AEM

Area Equivalent Method
Version 2c SP2

User's Guide

January 2018

Federal Aviation Administration
Office of Environment and Energy
Washington, DC 20591

1. Introduction

The Area Equivalent Method (AEM) is a screening procedure used to simplify the assessment step in determining the need for further analysis with the Aviation Environmental Design Tool (AEDT) as part of Environmental Assessments and Impact Statements (EA/EIS) and Federal Aviation Regulations (FAR) Part 150 studies. The AEM calculates changes in noise using the algorithms found in AEDT 2c SP2.

1.1. Change in Noise Area

AEM is a mathematical procedure that provides an estimated change in noise contour area for an airport given the types of aircraft and the number of operations for each aircraft. The noise contour area is a measure of the size of the landmass enclosed within a level of noise as produced by a given set of aircraft operations.

The noise contour metric is the Day-Night Average Sound Level (DNL) which provides a single quantitative rating of a noise level over a 24-hour period. This rating involves a 10-dBA penalty to aircraft operations during the nighttime (between 10 PM and 7 AM) to account for the increased annoyance in the community.

The AEM produces noise contour areas (in square miles) for the DNL 65 dBA noise level and the purpose of AEM is to screen for significant impact within the 65 dBA contour area. The user may specify other contour levels to obtain supplemental information. The AEM is used to develop insight into the potential increase or decrease of noise resulting from a change in aircraft operations.

This version of the model has been developed in a spreadsheet format using Microsoft Excel 2010 and is based upon AEDT 2c SP2 and its fixed-wing aircraft database covering 279 aircraft types.

1.2. Installation

AEM2cSp2 is designed for use on Microsoft Windows /7 PC and later operating systems under Microsoft Excel 2010 and later. There is no formal installation; only a requirement that the user have a copy of Microsoft Excel 2010 or later on their machine.

2. Description

2.1. Background

According to FAA Order 1050.lF, “Policies and Procedures for Considering Environmental Impacts,” an assessment must be made to determine the noise impact of a proposed airport action. This assessment compares the present noise impact on the environment with that of the proposed change. If the noise impact is significant, DNL 1.5 dBA increase at noise sensitive areas, then the FAA requires an Environmental Impact Statement (EIS). If the increase of noise impact on the community is not significant then the FAA prepares a Finding of No Significant Impact (FONSI), which briefly outlines the specifications of the change in airport operations for that particular airport.

The aircraft noise analysis for an EIS is a detailed process that requires use of an airport noise computer model such as the AEDT (Reference 1). AEDT can produce a DNL noise contour area based on flight track locations, operations (e.g., a specific mix of aircraft) and takeoff procedures and plots the contour relative to runway configuration. AEDT is a useful model for airport planners, airport operators, and local governments in assessing the noise impact to the community around an airport. AEDT offers the capability to analyze several operational controls beyond simply changing aircraft mix and number of operations. AEDT is the most appropriate tool for EISs and other federally funded airport environmental studies.

The old Civil Aeronautics Board (CAB) developed the Noise Screening Methodology to decide whether the noise impact due to a change is significant. CAB promulgated this noise screening procedure in 14 CFR 312, Appendix I. It was commonly called the "CAB Procedure." CAB established a decision criterion of 17% increase in cumulative noise contour area. A 17% increase in cumulative noise contour area translates into a one-decibel increase in the airport noise. If the percentage difference due to the change is less than 17%, no further study is necessary. The AEM is an outgrowth of the CAB Procedure. The FAA applies the same decision criterion to AEM as the CAB did with the Noise Screening Methodology.

The AEM is a screening procedure used to simplify the assessment step in determining the need for an EIS or further analysis with AEDT. The purpose of the AEM is to show change in airport DNL noise contour area relative to a change in aircraft mix and number of operations. AEM determines the DNL noise contour area in square miles for a mix and number of aircraft types by using linear regressions that relate DNL noise contour area as a function of the number of annual daily average operations. These AEM parameters are derived from AEDT and generated for each aircraft. A process developed from a Civil Aeronautics Board procedure allows AEM to combine the areas of individual aircraft in order to obtain a single contour for the airport under examination. These are general relationships that relate contour area to number of operations. It is to be used when the analysis can assume similar runway and flight track utilization between the basecase and the alternative.

In their report dated August 1992, the Federal Interagency Committee on Noise (FICON) (Reference 2) along with 1050.1F, recommended the use of AEM as a screening tool to determine the need for additional environmental noise analysis. FICON, which was composed of representatives from several Federal Government agencies, as chartered to review specific elements of federal agency procedures for the assessment of airport noise impacts and to make appropriate recommendations. In Volume 2, paragraph 3.3.1.1, of their report, they recommend the use of screening to determine the extent of noise analysis required. As with 1050.1F, FICON also established an increase of 17 percent or more in contour area as the threshold of significance for AEM within a DNL 65 dBA contour. A 17 percent increase indicates that the proposed action could result in a DNL 1.5 dBA or greater increase at a noise sensitive area and that further analysis is required. Conversely, if the screening process shows less than a 17 percent increase, it may be concluded that there are no significant impacts on a noise sensitive area.

The Office of Environment and Energy (AEE) has had nine previous releases of the AEM which are listed in Appendix A - References

2.2. How AEM Works

2.2.1. Contour Area Estimation

AEM is a method to predict contour area or noise level changes that correlate highly with AEDT predictions. The activity at airports can be expressed in terms of equivalent aircraft operations and reasonable estimates of impact area can be obtained without the use of more sophisticated and expensive computer modeling. Many studies, particularly those dealing with national impacts, have used variations of the “equivalency" approach. The basic hypothesis of AEM is that while equivalencies can be developed the nature of the relationship changes with the distance between the aircraft and the observation point. This assumption can be illustrated by considering noise versus distance curves--a basic input to models like AEDT--for two hypothetical aircraft as shown in Figure 1.

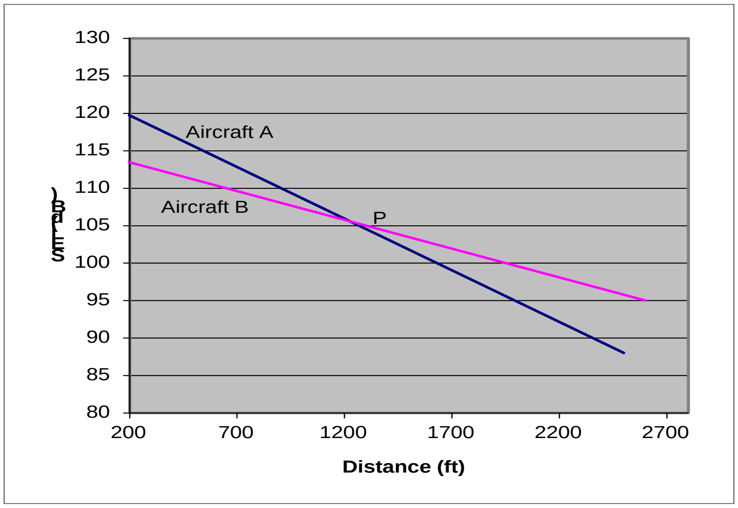


Figure 1: Noise Versus Distance

The curves for both aircraft A and B are at constant thrust level and noise for both decreases with distance. Note that at a distance from the aircraft of less than P, aircraft A is noisier while beyond P, aircraft B is noisier. At P, both aircraft emit the same noise levels and the equivalence between them is 1.0.

J. Watson Noah, Inc. developed an iterative process for using AEM and aircraft mix to estimate area and compared AEM estimates to available INM (Integrated Noise Model) estimates for 30 NEF (DNL 65 dBA). AEM estimates were based on single direction traffic on a single runway. This process is also used when estimating contours using AEDT.

2.2.2. Using AEM Effectively

AEM is a screening tool for AEDT and a quick way to assess the impact of changes in aircraft mix or number of operations as part of an EA, FONSI, or other environmental noise study. *If there is a 17% increase in DNL 65 dB contour area then further analysis is necessary using AEDT.*

AEM calculations are developed on the basis of a single runway, one-way traffic flow configuration-arrivals in and departures out in the same direction. AEM does not produce contours, only an estimate (in square miles) of the area impacted. This does not mean, however, that AEM usage and analysis are limited only to airports that have single runway, single flight track configurations. Airports with multiple runway and multiple flight tracks can also be assessed using AEM that models all operations on a single runway, single flight track configuration.

Whether an AEM-proposed screening analysis is appropriate depends upon the changes under study in the airport vicinity. *AEM use is limited to changes in fleet mix and number of operations.* It cannot be used to evaluate new procedures, alternative track load, or any other changes to airspace structure or utilization that would alter the location of aircraft flights, corresponding noise, and the general shape of the contour.

AEM is most often used prior to AEDT analysis to determine if AEDT is required for the specified type of changes, but it can also be used after initial AEDT evaluation in certain circumstances to refine analysis. Whether AEM results are acceptable depends both on the threshold of 17 percent area increase (an increase of approximately DNL 1.5 dBA distributed proportionately with no change in contour shape) and the level of public controversy surrounding the study project. Particular attention should be paid to the possibility of additional noise impact to sensitive locations, in which case it may be better to use or rerun AEDT to develop contours.

3. Noise Contour Area Development

3.1. Description

The AEM determines the DNL noise contour area (in square miles) for a specific case of aircraft operations, given the mix of aircraft types and the number of *landing-takeoff cycles* (LTO's) per aircraft. In order to create the AEM, aircraft specific parameters relating DNL noise contour areas to LTO's were derived from AEDT output for DNL 65 dBA. These parameters, represented by the variables ***a*** and ***b***, are constants that produce the DNL 65 dBA contour area due to a specific number of operations of an aircraft from the following equation:

$$A = a * N ^\wedge b$$

The constant ***a*** is the noise contour area in square miles of a single LTO for an aircraft. The constant ***b*** is a scaling parameter that determines the change in contour area, relative to a change in number of effective LTO's for an aircraft. The noise contour area ***A*** is the result of applying the parameters ***a*** and ***b*** to ***N***, the number of effective LTO's. The number of effective LTO's is the sum of the daytime LTO's and the nighttime LTO's of an aircraft. The nighttime LTO's are weighted by a multiple of 10 to account for the increase in annoyance to the community during the nighttime hours between 10 p.m. and 7 a.m.

Contour values other than DNL 65 dBA are estimated by logarithmically scaling the LTO cycle input file to estimate mathematically equivalent contour values (for example, a ten-fold increase in LTO cycles converts the DNL 65 dBA contour into the DNL 75 dBA contour).

3.2. Calculation of Parameters and Coefficients

AEDT version 2c SP2 algorithms are used to produce aircraft noise contour areas for specific numbers of LTO's. 247 aircraft types from AEDT version 2c SP2 database met the AEM inclusion criteria which requires that the aircraft contain representative takeoff and approach procedures. The ***a*** and ***b*** parameters were determined from the linear regression equation:

$$\log A = \log a + b * \log N$$

By taking the antilog of both sides of this equation it converts to the form $A = aN^b$.

The parameters ***a*** and ***b*** were calculated based on running AEDT only once for each aircraft type, using 100 LTO cycles, and requesting contour areas for eight contour intervals. The eight contour intervals equate to DNL 65 dBA for 100 LTO's at different values of LTO's cycles. The result of this exercise was the area of the DNL 65 dBA contour as a function of LTO cycles at eight intervals over a range covering a 100-fold increase in LTO cycles. In general, areas that are less than 1.4 square miles are excluded from the regression sample to obtain the best possible predictive value for areas that are off airport property.

An example of producing the a and b AEM parameters for the 707 is shown below:

Step 1. Create an AEDT 2c SP2 study with one runway, traffic in one direction, 100 LTO's (100 takeoffs and 100 arrivals) per aircraft, and requesting contour areas for eight contour intervals.
Step 2. Run AEDT 2c SP2 to find corresponding contour areas for each aircraft type.
Step 3. Using the equation derived above and regression analysis, determine the parameters ***a*** and ***b***. For example, the AEM parameters for the 707 were obtained in the following manner:

First, the AEDT run produced the following contour areas:

Table 1: Example AEDT Results

DNL (dBA)	Equivalent LTO's for DNL 65 dBA (N)	DNL 65 dBA Contour Area (A)
55	1000	25.4
58	500	16.7
62	200	9.2
65	100	6.0
68	50	3.7
72	20	2.0
75	10	1.3
85	1	0.5

Because the contour area for DNL 75 and 85 dBA are less than 1.4 square miles, they were discarded.

Next, the logarithm base 10 of ***N*** and ***A*** resulted in:

Table 2: Example Log Results

DNL (dBA)	Log N	Log A
55	3.0	1.4
58	2.69897	1.22
62	2.30103	0.964
65	2.0	0.778
68	1.69897	0.568
72	1.30103	0.301

Finally, using regression analysis, the parameters ***a*** and ***b*** were produced for the 707:

a = 0.291876116 and ***b*** = 0.649727389

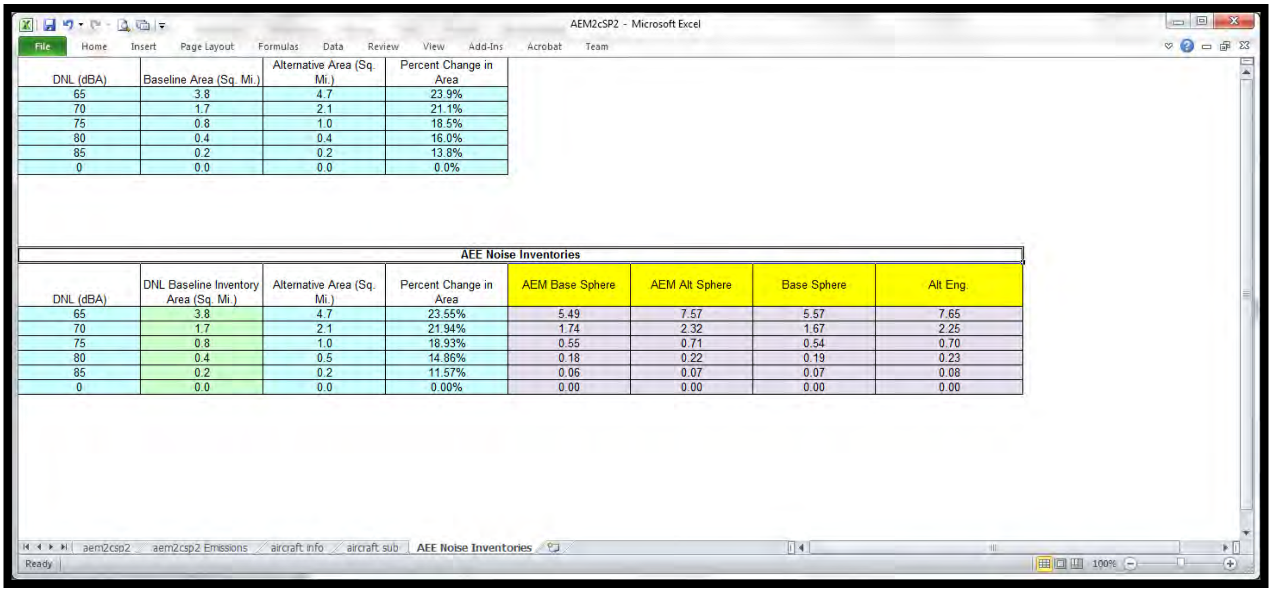
4. User Specified Baseline Area Comparisons

The AEM has the ability to estimate contour differences using the noise contour values generated from AEE Inventory studies. Use of this feature requires permission from AEE. The methodology is described below:

1. The AEM area is the equatorial area of a sphere whose volume is proportional to the acoustic energy from each aircraft operation.
2. Determine the spherical volume of the noise inventory baseline, the AEM partial baseline and AEM partial alternative.
3. The AEM partial baseline volume is then subtracted and the AEM partial alternative volume is then added to the noise inventory baseline volume.
4. The equatorial area of the resulting volume is then determined as the final Alternative Area.
5. Baseline vs. Alternative "Change in Area" percentages are computed for the specified DNL dB values.

To utilize this feature:

1. Enter the alternative operations and calculate the area for each of the desired dB levels using the "aem2csp2" worksheet. The areas will be displayed in the "AEE Noise Inventory" worksheet for reference as they are used in the calculations.
2. Enter the baseline inventory DNL contour areas in under the "DNL Baseline Inventory Area". You will be prompted to enter the password to unlock these cells.
3. The "Change in Area" column will update automatically.



DNL (dBA)	Baseline Area (Sq. Mi.)	Alternative Area (Sq. Mi.)	Percent Change in Area
65	3.8	4.7	23.9%
70	1.7	2.1	21.1%
75	0.8	1.0	18.5%
80	0.4	0.4	16.0%
85	0.2	0.2	13.8%
0	0.0	0.0	0.0%

AEE Noise Inventories

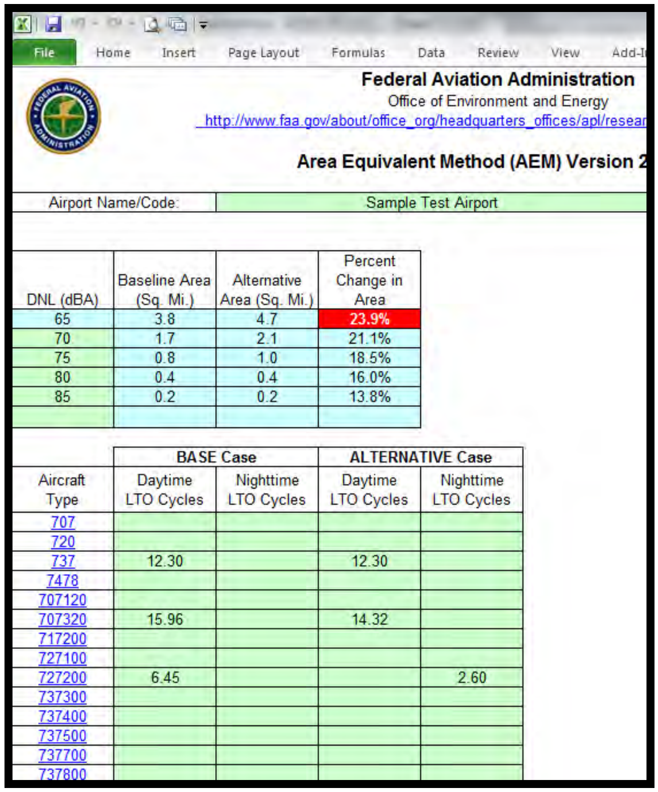
DNL (dBA)	DNL Baseline Inventory Area (Sq. Mi.)	Alternative Area (Sq. Mi.)	Percent Change in Area	AEM Base Sphere	AEM Alt Sphere	Base Sphere	Alt Eng.
65	3.8	4.7	23.55%	5.49	7.57	5.57	7.65
70	1.7	2.1	21.94%	1.74	2.32	1.67	2.25
75	0.8	1.0	18.93%	0.55	0.71	0.54	0.70
80	0.4	0.5	14.86%	0.18	0.22	0.19	0.23
85	0.2	0.2	11.57%	0.06	0.07	0.07	0.08
0	0.0	0.0	0.00%	0.00	0.00	0.00	0.00

5. Example AEM Analysis

1. Download and save the Excel spreadsheet to your PC.

2. Go to the folder where you saved the file and double-click on AEM2cSP2.xlsm icon.

3. You can now enter the appropriate information/data manually into the fields highlighted in GREEN. (Note: Data entry is restricted to the GREEN fields.) Results will be displayed in the fields highlighted in BLUE, which cannot be altered even though the cells can be selected. Navigating through the spreadsheet is accomplished by simply using the tab key, arrow keys, vertical scroll bar, page up/page down keys or mouse. The message window, shown below, will prompt the user to enter values within the appropriate ranges. Typically, the message window appears initially near the cell where the data is being entered, but can easily be dragged with the mouse to wherever the user wishes.



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Federal Aviation Administration
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Area Equivalent Method (AEM) Version 2

Airport Name/Code:	Sample Test Airport

DNL (dBA)	Baseline Area (Sq. Mi.)	Alternative Area (Sq. Mi.)	Percent Change in Area
65	3.8	4.7	23.9%
70	1.7	2.1	21.1%
75	0.8	1.0	18.5%
80	0.4	0.4	16.0%
85	0.2	0.2	13.8%

	BASE Case		ALTERNATIVE Case	
Aircraft Type	Daytime LTO Cycles	Nighttime LTO Cycles	Daytime LTO Cycles	Nighttime LTO Cycles
707				
720				
737	12.30		12.30	
7478				
707120				
707320	15.96		14.32	
717200				
727100				
727200	6.45			2.60
737300				
737400				
737500				
737700				
737800				

4. For those who are "cutting and pasting" information into the spreadsheet from another workbook you must use **[PASTE SPECIAL]** and specify **[VALUE]** otherwise the entire field is overwritten. When this occurs simply click "undo" and the field will be restored. Although the spreadsheet is formatted to validate data, data validation is only accurate with manual entry. If you AutoFill, copy drag, or drag an invalid value to a cell with data validation restrictions, the data validation restrictions are removed from the cell. **Use extra CAUTION to ensure that all data entered are within the specified ranges**.

5. Note in the example that the first DNL field is shaded BLUE indicating that the data cannot be changed and that the value has been fixed at 65 dBA.

6. If the model detects a 17% increase in contour area, the top row DNL 65 dBA "Change in Area" will become highlighted by turning RED thus alerting the user that the proposed action could result in a significant impact. At this stage, the comparison of baseline to alternative is beyond the scope of a simple model and a more detailed analysis using AEDT would be required.

Appendix A - References

1. FAA, ATAC and Volpe Center, (AEDT) User's Guide, March 2017.
2. FAA, ATAC and Volpe Center, AEDT2cSP2 Technical Manual, March 2017.
3. Federal Interagency Committee on Noise, Federal Agency Review of Selected Airport Noise Analysis Issues, August 1992.
4. Connor, T.L., and Fortescue, D.N., Area Equivalent Method on VISICALC, FAA-E-84-8, February 1984.
5. Warren, D.G., Area Equivalent Method on LOTUS l-2-3, FAA-EE-84-12, July 1984.
6. Nguyen, N.C., AEM - Area Equivalent Method, Version 2, User's Manual, FAA-EE-90-O 1, November 1989.23
7. Studholme, E.D., Grimsley, G., Plante, J.A., Warren, D.G., AEM - Area Equivalent Method, Version 3, User's Guide, DOT/FAA/EE-96-04, September 1996.
8. Studholme, E.D., Grimsley, G., Plante, J.A., Warren, D.G., Rickel, Denise N., AEM - Area Equivalent Method, Version 6.0c, User's Guide, DOT/FAA/EE-01-11, November 2001.
9. Studholme, E.D., Grimsley, G., Plante, J.A., Warren, D.G., Rickel, Denise N., AEM - Area Equivalent Method, Version 6.2a, User's Guide, DOT/FAA/EE-06-10, October 2006.
10. Studholme, E.D., Grimsley, G., Plante, J.A., Warren, D.G., Rickel, Denise N., AEM - Area Equivalent Method, Version 7.0, User's Guide, DOT/FAA/EE-08-01, January 2008.
11. Studholme, E.D., Grimsley, G., Plante, J.A., Warren, D.G., Rickel, Denise N., AEM - Area Equivalent Method, Version 7.0c, User's Guide, DOT/FAA/EE-12-04, April 2012.
12. Studholme, E.D., Grimsley, G., Plante, J.A., Warren, D.G., Rickel, Denise N., AEM - Area Equivalent Method, Version 7.0d, User's Guide, DOT/FAA/EE-13-07, July 2013.

Appendix B – Available Aircraft Types from AEDT 2c SP2

Aircraft Type	Aircraft Description	Takeoff Weight (lbs)	Noise ID/Stage
707	BOEING 707-120/JT3C	302400	1
720	BOEING 720/JT3C	223500	1
737	BOEING 737/JT8D-9	109000	1
7478	Boeing 747-8F/GEnx-2B67	987000	4
707120	BOEING 707-120B/JT3D-3	302400	1
707320	BOEING 707-320B/JT3D-7	334000	1
717200	BOEING 717-200/BR 715	121000	3
727100	BOEING 727-100/JT8D-7	169500	1
727200	BOEING 727-200/JT8D-7	217600	1
737300	BOEING 737-300/CFM56-3B-1	135000	3
737400	BOEING 737-400/CFM56-3C-1	150000	3
737500	BOEING 737-500/CFM56-3C-1	133500	3
737700	BOEING 737-700/CFM56-7B24	154500	3
737800	BOEING 737-800/CFM56-7B26	174200	3
747100	BOEING 747-100/JT9DBD	733000	2
747200	BOEING 747-200/JT9D-7	775000	3
747400	BOEING 747-400/PW4056	875000	4
757300	BOEING 757-300/RB211-535E4B	275000	3
767300	BOEING 767-300/PW4060	407000	3
767400	BOEING 767-400ER/CF6-80C2B(F)	450000	3
777200	BOEING 777-200ER/GE90-90B	656000	3
777300	BOEING 777-300/TRENT892	660000	3
1900D	BEECH 1900D / PT6A67	16950	1
707QN	BOEING 707-320B/JT3D-7QN	334000	2
720B	BOEING 720B/JT3D-3	234000	1
727D15	BOEING 727-200/JT8D-15	208000	1
727D17	BOEING 727-200/JT8D-17	208000	2
727EM1	FEDX 727-100/JT8D-7	169500	3
727EM2	FEDX 727-200/JT8D-15	208000	3
727Q15	BOEING 727-200/JT8D-15QN	208000	2
727Q7	BOEING 727-100/JT8D-7QN	169500	2
727Q9	BOEING 727-200/JT8D-9	191000	2
727QF	UPS 727100 22C 25C	169000	3
7373B2	BOEING 737-300/CFM56-3B-2	139500	3
737D17	BOEING 737-200/JT8D-17	124000	2
737200	B737-200/JT8D-17 NORDAM B737 LGW HUSHKIT	124000	3
737N9	B737/JT8D-9 NORDAM B737 LGW HUSHKIT	109000	3
737QN	BOEING 737/JT8D-9QN	109000	2

74710Q	BOEING 747-100/JT9D-7QN	733000	3
74720A	BOEING 747-200/JT9D-7A	785000	3
74720B	BOEING 747-200/JT9D-7Q	800000	3
747SP	BOEING 747SP/JT9D-7	702000	3
757PW	BOEING 757-200/PW2037	255000	3
757RR	BOEING 757-200/RB211-535E4	255000	3
767CF6	BOEING 767-200/CF6-80A	315500	3
767JT9	BOEING 767-200/JT9D-7R4D	351000	3
7773ER	Boeing 777-300ER/GE90-115B-EIS	775000	3
7878R	Boeing 787-8/T1000-C/01 Family Plan Cert	502500	4
A10A	FAIRCHILD THUNDERBOLT II TF34-GE-100 NM	50000	0
A3	MCDONNELL DOUGLAS SKYWARRIOR J79-GE-8 NM	80000	0
A300-622R	A300-622R\PW4168	378533	3
A300B4-203	AIRBUS A300B4-200/CF6-50C2	364000	3
A310-304	A310-304\GE CF6-80 C2A2	346126	3
A319-131	A319-131\IAE V2522-A5	166449	4
A320-211	A320-211\CFM56-5A1	169756	4
A320-232	A320-232\V2527-A5	169756	4
A321-232	A321-232\V2530-A5	196211	3
A330-301	A330-301\GE CF6-80 E1A2	467380	4
A330-343	A330-343\RR TRENT 772B	513677	4
A340-211	A340-211\CFM56-5C2	566588	3
A340-642	A340-642\Trent 556	804687	4
A37	CESSNA DRAGONFLY J85-GE-17A NM	14399	0
A380-841	A380-841\RR trent970	1254430	4
A380-861	A380-861\EA GP7270	1254430	4
A4C	MCDONNELL DOUGLAS SKYHAWK J52-P-8A NM	24490	0
A6A	GRUMMAN INTRUDER J52-P-8B NM	60400	0
A7D	A-7D,E/TF-41-A-1	42000	0
A7E	VOUGHT CORSAIR II TF41-A-2 NM	42000	0
B1	ROCKWELL LANCER F101-GE-102 NM	477000	0
B2A	F118-GE-110 NM	376000	0
B52BDE	BOEING STRATOFORTRESS J57P-19W NM	420000	0
B52G	BOEING STRATOFORTRESS J57-P-43WB NM	488000	0
B52H	BOEING STRATOFORTRESS B52H NM	0	0
B57E	ENGLISH ELECTRIC CANBERRA J57-PW-P-5 NM	54800	0
BAC111	BAC111/SPEY MK511-14	89600	2
BAE146	BAE146-200/ALF502R-5	93000	3
BAE300	BAE146-300/ALF502R-5	97500	3
BEC58P	BARON 58P/TS10-520-L	6100	0

C118	MCDONNELL DOUGLAS LIFT PW R-2800-CB17 NM	107000	0
C12	BEECH SUPER KING AIR HURON PW PT6A-41 NM	12500	0
C130	C-130H/T56-A-15	155000	3
C130AD	LOCKHEED HERCULES T56-A15 NM	175000	0
C130E	C-130E/T56-A-7	155000	0
C-130E	LOCKHEED HERCULES T56-A15 C130E NM	175000	0
C130HP	LOCKHEED HERCULES C130HP NM	0	0
C131B	GENERAL DYNAMICS CV34 PW R-2800-99W NM	41740	0
C135A	BOEING STRATOLIFTER PW J57-59W NM	300000	0
C135B	BOEING STRATOLIFTER C135B NM	300000	0
C137	JT3D-3B NM	322000	0
C140	LOCKHEED JETSTAR TFE731-3 NM	44507	0
C141A	LOCKHEED STARLIFTER TF-33-P-7 NM	342283	0
C17	F117-PW-100 NM	585000	0
C18A	JT41-11 NM	331000	0
C-20	GULFSTREAM III MK611-8RR NM	74600	0
C21A	LEARJET 35 TFE731-2-2B NM	18300	0
C22	BOEING 727 TRS18-1 NM	0	0
C23	PT6A-65AR NM	25600	0
C5A	LOCKHEED GALAXY TF39-GE-1 NM	769000	0
C7A	DEHAVILLAND CARIBOU DHC-4A NM	0	0
C9A	MCDONNELL DOUGLAS DC9 JT8D-9 NM	121000	0
CIT3	CIT 3/TFE731-3-100S	20000	3
CL600	CL600/ALF502L	36000	3
CL601	CL601/CF34-3A	43100	3
CNA172	CESSNA 172R / LYCOMING IO-360-L2A	2450	0
CNA182	Cessna 182H / Continental O-470-R	2800	2
CNA182FLT	Cessna 182S/Wipline amphibious floats	3100	0
CNA206	CESSNA 206H / LYCOMING IO-540-AC	3600	0
CNA208	Cessna 208 / PT6A-114	8750	3
CNA20T	CESSNA T206H / LYCOMING TIO-540-AJ1A	3600	0
CNA441	CONQUEST II/TPE331-8	9900	0
CNA500	CIT 2/JT15D-4	14700	3
CNA510	510 CITATION MUSTANG	8645	4
CNA525C	Cessna Model 525C CJ4	16950	4
CNA55B	CESSNA 550 CITATION BRAVO / PW530A	14800	4
CNA560E	Cessna Citation Encore 560 / PW535A	16300	3
CNA560U	Cessna Citation Ultra 560 / JT15D-5D	16300	3
CNA560XL	Cessna Citation Excel 560 / PW545A	20000	3
CNA680	Cessna Model 680 Sovereign / PW306C	30000	3

CNA750	CITATION X / ROLLS ROYCE ALLISON AE3007C	35700	3
COMJET	1985 BUSINESS JET	19200	1
COMSEP	1985 1-ENG COMP	2440	0
CONCRD	CONCORDE/OLY593	400000	0
CRJ9-ER	CL-600-2D15/CL-600-2D24/CF34-8C5	82500	4
CRJ9-LR	CL-600-2D15/CL-600-2D24/CF34-8C5	84500	3
CVR580	CV580/ALL 501-D15	58000	3
DC1010	DC10-10/CF6-6D	455000	3
DC1030	DC10-30/CF6-50C2	572000	3
DC1040	DC10-40/JT9D-20	555000	3
DC3	DC3/R1820-86	28000	0
DC6	DC6/R2800-CB17	106000	0
DC820	DC-8-20/JT4A	317600	1
DC850	DC8-50/JT3D-3B	325000	1
DC860	DC8-60/JT3D-7	355000	1
DC870	DC8-70/CFM56-2C-5	355000	3
DC8QN	DC8-60/JT8D-7QN	355000	2
DC910	DC9-10/JT8D-7	90700	1
DC930	DC9-30/JT8D-9	114000	3
DC93LW	DC9-30/JT8D-9 W/ ABS LIGHTWEIGHT HUSHKIT	114000	3
DC950	DC9-50/JT8D-17	121000	2
DC95HW	DC9-50/JT8D17 W/ ABS HEAVYWEIGHT HUSHKIT	121000	3
DC9Q7	DC9-10/JT8D-7QN	90700	2
DC9Q9	DC9-30/JT8D-9QN	114000	2
DHC-2FLT	DHC-2 Beaver Floatplane	5090	0
DHC6	DASH 6/PT6A-27	12500	0
DHC6QP	DASH 6/PT6A-27 RAISBECK QUIET PROP MOD	12500	0
DHC7	DASH 7/PT6A-50	41000	3
DHC8	DASH 8-100/PW121	34500	3
DHC830	DASH 8-300/PW123	43000	3
DO228	Dornier 228-202 / TPE 311-5	13669	3
DO328	Dornier 328-100 / PW119C	30843	3
E3A	BOEING SENTRY TF33-PW-100A NM	324909	0
E4	BOEING 747 CF6-50E NM	800000	0
EA6B	J52-P-408 NM	65000	0
ECLIPSE500	Eclipse 500 / PW610F	6000	4
EMB120	EMBRAER 120 ER/ PRATT & WHITNEY PW118	26433	3
EMB145	EMBRAER 145 ER/ALLISON AE3007	45420	4
EMB14L	EMBRAER 145 LR / ALLISON AE3007A1	48500	4
EMB170	ERJ170-100	82012	3
EMB175	ERJ170-200	85517	3

EMB190	ERJ190-100	114199	3
EMB195	ERJ190-200	115280	3
F10062	F100/TAY 620-15	95000	3
F10065	F100/TAY 650-15	98000	3
F100D	ROCKWELL SUPER SABRE PW J57-P-21A NM	32839	0
F101B	PW J57-P-55 NM	52408	0
F102	PW J57-P-23 NM	31505	0
F104G	LOCKHEED STARFIGHTER J79-GE-11A NM	28779	0
F105D	PW J75-P-19W NM	52847	0
F106	PW J57-P-17 NM	41440	0
F111AE	GENERAL DYNAMICS F111AE PW TF30-P-100 NM	100000	0
F111D	GENERAL DYNAMICS F111D NM	0	0
F-111F	GENERAL DYNAMICS F111F NM	0	0
F117A	F404-GE-F1D2 NM	52500	0
F14A	GRUMMAN TOMCAT TF30-P-414A NM	53000	0
F15A	MCDONNELL DOUGLAS EAGLE F100-PW-100 NM	56000	0
F15E20	MCDONNELL DOUGLAS EAGLE F100-PW-220 NM	81000	0
F15E29	MCDONNELL DOUGLAS EAGLE F100-PW-229 NM	0	0
F16A	GENERAL DYNAMICS FALCON PW200 NM	0	0
F16GE	GENERAL DYNAMICS FALCON F110-GE-100 NM	42300	0
F16PW0	GENERAL DYNAMICS FALCON F100-PW-220 NM	42300	0
F-18	MCDONNELL DOUGLAS HORNET F404-GE-400 NM	56000	0
F28MK2	F28-2000/RB183MK555	65000	2
F28MK4	F28-4000/RB183MK555	73000	2
F4C	F-4C/J79-GE-15	52000	0
F-4C	MCDONNELL DOUGLAS PHANTOM J79-6517A17 NM	61795	0
F5AB	NORTHRUP TIGER J85-GE-13 NM	20576	0
F5E	NORTHRUP TIGER J85-GE-21B NM	25152	0
F8	VOUGHT F-8 CRUSADER PW J57-P-201 NM	27500	0
FAL20	FALCON 20/CF700-2D-2	28700	2
FB111A	GENERAL DYNAMICS FB111 PW TF30-P-100 NM	100000	0
GASEPF	1985 1-ENG FP PROP	2200	0
GASEPV	1985 1-ENG VP PROP	3000	0
GII	GULFSTREAM GII/SPEY 511-8	64800	2
GIIB	GULFSTREAM GIIB/GIII - SPEY 511-8	69700	2
GIV	GULFSTREAM GIV-SP/TAY 611-8	74600	3
GV	GULFSTREAM GV/BR 710	90500	3

HS748A	HS748/DART MK532-2	46500	2
IA1125	ASTRA 1125/TFE731-3A	23500	3
JAGUAR	SEPECAT JAGUAR NM	34100	0
KC10A	CFG-50C2 NM	590000	0
KC135	KC135A/J57-P-59W	300000	0
KC-135	BOEING STRATOTANKER KC135R F108-CF100 NM	323000	0
KC135B	KC135B/JT3D-7	300000	0
KC135R	KC135R/CFM56-2B-1	324000	0
L1011	L1011/RB211-22B	430000	3
L10115	L1011-500/RB211-224B	510000	3
L188	L188C/ALL 501-D13	116000	0
LEAR25	LEAR 25/CJ610-8	15000	2
LEAR35	LEAR 36/TFE731-2	18300	3
MD11GE	MD-11/CF6-80C2D1F	682400	3
MD11PW	MD-11/PW 4460	682400	3
MD81	MD-81/JT8D-217	140000	3
MD82	MD-82/JT8D-217A	149500	3
MD83	MD-83/JT8D-219	160000	3
MD9025	MD-90/V2525-D5	156000	3
MD9028	MD-90/V2528-D5	156000	3
MU3001	MU300-10/JT15D-5	14100	3
OV10A	ROCKWELL BRONCO T76 NM	14466	0
P3A	LOCKHEED ORION T56-A-14 NM	142000	0
PA28	PIPER WARRIOR PA-28-161 / O-320-D3G	2325	0
PA30	PIPER TWIN COMANCHE PA-30 / IO-320-B1A	3600	0
PA31	PIPER NAVAJO CHIEFTAIN PA-31-350 / TIO-5	7000	0
PA42	Piper PA-42 / PT6A-41	11200	3
S3A&B	LOCKHEED VIKING TF34-6E-2 NM	52539	0
SABR80	NA SABRELINER 80	33720	2
SD330	SD330/PT6A-45AR	22900	3
SF340	SF340B/CT7-9B	27300	3
SR71	JT11D-20B NM	170000	0
T1	LOCKHEED SEA STAR JT15D-5 NM	16100	0
T29	GENERAL DYNAMICS CV34 PW R-2800-99W NM	41740	0
T-2C	ROCKWELL BUCKEYE J85-6E-4 NM	13284	0
T3	AEIO-540-D4A5 NM	2525	0
T33A	LOCKHEED T-33A J33-35 NM	0	0
T34	BEECH MENTOR (BE45) PT6A-25 NM	4300	0
T37B	CESSNA 318 J69-T-25 NM	6625	0
T-38A	NORTHRUP TALON T-38A NM	12093	0
T39A	ROCKWELL SABRELINER GEJ85 NM	0	0

T41	CESSNA 172 O-320-E2D NM	0	0
T42	BEECH BARON (BE55) NM	5500	0
T-43A	BOEING 737 T43A NM	0	0
T44	T44 NM	0	0
TORNAD	RB199-34R NM	45000	0
TR1	J75-P-13B NM	40000	0
U2	LOCKHEED U2 J75-P-13 NM	40000	0
U21	BEECH UTE PW PT6A-20 NM	12500	0
U6	DEHAVILLAND BEAVER PW R-985 DHC-2 NM	0	0
U8F	BEECH SEMINOLE 0-480-1 D50 NM	0	0

Appendix C – AEDT 2c SP2 Aircraft Types Not Included in AEM

The AEDT 2c SP2 FLEET database does not include complete flight profile data for the following aircraft types (the F16PW9 was excluded due to a known issue with the arrival profile causing unreasonable noise):

Aircraft Identifiers						
A5C	C121	F14B	HS748	M7235C	T45	YC14
AV8A	C123K	F16PW9	HUNTER	NIMROD	U4B	YC15
AV8B	CANBER	F18EF	JPATS	P3C	VC10	
BUCCAN	DOMIN	HARRIE	KC97L	PHANTO	VICTOR	
C119L	E8A	HAWK	LIGHTN	PROVOS	VULCAN	