

Test Report

Issued by University of Salford (Acoustics Test Laboratory)

Date of Issue: 10th September 2024

Report Number: 06912/13

University of
Salford
MANCHESTER

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APPROVED SIGNATORIES

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Determination of airborne noise from an appliance

Measurements described in this test report comply with:-
BS EN ISO 3744:2010 'Acoustics. Determination of sound power levels and sound energy levels of noise sources using sound pressure.
Engineering methods for an essentially free field over a reflecting plane'

COMPANY NAME & ADDRESS:

Chauvet UK
POD 1
EVO Park
Nottingham
NG16 6NT

FOR ATTENTION OF:

Ben Virgo

UNIT UNDER TEST:

Lighting Unit, ROGUE R3 BEAM

DATE OF TEST:

28th August 2024

TEST ENGINEER:

Sean Furlong

MEASUREMENT PURPOSE:

To determine airborne noise by measurements to the above standards.

Results relate only to samples tested. Items tested are the samples supplied by the manufacturer, who was responsible for selecting at random from a standard production run.

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1.0 Description of Appliance Under Test

CATEGORY:	Lighting Unit
DESIGN CHARACTERISTICS:	Floor mounted
MANUFACTURER:	Chauvet
MODEL:	ROGUE R3 BEAM
TEST REF NUMBERS:	06912/13_1 to 3
SERIAL NUMBER:	Not Stated
POWER:	Not Stated
POWER SOURCE:	UK Mains
SETTINGS:	06912/13_1 “Ambient” 06912/13_2 “Auto” 06912/13_3 “Max”
<i>*See Table 1.0 below for details of settings</i>	

* Table 1.0 – Manufacturer’s description of the different settings of the sample that were used to create the Test Configuration for each measurement.

Explanation of Settings Used for Each Test	
Setting Name	Test Configuration
Ambient	Unit is in idle state, switched on and no output or movements
Max	Unit is using all mechanical options, and the light output is on
Auto	All Effects Static, 100% Light output — Auto Fan mode

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2.0 Test Conditions

2.1 The following conditions were measured over duration of the test:-

	Measured Average Value
TEST REF NUMBER:	06912/13_1 to 3
SERIAL NO. / SAMPLE REF.	ROGUE R3 BEAM
Atmospheric Pressure	100.178
Ambient Temperature	23.4
Ambient Relative Humidity	56.1

2.2 The test was carried out in the hemi-anechoic chamber at the University of Salford.

2.3 The unit under test was mounted directly on the floor, in the centre of the hemi-anechoic chamber.

2.4 Unit operation was controlled by the client from outside the chamber, after initial configuration directly at the unit. Measurements were taken immediately after each setting of the unit was set and confirmed by the client.

2.5 For measurement of the sound pressure level of the Reference Sound Source (RSS), the RSS was placed directly on the floor of the hemi-anechoic chamber at the same location as the unit under test as defined in BS EN ISO 3744: 2010.

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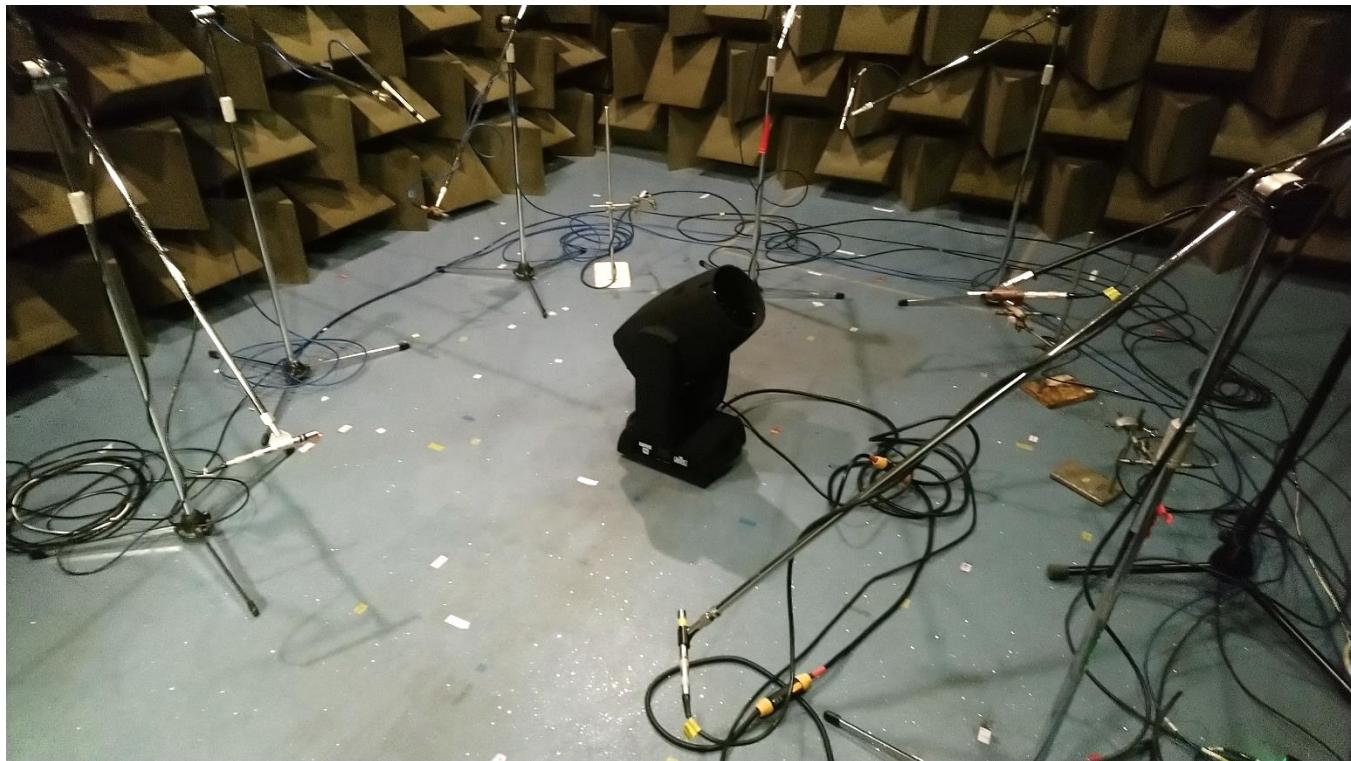


Figure 1 – unit under test mounted in the hemi-anechoic chamber at the University of Salford.

3 Acoustical Data

3.1 Measurement method

A direct measurement method was used as stated in BS EN ISO 3744: 2010.

3.2 Reference Sound Source

The Laboratory reference sound source (RSS) type B&K 4204, serial number 1460189 was used on mains supply.

3.3 Microphone Array

Ten laboratory free field, low noise microphones were used for the measurement, placed in fixed positions 1 to 10 on a hemispherical surface ($d = 1.00$ m) with guidance from BS EN ISO 3744: 2010. The location of each measurement position is provided in Appendix 1 to this report.

3.4 Measured sound pressure levels of the unit

Each unit was run at the selected setting. Six measurements were made at each setting,

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Mean sound pressure levels were measured over 30 seconds to give the measured sound pressure levels, L_{pi} at each measurement position in each third octave band. The sound power level was then calculated.

The background noise corrections K_1 , environmental correction calculated from RSS levels K_2 , measured sound pressure levels, L_{pi} at each measurement point, corrected sound pressure levels, L_{pf} , and the sound power level, L_w of the source in each third octave frequency band are given in Appendix 2 of this report. The measured time averaged sound pressure level of the RSS, $L'_{P(RSS)}$, at each microphone position is reported in Appendix 3 to this report.

3.5 Calculated sound power levels

The calculated A-Weighted sound power level, L_{WA} in dBA for each setting are given in table 3.1.

Table 3.1 –A-weighted noise emissions for each setting, averaged over 30 seconds and over 10 microphone positions.

Test Number	06912/13_1	06912/13_2	06912/13_3
Setting	Ambient	Auto	Max
A-weighted sound power level, L_{WA} in dBA	54.6	50.9	51.4

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3.6 Sound Pressure Level at 1 m from the source (not covered by BS EN 3744: 2010)

The A-weighted Sound Power Level can be used to calculate the A-weighted sound pressure level expected at different distances from the source in hemi-anechoic free field conditions*.

The calculation of the sound pressure levels is based on the formulae in BS EN 3744: 2010 for a parallelepiped measurement surface (for a noise source measured, in this case, above a single reflective plane).

The calculations show that to estimate the average sound pressure level expected at a distance of 1 m from the surface of the unit, 13.0 dB should be subtracted from the sound power value. This would give A-weighted average sound pressure levels in table 3.2 for each unit setting at 1 m from the surface of the unit:-

Table 3.2 – Calculated A-weighted sound pressure level* for each setting at 1 m from the unit surface

Test Number	06912/13_1	06912/13_2	06912/13_3
Setting	Ambient	Auto	Max
A-weighted sound pressure level, L _p in dBA	41.6	37.9	38.4

*This calculation represents an estimate of the levels that would be obtained in hemi-anechoic free field conditions and should not be assumed to be valid for any specific building environments where the characteristics of the room should be accounted for.

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Appendix 1 – Locations of measurement positions

Defining measurement surface & Co-ordinates

Measurement distance, d

1.00 m

	x, mm	y, mm	z, mm
Microphone Position 1	160	-960	220
Microphone Position 2	780	-600	200
Microphone Position 3	780	550	310
Microphone Position 4	160	900	410
Microphone Position 5	-830	320	450
Microphone Position 6	-830	-400	380
Microphone Position 7	-260	-650	710
Microphone Position 8	740	-70	670
Microphone Position 9	-260	500	830
Microphone Position 10	100	-100	990

Surface Area, m ²	6.28 m ²
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Appendix 2 – Measurements and calculations according to BS EN ISO 3744

The following tables include measurement details that provide in each third octave band, for each of the seven settings:-

- measured L_{pi} , averaged over 30 s, at each measurement position
- background noise corrections K_1
- environmental correction K_2 , calculated from RSS levels
- corrected sound pressure levels, L_{pf}
- the sound power level, L_w of the source
- the A-weighted sound power level, L_{wA} of the source

! The levels at these frequencies are affected by background level and therefore levels quoted represent an upper limit for the sound pressure levels of the noise source.

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MEASURED TIME AVERAGED SPL at 1 m, L'P - [06912/13_1 – “Ambient” Setting]											Mean L _P over mic positions	ΔL _P [dB]	BG corr. K ₁ , [dB]	Env corr. K ₂ , [dB]	L _P [dB]	Sound Power, L _w [dB]	A- weighting corrections [dB]	Sound Power, L _{WA} [dB]
Frequency [Hz]	Mic 1 [dB]	Mic 2 [dB]	Mic 3 [dB]	Mic 4 [dB]	Mic 5 [dB]	Mic 6 [dB]	Mic 7 [dB]	Mic 8 [dB]	Mic 9 [dB]	Mic 10 [dB]								
100	25.5	25.4	24.5	24.1	24.6	26.2	25.6	24.5	25.4	25.4	25.2	18.0	0.00	1.1	24.1	32.1	-19.1	13.0
125	27.4	26.1	24.8	25.8	25.0	27.5	25.2	22.1	25.7	23.2	25.5	29.0	0.00	2.4	23.2	31.1	-16.1	15.0
160	30.1	29.8	28.2	28.9	26.2	28.0	26.4	24.1	28.6	27.1	28.1	33.3	0.00	0.7	27.4	35.3	-13.4	21.9
200	35.3	32.4	31.7	32.9	30.5	31.4	28.1	26.2	29.9	31.9	31.7	37.7	0.00	0.5	31.2	39.1	-10.9	28.2
250	40.4	41.7	39.0	36.7	37.8	40.5	30.5	34.4	35.9	38.3	38.5	45.1	0.00	0.6	37.8	45.8	-8.6	37.2
315	47.2	47.8	45.0	41.1	42.9	45.3	34.9	34.6	37.2	44.7	44.0	54.2	0.00	0.3	43.7	51.7	-6.6	45.1
400	46.9	46.8	40.2	36.4	38.6	43.7	35.3	31.1	36.5	44.3	42.5	52.7	0.00	0.3	42.2	50.2	-4.8	45.4
500	39.4	39.5	39.1	35.7	34.4	38.7	41.7	33.0	40.2	44.3	39.7	49.6	0.00	0.2	39.5	47.5	-3.2	44.3
630	39.1	39.8	35.8	31.5	32.6	37.4	37.8	31.6	32.2	39.5	36.8	46.3	0.00	0.0	36.8	44.8	-1.9	42.9
800	38.0	37.6	29.7	31.3	30.2	30.8	40.0	34.7	33.0	33.3	35.3	44.4	0.00	-0.4	35.6	43.6	-0.8	42.8
1000	37.7	36.5	30.4	31.6	34.8	32.7	37.5	36.9	34.5	31.9	35.1	43.4	0.00	-0.9	36.1	44.1	0	44.1
1250	34.3	32.0	33.0	36.6	34.8	33.4	36.7	36.6	36.5	33.5	35.1	42.8	0.00	-1.2	36.2	44.2	0.6	44.8
1600	35.8	27.7	32.2	36.4	34.0	35.8	37.4	33.8	35.3	35.7	35.0	42.0	0.00	-0.6	35.6	43.5	1	44.5
2000	31.7	26.0	29.9	35.0	31.0	31.8	36.3	32.1	37.5	33.3	33.5	39.8	0.00	0.3	33.2	41.2	1.2	42.4
2500	36.7	27.1	29.5	33.5	27.3	29.6	37.0	31.8	32.9	31.1	32.9	38.5	0.00	-0.2	33.1	41.1	1.3	42.4
3150	38.2	31.6	30.7	30.3	27.1	27.9	35.5	26.3	30.5	30.4	32.4	37.6	0.00	0.4	32.0	40.0	1.2	41.2
4000	34.6	30.6	26.9	30.6	27.2	28.6	33.1	24.4	30.8	28.1	30.4	33.6	0.00	0.6	29.8	37.8	1	38.8
5000	27.6	26.5	23.3	31.1	22.8	27.4	30.4	21.7	28.6	26.1	27.5	31.5	0.00	-0.9	28.4	36.3	0.5	36.8
6300	25.4	22.0	23.4	25.6	18.9	22.3	26.4	18.2	25.9	21.7	23.8	27.8	0.00	-0.5	24.3	32.2	-0.1	32.1
8000	21.1	19.4	18.6	21.6	15.7	20.8	23.1	16.1	22.7	16.8	20.3	23.8	0.00	-0.3	20.6	28.5	-1.1	27.4
10000	19.2	13.8	15.8	18.9	12.5	16.7	20.3	12.9	18.0	13.4	17.0	19.4	0.00	0.5	16.4	24.4	-2.5	21.9

A-WEIGHTED SOUND POWER LEVEL **54.6**

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Frequency [Hz]	Mic 1 [dB]	Mic 2 [dB]	Mic 3 [dB]	Mic 4 [dB]	Mic 5 [dB]	Mic 6 [dB]	Mic 7 [dB]	Mic 8 [dB]	Mic 9 [dB]	Mic 10 [dB]								
100	23.6	24.4	23.8	23.0	24.3	24.7	24.6	24.5	24.6	25.2	24.3	17.2	0.00	1.1	23.2	31.2	-19.1	12.1
125	25.0	24.7	23.7	24.0	24.2	25.3	23.3	22.0	23.8	21.5	23.9	27.3	0.00	2.4	21.5	29.5	-16.1	13.4
160	27.5	27.6	26.4	27.0	25.0	25.6	24.7	23.4	26.5	25.0	26.0	31.3	0.00	0.7	25.3	33.3	-13.4	19.9
200	32.9	30.0	29.7	31.1	28.4	29.1	26.6	25.1	27.7	28.8	29.4	35.5	0.00	0.5	28.9	36.9	-10.9	26.0
250	37.1	38.3	36.1	34.0	35.2	37.4	28.7	32.1	32.7	35.2	35.4	42.0	0.00	0.6	34.8	42.8	-8.6	34.2
315	43.9	44.6	42.7	39.5	41.0	42.6	32.3	31.1	34.7	42.1	41.3	51.4	0.00	0.3	40.9	48.9	-6.6	42.3
400	39.3	38.5	33.8	32.1	33.2	36.6	30.7	27.1	30.5	36.3	35.2	45.4	0.00	0.3	34.9	42.9	-4.8	38.1
500	35.6	35.4	35.8	33.3	32.4	35.1	38.0	31.0	37.3	41.0	36.4	46.3	0.00	0.2	36.2	44.1	-3.2	40.9
630	34.3	35.0	32.4	28.8	29.7	33.7	34.4	28.7	30.6	36.0	33.1	42.5	0.00	0.0	33.1	41.1	-1.9	39.2
800	33.0	32.4	25.9	27.9	27.5	27.2	34.5	30.2	29.1	29.0	30.5	39.6	0.00	-0.4	30.9	38.9	-0.8	38.1
1000	33.4	32.5	27.0	28.8	31.2	29.9	33.0	32.7	30.9	27.8	31.2	39.4	0.00	-0.9	32.1	40.1	0	40.1
1250	30.4	28.2	29.9	33.8	30.5	29.7	33.7	31.2	32.3	30.2	31.3	39.1	0.00	-1.2	32.5	40.5	0.6	41.1
1600	32.2	24.9	30.7	35.1	31.1	33.7	34.2	30.1	32.8	33.8	32.6	39.6	0.00	-0.6	33.1	41.1	1	42.1
2000	29.5	24.6	28.8	34.2	28.9	29.2	32.8	28.1	37.2	30.7	31.8	38.1	0.00	0.3	31.5	39.5	1.2	40.7
2500	33.5	24.8	28.5	30.1	25.5	29.7	33.8	28.8	31.3	29.6	30.4	36.0	0.00	-0.2	30.7	38.6	1.3	39.9
3150	32.2	26.0	26.2	26.4	23.0	23.9	30.3	23.3	27.9	27.6	27.7	32.8	0.00	0.4	27.2	35.2	1.2	36.4
4000	28.3	24.7	22.2	26.2	23.7	23.4	28.0	22.2	26.8	24.2	25.5	28.7	0.00	0.6	24.9	32.9	1	33.9
5000	20.8	21.3	18.5	25.8	19.9	22.0	25.2	19.3	24.8	21.5	22.6	26.6	0.00	-0.9	23.5	31.4	0.5	31.9
6300	19.4	15.4	17.3	20.3	14.1	16.3	21.2	13.5	20.6	16.6	18.2	22.3	0.00	-0.5	18.7	26.7	-0.1	26.6
8000	14.7	12.8	13.3	16.8	10.5	14.8	18.5	11.7	17.3	11.9	15.0	18.4	0.00	-0.3	15.2	23.2	-1.1	22.1
10000	13.2	8.9	11.4	14.8	8.2	11.6	15.0	10.0	14.0	8.5	12.3	14.7	0.15	0.5	11.6	19.5	-2.5	17.0

A-WEIGHTED SOUND POWER LEVEL

50.9

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Frequency [Hz]	Mic 1 [dB]	Mic 2 [dB]	Mic 3 [dB]	Mic 4 [dB]	Mic 5 [dB]	Mic 6 [dB]	Mic 7 [dB]	Mic 8 [dB]	Mic 9 [dB]	Mic 10 [dB]								
100	24.6	26.1	25.5	23.9	26.2	26.4	25.7	26.2	25.5	26.4	25.7	18.6	0.00	1.1	24.6	32.6	-19.1	13.5
125	25.8	27.0	26.4	25.2	27.2	27.4	25.1	25.6	25.1	25.4	26.1	29.5	0.00	2.4	23.7	31.7	-16.1	15.6
160	28.2	28.8	28.4	27.8	27.6	27.5	27.3	27.0	28.0	28.8	28.0	33.2	0.00	0.7	27.3	35.2	-13.4	21.8
200	33.5	31.6	31.5	32.7	31.8	32.0	30.3	29.9	30.2	31.8	31.7	37.7	0.00	0.5	31.2	39.1	-10.9	28.2
250	38.6	38.9	37.6	36.8	37.4	38.5	34.0	35.6	34.7	35.8	37.1	43.7	0.00	0.6	36.4	44.4	-8.6	35.8
315	44.7	44.5	43.4	41.9	41.3	42.8	37.8	35.6	38.3	42.2	42.1	52.2	0.00	0.3	41.7	49.7	-6.6	43.1
400	39.8	38.4	36.3	35.7	34.6	36.7	34.1	32.2	36.5	38.7	36.8	47.0	0.00	0.3	36.5	44.5	-4.8	39.7
500	38.0	39.1	36.6	34.5	34.4	35.5	36.3	36.5	36.6	39.5	37.0	46.9	0.00	0.2	36.8	44.8	-3.2	41.6
630	35.4	36.6	34.3	32.7	33.6	33.8	34.8	34.8	35.0	36.7	34.9	44.4	0.00	0.0	34.9	42.9	-1.9	41.0
800	31.7	30.9	28.1	29.7	30.4	29.3	31.7	30.7	31.2	32.3	30.8	39.9	0.00	-0.4	31.1	39.1	-0.8	38.3
1000	31.5	30.8	28.7	30.7	31.0	30.8	31.7	31.1	30.4	31.2	30.9	39.1	0.00	-0.9	31.8	39.8	0	39.8
1250	28.3	28.4	30.5	30.2	32.1	32.1	31.1	31.6	31.4	32.9	31.1	38.8	0.00	-1.2	32.3	40.2	0.6	40.8
1600	29.8	28.8	31.2	32.3	32.8	32.9	31.8	32.8	33.0	34.5	32.3	39.3	0.00	-0.6	32.8	40.8	1	41.8
2000	30.0	31.2	30.8	30.5	33.5	32.3	32.0	33.2	33.0	35.2	32.5	38.7	0.00	0.3	32.1	40.1	1.2	41.3
2500	30.0	29.6	29.0	28.8	31.0	30.4	30.5	31.0	30.4	32.2	30.4	36.0	0.00	-0.2	30.6	38.6	1.3	39.9
3150	27.0	26.3	26.2	24.5	27.5	26.6	26.3	27.5	27.5	29.0	27.0	32.1	0.00	0.4	26.5	34.5	1.2	35.7
4000	23.1	25.1	24.0	23.0	25.4	25.6	24.6	25.7	25.5	27.3	25.1	28.3	0.00	0.6	24.5	32.5	1	33.5
5000	22.2	23.5	23.4	22.4	24.0	24.2	23.8	24.4	24.3	24.9	23.8	27.8	0.00	-0.9	24.6	32.6	0.5	33.1
6300	16.2	16.9	17.4	16.1	18.4	18.0	18.2	18.2	19.0	19.3	17.9	22.0	0.00	-0.5	18.4	26.4	-0.1	26.3
8000	12.3	13.2	14.0	13.1	14.5	14.8	16.9	15.0	15.2	15.8	14.7	18.1	0.00	-0.3	14.9	22.9	-1.1	21.8
10000	12.4	12.8	13.9	12.6	14.0	14.5	14.6	13.8	13.9	13.9	13.7	16.1	0.00	0.5	13.1	21.1	-2.5	18.6

A-WEIGHTED SOUND POWER LEVEL **51.4**

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Test Report

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Appendix 3 – Measured time averaged sound pressure level of RSS, $L'_{P(RSS)}$ at each microphone position

Frequency	Mic 1	Mic 2	Mic 3	Mic 4	Mic 5	Mic 6	Mic 7	Mic 8	Mic 9	Mic 10	Average $L'_{P(RSS)}$ over microphone positions	Calculated Sound Power of RSS
[Hz]	[dB]	[dB]	[dB]									
100	68.8	70.8	70.1	68.3	70.8	70.2	67.6	68.9	66.9	60.7	69.0	76.9
125	70.8	71.9	70.7	69.9	71.4	70.5	67.9	69.3	68.0	61.9	69.9	77.8
160	70.5	70.9	70.8	69.6	68.4	68.8	68.4	67.7	65.9	62.6	68.9	76.9
200	71.1	69.9	70.1	70.4	68.7	69.4	67.4	67.4	64.8	62.6	68.8	76.8
250	70.2	70.6	70.0	69.2	69.3	69.8	66.3	67.8	65.1	63.9	68.7	76.7
315	70.4	70.7	70.2	69.1	68.8	69.2	66.7	66.4	65.8	65.8	68.7	76.7
400	71.0	71.1	70.4	69.2	68.5	69.6	65.1	65.9	64.2	64.6	68.7	76.7
500	71.4	71.9	70.8	69.0	68.1	69.5	64.9	64.6	64.9	66.0	68.9	76.9
630	71.7	72.1	70.5	68.1	66.9	69.0	66.4	65.6	67.9	69.6	69.3	77.3
800	72.6	72.5	69.8	66.0	65.5	67.5	70.2	69.1	71.7	72.6	70.4	78.4
1000	72.3	73.0	67.9	65.0	65.6	65.6	73.2	72.9	72.7	70.9	70.9	78.9
1250	70.0	72.6	65.7	71.3	72.9	69.9	73.4	74.3	71.4	75.1	72.3	80.3
1600	66.0	68.1	72.0	75.4	75.9	74.8	71.6	71.0	74.2	73.4	73.1	81.1
2000	68.7	67.6	74.9	75.5	74.6	75.6	74.0	73.6	73.4	71.7	73.6	81.6
2500	71.8	69.1	73.8	71.6	70.6	72.5	71.0	71.9	70.1	68.3	71.3	79.3
3150	75.2	73.2	72.5	71.8	72.4	70.7	70.1	71.1	69.5	66.2	71.8	79.8
4000	73.6	73.7	70.7	72.9	72.3	72.7	70.5	71.2	69.0	66.3	71.8	79.7
5000	68.9	70.4	71.4	70.7	70.6	70.5	69.2	69.9	68.1	64.2	69.7	77.7
6300	69.6	69.4	70.3	69.7	69.6	69.8	67.8	68.8	67.1	62.6	68.9	76.9
8000	67.6	67.8	69.2	68.3	68.0	67.8	66.5	67.6	66.4	61.1	67.4	75.4
10000	66.0	66.5	67.5	66.9	67.1	67.1	65.0	66.4	65.1	59.7	66.1	74.1

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