

**Amscreen Group Limited**

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Elaxon Ltd  
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350 Euston Road  
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15<sup>th</sup> November 2017

Dear Sir or Madam,

Re: Charge code application on behalf of Clear Channel United Kingdom, Unit 9, Newtons Court, Galleon Boulevard, Crossways Business Park, Dartford, DA2 6QL

Please find enclosed information relating to the two UMS charge code applications for the following product variants:

Product:	LCD Advertising Panel
Model:	DS75
Charge code application 1:	Double Digital (2 x LCD display)
Charge code application 2:	Digital Poster (1 x LCD display)

The DS75 installed by Clear Channel is designed and manufactured by Amscreen as a modular LCD Advertising Panel which has been designed to be used within a bus shelter, as a standalone unit or integrated into other forms of street furniture e.g. telephone/ information kiosks. The modular design can be configured with either two digital LCD displays or a single digital display.

The core product comprises one or two LED backlit LCD panel(s) within an environmentally controlled cabinet. Sensors detect changes in ambient light levels and adjust the display brightness to compensate so the brightness will gradually fluctuate throughout the day between minimum and maximum levels. The majority of the power consumption is due to the energy consumption of the LED backlights. Content shown on the display(s) is remotely managed by Clear Channel and has very little effect on overall power consumption.

During set times at night the brightness is fixed at a very low level (smart brightness) with correspondingly low power consumption. When the unit is not showing content (during the small hours) it will go into a power save (standby) mode. It is anticipated that the units will operate to the same profile as the DS70 throughout the year, as follows:

Power Save (standby)	LCD(s), external fans off,	730 hours/ year
Smart Brightness (dusk to dawn)	LCDs 300nits max, external fans off	3422 hours/year
Normal (daytime) mode	LCD(s) 300-1800nits (10-100% max power)	4613 hours/year

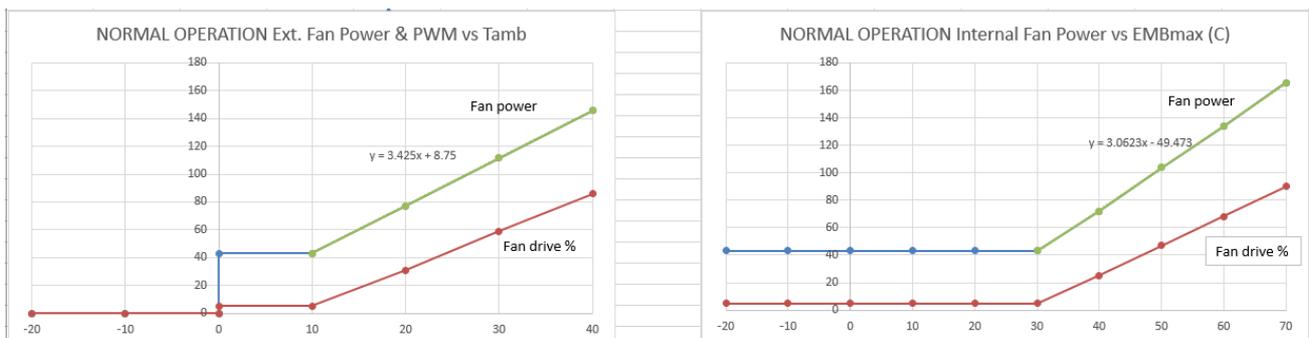
The environmental control includes fans which operate to limit the internal temperature. These fans are common to both product variants and comprise a set of internal circulation fans and a second set of external

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fans, the latter being used to remove heat from the unit. As such these fans are turned off in power save and smart brightness modes. Under normal daytime operation they will be controlled based on external ambient conditions, operating at minimum speed for ambient temperatures up to 10C. Above this temperature the speed and power consumption increases in a very predictable manner as shown in the following characteristic:



In a similar way the internal fan speed and power consumption track the internal temperature of the unit as shown in the second characteristic above, only this time the onset of the fans ramping up is at a somewhat higher temperature. Data from the Project Britain and Met Office websites has been used to establish the average UK temperatures, hours of daylight and this has been used in conjunction with known internal temperature rises to establish average and peak operating temperatures for the fan power consumption calculations.

Note that the above characteristics are for the double digital unit. Due to the lower power consumption of the single digital unit the cooling requirements and power consumption of the fans is reduced accordingly. For further details of both the double and single digital units please refer to document "DS75\_ChargeCodeApplication". This document sets out the rationale and calculations for weighted average power, factoring in the LCD panel(s) and fan power consumption in the three different operating modes.

The summary follows:

1. Double Digital Display (2 LCDs)

2. Single Digital Display (1 LCD)

Combined power draw	Average	Oper. Hours	Weighted	
Power save	171	730	14	W
Smart brightness	346	3422	135	W
Normal running	1083	4613	570	W
<b>Total (combined averages)</b>		<b>8765</b>	<b>719</b>	<b>W</b>

Combined power draw	Average	Oper. Hours	Weighted	
Power save	129	730	11	W
Smart brightness	218	3422	85	W
Normal running	616	4613	324	W
<b>Total (combined averages)</b>		<b>8765</b>	<b>420</b>	<b>W</b>

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An alternative way of viewing this information is to look at an equivalent annual steady state fan power consumption which was the approach used for the DS70 application. Data has been included for this too which shows that the DS75 fan load for double digital and single digital variants would be 112W (31%) & 94W (26%) respectively which compares to 34% (of max continuous rating) used for the DS70.

Clear Channel have already attained a charge code for the DS70 single digital display. This application for charge codes is to enable the rapid deployment of these two new DS75 products in January 2018.

The DS75 is a new product family which will be used in the same applications as the DS70 but with the additional offering of a double-sided display.

If you have any questions or require further information please contact me using the details below.

Yours faithfully



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