

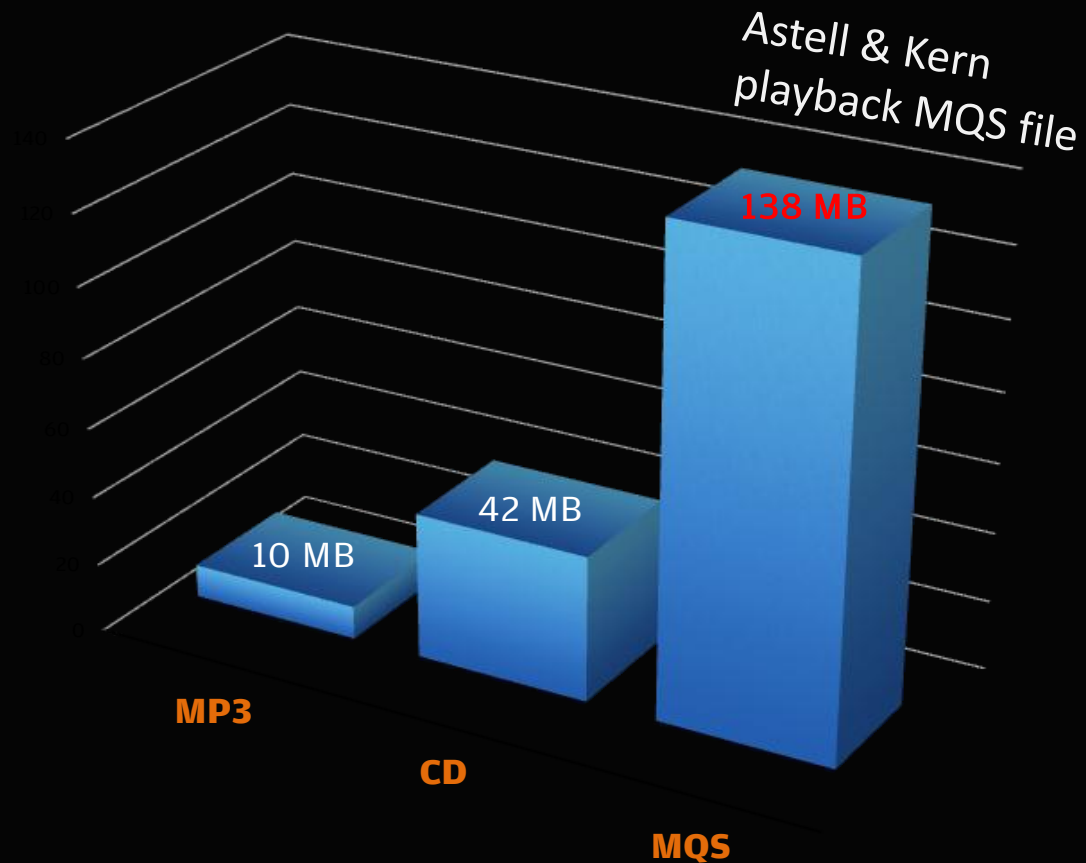
A close-up portrait of Neil Young, an older man with long, wavy grey hair and a serious expression. He is wearing a black shirt. The background is blurred, showing a red chair and some green and blue elements.

**“The MP3 only has
5 percent of the data
present in the original recording.”**

The convenience of the digital age
has forced people to choose
between quality and convenience,
but they shouldn't have to make that choice.”

Neil Young,
from All things D interview, January, 2012

MQS (Mastering Quality Sound) is..



MP3

320 kbps

CD

1,411 kbps
(16bit, 44.1kHz)

MQS

4,608 kbps
(24bit, 96kHz-192kHz)

** MQS file has 6.5 times more data than CD and it is used for Studio Mastering.

Astell & Kern delivers **REAL SOUND**.

Astell&Kern



- Plays back any hi-def. music tracks **up to MQS** exactly as it meant to be heard
- **‘Hi-Fi Audio’** level sound quality
- **Small & light**, Fits in your pocket

Feature



No more Down Playing

- Bit to Bit playing
(WAV, FLAC 24bit 96/192kHz)

Hi-Fi audio sound quality

- Dynamic Range : 110dB
- THD+N @1kHz : 0.0008%
- Crosstalk : 102dB

Optical In / Out

- Optical DAC with PC
- Source player with digital AC receiver & AMP



Dual volume control

- Basic / Special
- 150steps volume control

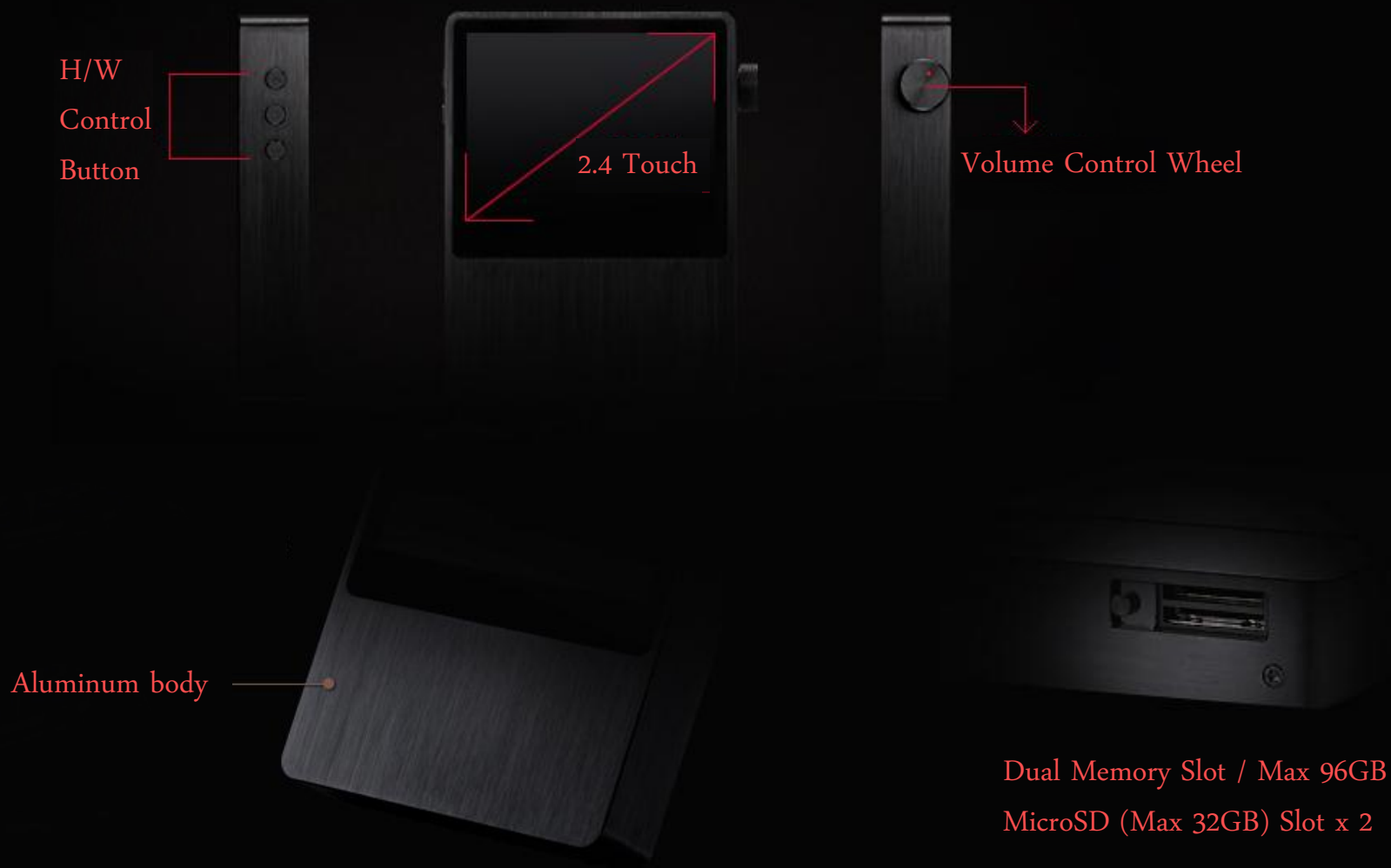
Switching UI

- Flick the three screen
- Open GL effects

Bluetooth 3.0

- Catch a phone ring
- Pairing BT devices
- File transfer

GUI + PUI User Interface



Hi-Fi Audio Specification

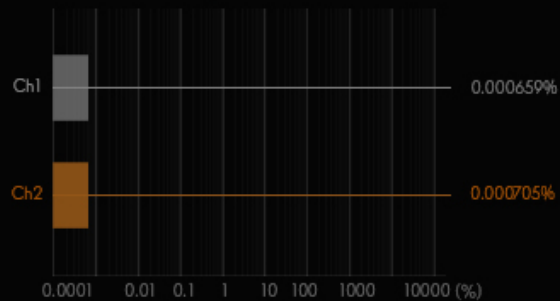
Astell&Kern



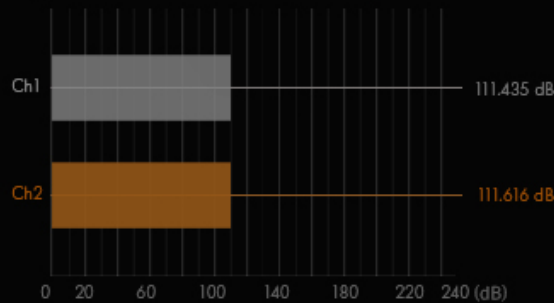
- ▶ THD+N : 0.0009%
- ▶ Crosstalk : -120dB
- ▶ Jitter : 90PS
- ▶ SNR : 110dB
- ▶ FR : +0.02~-0.02



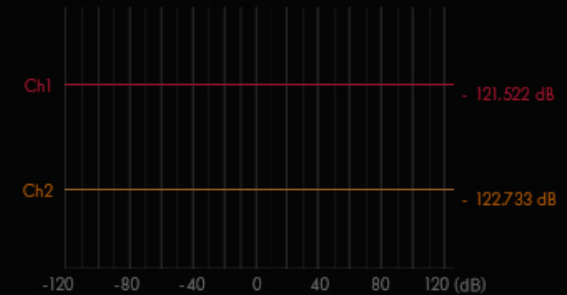
THD+N (1kHz 0dB, No load)



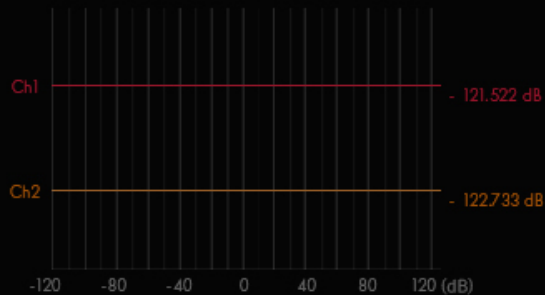
Signal to Noise Ratio (1kHz 0dB, No load)



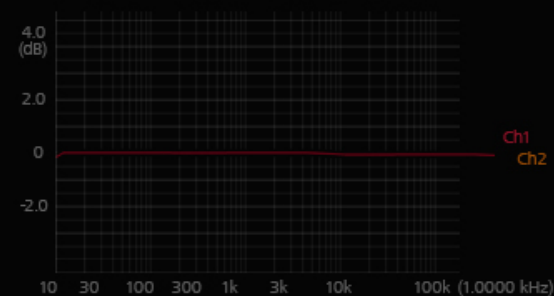
Crosstalk (1kHz 0dB, No load)



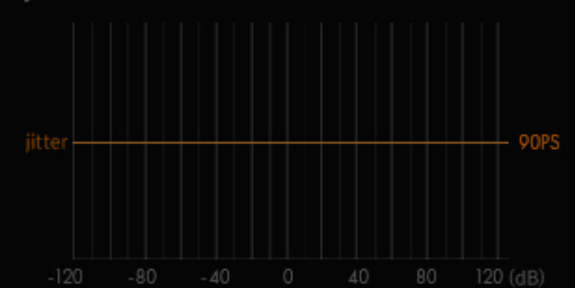
Crosstalk (1kHz 0dB, No load)



Frequency Response (1kHz 0dB, No load)



Jitter (1kHz 0dB, No load)

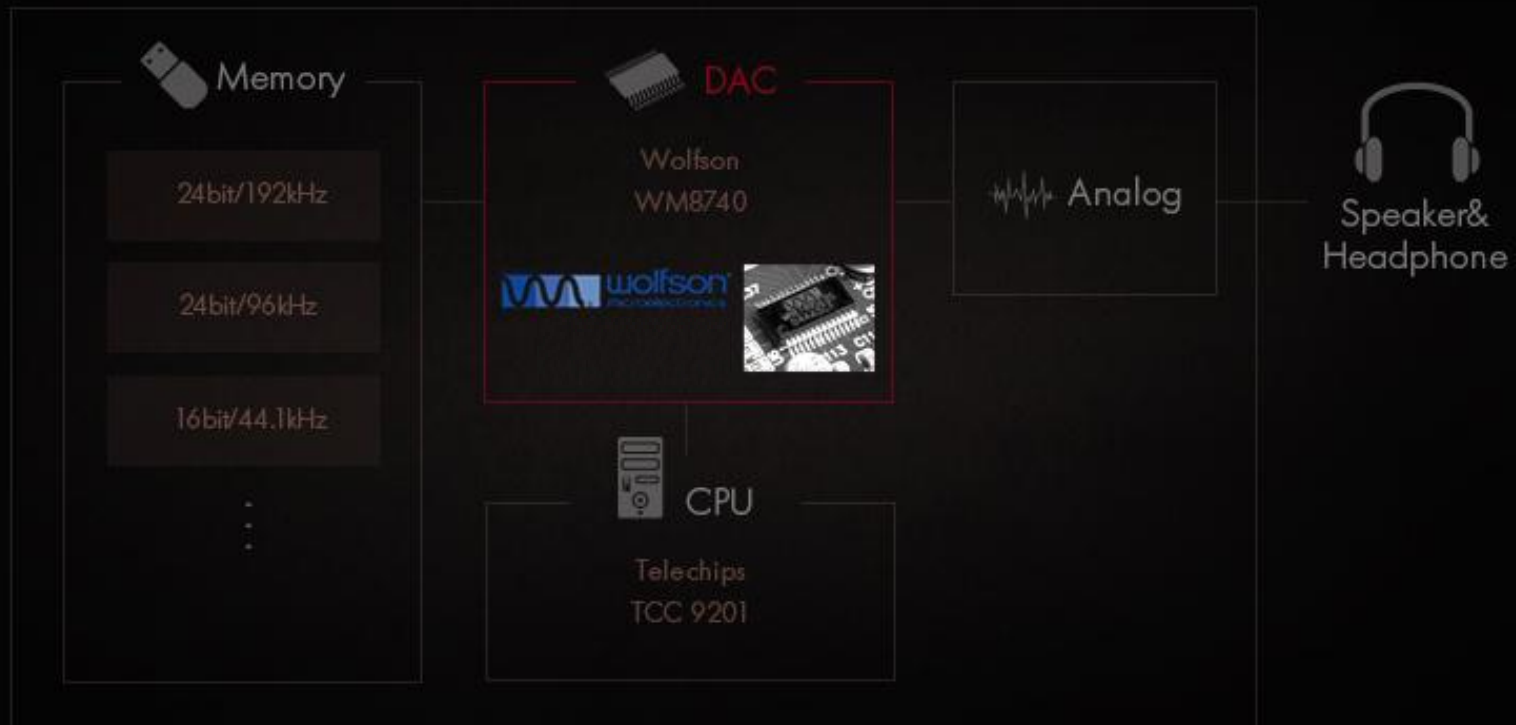


Wolfson 8740 DAC

Astell&Kern



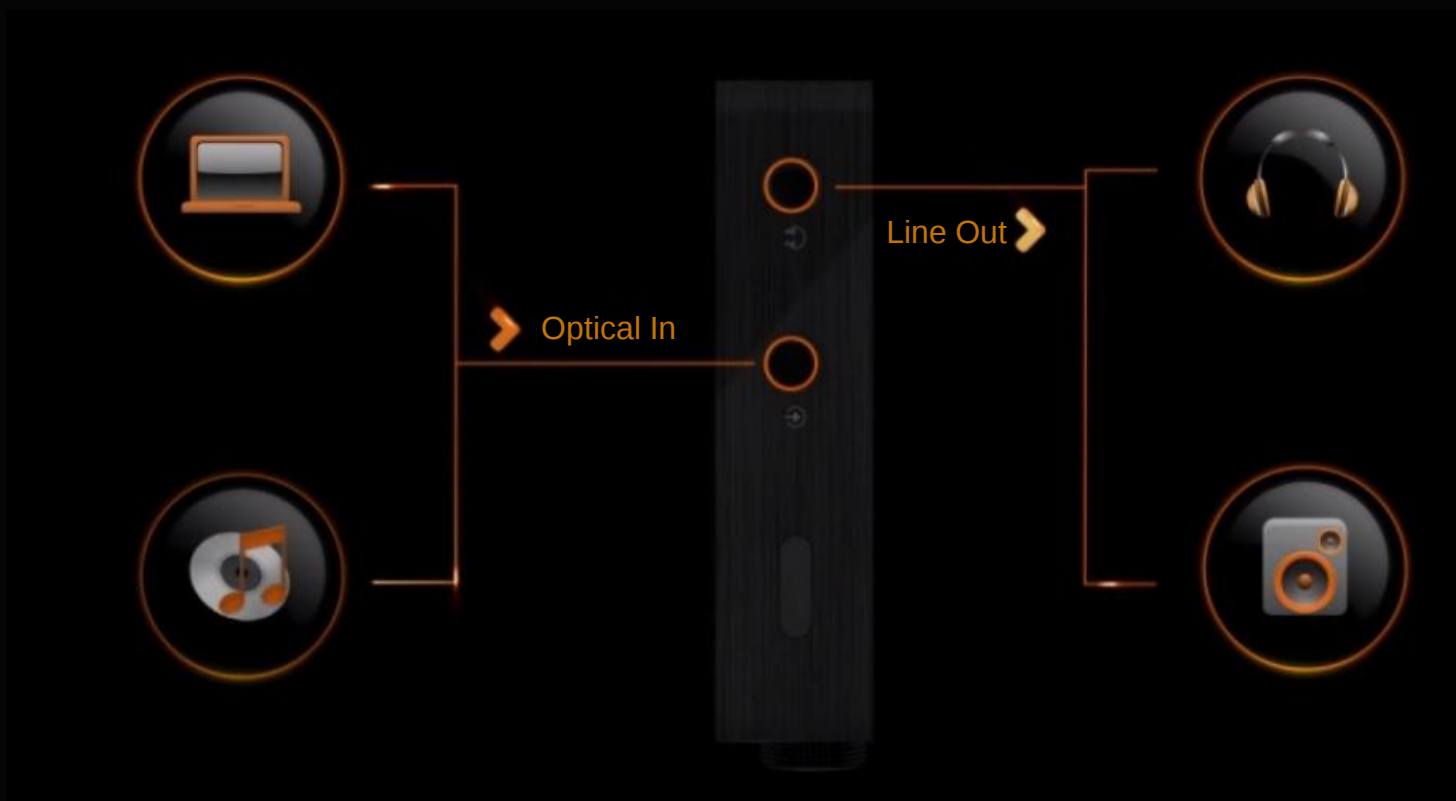
Hi-Fi Audio Spec : 24bit/192kHz, SNR, THD+N



Optical DAC

Astell & Kern supports **Optical In/Out** :

- Optical In : When Connected with PC, works like DAC
- Optical Out : Digital AV Receiver & Amplifier Connection



Comparison (1)

Company	Lindemann	Naim	SimAudio	Marantz	Iriver
Model	822CD	HDX	Moon 650D	CD6004	AK100
Design					
DAC	24bit 192KHz	Burr-Brown PCM1791 24bit 192KHz	SABRE ES9018 32bit 192KHz	Cirrus CS4398 24bit 192KHz	Wolfson WM8740 24bit 192KHz
Output Level	2.3 V _{RMS}	2.1 V _{RMS}	2 V _{RMS}	2.2 V _{RMS}	1.5 V _{RMS}
Channel Separation Separation	?	?	>116 dB	>110 dB	>120 dB
THD+N	< 0.0004% /1kHz	< 0.01% / 10Hz ~ 18kHz	< 0.001% /1kHz	< 0.002% /1kHz	< 0.0008% /1kHz < 0.001 % /10Hz ~ 20kHz ~ 20kHz
S/N (A-weighted)	120 dB	?	120 dB	110 dB	110 dB
Frequency Response Response	-3 dB 20Hz ~ 25kHz	$\pm$ 0.1 dB 10Hz ~ 18kHz	$\pm$ 0.1 dB 20Hz ~ 20kHz	- 2Hz ~ 20kHz ?	$\pm$ 0.14 dB 10Hz ~ 20kHz
Intrinsic Period jitter jitter	-	-	-	-	70 ps
Out put impedance impedance	50 ohm	22 ohm	100 ohm	-	22 ohm
Dimension(mm)	440X135X342	432X314 X 84	476X426X 101	440X339X106	59X79X14
Weight	19.2 lb (9.7 kg)	23.8 lb (10.8 kg)	35.2 lb (16 kg)	15.4 lb (7 kg)	4.3 oz. (122 g)
Price	\$ 12,000	\$ 11,000	\$ 8,000	\$ 5,000	TBD

Comparison (2)

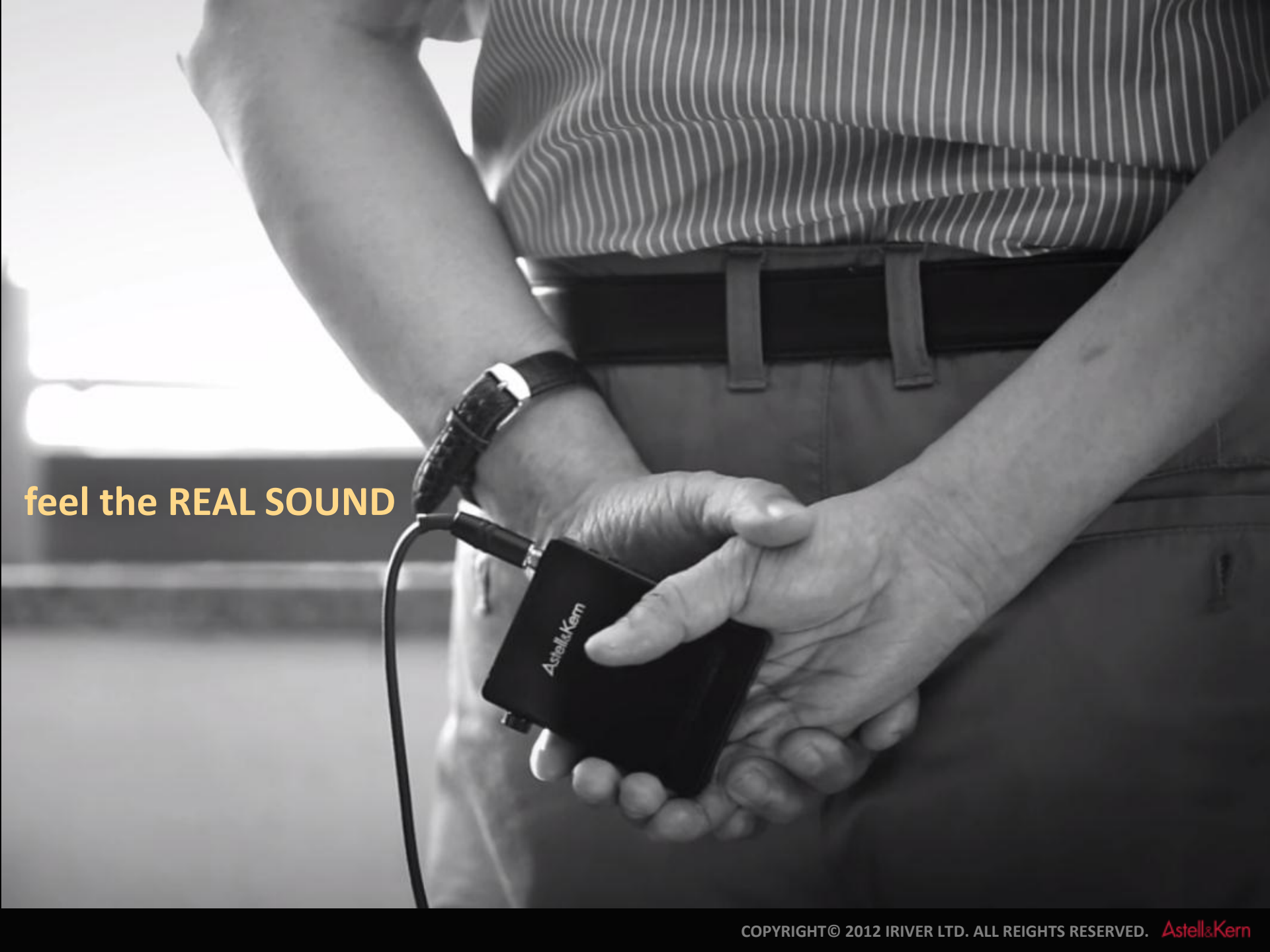
Astell&Kern



Company	QLS	Color Fly	Hifiman	Iriver
Model	QA350	C4 Pro	HM801	Astell & Kern
Design				
DAC	Wolfson 8740	Cirrus CS4398 (SRC CS8422)	Burr-Brown PCM1704 PCM1704	Wolfson 8740
Display	0.6" 96x96 mono	3.0" 320x240	2.0" 160x128	2.4" 320x240 IPS 1600M
Memory type	only SD Card(16G)	NAND 32G / SD card card	only SD Card(32G)	NAND 32G / SD card x2
THD	0.009%	0.003%	0.008%	0.0008%
S/N	100dB	108dB	102dB	110dB
I/O	Optical Out Headphone Out	Optical In/Out Headphone Out	Coax In/ Optical Out Headphone Out	Optical In/Out Headphone Out
Battery	6hrs	8hrs(2000mAh)	7hrs	12hrs
Network	X	X	X	BT 3.0
Dimension(mm)	135x78x27	124.4x71x20.3	114x78x25.5	59X79X14
Weight	300g	359g	307g	122g
Codec	WAV	WAV,FLAC, MP3	WAV,FLAC,MP3,OGG,APE G,APE	WAV,FLAC,MP3,OGG,APE WMV, AAC
24bit Play	X	WAV Converting (24bit/192kHz)	FLAC (24bit/96kHz)	24bit player (Bit to Bit)
Music List	Folder	Folder	Folder	Folder / DB (open GL)
Price	\$235	\$799	\$790	TBD

Specification Detail

Display	2.4" (320x240) 1600M IPS	Capacitive Touch
CPU	TCC9201	DAC WOLFSON 8740
Storage	Flash Memory, 32G	External Memory Slots Available
Battery	12 hours audio playing (FLAC 24bit/96kHz) 15 hours audio playing (MP3)	
Network	Bluetooth 3.0	BT A2DP, File Transfer
SD Slot	Micro SD x 2ea (SDHC max 32GB)	Dual Music Card (Micro SD) Slots
USB	Micro USB connector x 1ea	
Headphone-Out	Yes (3.5mm) x 1ea	
Optical In / Out	Yes (3.5mm) x 1ea	Optical In : When Connected with PC, works like DAC Optical Out : Digital AV Receiver & Amplifier Connection
Audio Formats	WAV, FLAC, WMA, MP3, OGG, AAC, APE	
Sampling Frequency	44.1kHz, 48kHz, 96kHz, 192kHz (16/24bit)	WAV, FLAC 24bit 96/192kHz supported

A black and white photograph of a person's torso and arms. They are wearing a vertically striped short-sleeved shirt and a dark belt. Their left hand is holding a small, black, rectangular portable music player with the 'Astell&Kern' logo on it. A cable is plugged into the top of the device. Their right hand is resting on their hip, wearing a dark leather watch. The background is bright and out of focus, suggesting an outdoor setting.

feel the REAL SOUND

APPENDIX – “Goldenears” test result

“Astell & Kern” test result by “Goldenears.net”

Prestigious Hi-fi forum, Golden ears Korea , have tested “Astell & Kern” and posted its test result on its website at October 11th 2012. (<http://ko.goldenears.net/board/2459115>)

Overview

Using 24bit test sound source, it shows broader Dynamic range compared with other portable player which supports 16bit/44.1kHz and Bandwidth is extended for 192kHz sampling rate source showing actual performance able to support high quality sound source. Output on No load RMAA signal level base shows -1.5dB.

16bit sound source playback performance also shows top class level compare to other portable devices.

Optical Input test result is normal and Optical output also shows similar result as test equipment's resolution, so there is no distortion of sound connecting to other high class DAC.

But it is same that its output impedance is little high than other portable player, Iriver (Manufacturer) explained that it is tuned for using lower impedance receiver and harmonics with it.

APPENDIX – “Goldenears” test result

01. Decoder Test (No Load)

1. WAV Test Result (Lossless File)

1.1 16bit-44.1kHz Test Signal

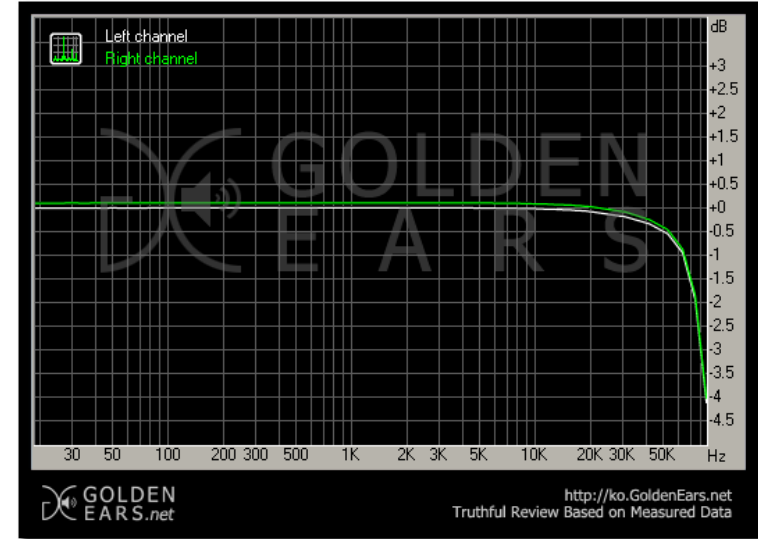


Sampling Frequency : 44.1kHz / Astell&Kern - AK100

Frequency response (from 40 Hz to 15 kHz), dB	+0.01, -0.10	Excellent
Noise level, dB (A)	-97.7	Excellent
Dynamic range, dB (A)	97.7	Excellent
THD, %	0.0008	Excellent
THD + Noise, dB (A)	-90.9	Very good
IMD + Noise, %	0.0038	Excellent
Stereo crosstalk, dB	-98.8	Excellent
IMD at 10 kHz, %	0.0097	Very good
General performance		Excellent

Test Mode : 24bit, 44.1kHz

1.2 24bit-192kHz Test Signal



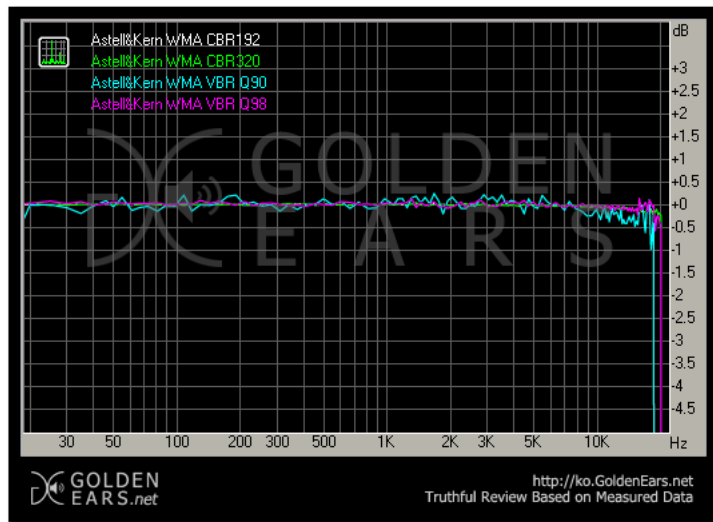
Sampling Frequency : 192kHz / Astell&Kern - AK100

Frequency response (from 40 Hz to 15 kHz), dB	+0.01, -0.04	Excellent
Noise level, dB (A)	-112.2	Excellent
Dynamic range, dB (A)	112.1	Excellent
THD, %	0.0014	Excellent
THD + Noise, dB (A)	-94.3	Very good
IMD + Noise, %	0.0015	Excellent
Stereo crosstalk, dB	-106.2	Excellent
IMD at 10 kHz, %	0.0090	Very good
General performance		Excellent

Test Mode : 24bit, 192kHz

APPENDIX – “Goldenears” test result

2. WMA Test Result

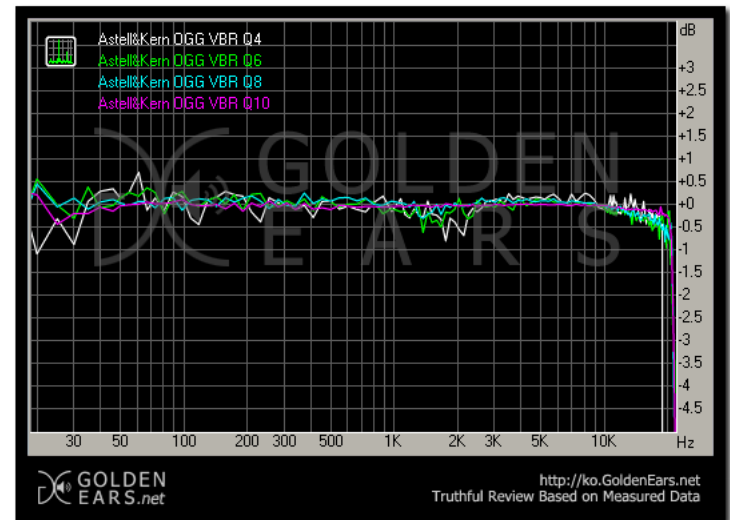


Sampling Frequency : 44.1kHz / Astell&Kern - AK100

Test	Astell&Kern WMA CBR192	Astell&Kern WMA CBR320	Astell&Kern WMA VBR Q90	Astell&Kern WMA VBR Q98
Frequency response (from 40 Hz to 15 kHz), dB:	+0.04, -0.11	+0.04, -0.11	+0.25, -0.42	+0.13, -0.14
Noise level, dB (A):	-95.9	-95.3	-111.7	-111.3
Dynamic range, dB (A):	96.1	95.4	80.8	87.7
THD, %:	0.0019	0.0019	0.0019	0.0016
IMD + Noise, %:	0.212	0.213	6.155	1.053
Stereo crosstalk, dB:	-96.4	-96.0	-106.7	-98.9

Test Mode : 24bit, 44.1kHz

3. OGG Test Result



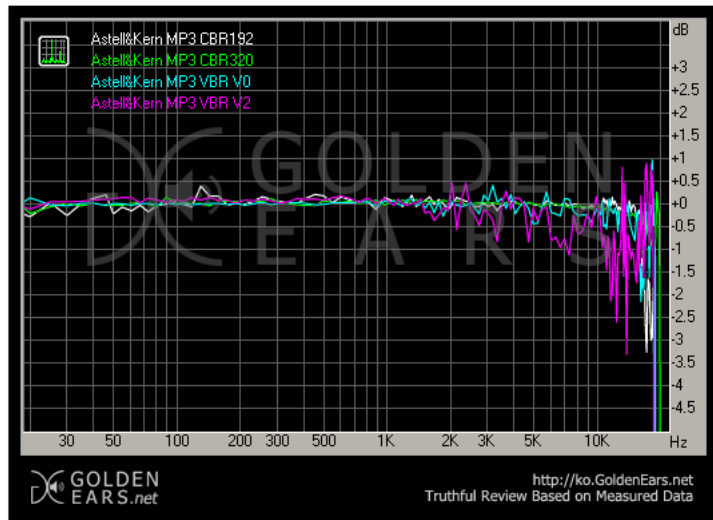
Sampling Frequency : 44.1kHz / Astell&Kern - AK100

Test	Astell&Kern OGG VBR Q4	Astell&Kern OGG VBR Q6	Astell&Kern OGG VBR Q8	Astell&Kern OGG VBR Q10
Frequency response (from 40 Hz to 15 kHz), dB:	+0.70, -0.81	+0.36, -0.62	+0.25, -0.37	+0.10, -0.15
Noise level, dB (A):	-107.1	-106.2	-105.9	-110.1
Dynamic range, dB (A):	93.0	93.9	94.3	95.5
THD, %:	0.0014	0.0014	0.0014	0.0014
IMD + Noise, %:	1.067	0.565	0.423	0.304
Stereo crosstalk, dB:	-99.3	-105.7	-106.3	-109.6

Test Mode : 24bit, 44.1kHz

APPENDIX – “Goldenears” test result

4. MP3 Test Result



Sampling Frequency : 44.1kHz / Astell&Kern - AK100

Test	Astell&Kern MP3 CBR192	Astell&Kern MP3 CBR320	Astell&Kern MP3 VBR V0	Astell&Kern MP3 VBR V2
Frequency response (from 40 Hz to 15 kHz), dB:	+0.39, -0.22	+0.14, -0.28	+0.41, -0.72	+0.80, -3.31
Noise level, dB (A):	-96.7	-97.2	-96.7	-96.7
Dynamic range, dB (A):	96.1	96.8	94.4	93.3
THD, %:	0.0014	0.0016	0.0016	0.0016
IMD + Noise, %:	0.013	0.012	0.014	0.022
Stereo crosstalk, dB:	-96.7	-97.3	-98.8	-102.3

Test Mode : 24bit, 44.1kHz

5. Optical Input Test Result (24bit-96kHz Test Signal)



Sampling Frequency : 96kHz / Astell&Kern - AK100

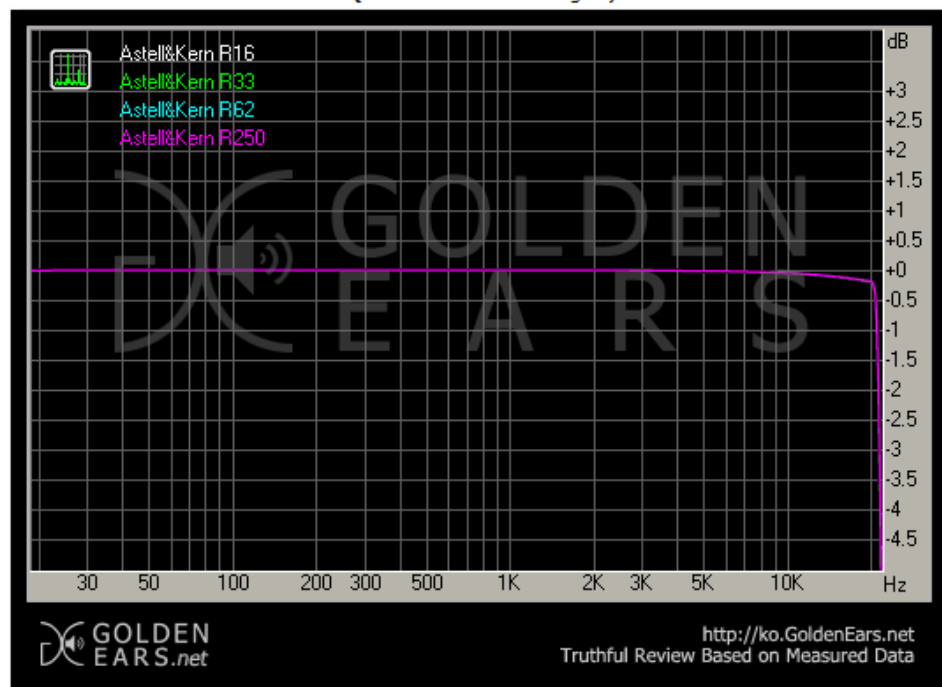
Frequency response (from 40 Hz to 15 kHz), dB	+0.02, -0.13	Excellent
Noise level, dB (A)	-111.8	Excellent
Dynamic range, dB (A)	112.0	Excellent
THD, %	0.0014	Excellent
THD + Noise, dB (A)	-93.9	Very good
IMD + Noise, %	0.0017	Excellent
Stereo crosstalk, dB	-108.9	Excellent
IMD at 10 kHz, %	0.0095	Very good
General performance		Excellent

Test Mode : 24bit, 96kHz

APPENDIX – “Goldenears” test result

02. Amplifier Test (Load Test)

(24bit-44.1kHz Test Signal)



Normally 16 bit test signal is used for portable player Load test but we use 24bit, 44.1kHz test signal for this device.

(24bit-44.1kHz Test Signal)

Test	Astell&Kern R16	Astell&Kern R33	Astell&Kern R62	Astell&Kern R250
Frequency response (from 40 Hz to 15 kHz), dB:	+0.01, -0.10	+0.01, -0.10	+0.01, -0.10	+0.01, -0.10
Noise level, dB (A):	-108.8	-110.1	-110.8	-111.3
Dynamic range, dB (A):	108.6	109.9	110.7	111.1
THD, %:	0.020	0.015	0.010	0.0034
IMD + Noise, %:	0.019	0.014	0.0095	0.0034
Stereo crosstalk, dB:	-50.4	-60.0	-70.8	-100.2

R16:16Ω / R33:33Ω / R62:62Ω / R250:250Ω

Test Mode : 24bit, 44.1kHz

APPENDIX – “Goldenears” test result

03. Output Impedance (Headphone out)

Product	Output Impedance
NuForce Icon Mobile	0.26
SONY NWZ-X1050	3.96
COWON S9	2.17
YEPP YP-R1	1.33
YEPP YP-R0	5.24
Graham Slee Voyager	31.31
iCube	0.23
iBasso D2+BOA	0.83
Samsung YP-P3	1.04
SONY NWZ-S755	3.40
FiiO E11	0.05
FiiO E7	0.15
Iriver B100	0.76
Apple iPod nano 4thG	5.29
Focusrite VRM BOX	10.68
iriver Astell&Kern	22.41

04. Digital Out

1. Optical Out



Sampling Frequency : 96kHz / Astell&Kern - AK100

Frequency response (from 40 Hz to 15 kHz), dB	+0.00, -0.00	Excellent
Noise level, dB (A)	-117.3	Excellent
Dynamic range, dB (A)	117.3	Excellent
THD, %	0.0000	Excellent
THD + Noise, dB (A)	-111.2	Excellent
IMD + Noise, %	0.0004	Excellent
Stereo crosstalk, dB	-114.3	Excellent
IMD at 10 kHz, %	0.0004	Excellent
General performance		Excellent

Test Mode : 24bit, 96kHz