4  Standard	<p>5.6.1.4 When it is shown by the applicant that the design characteristics of the aeroplane would prevent flight being conducted in accordance with 5.6.2 and 5.6.3, the reference procedures shall:</p> <p>a) depart from the reference procedures defined in 5.6.2 and 5.6.3 only to the extent demanded by those design characteristics which make compliance with the procedures impossible; and</p> <p>b) be approved by the certifying authority.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 5 Reference 5.6.1.5  Standard	<p>5.6.1.5 The reference procedures shall be calculated under the following reference atmospheric conditions:</p> <ul style="list-style-type: none"> <li>a) atmospheric pressure at sea level of 1 013.25 hPa, decreasing with altitude at a rate defined by the ICAO Standard Atmosphere;</li> <li>b) ambient air temperature at sea level of 25°C, decreasing with altitude at a rate defined by the ICAO Standard Atmosphere (i.e. 0.65°C per 100 m), except that at the discretion of the certificating authority, an alternative ambient air temperature at sea level of 15°C may be used;</li> <li>c) constant relative humidity of 70 per cent;</li> <li>d) zero wind; and</li> <li>e) the reference atmosphere in terms of temperature and relative humidity is considered to be homogeneous (i.e. ambient temperature 25°C and relative humidity 70 per cent) for the purpose of calculating: <ul style="list-style-type: none"> <li>1) the reference sound attenuation rate due to atmospheric absorption; and</li> <li>2) the reference speed of sound used in the calculation of the reference sound propagation geometry.</li> </ul> </li> </ul> <p><i>Note 1.— Details for calculating the variation of reference atmospheric pressure with altitude are given in the section of the Environmental Technical Manual (Doc 9501), Volume I — Procedures for the Noise Certification of Aircraft, concerning the ICAO Standard Atmosphere.</i></p> <p><i>Note 2. —The characteristics of the ICAO Standard Atmosphere are provided in the Manual of the ICAO</i></p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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	Standard Atmosphere (extended to 80 kilometres (262 500 feet) (Doc 7488/3).				



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Chapter 5 Reference 5.6.2  Standard	<p>5.6.2 Take-off reference procedure</p> <p>The take-off flight path shall be calculated as follows:</p> <p>a) average take-off power shall be used from the start of take-off to the point where at least the height above runway level shown below is reached. The take-off power used shall be the maximum available for normal operations as scheduled in the performance section of the aeroplane flight manual for the reference atmospheric conditions given in 5.6.1.5;</p> <p>1) aeroplanes with two engines or less — 300 m (984 ft);</p> <p>2) aeroplanes with three engines — 260 m (853 ft);</p> <p>3) aeroplanes with four engines or more — 210 m (689 ft);</p> <p>b) upon reaching the height specified in a) above, the power shall not be reduced below that required to maintain:</p> <p>1) a climb gradient of 4 per cent; or</p> <p>2) in the case of multi-engined aeroplanes, level flight with one engine inoperative;</p> <p>whichever power is the greater;</p> <p>c) the speed shall be the all-engines operating take-off climb speed selected by the applicant for use in normal operation, which shall be at least <math>V_2 + 19</math> km/h (<math>V_2 + 10</math> kt) and which shall be attained as soon as practicable after lift-off and be maintained throughout the take-off noise certification test;</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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	<p>d) a constant take-off configuration selected by the applicant shall be maintained throughout the take-off reference procedure except that the landing gear may be retracted; and</p> <p>e) the mass of the aeroplane at the brake release shall be the maximum take-off mass at which the noise certification is requested.</p>				
<p>Chapter 5</p> <p>Reference</p> <p>5.6.3</p> <p>Standard</p>	<p>5.6.3 Approach reference procedure</p> <p>The approach reference flight path shall be calculated as follows:</p> <p>a) the aeroplane shall be stabilized and following a 3° glide path;</p> <p>b) the approach shall be made at a stabilized airspeed of not less than 1.3 VS + 19 km/h (1.3 VS + 10 kt) with power stabilized during approach and over the measuring point and continued to a normal touchdown;</p> <p>c) the constant approach configuration used in the airworthiness certification test, but with the landing gear down, shall be maintained throughout the approach reference procedure;</p> <p>d) the mass of the aeroplane at the touchdown shall be the maximum landing mass permitted in the approach configuration defined in 5.6.3 c) at which noise certification is requested; and</p> <p>e) the most critical (that which produces the highest noise levels) configuration at the mass at which certification is requested shall be used.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		





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Chapter 5 Reference 5.7.1  Standard	<b>5.7 Test procedures</b>  5.7.1 The test procedures shall be acceptable to the airworthiness and noise certifying authority of the State issuing the certificate.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 5 Reference 5.7.2  Standard	5.7.2 The test procedures and noise measurements shall be conducted and processed in an approved manner to yield the noise evaluation measure designated as effective perceived noise level, EPNL, in units of EPNdB, as described in Appendix 2.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 5 Reference 5.7.3  Standard	5.7.3 Acoustic data shall be adjusted by the methods outlined in Appendix 2 to the reference conditions specified in this chapter. Adjustments for speed and thrust shall be made as described in Section 8 of Appendix 2.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 5 Reference 5.7.4  Standard	5.7.4 If the mass during the test is different from the mass at which the noise certification is requested, the necessary EPNL adjustment shall not exceed 2 EPNdB for take-offs and 1 EPNdB for approaches. Data approved by the certifying authority shall be used to determine the variation of EPNL with mass for both take-off and approach test conditions. Similarly, the necessary EPNL adjustment for variations in approach flight path from the reference flight path shall not exceed 2 EPNdB.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 5 Reference 5.7.5  Standard	5.7.5 For the approach conditions the test procedures shall be accepted if the aeroplane follows a steady glide path angle of $3^\circ \pm 0.5^\circ$ .	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 5 Reference 5.7.6  Standard	5.7.6 If equivalent test procedures different from the reference procedures are used, the test procedures and all methods for adjusting the results to the reference procedures shall be approved by the certifying authority. The amounts of the adjustments shall not exceed 16 EPNdB on take-off and 8 EPNdB on approach, and if the adjustments are more than 8 EPNdB and 4 EPNdB, respectively, the resulting numbers shall not be within 2 EPNdB of the limit noise levels specified in 5.4.  <i>Note.— Guidance material on the use of equivalent procedures is provided in the Environmental Technical Manual (Doc 9501), Volume I — Procedures for the Noise Certification of Aircraft.</i>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 6 Reference 6.1  Standard	<p><b>CHAPTER 6. PROPELLER-DRIVEN AEROPLANES NOT EXCEEDING 8 618 kg — Application for Type Certificate submitted before 17 November 1988</b></p> <p><b>6.1 Applicability</b></p> <p><i>Note 1.— See also Chapter 1, 1.10, 1.11, 1.12 and 1.13.</i></p> <p><i>Note 2.— See Attachment E for guidance on interpretation of these applicability provisions.</i></p> <p>The Standards of this chapter shall be applicable to all propeller-driven aeroplanes, except those aeroplanes specifically designed and used for aerobatic, agricultural or firefighting purposes, having a maximum certificated take-off mass not exceeding 8 618 kg for which either:</p> <p>a) the application for the Type Certificate was submitted on or after 1 January 1975 and before 17 November 1988, except for derived versions for which the application for certification of the change in type design was submitted on or after 17 November 1988, in which case the Standards of Chapter 10 apply; or</p> <p>b) a certificate of airworthiness for the individual aeroplane was first issued on or after 1 January 1980.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 6 Reference 6.2  Standard	<b>6.2 Noise evaluation measure</b>  The noise evaluation measure shall be a weighted overall sound pressure level as defined in International Electrotechnical Commission (IEC) Publication No. 179. The weighting applied to each sinusoidal component of the sound pressure shall be given as a function of frequency by the standard reference curve called "A".	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 6 Reference 6.3  Standard	<b>6.3 Maximum noise levels</b>  For aeroplanes specified in 6.1 a) and b), the maximum noise levels, when determined in accordance with the noise evaluation method of Appendix 3, shall not exceed the following:  — a 68 dB(A) constant limit up to an aeroplane mass of 600 kg, varying linearly with mass from that point to 1 500 kg, after which the limit is constant at 80 dB(A) up to 8 618 kg.  <i>Note 1.— Where an aeroplane comes within the provisions of Chapter 10, 10.1.2, the limit of 80 dB(A) applies up to 8 618 kg.</i>  <i>Note 2.— See Attachment A for equations for the calculation of maximum permitted noise levels as a function of take-off mass.</i>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 6 Reference 6.4  Standard	<p><b>6.4 Noise certification reference procedures</b></p> <p>The reference procedures shall be calculated under the following reference atmospheric conditions:</p> <ul style="list-style-type: none"> <li>a) atmospheric pressure at sea level of 1 013.25 hPa, decreasing with altitude at a rate defined by the ICAO Standard Atmosphere; and</li> <li>b) ambient air temperature at sea level of 25°C, decreasing with altitude at a rate defined by the ICAO Standard Atmosphere (i.e. 0.65°C per 100 m);</li> </ul> <p><i>Note 1.— Details for calculating the variation of reference atmospheric pressure with altitude are given in the section of the Environmental Technical Manual (Doc 9501), Volume I — Procedures for the Noise Certification of Aircraft, concerning the ICAO Standard Atmosphere.</i></p> <p><i>Note 2. —The characteristics of the ICAO Standard Atmosphere are provided in the Manual of the ICAO Standard Atmosphere (extended to 80 kilometres (262 500 feet)(Doc 7488/3).</i></p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 6 Reference 6.5.1  Standard	<p><b>6.5 Test procedures</b></p> <p>6.5.1 Either the test procedures described in 6.5.2 and 6.5.3 or equivalent test procedures approved by the certifying authority shall be used.</p> <p>-----</p> <p>. As amended. Available from the Central Office of the International Electrotechnical Commission, 3 rue de Varembe, Geneva, Switzerland.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 6 Reference 6.5.2  Standard	6.5.2 Tests to demonstrate compliance with the maximum noise levels of 6.3 shall consist of a series of level flights overhead the measuring station at a height of  The aeroplane shall pass over the measuring point within $\pm 10^\circ$ from the vertical.	Article 9(2) of Reg. (EU)201 8/1139	No Difference		
Chapter 6 Reference 6.5.3  Standard	6.5.3 Overflight shall be performed at the highest power in the normal operating range, stabilized airspeed and with the aeroplane in the cruise configuration.  <i>Note.— Guidance material on the use of equivalent procedures is provided in the Environmental Technical Manual (Doc 9501), Volume I — Procedures for the Noise Certification of Aircraft.</i>  ----- This is normally indicated in the aeroplane flight manual and on the flight instruments.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 7 Reference 7  Note	<b>CHAPTER 7. PROPELLER-DRIVEN STOL AEROPLANES</b>  <i>Note.— Standards and Recommended Practices for this chapter are not yet developed. In the meantime, guidelines provided in Attachment B may be used for noise certification of propeller-driven STOL aeroplanes for which a certificate of airworthiness for the individual aeroplane was first issued on or after 1 January 1976.</i>		Not Applicable		
Chapter 8 Reference 8.1.1  Standard	<b>CHAPTER 8. HELICOPTERS</b>  <b>8.1 Applicability</b>  <i>Note.— See also Chapter 1, 1.10, 1.11, 1.12 and 1.13.</i>  8.1.1 The Standards of this chapter shall be applicable to all helicopters for which 8.1.2, 8.1.3 and 8.1.4 apply, except those specifically designed and used for agricultural, firefighting or external load-carrying purposes.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.1.2  Standard	8.1.2 For a helicopter for which the application for the Type Certificate was submitted on or after 1 January 1985, except for those helicopters specified in 8.1.4, the maximum noise levels of 8.4.1 shall apply.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 8 Reference 8.1.3  Standard	8.1.3 For a derived version of a helicopter for which the application for certification of the change in type design was submitted on or after 17 November 1988, except for those helicopters specified in 8.1.4, the maximum noise levels of 8.4.1 shall apply.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.1.4  Standard	8.1.4 For all helicopters, including their derived versions, for which the application for the Type Certificate was submitted on or after 21 March 2002, the maximum noise levels of 8.4.2 shall apply.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.1.5  Standard	8.1.5 Certification of helicopters which are capable of carrying external loads or external equipment shall be made without such loads or equipment fitted.  <i>Note.— Helicopters which comply with the Standards with internal loads may be excepted when carrying external loads or external equipment, if such operations are conducted at a gross mass or with other operating parameters which are in excess of those certificated for airworthiness with internal loads.</i>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.1.6  Standard	8.1.6 An applicant under 8.1.1 may alternatively elect to show compliance with Chapter 11 instead of Chapter 8 if the helicopter has a maximum certificated take-off mass of 3 175 kg or less.	Article 9(2) of Reg. (EU)2018/1139	No Difference		





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Chapter 8 Reference 8.2  Standard	<b>8.2 Noise evaluation measure</b>  The noise evaluation measure shall be the effective perceived noise level in EPNdB as described in Appendix 2.	Article 9(2) of Reg. (EU)201 8/1139	No Difference		



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Chapter 8  Reference 8.3  Standard	<p><b>8.3 Reference noise measurement points</b></p> <p>A helicopter, when tested in accordance with these Standards, shall not exceed the noise levels specified in 8.4 at the following points:</p> <p>a) <i>Take-off reference noise measurement points</i></p> <p>1) a flight path reference point located on the ground vertically below the flight path defined in the take-off reference procedure and 500 m horizontally in the direction of flight from the point at which transition to climbing flight is initiated in the reference procedure (see 8.6.2);</p> <p>2) two other points on the ground symmetrically disposed at 150 m on both sides of the flight path defined in the take-off reference procedure and lying on a line through the flight path reference point.</p> <p>b) <i>Overflight reference noise measurement points</i></p> <p>1) a flight path reference point located on the ground 150 m (492 ft) vertically below the flight path defined in the overflight reference procedure (see 8.6.3.1);</p> <p>2) two other points on the ground symmetrically disposed at 150 m on both sides of the flight path defined in the overflight reference procedure and lying on a line through the flight path reference point.</p> <p>c) <i>Approach reference noise measurement points</i></p> <p>1) a flight path reference point located on the</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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	<p>ground 120 m (394 ft) vertically below the flight path defined in the approach reference procedure (see 8.6.4). On level ground, this corresponds to a position 1 140 m from the intersection of the 6.0° approach path with the ground plane;</p> <p>2) two other points on the ground symmetrically disposed at 150 m on both sides of the flight path defined in the approach reference procedure and lying on a line through the flight path reference point.</p> <p><i>Note.— See Attachment H (Guidelines for Obtaining Helicopter Noise Data for Land-use Planning Purposes) that defines acceptable supplemental land-use planning (LUP) data procedures.</i></p>				
Chapter 8 Reference 8.4.1  Standard	<p><b>8.4 Maximum noise levels</b></p> <p>8.4.1 For helicopters specified in 8.1.2 and 8.1.3, the maximum noise levels, when determined in accordance with the noise evaluation method of Appendix 2, shall not exceed the following:</p>	Article 9(2) of Reg. (EU)201 8/1139	No Difference		
Chapter 8 Reference 8.4.1.1  Standard	<p>8.4.1.1 <i>For take-off:</i> 109 EPNdB for helicopters with maximum certificated take-off mass, at which the noise certification is requested, of 80 000 kg and over and decreasing linearly with the logarithm of the helicopter mass at a rate of 3 EPNdB per halving of mass down to 89 EPNdB after which the limit is constant.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 8 Reference 8.4.1.2  Standard	8.4.1.2 <i>For overflight:</i> 108 EPNdB for helicopters with maximum certificated take-off mass, at which the noise certification is requested, of 80 000 kg and over and decreasing linearly with the logarithm of the helicopter mass at a rate of 3 EPNdB per halving of mass down to 88 EPNdB after which the limit is constant.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.4.1.3  Standard	8.4.1.3 <i>For approach:</i> 110 EPNdB for helicopters with maximum certificated take-off mass, at which the noise certification is requested, of 80 000 kg and over and decreasing linearly with the logarithm of the helicopter mass at a rate of 3 EPNdB per halving of mass down to 90 EPNdB after which the limit is constant.  <i>Note.— See Attachment A for equations for the calculation of maximum permitted noise levels as a function of take-off mass.</i>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.4.2  Standard	8.4.2 For helicopters specified in 8.1.4, the maximum noise levels, when determined in accordance with the noise evaluation method of Appendix 2, shall not exceed the following:	Article 9(2) of Reg. (EU)201 8/1139	No Difference		
Chapter 8 Reference 8.4.2.1  Standard	8.4.2.1 <i>For take-off:</i> 106 EPNdB for helicopters with maximum certificated take-off mass, at which the noise certification is requested, of 80 000 kg and over and decreasing linearly with the logarithm of the helicopter mass at a rate of 3 EPNdB per halving of mass down to 86 EPNdB after which the limit is constant.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 8 Reference 8.4.2.2  Standard	8.4.2.2 <i>For overflight:</i> 104 EPNdB for helicopters with maximum certificated take-off mass, at which the noise certification is requested, of 80 000 kg and over and decreasing linearly with the logarithm of the helicopter mass at a rate of 3 EPNdB per halving of mass down to 84 EPNdB after which the limit is constant.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.4.2.3  Standard	8.4.2.3 <i>For approach:</i> 109 EPNdB for helicopters with maximum certificated take-off mass, at which the noise certification is requested, of 80 000 kg and over and decreasing linearly with the logarithm of the helicopter mass at a rate of 3 EPNdB per halving of mass down to 89 EPNdB after which the limit is constant.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.5  Standard	<b>8.5 Trade-offs</b>  If the noise level limits are exceeded at one or two measurement points:  a) the sum of excesses shall not be greater than 4 EPNdB;  b) any excess at any single point shall not be greater than 3 EPNdB; and  c) any excess shall be offset by corresponding reductions at the other point or points.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 8 Reference 8.6.1.1  Standard	<b>8.6 Noise certification reference procedures</b>  8.6.1 General conditions  8.6.1.1 The reference procedures shall comply with the appropriate airworthiness requirements.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.6.1.2  Standard	8.6.1.2 The reference procedures and flight paths shall be approved by the certifying authority.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.6.1.3  Standard	8.6.1.3 Except in conditions specified in 8.6.1.4, the take-off, overflight and approach reference procedures shall be those defined in 8.6.2, 8.6.3 and 8.6.4, respectively.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.6.1.4  Standard	8.6.1.4 When it is shown by the applicant that the design characteristics of the helicopter would prevent flight being conducted in accordance with 8.6.2, 8.6.3 or 8.6.4, the reference procedures shall:  a) depart from the reference procedures defined in 8.6.2, 8.6.3 or 8.6.4 only to the extent demanded by those design characteristics which make compliance with the reference procedures impossible; and  b) be approved by the certifying authority.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 8 Reference 8.6.1.5  Standard	8.6.1.5 The reference procedures shall be calculated under the following reference atmospheric conditions:  a) constant atmospheric pressure of 1 013.25 hPa;  b) constant ambient air temperature of 25°C;  c) constant relative humidity of 70 per cent; and  d) zero wind.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.6.1.6  Standard	8.6.1.6 In 8.6.2 c), 8.6.3.1 c) and 8.6.4 c), the maximum normal operating rpm shall be taken as the highest rotor speed for each reference procedure corresponding to the airworthiness limit imposed by the manufacturer and approved by the certifying authority. Where a tolerance on the highest rotor speed is specified, the maximum normal operating rotor speed shall be taken as the highest rotor speed about which that tolerance is given. If the rotor speed is automatically linked with flight condition, the maximum normal operating rotor speed corresponding with the reference flight condition shall be used during the noise certification procedure. If rotor speed can be changed by pilot action, the maximum normal operating rotor speed specified in the flight manual limitation section for the reference conditions shall be used during the noise certification procedure.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 8 Reference 8.6.2  Standard	<p>8.6.2 Take-off reference procedure</p> <p>The take-off reference flight procedure shall be established as follows:</p> <ul style="list-style-type: none"> <li>a) the helicopter shall be stabilized at the maximum take-off power corresponding to minimum installed engine(s) specification power available for the reference ambient conditions or gearbox torque limit, whichever is lower, and along a path starting from a point located 500 m prior to the flight path reference point, at 20 m (65 ft) above the ground;</li> <li>b) the best rate of climb speed, VY, or the lowest approved speed for the climb after take-off, whichever is the greater, shall be maintained throughout the take-off reference procedure;</li> <li>c) the steady climb shall be made with the rotor speed stabilized at the maximum normal operating rpm certificated for take-off;</li> <li>d) a constant take-off configuration selected by the applicant shall be maintained throughout the take-off reference procedure with the landing gear position consistent with the airworthiness certification tests for establishing the best rate of climb speed, VY;</li> <li>e) the mass of the helicopter shall be the maximum take-off mass at which noise certification is requested; and</li> <li>f) the reference take-off path is defined as a straight line segment inclined from the starting point (500 m prior to the centre microphone location and 20 m (65 ft) above ground level) at an angle defined by best rate of climb and VY for minimum specification</li> </ul>	Article 9(2) of Reg. (EU)2018/1139	No Difference		





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	engine performance.				
Chapter 8 Reference 8.6.3.1  Standard	<p>8.6.3 Overflight reference procedure</p> <p>8.6.3.1 The overflight reference procedure shall be established as follows:</p> <p>a) the helicopter shall be stabilized in level flight overhead the flight path reference point at a height of 150 m (492 ft);</p> <p>b) a speed of 0.9 VH or 0.9 VNE or 0.45 VH + 120 km/h (0.45 VH + 65 kt) or 0.45 VNE + 120 km/h (0.45 VNE + 65 kt), whichever is the least, shall be maintained throughout the overflight reference procedure;</p> <p><i>Note.— For noise certification purposes, VH is defined as the airspeed in level flight obtained using the torque corresponding to minimum engine installed, maximum continuous power available for sea level pressure (1 013.25 hPa), 25°C ambient conditions at the relevant maximum certificated mass. VNE is defined as the not-to-exceed airworthiness airspeed imposed by the manufacturer and approved by the certifying authority.</i></p> <p>c) the overflight shall be made with the rotor speed stabilized at the maximum normal operating rpm certificated for level flight;</p> <p>d) the helicopter shall be in the cruise configuration; and</p> <p>e) the mass of the helicopter shall be the maximum take-off mass at which noise certification is requested.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 8 Reference 8.6.3.2  Standard	8.6.3.2 The value of VH and/or VNE used for noise certification shall be quoted in the approved flight manual.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.6.4  Standard	8.6.4 Approach reference procedure  The approach reference procedure shall be established as follows:  a) the helicopter shall be stabilized and following a 6.0° approach path;  b) the approach shall be made at a stabilized airspeed equal to the best rate of climb speed, VY, or the lowest approved speed for the approach, whichever is the greater, with power stabilized during the approach and over the flight path reference point, and continued to a normal touchdown;  c) the approach shall be made with the rotor speed stabilized at the maximum normal operating rpm certificated for approach;  d) the constant approach configuration used in airworthiness certification tests, with the landing gear extended, shall be maintained throughout the approach reference procedure; and  e) the mass of the helicopter at touchdown shall be the maximum landing mass at which noise certification is requested.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 8 Reference 8.7.1  Standard	<b>8.7 Test procedures</b>  8.7.1 The test procedures shall be acceptable to the airworthiness and noise certificating authority of the State issuing the certificate.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.7.2  Standard	8.7.2 The test procedures and noise measurements shall be conducted and processed in an approved manner to yield the noise evaluation measure designated as effective perceived noise level, EPNL, in units of EPNdB, as described in Appendix 2.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.7.3  Standard	8.7.3 Test conditions and procedures shall be closely similar to reference conditions and procedures or the acoustic data shall be adjusted, by the methods outlined in Appendix 2, to the reference conditions and procedures specified in this chapter.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.7.4  Standard	8.7.4 Adjustments for differences between test and reference flight procedures shall not exceed:  a) <i>for take-off</i> : 4.0 EPNdB, of which the arithmetic sum of $\Delta 1$ and the term $-7.5 \log (QK/QrKr)$ from $\Delta 2$ shall not in total exceed 2.0 EPNdB;  b) <i>for overflight or approach</i> : 2.0 EPNdB.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 8 Reference 8.7.5  Standard	8.7.5 During the test the average rotor rpm shall not vary from the normal maximum operating rpm by more than $\pm 1.0$ per cent during the 10 dB-down period.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.7.6  Standard	8.7.6 The helicopter airspeed shall not vary from the reference airspeed appropriate to the flight demonstration by more than $\pm 9$ km/h ( $\pm 5$ kt) throughout the 10 dB-down period.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.7.7  Standard	8.7.7 The number of level overflights made with a headwind component shall be equal to the number of level overflights made with a tailwind component.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.7.8  Standard	8.7.8 The helicopter shall fly within $\pm 10^\circ$ or $\pm 20$ m, whichever is greater, from the vertical above the reference track throughout the 10 dB-down period (see Figure 8-1).  <b>Figure 8-1. Helicopter lateral deviation tolerances</b>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 8 Reference 8.7.9  Standard	8.7.9 The helicopter height shall not vary during overflight from the reference height at the overhead point by more than $\pm 9$ m ( $\pm 30$ ft).	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.7.10  Standard	8.7.10 During the approach noise demonstration the helicopter shall be established on a stabilized constant speed approach within the airspace contained between approach angles of $5.5^\circ$ and $6.5^\circ$ .	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Chapter 8 Reference 8.7.11  Standard	8.7.11 Tests shall be conducted at a helicopter mass not less than 90 per cent of the relevant maximum certificated mass and may be conducted at a mass not exceeding 105 per cent of the relevant maximum certificated mass. For each of the three flight conditions, at least one test shall be completed at or above this maximum certificated mass.  <i>Note.— Guidance material on the use of equivalent procedures is provided in the Environmental Technical Manual (Doc 9501), Volume I — Procedures for the Noise Certification of Aircraft.</i>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Chapter 9 Reference 9  Note	<p><b>CHAPTER 9. INSTALLED AUXILIARY POWER UNITS (APU) AND ASSOCIATED AIRCRAFT SYSTEMS DURING GROUND OPERATIONS</b></p> <p><i>Note.— Standards and Recommended Practices for this chapter are not yet developed. In the meantime, guidelines provided in Attachment C may be used for noise certification of installed auxiliary power units (APU) and associated aircraft systems in:</i></p> <p>a) <i>all aircraft for which the application for a Type Certificate was submitted, or another equivalent prescribed procedure was carried out by the certifying authority, on or after 6 October 1977; and</i></p> <p>b) <i>aircraft of existing type design for which the application for a change of type design involving the basic APU installation was submitted, or another equivalent prescribed procedure was carried out by the certifying authority, on or after 6 October 1977.</i></p>		Not Applicable		



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Reference 10.1.1  Standard	<p><b>CHAPTER 10.</b></p> <p><b>PROPELLER-DRIVEN</b></p> <p><b>AEROPLANES NOT</b></p> <p><b>EXCEEDING 8 618 kg — Application</b></p> <p><b>for Type Certificate</b></p> <p><b>or Certification of Derived Version</b></p> <p><b>submitted on</b></p> <p><b>or after 17 November 1988</b></p> <p><b>10.1 Applicability</b></p> <p><i>Note 1.— See also Chapter 1, 1.10, 1.11, 1.12 and 1.13.</i></p> <p><i>Note 2.— See Attachment E for guidance on interpretation of these applicability provisions.</i></p> <p>10.1.1 The Standards of this chapter shall be applicable to all propeller-driven aeroplanes with a certificated take-off mass not exceeding 8 618 kg, except those aeroplanes specifically designed and used for aerobatic, agricultural or firefighting purposes and self-sustaining powered sailplanes.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 10.1.2  Standard	<p>10.1.2 For aeroplanes for which the application for the Type Certificate was submitted on or after 17 November 1988, except for those aeroplanes specified in 10.1.6, the maximum noise levels of 10.4 a) shall apply.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 10.1.3  Standard	10.1.3 For aeroplanes specified in 10.1.2 where the application for the Type Certificate was submitted before 17 November 1993 and which fail to comply with the Standards of this chapter, the Standards of Chapter 6 shall apply.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 10.1.4  Standard	10.1.4 For derived versions for which the application for certification of the change in type design was submitted on or after 17 November 1988, except for those derived versions specified in 10.1.6, the maximum noise levels of 10.4 a) shall apply.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 10.1.5  Standard	10.1.5 For derived versions specified in 10.1.4 where the application for certification of the change in type design was submitted before 17 November 1993 and which fail to comply with the Standards of this chapter, the Standards of Chapter 6 shall apply.	Article 9(2) of Reg. (EU)2018/1139	No Difference		





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Reference 10.1.6  Standard	<p>10.1.6 For single-engined aeroplanes, except float planes and amphibians:</p> <p>a) the maximum noise levels of 10.4 b) shall apply to those aeroplanes, including their derived versions, for which the application for the Type Certificate was submitted on or after 4 November 1999;</p> <p>b) the maximum noise levels of 10.4 b) shall apply to those derived versions of aeroplanes for which the application for the Type Certificate was submitted before 4 November 1999 and for which the application for certification of the change in type design was submitted on or after 4 November 1999; except</p> <p>c) for those derived versions described in 10.1.6 b) where the application for certification of the change in type design was submitted before 4 November 2004 and which exceed the maximum noise levels of 10.4 b), in which case the maximum noise levels of 10.4 a) shall apply.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 10.2  Standard	<p><b>10.2 Noise evaluation measure</b></p> <p>The noise evaluation measure shall be the maximum A-weighted noise level, LASmax, as defined in Appendix 6.</p>	Article 9(2) of Reg. (EU)201 8/1139	No Difference		



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Reference 10.3.1  Standard	<b>10.3 Reference noise measurement points</b>  10.3.1 An aeroplane, when tested in accordance with these Standards, shall not exceed the noise level specified in 10.4 at the take-off reference noise measurement point.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 10.3.2  Standard	10.3.2 The take-off reference noise measurement point is the point on the extended centre line of the runway at a distance of 2 500 m from the start of take-off roll.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference <b>10.4</b>  Standard	<p><b>10.4 Maximum noise levels</b></p> <p>The maximum noise levels determined in accordance with the noise evaluation method of Appendix 6 shall not exceed the following:</p> <ul style="list-style-type: none"> <li>a) for aeroplanes specified in 10.1.2 and 10.1.4, a 76 dB(A) constant limit up to an aeroplane mass of 600 kg varying linearly from that point with the logarithm of aeroplane mass until at 1 400 kg the limit of 88 dB(A) is reached after which the limit is constant up to 8 618 kg; and</li> <li>b) for aeroplanes specified in 10.1.4, a 70 dB(A) constant limit up to an aeroplane mass of 570 kg increasing linearly from that point with the logarithm of aeroplane mass until at 1 500 kg the limit of 85 dB(A) is reached after which the limit is constant up to 8 618 kg.</li> </ul> <p><i>Note.— See Attachment A for equations for the calculation of maximum permitted noise levels as a function of take-off mass.</i></p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference <b>10.5.1.1</b>  Standard	<p><b>10.5 Noise certification reference procedures</b></p> <p>10.5.1 General conditions</p> <p>10.5.1.1 The calculations of reference procedures and flight paths shall be approved by the certifying authority.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 10.5.1.2  Standard	10.5.1.2 Except in conditions specified in 10.5.1.3, the take-off reference procedure shall be that defined in 10.5.2.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 10.5.1.3  Standard	10.5.1.3 When it is shown by the applicant that the design characteristics of the aeroplane would prevent flights being conducted in accordance with 10.5.2, the reference procedures shall:  a) depart from the reference procedures defined only to the extent demanded by those design characteristics which make compliance with the procedures impossible; and  b) be approved by the certifying authority.	Article 9(2) of Reg. (EU)201 8/1139	No Difference		



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Reference 10.5.1.4  Standard	<p>10.5.1.4 The reference procedures shall be calculated under the following atmospheric conditions:</p> <ul style="list-style-type: none"> <li>a) atmospheric pressure at sea level of 1 013.25 hPa, decreasing with altitude at a rate defined by the ICAO Standard Atmosphere;</li> <li>b) ambient air temperature at sea level of 15°C, decreasing with altitude at a rate defined by the ICAO Standard Atmosphere (i.e. 0.65°C per 100 m);</li> <li>c) constant relative humidity of 70 per cent; and</li> <li>d) zero wind.</li> </ul> <p><i>Note 1.— Details for calculating the variation of reference atmospheric pressure with altitude are given in the section of the Environmental Technical Manual (Doc 9501), Volume I — Procedures for the Noise Certification of Aircraft, concerning the ICAO Standard Atmosphere.</i></p> <p><i>Note 2. —The characteristics of the ICAO Standard Atmosphere are provided in the Manual of the ICAO Standard Atmosphere (extended to 80 kilometres (262 500 feet) (Doc 7488/3).</i></p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 10.5.1.5  Standard	<p>10.5.1.5 The acoustic reference atmospheric conditions shall be the same as the reference atmospheric conditions for flight.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference <b>10.5.2</b>	10.5.2 Take-off reference procedure  The take-off flight path shall be calculated taking into account the following two phases.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Standard	<p><i>First phase</i></p> <ul style="list-style-type: none"> <li>a) take-off power shall be used from the brake release point to the point at which the height of 15 m (50 ft) above the runway is reached;</li> <li>b) a constant take-off configuration selected by the applicant shall be maintained throughout this first phase;</li> <li>c) the mass of the aeroplane at the brake release shall be the maximum take-off mass at which the noise certification is requested; and</li> <li>d) the length of this first phase shall correspond to the length given in the airworthiness data for a take-off on a level paved runway.</li> </ul> <p><i>Second phase</i></p> <ul style="list-style-type: none"> <li>a) the beginning of the second phase corresponds to the end of the first phase;</li> <li>b) the aeroplane shall be in the climb configuration with landing gear up, if retractable, and flap setting corresponding to normal climb throughout this second phase;</li> <li>c) the speed shall be the best rate of climb speed, VY; and</li> <li>d) take-off power and, for aeroplanes equipped with</li> </ul>				



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	variable pitch or constant speed propellers, rpm shall be maintained throughout the second phase. If airworthiness limitations do not permit the application of take-off power and rpm up to the reference point, then take-off power and rpm shall be maintained for as long as is permitted by such limitations and thereafter at maximum continuous power and rpm. Limiting of time for which take-off power and rpm shall be used in order to comply with this chapter shall not be permitted. The reference height shall be calculated assuming climb gradients appropriate to each power setting used.				
Reference 10.6.1  Standard	<b>10.6 Test procedures</b>  10.6.1 The test procedures shall be acceptable to the airworthiness and noise certificating authorities of the State issuing the certificate.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 10.6.2  Standard	10.6.2 The test procedures and noise measurements shall be conducted and processed in an approved manner to yield the noise evaluation measure in units of LASmax as described in Appendix 6.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 10.6.3  Standard	10.6.3 Acoustic data shall be adjusted by the methods outlined in Appendix 6 to the reference conditions specified in this chapter.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 10.6.4  Standard	<p>10.6.4 If equivalent test procedures are used, the test procedures and all methods for correcting the results to the reference procedures shall be approved by the certifying authority.</p> <p><i>Note.— Guidance material on the use of equivalent procedures is provided in the Environmental Technical Manual (Doc 9501), Volume I — Procedures for the Noise Certification of Aircraft.</i></p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 11.1.1  Standard	<p><b>CHAPTER 11. HELICOPTERS NOT EXCEEDING 3 175 kg MAXIMUM CERTIFICATED TAKE-OFF MASS</b></p> <p><b>11.1 Applicability</b></p> <p><i>Note.— See also Chapter 1, 1.10, 1.11, 1.12 and 1.13.</i></p> <p>11.1.1 The Standards of this chapter shall be applicable to all helicopters having a maximum certificated take-off mass not exceeding 3 175 kg for which 11.1.2, 11.1.3 and 11.1.4 apply, except those specifically designed and used for agricultural, firefighting or external load-carrying purposes.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		





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Reference 11.1.2  Standard	11.1.2 For a helicopter for which the application for the Type Certificate was submitted on or after 11 November 1993, except for those helicopters specified in 11.1.4, the maximum noise levels of 11.4.1 shall apply.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 11.1.3  Standard	11.1.3 For a derived version of a helicopter for which the application for certification of the change in type design was submitted on or after 11 November 1993, except for those helicopters specified in 11.1.4, the maximum noise levels of 11.4.1 shall apply.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 11.1.4  Standard	11.1.4 For all helicopters, including their derived versions, for which the application for the Type Certificate was submitted on or after 21 March 2002, the maximum noise levels of 11.4.2 shall apply.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 11.1.5  Standard	11.1.5 Certification of helicopters which are capable of carrying external loads or external equipment shall be made without such loads or equipment fitted.  <i>Note.— Helicopters which comply with the Standards with internal loads may be excepted when carrying external loads or external equipment, if such operations are conducted at a gross mass or with other operating parameters which are in excess of those certificated for airworthiness with internal loads.</i>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 11.1.6  Standard	11.1.6 An applicant under 11.1.1, 11.1.2, 11.1.3 and 11.1.4 may alternatively elect to show compliance with Chapter 8 instead of complying with this chapter.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 11.2  Standard	<b>11.2 Noise evaluation measure</b>  The noise evaluation measure shall be the sound exposure level LAE as described in Appendix 4.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 11.3  Standard	<b>11.3 Reference noise measurement points</b>  A helicopter, when tested in accordance with these Standards, shall not exceed the noise levels specified in 11.4 at a flight path reference point located on the ground 150 m (492 ft) vertically below the flight path defined in the overflight reference procedure (see 11.5.2.1).  <i>Note.— See Attachment H (Guidelines for Obtaining Helicopter Noise Data for Land-use Planning Purposes) that defines acceptable supplemental land-use planning (LUP) data procedures.</i>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 11.4.1  Standard	<b>11.4 Maximum noise level</b>  11.4.1 For helicopters specified in 11.1.2 and 11.1.3, the maximum noise levels, when determined in accordance with the noise evaluation method of Appendix 4, shall not exceed 82 dB(A) for helicopters with maximum certificated take-off mass, at which the noise certification is requested, of up to 788 kg and increasing linearly with the logarithm of the helicopter mass at a rate of 3 decibels per doubling of mass thereafter.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 11.4.2  Standard	11.4.2 For helicopters specified in 11.1.4, the maximum noise levels, when determined in accordance with the noise evaluation method of Appendix 4, shall not exceed 82 dB(A) for helicopters with maximum certificated take-off mass, at which the noise certification is requested, of up to 1 417 kg and increasing linearly with the logarithm of the helicopter mass at a rate of 3 decibels per doubling of mass thereafter.  <i>Note.— See Attachment A for equations for the calculation of maximum permitted noise levels as a function of take-off mass.</i>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 11.5.1.1  Standard	<b>11.5 Noise certification reference procedures</b>  11.5.1 General conditions  11.5.1.1 The reference procedure shall comply with the appropriate airworthiness requirements and shall be approved by the certifying authority.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 11.5.1.2  Standard	11.5.1.2 Except as otherwise approved, the overflight reference procedures shall be as defined in 11.5.2.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 11.5.1.3  Standard	11.5.1.3 When it is shown by the applicant that the design characteristics of the helicopter would prevent flight being conducted in accordance with 11.5.2 the reference procedure shall be permitted to depart from the standard reference procedure, with the approval of the certifying authority, but only to the extent demanded by those design characteristics which make compliance with the reference procedures impossible.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 11.5.1.4  Standard	11.5.1.4 The reference procedures shall be established for the following reference atmospheric conditions:  a) constant atmospheric pressure of 1 013.25 hPa;  b) constant ambient air temperature of 25°C;  c) constant relative humidity of 70 per cent; and  d) zero wind.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 11.5.1.5  Standard	11.5.1.5 The maximum normal operating rpm shall be taken as the highest rotor speed corresponding to the airworthiness limit imposed by the manufacturer and approved by the certifying authority for overflight. Where a tolerance on the highest rotor speed is specified, the maximum normal operating rotor speed shall be taken as the highest rotor speed about which that tolerance is given. If rotor speed is automatically linked with flight condition, the maximum normal operating rotor speed corresponding with the reference flight condition shall be used during the noise certification procedure. If rotor speed can be changed by pilot action, the maximum normal operating rotor speed specified in the flight manual limitation section for the reference conditions shall be used during the noise certification procedure.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 11.5.2.1  Standard	<p>11.5.2 Reference procedure</p> <p>11.5.2.1 The reference procedure shall be established as follows:</p> <p>a) the helicopter shall be stabilized in level flight overhead the flight path reference point at a height of 150 m ± 15 m (492 ft ± 50 ft);</p> <p>b) a speed of 0.9 VH or 0.9 VNE or 0.45 VH + 120 km/h (65 kt) or 0.45 VNE + 120 km/h (65 kt), whichever is the least, shall be maintained throughout the overflight procedure. For noise certification purposes, VH is defined as the airspeed in level flight obtained using the torque corresponding to minimum engine installed, maximum continuous power available for sea level pressure (1 013.25 hPa), 25°C ambient conditions at the relevant maximum certificated mass. VNE is defined as the not-to-exceed airworthiness airspeed imposed by the manufacturer and approved by the certifying authority;</p> <p>c) the overflight shall be made with the rotor speed stabilized at the maximum normal operating rpm certificated for level flight;</p> <p>d) the helicopter shall be in the cruise configuration; and</p> <p>e) the mass of the helicopter shall be the maximum take-off mass at which noise certification is requested.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 11.5.2.2  Standard	11.5.2.2 The value of VH and/or VNE used for noise certification shall be quoted in the approved flight manual.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 11.6.1  Standard	<b>11.6 Test procedures</b>  11.6.1 The test procedures shall be acceptable to the airworthiness and noise certifying authorities of the State issuing the certificate.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 11.6.2  Standard	11.6.2 The test procedure and noise measurements shall be conducted and processed in an approved manner to yield the noise evaluation measure designated as sound exposure level (LAE), in A-weighted decibels integrated over the duration time, as described in Appendix 4.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 11.6.3  Standard	11.6.3 Test conditions and procedures shall be closely similar to reference conditions and procedures or the acoustic data shall be adjusted, by the methods outlined in Appendix 4, to the reference conditions and procedures specified in this chapter.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 11.6.4  Standard	11.6.4 During the test, flights shall be made in equal numbers with tailwind and headwind components.	Article 9(2) of Reg. (EU)201 8/1139	No Difference		



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Reference 11.6.5  Standard	11.6.5 Adjustments for differences between test and reference flight procedures shall not exceed 2.0 dB(A).	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 11.6.6  Standard	11.6.6 During the test, the average rotor rpm shall not vary from the normal maximum operating rpm by more than $\pm 1.0$ per cent during the 10 dB-down period.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 11.6.7  Standard	11.6.7 The helicopter airspeed shall not vary from the reference airspeed appropriate to the flight demonstration as described in Appendix 4 by more than $\pm 5.5$ km/h ( $\pm 3$ kt) throughout the 10 dB-down period.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 11.6.8  Standard	11.6.8 The helicopter shall fly within $\pm 10^\circ$ from the vertical above the reference track through the reference noise measurement position.	Article 9(2) of Reg. (EU)2018/1139	No Difference		





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Reference 11.6.9  Standard	<p>11.6.9 Tests shall be conducted at a helicopter mass not less than 90 per cent of the relevant maximum certificated mass and may be conducted at a mass not exceeding 105 per cent of the relevant maximum certificated mass.</p> <p><i>Note.— Guidance material on the use of equivalent procedures is provided in the Environmental Technical Manual (Doc 9501), Volume I — Procedures for the Noise Certification of Aircraft.</i></p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 12.1.1  Standard	<p><b>CHAPTER 12. SUPERSONIC AEROPLANES</b></p> <p><b>12.1 Supersonic aeroplanes — Application for Type Certificate submitted before 1 January 1975</b></p> <p>12.1.1 The Standards of Chapter 2 of this Part, with the exception of the maximum noise levels specified in 2.4, shall be applicable to all supersonic aeroplanes, including their derived versions, for which the application for the Type Certificate was submitted before 1 January 1975, and for which a certificate of airworthiness for the individual aeroplane was first issued after 26 November 1981.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 12.1.2  Standard	12.1.2 The maximum noise levels of those aeroplanes covered by 12.1.1, when determined in accordance with the noise evaluation method of Appendix 1, shall not exceed the measured noise levels of the first certificated aeroplane of the type.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 12.2  Note	<b>12.2 Supersonic aeroplanes — Application for Type Certificate submitted on or after 1 January 1975</b>  <i>Note.— Standards and Recommended Practices for these aeroplanes have not been developed. However, the maximum noise levels of the Part that would be applicable to subsonic jet aeroplanes may be used as a guideline. Acceptable levels of sonic boom have not been established and compliance with subsonic noise Standards may not be presumed to permit supersonic flight.</i>		Not Applicable		



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Reference 13.1.1  Standard	<p><b>CHAPTER 13. TILT-ROTORS</b></p> <p><i>Note.— These Standards are not intended to be used for tilt-rotors that have one or more configurations that are certificated for airworthiness for STOL only. In such cases, different or additional procedures/conditions would likely be needed.</i></p> <p><b>13.1 Applicability</b></p> <p><i>Note.— See also Chapter 1, 1.10, 1.11, 1.12 and 1.13.</i></p> <p>13.1.1 The Standards of this chapter shall be applicable to all tilt-rotors, including their derived versions, for which the application for a Type Certificate was submitted on or after 1 January 2018.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 13.1.2  Standard	<p>13.1.2 Noise certification of tilt-rotors which are capable of carrying external loads or external equipment shall be made without such loads or equipment fitted.</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 13.2  Standard	<p><b>13.2 Noise evaluation measure</b></p> <p>The noise evaluation measure shall be the effective perceived noise level in EPNdB as described in Appendix 2 of this Annex. The correction for spectral irregularities shall start at 50 Hz (see 4.3.1 of Appendix 2).</p> <p><i>Note.— Additional data in LAE and LASmax as defined in Appendix 4, and one-third octave SPLs as defined in Appendix 2 corresponding to LASmax should be made available to the certificating authority for land-use planning purposes.</i></p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 13.3  Standard	<p><b>13.3 Noise measurement reference points</b></p> <p>A tilt-rotor, when tested in accordance with the reference procedures of 13.6 and the test procedures of 13.7, shall not exceed the noise levels specified in 13.4 at the following reference points:</p> <p>a) <i>Take-off reference noise measurement points:</i></p> <ol style="list-style-type: none"> <li>1) a flight path reference point located on the ground vertically below the flight path defined in the take-off reference procedure (see 13.6.2) and 500 m (1 640 ft) horizontally in the direction of flight from the point at which transition to climbing flight is initiated in the reference procedure;</li> <li>2) two other points on the ground symmetrically disposed at 150 m (492 ft) on both sides of the flight path defined in the take-off reference procedure and lying on a line through the flight path reference point.</li> </ol> <p>b) <i>Overflight reference noise measurement points:</i></p> <ol style="list-style-type: none"> <li>1) a flight path reference point located on the ground 150 m (492 ft) vertically below the flight path defined in the overflight reference procedure (see 13.6.3);</li> <li>2) two other points on the ground symmetrically disposed at 150 m (492 ft) on both sides of the flight path defined in the overflight reference procedure and lying on a line through the flight path reference point.</li> </ol> <p>c) <i>Approach reference noise measurement points:</i></p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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	<p>1) a flight path reference point located on the ground 120 m (394 ft) vertically below the flight path defined in the approach reference procedure (see 13.6.4). On level ground, this corresponds to a position 1 140 m (3 740 ft) from the intersection of the 6.0° approach path with the ground plane;</p> <p>2) two other points on the ground symmetrically disposed at 150 m (492 ft) on both sides of the flight path defined in the approach reference procedure and lying on a line through the flight path reference point.</p>				
Reference 13.4.1  Standard	<p><b>13.4 Maximum noise levels</b></p> <p>13.4.1 For tilt-rotors specified in 13.1, the maximum noise levels, when determined in accordance with the noise evaluation method of Appendix 2 for helicopters, shall not exceed the following:</p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 13.4.1.1  Standard	<p>13.4.1.1 <i>For take-off:</i> 109 EPNdB for tilt-rotors in VTOL/conversion mode with maximum certificated take-off mass, at which the noise certification is requested, of 80 000 kg and over and decreasing linearly with the logarithm of the tilt-rotor mass at a rate of 3 EPNdB per halving of mass down to 89 EPNdB after which the limit is constant.</p>	Article 9(2) of Reg. (EU)201 8/1139	No Difference		



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Reference 13.4.1.2  Standard	<p>13.4.1.2 <i>For overflight:</i> 108 EPNdB for tilt-rotors in VTOL/conversion mode with maximum certificated take-off mass, at which the noise certification is requested, of 80 000 kg and over and decreasing linearly with the logarithm of the tilt-rotor mass at a rate of 3 EPNdB per halving of mass down to 88 EPNdB after which the limit is constant.</p> <p><i>Note 1.— For the tilt-rotor in aeroplane mode, there is no maximum noise level.</i></p> <p><i>Note 2.— VTOL/conversion mode is all approved configurations and flight modes where the design operating rotor speed is that used for hover operations.</i></p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 13.4.1.3  Standard	<p>13.4.1.3 <i>For approach:</i> 110 EPNdB for tilt-rotors in VTOL/conversion mode with maximum certificated take-off mass, at which the noise certification is requested, of 80 000 kg and over and decreasing linearly with the logarithm of the tilt-rotor mass at a rate of 3 EPNdB per halving of mass down to 90 EPNdB after which the limit is constant.</p> <p><i>Note.— The equations for the calculation of noise levels as a function of take-off mass presented in Section 7 of Attachment A, for conditions described in Chapter 8, 8.4.1, are consistent with the maximum noise levels defined in 13.4.</i></p>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 13.5  Standard	<b>13.5 Trade-offs</b>  If the maximum noise levels are exceeded at one or two measurement points:  a) the sum of excesses shall not be greater than 4 EPNdB;  b) any excess at any single point shall not be greater than 3 EPNdB; and  c) any excess shall be offset by corresponding reductions at the other point or points.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 13.6.1.1  Standard	<b>13.6 Noise certification reference procedures</b>  13.6.1 General conditions  13.6.1.1 The reference procedures shall comply with the appropriate airworthiness requirements.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 13.6.1.2  Standard	13.6.1.2 The reference procedures and flight paths shall be approved by the certifying authority.	Article 9(2) of Reg. (EU)201 8/1139	No Difference		





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Reference 13.6.1.3  Standard	13.6.1.3 Except in conditions specified in 13.6.1.4, the take-off, overflight and approach reference procedures shall be those defined in 13.6.2, 13.6.3 and 13.6.4, respectively.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 13.6.1.4  Standard	13.6.1.4 When it is shown by the applicant that the design characteristics of the tilt-rotor would prevent a flight from being conducted in accordance with 13.6.2, 13.6.3 or 13.6.4, the reference procedures shall:  a) depart from the reference procedures defined in 13.6.2, 13.6.3 or 13.6.4 only to the extent demanded by those design characteristics which make compliance with the reference procedures impossible; and  b) be approved by the certifying authority.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 13.6.1.5  Standard	13.6.1.5 The reference procedures shall be calculated under the following reference atmospheric conditions:  a) constant atmospheric pressure of 1 013.25 hPa;  b) constant ambient air temperature of 25°C, i.e. ISA + 10°C;  c) constant relative humidity of 70 per cent; and  d) zero wind.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 13.6.1.6  Standard	13.6.1.6 In 13.6.2 d), 13.6.3 d) and 13.6.4 c), the maximum normal operating rpm shall be taken as the highest rotor speed for each reference procedure corresponding to the airworthiness limit imposed by the manufacturer and approved by the certificating authority. Where a tolerance on the highest rotor speed is specified, the maximum normal operating rotor speed shall be taken as the highest rotor speed about which that tolerance is given. If the rotor speed is automatically linked with the flight condition, the maximum normal operating rotor speed corresponding with the reference flight condition shall be used during the noise certification procedure. If the rotor speed can be changed by pilot action, the maximum normal operating rotor speed specified in the flight manual limitation section for the reference conditions shall be used during the noise certification procedure.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 13.6.2  Standard	<p>13.6.2 Take-off reference procedure</p> <p>The take-off reference flight procedure shall be established as follows:</p> <ul style="list-style-type: none"> <li>a) a constant take-off configuration, including nacelle angle, selected by the applicant shall be maintained throughout the take-off reference procedure;</li> <li>b) the tilt-rotor shall be stabilized at the maximum take-off power corresponding to minimum installed engine(s) specification power available for the reference ambient conditions or gearbox torque limit, whichever is lower, and along a path starting from a point located 500 m (1 640 ft) prior to the flight path reference point, at 20 m (65 ft) above the ground;</li> <li>c) the nacelle angle and the corresponding best rate of climb speed, or the lowest approved speed for the climb after take-off, whichever is the greater, shall be maintained throughout the take-off reference procedure;</li> <li>d) the steady climb shall be made with the rotor speed stabilized at the maximum normal operating rpm certificated for take-off;</li> <li>e) the mass of the tilt-rotor shall be the maximum take-off mass at which noise certification is requested; and</li> <li>f) the reference take-off path is defined as a straight line segment inclined from the starting point (500 m (1 640 ft) prior to the centre noise measurement point and 20 m (65 ft) above ground level) at an angle defined by best rate of climb and the best rate of</li> </ul>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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	climb speed corresponding to the selected nacelle angle and for minimum specification engine performance.				



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Reference 13.6.3.1  Standard	<p>13.6.3 Overflight reference procedure</p> <p>13.6.3.1 The overflight reference procedure shall be established as follows:</p> <ul style="list-style-type: none"> <li>a) the tilt-rotor shall be stabilized in level flight overhead the flight path reference point at a height of 150 m (492 ft);</li> <li>b) a constant configuration selected by the applicant shall be maintained throughout the overflight reference procedures;</li> <li>c) the mass of the tilt-rotor shall be the maximum take-off mass at which noise certification is requested;</li> <li>d) in the VTOL/conversion mode, the nacelle angle at the authorized fixed operation point that is closest to the lowest nacelle angle certificated for zero airspeed, a speed of 0.9 VCON and a rotor speed stabilized at the maximum normal operating rpm certificated for level flight shall be maintained throughout the overflight reference procedure;</li> </ul> <p><i>Note.— For noise certification purposes, VCON is defined as the maximum authorized speed for VTOL/conversion mode at a specific nacelle angle.</i></p> <ul style="list-style-type: none"> <li>e) in the aeroplane mode, the nacelles shall be maintained on the down-stop throughout the overflight reference procedure, with: <ul style="list-style-type: none"> <li>1) rotor speed stabilized at the rpm associated with the VTOL/conversion mode and a speed of 0.9 VCON; and</li> </ul> </li> </ul>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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	<p>2) rotor speed stabilized at the normal cruise rpm associated with the aeroplane mode and at the corresponding 0.9 VMCP or 0.9 VMO, whichever is lesser, certificated for level flight.</p> <p><i>Note.— For noise certification purposes, VMCP is defined as the maximum operating limit airspeed for aeroplane mode corresponding to minimum engine installed, maximum continuous power (MCP) available for sea level pressure (1 013.25 hPa), 25°C ambient conditions at the relevant maximum certificated mass; and VMO is the maximum operating (MO) limit airspeed that may not be deliberately exceeded.</i></p>				
Reference 13.6.3.2	13.6.3.2 The values of VCON and VMCP or VMO used for noise certification shall be quoted in the approved flight manual.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Standard					



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Reference 13.6.4  Standard	<p>13.6.4 Approach reference procedure</p> <p>The approach reference procedure shall be established as follows:</p> <ul style="list-style-type: none"> <li>a) the tilt-rotor shall be stabilized and follow a 6.0° approach path;</li> <li>b) the approach shall be in an airworthiness approved configuration in which maximum noise occurs, at a stabilized airspeed equal to the best rate of climb speed corresponding to the nacelle angle, or the lowest approved airspeed for the approach, whichever is the greater, and with power stabilized during the approach and over the flight path reference point, and continued to a normal touchdown;</li> <li>c) the approach shall be made with the rotor speed stabilized at the maximum normal operating rpm certificated for approach;</li> <li>d) the constant approach configuration used in airworthiness certification tests, with the landing gear extended, shall be maintained throughout the approach reference procedure; and</li> <li>e) the mass of the tilt-rotor at touchdown shall be the maximum landing mass at which noise certification is requested.</li> </ul>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 13.7.1  Standard	<b>13.7 Test procedures</b>  13.7.1 The test procedures shall be acceptable to the airworthiness and noise certifying authority of the State issuing the certificate.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 13.7.2  Standard	13.7.2 The test procedures and noise measurements shall be conducted and processed in an approved manner to yield the noise evaluation measure designated in 13.2.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 13.7.3  Standard	13.7.3 Test conditions and procedures shall be similar to reference conditions and procedures or the acoustic data shall be adjusted, by the methods outlined in Appendix 2 for helicopters, to the reference conditions and procedures specified in this chapter.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 13.7.4  Standard	13.7.4 Adjustments for differences between test and reference flight procedures shall not exceed:  a) <i>for take-off</i> : 4.0 EPNdB, of which the arithmetic sum of $\Delta 1$ and the term $-7.5 \log QK/QrKr$ from $\Delta 2$ shall not in total exceed 2.0 EPNdB; and  b) <i>for overflight or approach</i> : 2.0 EPNdB.	Article 9(2) of Reg. (EU)2018/1139	No Difference		





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Reference 13.7.5  Standard	13.7.5 During the test the average rotor rpm shall not vary from the normal maximum operating rpm by more than $\pm 1.0$ per cent throughout the 10 dB-down period.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 13.7.6  Standard	13.7.6 The airspeed of the tilt-rotor shall not vary from the reference airspeed appropriate to the flight demonstration by more than $\pm 9$ km/h ( $\pm 5$ kt) throughout the 10 dB-down period.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 13.7.7  Standard	13.7.7 The number of level overflights made with a headwind component shall be equal to the number of level overflights made with a tailwind component.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 13.7.8  Standard	13.7.8 The tilt-rotor shall fly within $\pm 10^\circ$ or $\pm 20$ m ( $\pm 65$ ft), whichever is greater, from the vertical above the reference track throughout the 10 dB-down period (see Figure 8-1).	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 13.7.9  Standard	13.7.9 The height of the tilt-rotor shall not vary during overflight from the reference height throughout the 10 dB-down period by more than $\pm 9$ m ( $\pm 30$ ft).	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 13.7.10  Standard	13.7.10 During the approach noise demonstration the tilt-rotor shall be established on a stabilized constant speed approach within the airspace contained between approach angles of 5.5° and 6.5° throughout the 10 dB-down period.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 13.7.11  Standard	13.7.11 Tests shall be conducted at a tilt-rotor mass not less than 90 per cent of the relevant maximum certificated mass and may be conducted at a mass not exceeding 105 per cent of the relevant maximum certificated mass. For each of the flight conditions, at least one test shall be completed at or above this maximum certificated mass.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 14.1.1	<b>CHAPTER 14.</b>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Standard	<p><b>14.1 Applicability</b></p> <p><i>Note.— See also Chapter 1, 1.10, 1.11, 1.12 and 1.13.</i></p> <p>14.1.1 The Standards of this chapter shall, with the exception of those aeroplanes which require a runway length of 610 m or less at maximum certificated mass for airworthiness or propeller-driven aeroplanes specifically designed and used for agricultural or firefighting purposes, be applicable to:</p> <ul style="list-style-type: none"> <li>a) all subsonic jet aeroplanes and propeller-driven aeroplanes, including their derived versions, with a maximum certificated take-off mass of 55 000 kg and over for which the application for a Type Certificate was submitted on or after 31 December 2017;</li> <li>b) all subsonic jet aeroplanes, including their derived versions, with a maximum certificated take-off mass of less than 55 000 kg for which the application for a Type Certificate was submitted on or after 31 December 2020;</li> <li>c) all propeller-driven aeroplanes, including their derived versions, with a maximum certificated take-off mass of over 8 618 kg and less than 55 000 kg for which the application for a Type Certificate was submitted on or after 31 December 2020; and</li> <li>d) all subsonic jet aeroplanes and all propeller-driven aeroplanes certificated originally as satisfying Annex</li> </ul>				



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	<p>16, Volume I, Chapter 3, Chapter 4 or Chapter 5, for which recertification to Chapter 14 is requested.</p> <p><i>Note.— Guidance material on applications for recertification is provided in the Environmental Technical Manual (Doc 9501), Volume I — Procedures for Noise Certification of Aircraft.</i></p> <p>----- With no stopway or clearway.</p>				
<p>Reference 14.1.2</p> <p>Standard</p>	<p>14.1.2 Notwithstanding 14.1.1, it may be recognized by a Contracting State that the following situations for jet aeroplanes and propeller-driven aeroplanes over 8 618 kg maximum certificated take-off mass on its registry do not require demonstration of compliance with the provisions of the Standards of Annex 16, Volume I:</p> <ul style="list-style-type: none"> <li>a) gear down flight with one or more retractable landing gear down during the entire flight;</li> <li>b) spare engine and nacelle carriage external to the skin of the aeroplane (and return of the pylon or other external mount); and</li> <li>c) time-limited engine and/or nacelle changes, where the change in type design specifies that the aeroplane may not be operated for a period of more than 90 days unless compliance with the provisions of Annex 16, Volume I, is shown for that change in type design. This applies only to changes resulting from a required maintenance action.</li> </ul>	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 14.2.1  Standard	<b>14.2 Noise measurements</b>  14.2.1 Noise evaluation measure  The noise evaluation measure shall be the effective perceived noise level in EPNdB as described in Appendix 2.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 14.3.1  Standard	<b>14.3 Reference noise measurement points</b>  14.3.1 An aeroplane, when tested in accordance with these Standards, shall not exceed the maximum noise level specified in 14.4 of the noise measured at the points specified in Chapter 3, 3.3.1 a), b) and c).	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 14.3.2  Standard	<b>14.3.2 Test noise measurement points</b>  The provisions of Chapter 3, 3.3.2, relating to test noise measurement points shall apply.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 14.4.1  Standard	<b>14.4 Maximum noise levels</b>  14.4.1 The maximum noise levels, when determined in accordance with the noise evaluation method of Appendix 2, shall not exceed the following:	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 14.4.1.1	14.4.1.1 <i>At the lateral full-power reference noise measurement point</i>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Standard	103 EPNdB for aeroplanes with maximum certificated take-off mass, at which the noise certification is requested, of 400 000 kg and over, decreasing linearly with the logarithm of the mass down to 94 EPNdB at 35 000 kg, after which the limit is constant to 8 618 kg, where it decreases linearly with the logarithm of the mass down to 88.6 EPNdB at 2 000 kg, after which the limit is constant.				
Reference 14.4.1.2	14.4.1.2 <i>At the flyover reference noise measurement point</i>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Standard	<p>a) <i>Aeroplanes with two engines or less</i></p> <p>101 EPNdB for aeroplanes with maximum certificated take-off mass, at which the noise certification is requested, of 385 000 kg and over, decreasing linearly with the logarithm of the mass at the rate of 4 EPNdB per halving of mass down to 89 EPNdB, after which the limit is constant to 8 618 kg, where it decreases linearly with the logarithm of the mass at a rate of 4 EPNdB per halving of mass down to 2 000 kg, after which the limit is constant.</p> <p>b) <i>Aeroplanes with three engines</i></p> <p>As a) but with 104 EPNdB for aeroplanes with maximum certificated take-off mass of 385 000 kg and over.</p> <p>c) <i>Aeroplanes with four engines or more</i></p> <p>As a) but with 106 EPNdB for aeroplanes with maximum certificated take-off mass of 385 000 kg and over.</p>				



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Reference 14.4.1.3  Standard	14.4.1.3 <i>At the approach reference noise measurement point</i>  105 EPNdB for aeroplanes with maximum certificated take-off mass, at which the noise certification is requested, of 280 000 kg and over, decreasing linearly with the logarithm of the mass down to 98 EPNdB at 35 000 kg, after which the limit is constant to 8 618 kg, where it decreases linearly with the logarithm of the mass down to 93.1 EPNdB at 2 000 kg, after which the limit is constant.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 14.4.1.4  Standard	14.4.1.4 The sum of the differences at all three measurement points between the maximum noise levels and the maximum permitted noise levels specified in 14.4.1.1, 14.4.1.2 and 14.4.1.3, shall not be less than 17 EPNdB.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 14.4.1.5  Standard	14.4.1.5 The maximum noise level at each of the three measurement points shall not be less than 1 EPNdB below the corresponding maximum permitted noise level specified in 14.4.1.1, 14.4.1.2 and 14.4.1.3.  <i>Note.— See Attachment A for equations for the calculation of maximum permitted noise levels as a function of take-off mass.</i>	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 14.5  Standard	<b>14.5 Noise certification reference procedures</b>  The noise certification reference procedures shall be as specified in Chapter 3, 3.6.	Article 9(2) of Reg. (EU)2018/1139	No Difference		



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Reference 14.6  Standard	<b>14.6 Test procedures</b>  The test procedures shall be as specified in Chapter 3, 3.7.	Article 9(2) of Reg. (EU)2018/1139	No Difference		
Reference 14.7  Standard	<b>14.7 Recertification</b>  For aeroplanes specified in 14.1.1 d), recertification shall be granted on the basis that the evidence used to determine compliance with Chapter 14 is as satisfactory as the evidence associated with aeroplanes specified in 14.1.1 a), b) and c).	Article 9(2) of Reg. (EU)2018/1139	No Difference		





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Chapter 1  Reference 1.0.2   Recommendation	<p><b>PART III. NOISE MEASUREMENT FOR MONITORING PURPOSES</b></p> <p><i>Note.— The following Recommendation has been developed to assist States that measure noise for monitoring purposes, until such time as agreement on a single method can be reached.</i></p> <p><b>Recommendation.—</b> Where the measurement of aircraft noise is made for monitoring purposes, the method of Appendix 5 should be used.</p> <p><i>Note.— These purposes are described as including: monitoring compliance with and checking the effectiveness of such noise abatement requirements as may have been established for aircraft in flight or on the ground. An indication of the degree of correlation between values obtained by the method used for measuring noise for aircraft design purposes and the method(s) used for monitoring purposes would be necessary.</i></p>		Not Applicable		Not covered as it is outside EASA's domain of competence.



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Chapter 1 Reference 1  Recommendation	<p><b>PART IV. ASSESSMENT OF AIRPORT NOISE</b></p> <p><i>Note.— The following Recommendations have been developed for the purpose of promoting international communication between States that have adopted a variety of methods of assessing noise for land-use planning purposes.</i></p> <p>1. <b>Recommendation.</b>— <i>Where international comparison of noise assessment around airports is undertaken, the methodology described in Recommended Method for Computing Noise Contours Around Airports (Doc 9911) should be used.</i></p>		Not Applicable		PART IV is not covered as it is outside EASA's domain of competence. Member States should refer to Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise.
Chapter 2 Reference 2  Recommendation	<p>2. <b>Recommendation.</b>— <i>Contracting States that have not yet adopted, or are considering changing a national noise assessment methodology, should use the methodology described in Recommended Method for Computing Noise Contours Around Airports (Doc 9911).</i></p>		Not Applicable		PART IV is not covered as it is outside EASA's domain of competence. Member States should refer to Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise.



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Chapter 1 Reference 1  Standard	<p><b>PART V. BALANCED APPROACH TO NOISE MANAGEMENT</b></p> <p><i>Note.— Provisions in Part II of this Annex are aimed at noise certification which characterizes the maximum noise emitted by the aircraft. However, noise abatement procedures approved by national authorities and included in operations manuals allow a reduction of noise during aircraft operations.</i></p> <p>1. The balanced approach to noise management consists of identifying the noise problem at an airport and then analysing the various measures available to reduce noise through the exploration of four principal elements, namely reduction at source (addressed in Part II of this Annex), land-use planning and management, noise abatement operational procedures and operating restrictions, with the goal of addressing the noise problem in the most cost-effective manner. All the elements of the balanced approach are addressed in the <i>Guidance on the Balanced Approach to Aircraft Noise Management</i> (Doc 9829).</p>		Not Applicable		PART V is not covered as it is outside EASA's domain of competence. Member States should refer to Regulation (EU) No 598/2014 of the European Parliament and of the Council of 16 April 2014 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach.



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Chapter 2 Reference 2  Standard	2. Aircraft operating procedures for noise abatement shall not be introduced unless the regulatory authority, based on appropriate studies and consultation, determines that a noise problem exists.	Article 4(3) of Directive 2002/30/EC	Not Applicable		Member States should refer to Regulation (EU) No 598/2014 of the European Parliament and of the Council of 16 April 2014 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach.
Chapter 3 Reference 3  Standard	3. Aircraft operating procedures for noise abatement shall be developed in consultation with operators that use the aerodrome concerned.		Not Applicable		Member States should refer to Regulation (EU) No 598/2014 of the European Parliament and of the Council of 16 April 2014 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach.



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Chapter 4 Reference 4  Recommendation	<p>4. <b>Recommendation.</b>— <i>The factors to be taken into consideration in the development of appropriate aircraft operating procedures for noise abatement should include the following:</i></p> <p>a) <i>the nature and extent of the noise problem including:</i></p> <p>1) <i>the location of noise-sensitive areas; and</i></p> <p>2) <i>critical hours;</i></p> <p>b) <i>the types of aircraft affected, including aircraft mass, aerodrome elevation, temperature considerations;</i></p> <p>c) <i>the types of procedures likely to be most effective;</i></p> <p>d) <i>obstacle clearances (PANS-OPS (Doc 8168), Volumes I and II); and</i></p> <p>e) <i>human performance in the application of the operating procedures.</i></p> <p><i>Note 1.— See Annex 6, Part I, Chapter 4, for aeroplane noise abatement operating procedures.</i></p> <p><i>Note 2.— Guidance material on human performance can be found in the Human Factors Training Manual (Doc 9683).</i></p>		Not Applicable		Member States should refer to Regulation (EU) No 598/2014 of the European Parliament and of the Council of 16 April 2014 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach.



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Chapter 5 Reference 5  Recommendation	5. <b>Recommendation.</b> — <i>Although in most countries, land-use planning and management are the responsibility of national and/or local planning authorities rather than aviation authorities, ICAO has developed guidance material which should be used to assist planning authorities in taking appropriate measures to ensure compatible land-use management around airports to the benefit of both the airport and the surrounding communities (Airport Planning Manual, Part 2 — Land Use and Environmental Control (Doc 9184)).</i>		Not Applicable		Member States should refer to Regulation (EU) No 598/2014 of the European Parliament and of the Council of 16 April 2014 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach.

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