Commission Directive (EU) 2015/996 of 19 May 2015 establishing common noise assessment methods according to Directive 2002/49/EC of the European Parliament and of the Council (Text with EEA relevance)

ANNEX

Appendix E

The finite segment correction

E1 GEOMETRY

The energy fraction algorithm is based on the sound radiation of a 'fourth-power' 90-degree dipole sound source. This has directional characteristics which approximate those of jet aircraft sound, at least in the angular region that most influences sound event levels beneath and to the side of the aircraft flight path.
Figure E-1

Geometry between flight path and observer location O

Aircraft designation from ANP database	B727C3
NPD-Identifier from ANP database	JT8E5
No of engines	3
Mode of operation	Departure
Actual aircraft mass [t]	71,5
Headwind [m/s]	5
Temperature [°C]	15
Airport elevation [m]	100

Segment No	Mode	Target	Flaps	Engine Power
1	Takeoff		5	Takeoff
2	Initial Climb	Altitude 1 500 ft	5	Takeoff
3	Retract Flaps	210 kts IAS ROC 750 ft/min	0	Max. Climb
4	Accelerate	250 kts IAS ROC 1 500 ft/min	0	Max. Climb
5	Climb	10 000 ft	0	Max. Climb

Figure E-1 illustrates the geometry of sound propagation between the flight path and the observer location **O**. The aircraft at **P** is flying in still uniform air with a constant speed on a straight, level flight path. Its closest point of approach to the observer is $\mathbf{P_p}$. The parameters are:

d	distance from the observer to the aircraft
d_p	perpendicular distance from the observer to the flight path (slant distance)
q	distance from **P** to $\mathbf{P_p}$ = $- V \cdot \tau$
V	speed of the aircraft
t	time at which the aircraft is at point **P**
t_p	time at which the aircraft is located at the point of closest approach $\mathbf{P_p}$

τ	flight time = time relative to time at $\mathbf{P_p}$ = $t - t_p$
ψ	angle between flight path and aircraft-observer vector

It should be noted that, since the flight time τ relative to the point of closest approach is negative when the aircraft is before the observer position (as shown in **Figure E-1**), the relative distance *q* to the point of closest approach becomes positive in that case. If the aircraft is ahead of the observer, *q* becomes negative.