**REPORT**

|  |  |  |  |
| --- | --- | --- | --- |
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# SUMMARY

This report contains the results of power consumption measurements on a range of digital radios and is an update to previous reports on this subject carried out in 2010 and 2011.

* Test data has been provided for 78 different models, 38 from testing carried out since the previous reports and 40 from current tests.

**Table 1** below provides an overall summary of the in-use and standby power consumption figures for all 78 models and a comparison with the previous two projects (carried out in 2010 and 2011).

|  |  |  |  |
| --- | --- | --- | --- |
| **Mode** |  | **Average all products (W)** |  |
|   | **101092233****(2013 test)** | **R66398** **(2011 test)** | **R66198 & R66398 combined****(2010 and 2011 tests)** |
| Total number of products | 78 | 57 | 221 |
| Power consumption in-use DAB | 3.75 | 4.05 | 6.11 |
| Power consumption in-use FM (in DAB) | 5.38 | 4.68 | 8.99 |
| Power consumption in-use FM only  | 4.69 | 6.04 | 6.01 |
| Power consumption internet | 4.98 | 10.55 | 14.05 |
| Standby power consumption | 0.84 | 1.02 | 1.86 |

**Table 2** provides an overall summary of the in-use and standby power consumption figures by product category.

|  |  |  |  |
| --- | --- | --- | --- |
| **Table 2 - Summary of results by product (2013 test)** |  |  |  |
|  |  |  |  |  |
|   | **Average in use power consumption (W)****(2013 test)** | **% difference against FM only** | **Average standby consumption (W) [1]****(2013 test)** | **% difference against FM only** |
| **Tabletop** **(29 products tested)** |   |  |   |  |
| DAB | 3.34 | -39% | 1.17 | -49% |
| FM (in DAB) | 3.68 | -34% |   |  |
| FM only | 5.40 |  | 3.37 |  |
| Internet (in DAB) | 4.57 |  | NA |  |
| Internet (no DAB) | 6.40 |  | 1.25 |  |
| **Tabletops/portables (35 products tested)** |   |  |   |  |
| DAB | 2.04 | NA | 0.58 | NA |
| FM (in DAB) | 2.38 |  |   |  |
| FM only | NA | NA | NA |  |
| Internet (in DAB) | NA |  | NA |  |
| Internet (no DAB) | 3.43 |  | 0.90 |  |
| **Mini/Micro/audio** **(14 products tested)** |   |  |   |  |
| DAB | 10.48 | 152% | 0.53 | -24% |
| FM (in DAB) | 10.69 | 157% |   |  |
| FM only | 4.16 |  | 0.70 |  |
| Internet (in DAB) | 7.49 |  | 0.53 |  |
| Internet (no DAB) | NA |  | NA |  |
|  |  |  |  |  |
| Notes: [1] Greater than 1W is allowed if device has a clock |  |  |  |
| NA - not applicable  |  |  |  |  |

For comparison **Table 3** provides an overall summary of the in-use and standby power consumption figures by product category (combined 2010 and 2011 tests).

**Table 3 – Summary of results by product (combined 2010 and 2011 tests)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | **Average in use power consumption (W)****(combined 2010 and 2011 tests)** | **% difference against FM only** | **Average standby power consumption (W)****(combined 2010 and 2011 tests)** | **% difference against FM only** |
| **Tabletop** **(78 products tested)** |   |  |   |  |
| DAB | 4.78 | 0% | 1.56 | -7% |
| FM (in DAB) | 3.35 | -30% |   |  |
| FM only | 4.78 |  | 1.68 |  |
| **Tabletop/portables (96 products tested)** |   |  |   |  |
| DAB | 3.14 | 166% | 0.81 | 0% |
| FM (in DAB) | 2.57 | 118% |   |  |
| FM only | 1.18 |  | 0.81 |  |
| **Mini/Micro/audio** **(38 products tested)** |   |  |   |  |
| DAB | 9.01 | 19% | 0.60 | -37% |
| FM (in DAB) | 9.12 | 21% |   |  |
| FM only | 7.54 |  | 0.95 |  |

**Table 4** provides an overall summary of the in-use and standby power consumption for tradebrands versus non-tradebrands (2013 test).

|  |  |
| --- | --- |
| **Table 4 - Tradebrands v Non-tradebrands** |  |
|  |  |  |
|  | **Tradebrands****(2013 test)** | **Non-tradebrands****(2013 test)** |
| No. of models tested | 24 | 54 |
| Power consumption in-use DAB (W) | 2.37 | 4.40 |
| Power consumption in-use FM (in DAB) (W) | 2.99 | 6.32 |
| Power consumption in-use FM only (W) | 5.61 | 4.32 |
| Power consumption in-use Internet (in DAB) (W) | NA | 5.54 |
| Power consumption in-use Internet (no DAB) (W) | NA | 4.42 |
| Standby power consumption (W) | 0.62 | 0.95 |

## Introduction

Intertek Milton Keynes was commissioned by DCMS, to update the research and testing data from 2010/2011 (see reports below) and update the energy consumption model developed for digital radios. Previous reports on this were:

**R66198 Research Study of Energy Consumption of Digital Radios Upgrade – Phase 1 Issue 1** **(2010)**

**R66398 Research** **Study of Energy Consumption of Digital Radios Upgrade Issue 3 (2011)**

The project was split into 3 Phases:

* Phase 1

Market analysis and purchase of samples for testing

* Phase 2

Power consumption measurements of samples purchased

* Phase 3

Update to the digital radio model produced to forecast changes to energy consumption post switchover

This report covers the results from Phases 1 and 2 only; an updated model will be supplied separately.

Testing was carried out at Intertek Milton Keynes during March 2013. This report should be read in conjunction with Excel spreadsheet **101092233MKS-002a.xls.**

The tests have been carried out in accordance with the test programme, and as such, the results are only applicable to the sample tested and the conditions of the test. Sample variability and changes in test conditions could influence some results, and the result(s) as stated may not be representative of the mean result if a number of different samples were tested under a variety of test conditions.

Taken on its own, this report should not be used for regulatory purposes e.g. declaring conformance with directives.

##

## 1 Existing Data

Power consumption data for a range of products launched since the previous projects, belonging to another Intertek client, was made available to this project, after obtaining consent from the client. These products were incorporated into the main database of available products and, from this list, 40 new models were selected for testing.

## 2 Market Analysis

Market analysis was carried out to ensure that the products chosen for testing represented the market both in terms of brand coverage and specific models of radio.

A thorough search of radio manufacturers, major online retailers and price comparison websites was undertaken to identify the most common brands and models currently on the market. Models launched since the previous testing in 2011 were specifically targeted.

From these sources a list of currently available products was compiled, **Appendix I**. All products were organised into brands and categories to enable short listing of products. The list of available products was compared with results that were available from previous testing and care was taken to avoid testing duplicate or similar models. We also ensured that there was good coverage of trade brands and non-trade brands as well as a range of price points.

The selection of models to test was based on a number of factors:

* Good representation of the major DAB brands (as per GfK data). Multiple samples were chosen from the brands with the highest market share and product ranges.
* Coverage of the majority of brands in the market, including some new brands to the market since the last test was carried out in 2011. Data is available for 31 different brands.
* Good representation of the various trade brands, given their high percentage share of the portable audio market.
* Good coverage of the different types of radio receiver, eg portable/tabletop, clock radios, CD players, iPod docks etc. Since tests in 2011, there has been a significant increase in radios that incorporate iPod docks and music streaming facilities and this has been taken into account.
* Where a manufacturer had a range of models available, preference was given to the newest and most popular/widely available models. Care was taken to avoid similar models.
* Where available, FM only models were included for comparison.

## 3 Purchase of Samples

The samples selected for testing were purchased through normal consumer channels, either via the internet or from high street retailers.

## 4 Product Categories

The radios selected for testing were categorised into the following groups:

**Tabletop:** Unit has integrated loudspeakers and mains powered only, **Figures 1 and 2**.





**Figure 1** – Tabletop (small) **Figure 2** – Tabletop (large)

**Tabletop/Portable:** Unit has integrated loudspeakers and can be mains or battery powered. It is small/light enough to carry when battery powered and may have a carrying handle, recess or groove, **Figure 3**.



**Figure 3** – Tabletop/Portable

**Mini/Micro/Audio:** The unit has separate loudspeakers and is likely to be a multi-function device probably incorporating a CD player or iPod docking mechanism, **Figure 4**. It is also mains powered only.



**Figure 4** – Mini/Micro System

## 5 Power Consumption Measurements

Standby and off-mode measurements have been measured according to BS EN 50564: 2011. Where power saving features were available (e.g. dimming of displays, clock display on/off etc) measurements have been made at the minimum and maximum settings for standby mode and for ‘on-modes’. Two figures are entered in the results table for standby power and for on-mode power if the display brightness is adjustable. This shows that in some cases the measured value can be significantly higher than the allowed standby power consumption according to the EU directive. In practice we question whether consumers would implement the lowest power standby modes. The reason for the higher power modes can be either full brightness of the clock display or keeping an internet or network connection active.

For the on-mode measurements, a pink noise based simulated programme test signal was used as the input to the radios via a DAB or FM generator, the volume was then adjusted to achieve a sound pressure level of 70dBA measured in our standard [[1]](#footnote-1) listening room. The measurement was recorded at 0.5 metre, 1 metre or 3 metres depending on the type of unit. For small radios and clock radios the distance used was 0.5 metres. For tabletop radios the sound level was measured at a distance of 1 metre. For mini Hi-Fi units and larger amplifiers the distance used was 3 metres.

In the case of a system not supplied with speakers, 6 ohm dummy load resistors (typical nominal speaker impedance) would have been used instead of speakers and the volume of the unit would have been adjusted to obtain a reading of 1 watt across one of the resistors, measured with a true RMS voltmeter. However none of this type was tested in this batch.

To ensure the units under test were correctly warmed up and electronically stable, each unit was turned on and allowed to settle for at least 30 minutes. The units were tuned to a signal and had their clocks set to ensure they were not ‘hunting’ for signals. For standby measurements the samples were switched to standby after a minimum of 30 minutes in ‘on-mode’. The samples were then left for at least 15 minutes in each standby before the power was tested and recorded when stability had been confirmed by the logging power meter. For ‘on-mode’ measurements the same 30 minute warm up period was employed before the readings were recorded for FM and/or DAB and/or Internet Radio modes.

### 5.1 Equipment Used

E10418 Kikusui Power Supply PCR1000

E10616 Yokogawa WT210 Power Meter

E10726 Yokogawa WT210 Power Meter

E10843 Airflow TA430 Anemometer

E10148 Vaisala HMI41 Humidity & Temperature Sensor

E10403 RS 206-3744 Thermometer

### 5.2 Conditions

All power consumption measurements were completed under controlled conditions. Throughout the testing procedure, the ambient temperature, relative humidity, airspeed and condition of the mains supply were monitored and controlled where necessary to ensure they complied with the requirements of BS EN 50564: 2011 and IEC 62087: 2008.

Voltage: 230v ±1% at 50Hz ±1%

Total Harmonic Distortion of voltage supply: < 0.2%

Temperature: 23°C ±5°

Relative Humidity: Between 10% and 80%

Airspeed: < 0.5m/s

### 5.3 Test Results

The power consumption test results are presented in Excel Spreadsheet **101092233MKS-002.xls.**

**Appendix I**

**List of Products Tested**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sample code** | **Brand** | **Model name/number** | **Category** | **DAB** | **FM** | **Internet radio/Streaming** |
| DR02 | Bush | Bullet Black Digital Radio 9082249 | Portable | Yes | Yes | No |
| DR03 | Bush | CMC-CUBED-DAB | Micro | Yes | Yes | No |
| DR04 | Bush | CMC1BT | Micro | No | Yes | No |
| **WH10196-0045-00** | Bush | Espresso DAB Radio DAB-042 | Tabletop | Yes | Yes | No |
| **WH10196-0071-01** | Bush | 935/3260 (SG002D) | Tabletop/Portable | Yes | Yes | No |
| DR08 | Denon | RCD-M39DAB | Micro | Yes | Yes | No |
| DR09 | Gear4 | Airzone Series 1 PG539 | Tabletop | No | Yes | No |
| DR10 | Humax | BC-900i | Tabletop | Yes | Yes | Yes |
| DR11 | John Lewis | Apollo 2 | Tabletop/Portable | Yes | Yes | No |
| **WH10196-0050-00** | John Lewis | Carbon Stock No: 823 10104 | Tabletop | Yes | Yes | No |
| **WH10196-0072-01** | John Lewis | Neptune Mono | Tabletop | Yes | Yes | No |
| DR12 | Kitsound | Surfer | Tabletop  | No | Yes | Yes |
| DR13 | LG | CM2820DAB | Tabletop  | Yes | Yes | No |
| DR06 | Logik | LHFIP2112 | Micro | No | Yes | No |
| DR05 | Logik | L3DAB12 | Portable | Yes | Yes | No |
| **WH10196-0049-00** | Logik | Wooden kitchen DAB radio with FM PLL L55DAB10 | Tabletop/Portable  | Yes | Yes | No |
| **WH10196-0069-01** | Logik | L6DAB11 | Tabletop/Portable  | Yes | Yes | No |
| **WH10196-0080-01** | M&S | Victoria DAB | Tabletop/Portable | Yes | Yes | No |
| **WH10196-0070-01** | Magicbox | Atom | Portable | Yes | Yes | No |
| DR14 | Magicbox | STP0164MBX | Portable | Yes | Yes | No |
| **WH10196-0068-01** | Magicbox | White Cleaver (SG001D) | Tabletop | Yes | Yes | No |
| DR15 | Onkyo | CR-555DAB | Micro | Yes | Yes | No |
| **WH10196-0067-01** | Onn | E80090R | Tabletop/Portable | Yes | Yes | No |
| **WH10196-0078-01** | Oxx | Classic + DAB | Tabletop | Yes | Yes | Yes |
| DR16 | Panasonic | SC-HC27DB | Micro | Yes | Yes | No |
| **WH10196-0075-01** | Philips | AE5010/05 | Portable | Yes | Yes | No |
| **WH10196-0076-01** | Philips | AE5430/10 | Tabletop/Portable | Yes | Yes | No |
| **WH10196-0066-01** | Philips | AJB1002/05 | Tabletop | Yes | Yes | No |
| DR17 | Philips | BTM2056/05 | Micro | No | Yes | No |
| DR18 | Pioneer | X-EM21 | Micro | No | Yes | No |
| DR19 | Pioneer | X-CM31DAB-K | Micro | Yes | Yes | No |
| DR01 | Polaroid | DS234I | Portable | Yes | Yes | No |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sample code** | **Brand** | **Model name/number** | **Category** | **DAB** | **FM** | **Internet radio/Streaming** |
| **WH10196-0054-00** | Pure | Contour | Tabletop | Yes | Yes | No |
| **WH10196-0061-01** | Pure | Contour 100Di | Tabletop | Yes | Yes | No |
| **WH10196-0082-01** | Pure | Evoke Mio | Tabletop/Portable | Yes | Yes | No |
| **WH10196-0064-01** | Pure | One Classic Series II | Tabletop/Portable | Yes | Yes | No |
| **WH10196-0053-00** | Pure | One Elite | Tabletop | Yes | Yes | No |
| **WH10196-0063-01** | Pure | One Elite Series II | Tabletop | Yes | Yes | No |
| DR20 | Pure | One Mi Series 2 | Portable | Yes | Yes | No |
| **WH10196-0065-01** | Pure | One Mini Series II | Portable | Yes | Yes | No |
| DR21 | Pure | Sensia 200D Connect | Tabletop | Yes | Yes | Yes |
| DR22 | Pure | Siesta Mi Series 2 | Tabletop  | Yes | Yes | No |
| DR23 | Pure | Sirocco 550 | Micro | Yes | Yes | Yes |
| DR32 | Red | NE-3126 | Portable | Yes | Yes | No |
| **WH10196-0040-00** | Red | Wooden DAB Radio 583 151 | Tabletop/Portable | Yes | Yes | No |
| **WH10196-0062-01** | Red | 583 229 | Tabletop/Portable | Yes | Yes | No |
| **WH10196-0074-01** | Revo | K2 | Tabletop | Yes | Yes | Yes |
| DR24 | Revo | Pixis iR | Tabletop/Portable | No | No | Yes |
| DR25 | Roberts | Fusion | Tabletop | Yes | Yes | No |
| DR26 | Roberts | MessageЯ | Portable | Yes | Yes | No |
| DR27 | Roberts | Sound 38 | Tabletop  | Yes | Yes | No |
| DR28 | Roberts | Sound 70 | Micro | Yes | Yes | No |
| DR29 | Roberts | Sound 200 | Tabletop | Yes | Yes | No |
| **WH10196-0038-00** | Roberts | Classic DAB | Tabletop/Portable | Yes | Yes | No |
| **WH10196-0059-01** | Roberts | DreamDock | Tabletop | Yes | Yes | No |
| **WH10196-0081-01** | Roberts | Dreamtime 2 | Tabletop | Yes | Yes | No |
| **WH10196-0083-01** | Roberts | Gemini (RD-45) | Tabletop/Portable | Yes | Yes | No |
| **WH10196-0052-00** | Roberts | Gemini 33 CRD-33 | Tabletop | Yes | Yes | No |
| **WH10196-0058-01** | Roberts | Record R | Tabletop/Portable | Yes | Yes | No |
| **WH10196-0055-00** | Roberts  | Sound 66 | Tabletop | Yes | Yes | No |
| **WH10196-0060-01** | Roberts | Stream 105 | Tabletop/Portable | No | No | Yes |
| **WH10196-0057-01** | Roberts | Vintage | Tabletop/Portable | Yes | Yes | No |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sample code** | **Brand** | **Model name/number** | **Category** | **DAB** | **FM** | **Internet radio/Streaming** |
| DR30 | Roth | DBT-003 | Tabletop | Yes | Yes | No |
| DR31 | Sagemcom | HM40 | Portable | Yes | Yes | No |
| DR33 | Samsung | MM-E460D | Micro | Yes | Yes | No |
| DR07 | Sandstrom | SDABTIP12 | Micro | Yes | Yes | No |
| **WH10196-0044-00** | Sandstrom | SRDAB10 | Tabletop/Portable | Yes | Yes | No |
| DR35 | Sony | CMT-V75BTiP | Tabletop  | Yes | Yes | No |
| DR34 | Sony | HCD-G1BiP | Micro | Yes | Yes | No |
| **WH10196-0039-00** | Sony | XDR-S16DBP | Tabletop | Yes | Yes | No |
| **WH10196-0073-01** | Sony | XDR-S56DBP | Portable | Yes | Yes | No |
| DR36 | Tangent | Uno | Tabletop | No | Yes | No |
| DR38 | Technika | DAB129IDV | Tabletop | Yes | Yes | No |
| DR37 | Technika | DR11202B | Portable | Yes | Yes | No |
| **WH10196-0041-00** | Tesco | DAB Clock Radio CR112DABV | Tabletop/Portable | Yes | Yes | No |
| **WH10196-0056-01** | Tesco | DAB 211E | Tabletop/Portable | Yes | Yes | No |
| DR39 | Tivoli | PAL+ | Tabletop/Portable | Yes | Yes | No |
| DR40 | View quest | Retro DAB+ | Portable | Yes | Yes | No |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|   | New data from current models |  |  |  |  |
|   | Data from other Intertek clients for current models |  |  |  |

1. IEC 60268-13 [↑](#footnote-ref-1)