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(ISO 9001 CERTIFIED)
AIR TRAFFIC MANAGEMENT DIVISION
CIVIL AVIATION DEPARTMENT
HONG KONG INTERNATIONAL AIRPORT

AIC 16 / 14 26 June 2014

**Termination of Allocation of Slots to
Marginally Compliant Chapter 3 Aircraft Operating to/from
Hong Kong International Airport**

1. Introduction

- 1.1 Since July 2002, all subsonic jet aircraft landing or taking off in Hong Kong have been required to meet the noise standards stipulated in Volume I, Part II, Chapter 3 of Annex 16 to the Convention on International Civil Aviation.
- 1.2 For the purpose of improving the local noise environment and alleviating the aircraft noise impact on the local communities, the Civil Aviation Department (CAD) has embarked on the termination of allocation of slots to flights which will be operated by Marginally Compliant Chapter 3 (MCC3) aircraft in phases. MCC3 aircraft are defined as “civil subsonic jet aircraft that meet the Chapter 3 standards by a cumulative margin of not more than 5EPNdB”. The methodology in ascertaining whether an aircraft meets this definition is shown in the Attachment hereto. Aircraft types that are commonly known as MCC3 aircraft include Boeing B727, Boeing B737 (-100 and -200 series), Boeing B747 (-100, -200, -300 and SP series), McDonnell Douglas DC-10 etc.
- 1.3 AIC 32/13 promulgated the implementation of Phase 1 of the termination whereby, commencing from the slot allocation for the Summer Schedule of 2014, the CAD will not allocate slots to flights which are proposed to be operated by MCC3 aircraft between 1500 UTC and 2259 UTC (“MCC3-Prohibited Period”).
- 1.4 To further improve the local noise environment, commencing from the slot allocation for the Winter Schedule of 2014¹ the CAD will implement Phase 2 whereby the MCC3-Prohibited Period will be extended to cover the period between 2300 UTC and 1459 UTC, i.e., no slot will be allocated to MCC3 aircraft landing or taking off in Hong Kong throughout the whole day. An advisory note was incorporated into the Slot Historic List (SHL) and the Slot Initial Allocation List (SAL) issued to aircraft operators applying for slots in the Winter Schedule of 2014 for the purpose of notifying the planned requirement for extension of MCC3-Prohibited Period.

¹ Start of Season on 26 October 2014

2. Pre-assessment of Commonly Known MCC3 Aircraft

- 2.1 As the certificated noise performance of individual aircraft may vary depending on its engineering configuration, it is possible that an aircraft, though its type is one of the commonly known MCC3 aircraft types, may not be an MCC3 aircraft. An operator is recommended to carry out a self-assessment of the noise performance of its aircraft as early as possible in accordance with the methodology in the Attachment in the first place before submitting slot requests. However, if an operator has reason(s) to believe that its aircraft, whose type is one of the commonly known MCC3 aircraft types, may NOT be classified as MCC3 aircraft, it is advised to request the CAD Airport Standards Division to conduct a noise assessment of the aircraft. The operator is required to submit the data required for such assessment which include registration mark, certificated maximum take-off mass, number of engines and certificated noise levels of each aircraft. Operators should provide documentary evidence on the data submitted. The assessment by the Airport Standards Division will be Registration Mark-specific. Each individual aircraft, which is NOT classified as MCC3 aircraft after the assessment, will be issued a Pre-assessment Non-MCC3 Reference Number.
- 2.2 The contact details of the CAD Airport Standard Division are:

Airport Standards Division
Civil Aviation Department
Level 5, CAD Headquarters
1 Tung Fai Road
Hong Kong International Airport
Lantau, Hong Kong

Telephone : (852) 2769 6969
Fax: (852) 2795 8469
Email: aircraftnoise@cad.gov.hk

3. Requesting Slots for MCC3 Aircraft

- 3.1 For a slot request proposing the use of an aircraft type commonly known as MCC3 aircraft as per the above paragraph 1.2, the CAD Hong Kong Schedule Coordination Office (HKSCO) will apply the MCC3-Prohibited Period restriction as per the above paragraph 1.4, unless the slot applicant has included in the SCR (Slot Clearance Request/Reply) message under SI (Supplementary Information) the corresponding Pre-assessment Non-MCC3 Reference Number(s) of the aircraft to be used in the proposed operation. In the absence of a valid Pre-assessment Non-MCC3 Reference Number, no slot will be confirmed or offered by HKSCO.
- 3.2 Should the slot applicant be applying for a noise assessment with Airport Standards Division at the same time as submitting the slot request, the SCR message should be emailed to HKSCO at hkgslot@cad.gov.hk and copied to Airport Standards Division at aircraftnoise@cad.gov.hk. The SCR should include (i) under SI: *Request for a noise assessment with Airport Standards Division* and (ii) as an attachment all the documentary evidence required as per the above paragraph 2.1. It should be noted that Airport Standards

Division normally needs three (3) working days after receipt of request and associated documentary evidence to assess whether the aircraft concerned may be classified as an MCC3 aircraft or not. To avoid delay to their slot requests, operators intending to operate to Hong Kong with types of aircraft which are commonly known as MCC3 aircraft as per the above paragraph 1.2 are strongly advised to submit their requests as early as possible in advance of their planned schedules to facilitate noise assessment and possible aircraft deployment planning.

4. Use of MCC3 Aircraft in Unforeseen Circumstances

- 4.1 If an operator allocated with a slot needs to operate an MCC3 aircraft due to unforeseen circumstances (such as aircraft deployment needs), the CAD will be prepared to accommodate such a request on a case-by-case basis but the operator concerned will be required to provide a written report to Airport Standards Division with the justifications within 96 hours after the flight is flown.
- 4.2 The CAD will take appropriate action against any failure to provide the written report with the justifications, repeated and intentional misuse of the above arrangement.

5. Exempted Aircraft

- 5.1 MCC3 aircraft operated for emergency, medical and humanitarian purposes are exempted from the above restriction.

6. AIC 32/13 is hereby superseded.

This Circular is issued for information, guidance and necessary action
By direction of the Director-General of Civil Aviation
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Assessment of Marginally Compliant Chapter 3 Aircraft

Example 1 – B737-200

Aircraft	:	B737-200
Maximum Take-off Weight (MTOW)	:	52,400 kg
Number of engines	:	2
Aircraft Certified Noise Limits	:	- Lateral 96.2 (EPNdB)
		- Approach 98.4 (EPNdB)
		- Flyover 87.7 (EPNdB)

Applicable standards in ICAO Annex 16, Vol. 1, Chapter 3, 3.4.1

Table

M = Maximum take-off mass in 1 000 kg		0	20.2	28.6	35	48.1	280	385	400
Lateral full-power noise level (EPNdB) All aeroplanes		94		80.87 + 8.51 log M				103	
Approach noise level (EPNdB) All aeroplanes		98		86.03 + 7.75 log M				105	
Flyover noise levels (EPNdB)	2 engines or less	89		66.65 + 13.29 log M				101	
	3 engines	89		69.65 + 13.29 log M				104	
	4 engines or more	89		71.65 + 13.29 log M				106	

Calculation of ICAO Limits

a) Lateral Full Power (L)

$$\begin{aligned}
 L &= 80.87 + 8.51 \log (52,400/1,000) \\
 &= \underline{95.5 \text{ (EPNdB)}}
 \end{aligned}$$

b) Approach (A)

$$\begin{aligned}
 A &= 86.03 + 7.75 \log (52,400/1,000) \\
 &= \underline{99.4 \text{ (EPNdB)}}
 \end{aligned}$$

c) Flyover (F)

As the aircraft has 2 engines and with MTOW 52,400 kg, the equation $66.65 + 13.29 \log M$ applies.

$$\begin{aligned}
 F &= 66.65 + 13.29 \log (52,400/1,000) \\
 &= \underline{89.5 \text{ (EPNdB)}}
 \end{aligned}$$

Assessment of compliance

ICAO Cumulative Limits

$$L+A+F = \underline{284.4 \text{ (EPNdB)}} \quad \text{---(1)}$$

$$\begin{aligned} \text{Aircraft Cumulative} &= 96.2 \text{ (Lateral)} + \\ \text{Certified Limits} &98.4 \text{ (Approach)} + \\ &87.7 \text{ (Flyover)} \\ &= \underline{282.3 \text{ (EPNdB)}} \quad \text{---(2)} \end{aligned}$$

$$\begin{aligned} \text{Difference} &= (1) - (2) \\ &= \underline{2.1 \text{ (EPNdB)}} \end{aligned}$$

Conclusion

Since the difference is smaller than the threshold (5 EPNdB), this aircraft is a MCC3 aircraft.

Assessment of Marginally Compliant Chapter 3 Aircraft

Example 2 – B747-200

Aircraft	:	B747-200
Maximum Take-off Weight (MTOW)	:	377,842 kg
Number of engines	:	4
Aircraft Certified Noise Limits	:	- Lateral 103.5 (EPNdB)
		- Approach 104.4 (EPNdB)
		- Flyover 103.1 (EPNdB)

Applicable standards in ICAO Annex 16, Vol. 1, Chapter 3, 3.4.1

Table

M = Maximum take-off mass in 1 000 kg										0	20.2	28.6	35	48.1	280	385	400
Lateral full-power noise level (EPNdB) All aeroplanes		94		80.87 + 8.51 log M										103			
Approach noise level (EPNdB) All aeroplanes		98		86.03 + 7.75 log M										105			
Flyover noise levels (EPNdB)	2 engines or less	89			66.65 + 13.29 log M										101		
	3 engines	89		69.65 + 13.29 log M										104			
	4 engines or more	89	71.65 + 13.29 log M										106				

377.842

377.842

Calculation of ICAO Limits

a) Lateral Full Power (L)

$$L = 80.87 + 8.51 \log (377,842/1,000)$$

$$= \underline{\underline{102.8 \text{ (EPNdB)}}}$$

b) Approach (A)

$$A = \underline{\underline{105.0 \text{ (EPNdB)}}}$$

c) Flyover (F)

As the aircraft has 4 engines and with MTOW 377,842 kg, the equation $71.65 + 13.29 \log M$ applies.

$$F = 71.65 + 13.29 \log (377,842/1,000)$$

$$= \underline{\underline{105.9 \text{ (EPNdB)}}}$$

Assessment of compliance

ICAO Cumulative Limits

$$L+A+F = \underline{313.7 \text{ (EPNdB)}} \quad \text{---(1)}$$

$$\begin{aligned} \text{Aircraft Cumulative} &= 103.5 \text{ (Lateral)} + \\ \text{Certified Limits} &104.4 \text{ (Approach)} + \\ &103.1 \text{ (Flyover)} \\ &= \underline{311.0 \text{ (EPNdB)}} \quad \text{---(2)} \end{aligned}$$

$$\begin{aligned} \text{Difference} &= (1) - (2) \\ &= \underline{2.7 \text{ (EPNdB)}} \end{aligned}$$

Conclusion

Since the difference is smaller than the threshold (5 EPNdB), the aircraft is a MCC3 aircraft.

Assessment of Marginally Compliant Chapter 3 Aircraft

Example 3 – DC-10

Aircraft	:	DC-10
Maximum Take-off Weight (MTOW)	:	263,084 kg
Number of engines	:	3
Aircraft Certified Noise Limits	:	- Lateral 98.0 (EPNdB)
		- Approach 106.0 (EPNdB)
		- Flyover 98.6 (EPNdB)

Applicable standards in ICAO Annex 16, Vol. 1, Chapter 3, 3.4.1

Table

M = Maximum take-off mass in 1 000 kg		0	20.2	28.6	35	48.1		280	385	400
Lateral full-power noise level (EPNdB)	All aeroplanes	94	80.87 + 8.51 log M							103
Approach noise level (EPNdB)	All aeroplanes	98	86.03 + 7.75 log M						105	
Flyover noise levels (EPNdB)	2 engines or less	89		66.65 + 13.29 log M						101
	3 engines	89	69.65 + 13.29 log M							104
	4 engines or more	89	71.65 + 13.29 log M							106

263.084



Calculation of ICAO Limits

a) Lateral Full Power (L)

$$\begin{aligned}
 L &= 80.87 + 8.51 \log (263,084/1,000) \\
 &= \underline{\underline{101.5 \text{ (EPNdB)}}}
 \end{aligned}$$

b) Approach (A)

$$\begin{aligned}
 A &= 86.03 + 7.75 \log (263,084/1,000) \\
 &= \underline{\underline{104.8 \text{ (EPNdB)}}}
 \end{aligned}$$

c) Flyover (F)

As the aircraft has 3 engines and with MTOW 263,084 kg, the equation $69.65 + 13.29 \log M$ applies.

$$\begin{aligned}
 F &= 69.65 + 13.29 \log (263,084/1,000) \\
 &= \underline{\underline{101.8 \text{ (EPNdB)}}}
 \end{aligned}$$

Assessment of compliance

ICAO Cumulative Limits

$$L+A+F = \underline{308.1 \text{ (EPNdB)}} \quad \text{---(1)}$$

$$\begin{aligned} \text{Aircraft Cumulative Limits} &= 98.0 \text{ (Lateral)}+ \\ &106.0 \text{ (Approach)}+ \\ &98.6 \text{ (Flyover)} \\ &\underline{302.6 \text{ (EPNdB)}} \quad \text{---(2)} \end{aligned}$$

$$\begin{aligned} \text{Difference} &= (1) - (2) \\ &= \underline{5.5 \text{ (EPNdB)}} \end{aligned}$$

Conclusion

Since the difference is larger than the threshold (5 EPNdB), this aircraft is **NOT** a MCC3 aircraft.

Assessment of Marginally Compliant Chapter 3 Aircraft

Example 4 – B747-400

Aircraft	:	B747-400F
Maximum Take-off Weight (MTOW)	:	396,893 kg
Number of engines	:	4 x Rolls Royce RB211-524G3-19
Aircraft Certified Noise Limits	:	- Lateral 98.0 (EPNdB) - Approach 104.0 (EPNdB) - Flyover 100.8 (EPNdB)

Applicable standards in ICAO Annex 16, Vol. 1, Chapter 3, 3.4.1

Table

M = Maximum take-off mass in 1 000 kg		0	20.2	28.6	35	48.1	280	385	400
Lateral full-power noise level (EPNdB) All aeroplanes		94		80.87 + 8.51 log M				103	
Approach noise level (EPNdB) All aeroplanes		98		86.03 + 7.75 log M				105	
Flyover noise levels (EPNdB)	2 engines or less	89		66.65 + 13.29 log M				101	
	3 engines	89		69.65 + 13.29 log M				104	
	4 engines or more	89		71.65 + 13.29 log M				106	

396.893

Calculation of Limits

a) Lateral Full Power (L)

$$\begin{aligned}
 L &= 80.87 + 8.51 \log (396,893/1,000) \\
 &= \underline{\underline{103 \text{ (EPNdB)}}}
 \end{aligned}$$

b) Approach (A)

$$A = \underline{\underline{105.0 \text{ (EPNdB)}}}$$

c) Flyover (F)

As the aircraft has 4 engines and with MTOW 350,000 kg, the limit of 106 EPNdB applies

$$F = 106.0 \text{ EPNdB}$$

Assessment of compliance

ICAO Cumulative Limits

$$L+A+F = \underline{314.0 \text{ (EPNdB)}} \quad \text{---(1)}$$

$$\begin{aligned} \text{Aircraft Cumulative Limits} &= 98.0 \text{ (Lateral)} + \\ &\quad 104.0 \text{ (Approach)} + \\ &\quad 100.8 \text{ (Flyover)} \\ &= \underline{302.8 \text{ (EPNdB)}} \quad \text{---(2)} \end{aligned}$$

$$\begin{aligned} \text{Difference} &= (1) - (2) \\ &= \underline{11.2 \text{ (EPNdB)}} \end{aligned}$$

Conclusion

Since the difference is larger than the threshold (5 EPNdB), this aircraft is **NOT** a MCC3 aircraft.