

# SW51+ Tungram EF184 300R DISTORTION UNBAL REPORT

Overall Result: **PASS**

SUMMARY:	RESULT
A01 Tube Freq Resp 5Hz - 96KHz 0dBu	OK
A04 THD+N,THD, nth-HD 2 3 4 - THD+N minus 2nd and 3rd harmonics	✓
A07 Noise, SNR	✓
A16 FFT residual noise	✓
A17 Tube THD+N and 4+HD+N vs Ampl +10dBu start unBal	OK
A18 - gain linearity 4+HD+N - unBal output - 440Hz	OK
A19 - gain linearity 4+HD+N - unBal output - 40Hz	OK
A20_MT_Analogue_31Tones	OK

**KEY:** ✓ = Test passes, ✗ = Test fails, OK = Test has run but has no limit checking, (X) = Test has failed to run or has not completed, [N] = Test passes but is not required, [X] = Test fails but is not required, ? = Test is required but has not been run.  
 - = Test is not required.

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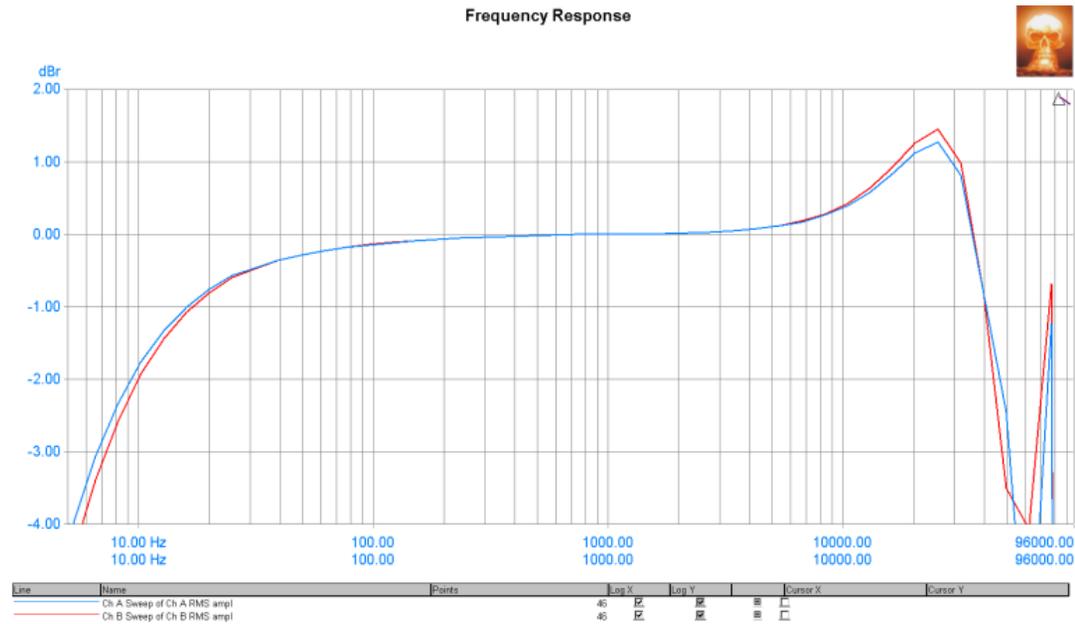
**A01 Tube Freq Resp 5Hz - 96KHz 0dBu:** Not limit checked.

Measured at 11/29/2020 2:51:15 PM

Signal Analyzer Readings		
RMS amplitude (Channel A)	-0.138 dBu	Not limit checked.
RMS amplitude (Channel B)	0.136 dBu	Not limit checked.

CTA Readings		
Gain (Channel A RMS)	-0.139 dB	Not limit checked.
Gain (Channel B RMS)	0.135 dB	Not limit checked.

Settings: Generator relative, 22 Hz - 22 kHz, unweighted RMS with 1/3rd octave band-pass filter at the generator frequency



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**A04 THD+N,THD, nth-HD 2 3 4 - THD+N minus 2nd and 3rd harmonics:** **PASSED**

Measured at 11/29/2020 2:51:32 PM

Signal Analyzer Readings		
RMS amplitude (Channel A)	-0.133 dBu	Not limit checked.
RMS amplitude (Channel B)	0.143 dBu	Not limit checked.

**CTA Readings**

THD+N - relative (Channel A RMS)

0.23731 %

< 200 %

> 0 %

THD+N - relative (Channel B RMS)

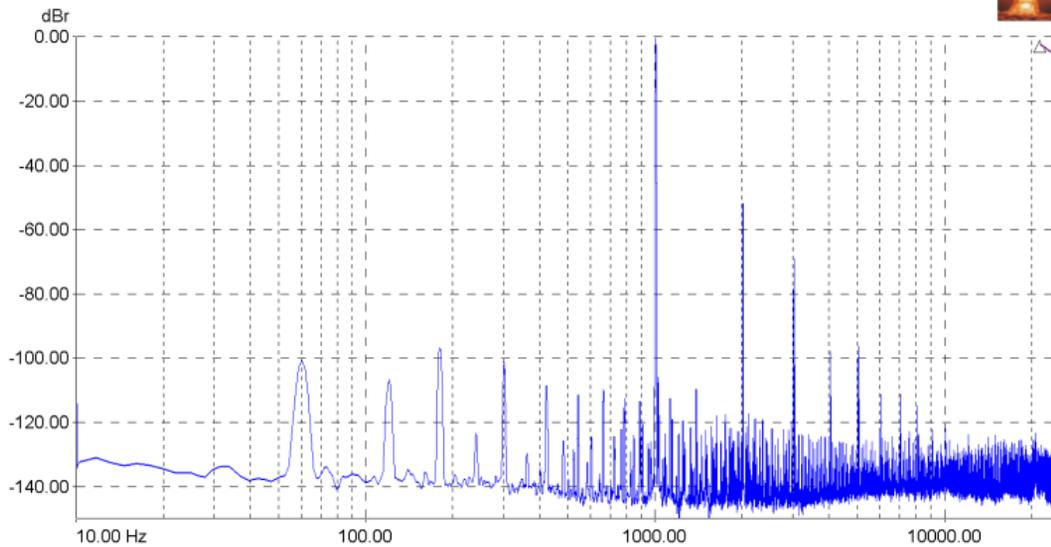
0.23989 %

< 200 %

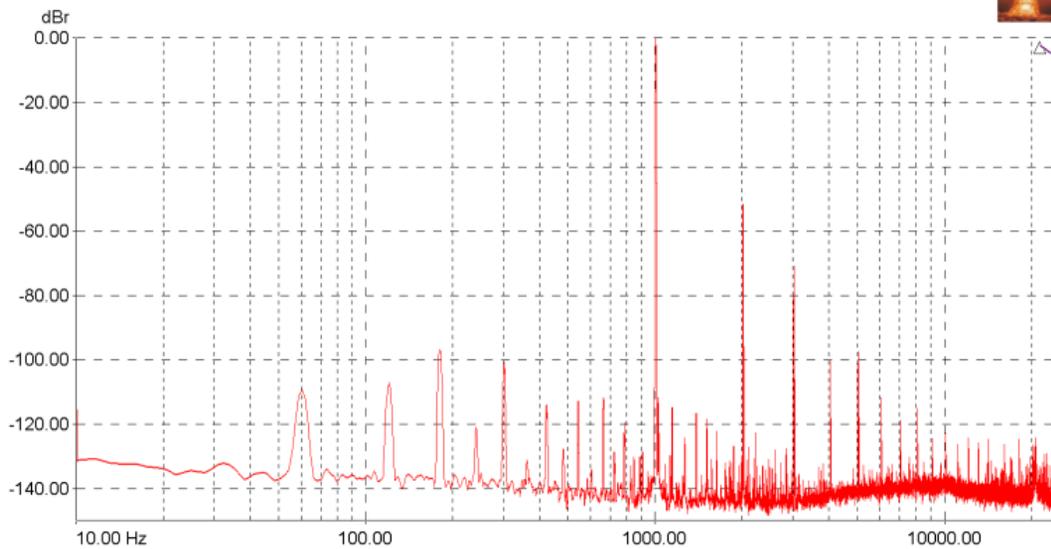
> 0 %

Settings: Self relative, 22 Hz - 22 kHz, unweighted RMS with 1/3rd octave band-reject filter at the input frequency

**Distortion 1 KHz**



**Distortion 1 KHz**



FFT Detector Readings		
THD (Channel A)	0.25897 %	< 200 % > 0 %
THD (Channel B)	0.25959 %	< 200 % > 0 %
FFTD 1 Settings: Self relative, 22 Hz - 22 kHz, unweighted with band-pass notch filters from the 2nd to 10th harmonics		
2nd Harmonic Distortion (Channel A)	0.25657 %	< 200 % > 0 %
2nd Harmonic Distortion (Channel B)	0.25811 %	< 200 % > 0 %
FFTD 2 Settings: Self relative, 22 Hz - 22 kHz, unweighted with band-pass notch filter at the 2nd harmonic		
3rd Harmonic Distortion (Channel A)	0.03509 %	< 200 % > 0 %
3rd Harmonic Distortion (Channel B)	0.02756 %	< 200 % > 0 %
FFTD 3 Settings: Self relative, 22 Hz - 22 kHz, unweighted with band-pass notch filter at the 3rd harmonic		
4th Harmonic Distortion (Channel A)	0.00129 %	Not limit checked.
4th Harmonic Distortion (Channel B)	0.00095 %	Not limit checked.
FFTD 4 Settings: Self relative, 22 Hz - 22 kHz, unweighted with band-pass notch filter at the 4th harmonic		
5th Harmonic Distortion (Channel A)	0.00155 %	Not limit checked.
5th Harmonic Distortion (Channel B)	0.00131 %	Not limit checked.
FFTD 5 Settings: Self relative, 22 Hz - 22 kHz, unweighted with band-pass notch filter at the 5th harmonic		
4+HD + N (Channel A)	0.00320 %	< 0.05 % > 0 %
4+HD + N (Channel B)	0.00259 %	< 0.05 % > 0 %
FFTD 6 Settings: Self relative, 22 Hz - 22 kHz, unweighted with band-reject notch filters, fundamental to the 3rd harmonic		
Hum (Channel A)	0.00089 %	< 0.017783 % > 0 %
Hum (Channel B)	0.00033 %	< 0.017783 % > 0 %
FFTD 7 Settings: Self relative, 22 Hz - 22 kHz, unweighted with window notch (14 bins) band-pass filter at 60 Hz		
Noise (residual) (Channel A)	0.00245 %	< 0.017783 % > 0 %
Noise (residual) (Channel B)	0.00199 %	< 0.017783 % > 0 %
FFTD 8 Settings: Self relative, 22 Hz - 22 kHz, unweighted with band-reject notch filters, fundamental to the 10th harmonic		

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#### A07 Noise, SNR: PASSED

Measured at 11/29/2020 2:52:35 PM

CTA Readings		
Amplitude (Channel A RMS)	-42.127 dBu	Not limit checked.
Amplitude (Channel B RMS)	-41.854 dBu	Not limit checked.
Settings: 22 Hz - 22 kHz, unweighted RMS		

FFT Detector Readings		
Noise (unweighted) (Channel A)	-103.696 dBr	< 200 dBr > -200 dBr
Noise (unweighted) (Channel B)	-105.818 dBr	< 200 dBr > -200 dBr
FFTD 1 Settings: 22 Hz - 22 kHz, unweighted with window notch (14 bins) band-reject filter at the generator frequency		
SNR (Channel A)	-103.872 dBr	< 200 dBr > -200 dBr
SNR (Channel B)	-105.969 dBr	< 200 dBr > -200 dBr
FFTD 2 Settings: 22 Hz - 22 kHz, unweighted with 1/3rd octave band-reject filter at the generator frequency		

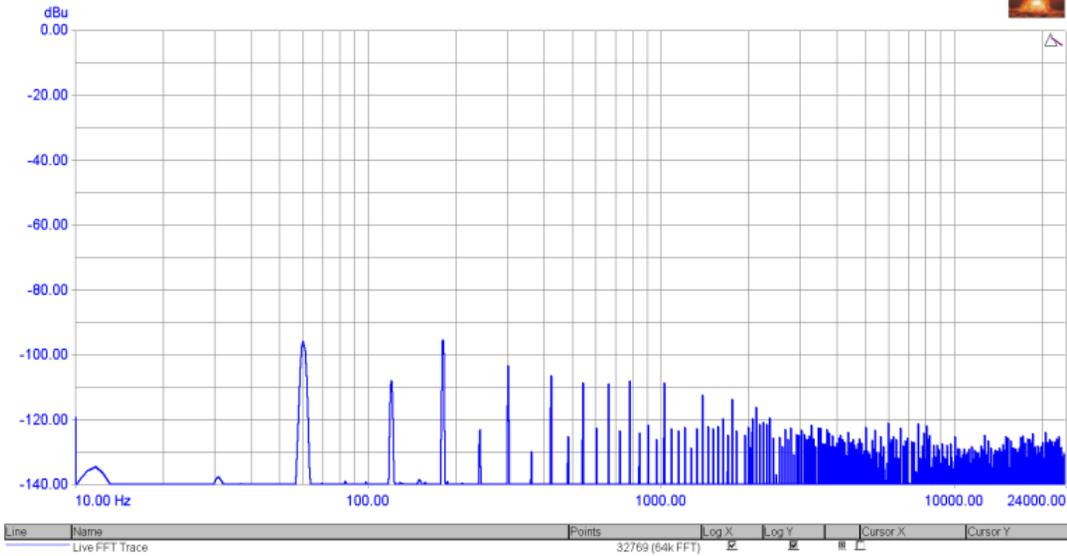
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#### A16 FFT residual noise: PASSED

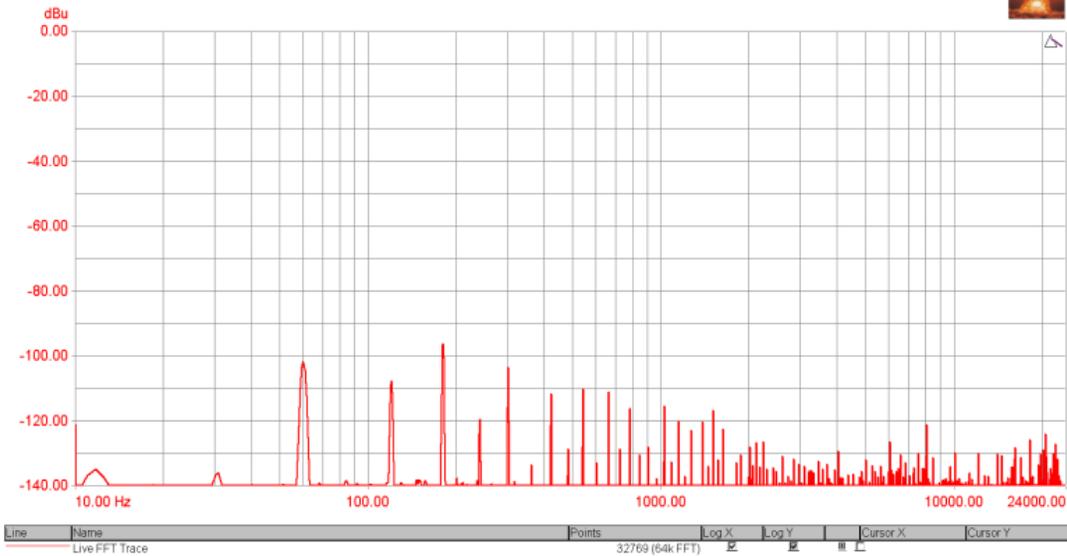
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Signal Analyzer Readings		
RMS amplitude (Channel A)	-85.541 dBu	Not limit checked.
RMS amplitude (Channel B)	-88.001 dBu	Not limit checked.

FFT residual noise



FFT residual noise



FFT Detector Readings

Noise (residual) (Channel A)	-91.073 dBu	< -80 dBu > -140 dBu
Noise (residual) (Channel B)	-96.980 dBu	< -80 dBu > -140 dBu
FFT 1 Settings: 22 Hz - 22 kHz, unweighted with band-reject notch filters, fundamental to the 10th harmonic		

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A17 Tube THD+N and 4+HD+N vs Ampl +10dBu start unBal: Not limit checked.

Measured at 11/29/2020 2:53:59 PM

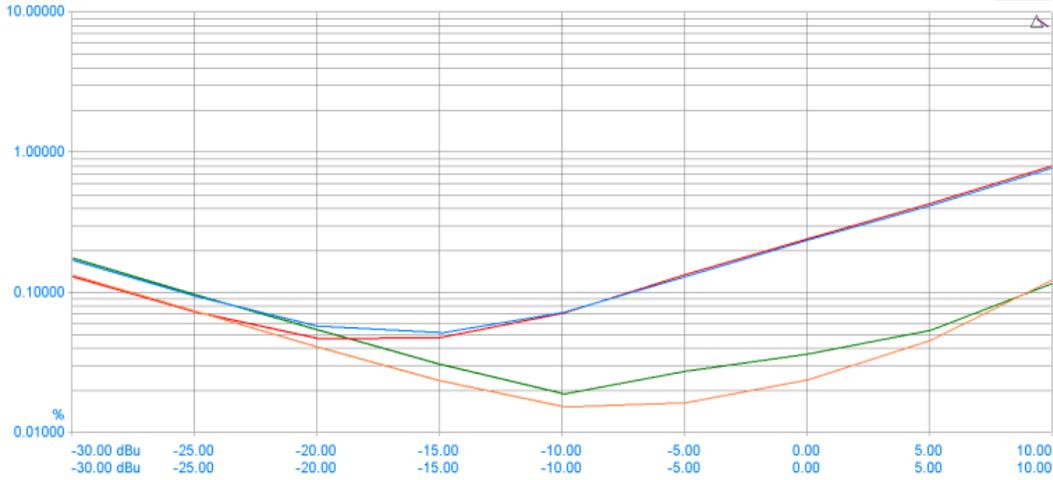
CTA Readings

Amplitude (Channel A RMS)	-0.129 dBu	Not limit checked.
Amplitude (Channel B RMS)	0.147 dBu	Not limit checked.
Settings: 22 Hz - 22 kHz, unweighted RMS		

FFT Detector Readings

THD+N - relative (Channel A)	0.215 %	Not limit checked.
THD+N - relative (Channel B)	0.226 %	Not limit checked.
FFT 1 Settings: Self relative, 22 Hz - 22 kHz, unweighted with 1/3rd octave band-reject filter at the input frequency		
4+HD+N	0.042 %	Not limit checked.
4+HD+N	0.023 %	Not limit checked.
FFT 2 Settings: Self relative, 22 Hz - 22 kHz, unweighted with band-reject notch filters, fundamental to the 2nd harmonic		

THD+N and 4+HD+N vs Amplitude



Line	Name	Points	Log X	Log Y	...	Cursor X	Cursor Y
1	Ch A Sweep of FFT Det 1 : THD+N - relative : Ch A	9	☑	☑	...	0.00	0.00
2	Ch A Sweep of FFT Det 2 : THD : Ch A	9	☑	☑	...	0.00	0.00
3	Ch B Sweep of FFT Det 1 : THD+N - relative : Ch B	9	☑	☑	...	0.00	0.00

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A18 - gain linearity 4+HD+N - unBal output - 440Hz: Not limit checked.

Measured at 11/29/2020 2:54:48 PM

Signal Analyzer Readings

Frequency (Channel A) 440.000 Hz Not limit checked.

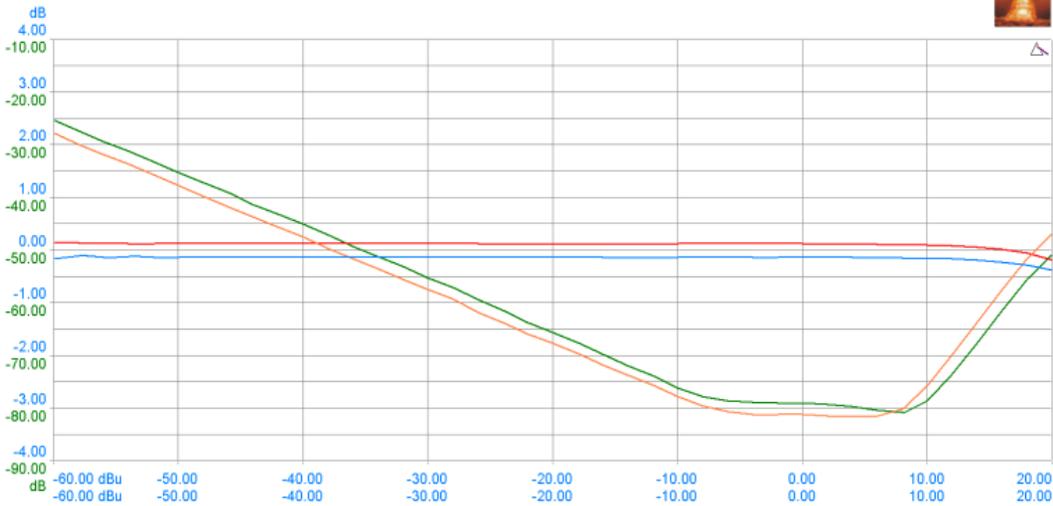
CTA Readings

Gain (Channel A RMS) -0.150 dB Not limit checked.

Gain (Channel B RMS) 0.124 dB Not limit checked.

Settings: Generator relative, 22 Hz - 22 kHz, unweighted RMS with 1/3rd octave band-pass filter at the generator frequency

Gain Linearity and 4+HD+N vs Amplitude - 440 Hz



Line	Name	Points	Log X	Log Y	...	Cursor X	Cursor Y
1	Ch A Sweep of CT Det : Gain : Ch A	41	☑	☑	...	0.00	0.00
2	Ch A Sweep of FFT Det 1 : THD+N - relative : Ch A	41	☑	☑	...	0.00	0.00
3	Ch B Sweep of CT Det : Gain : Ch B	41	☑	☑	...	0.00	0.00

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A19 - gain linearity 4+HD+N - unBal output - 40Hz: Not limit checked.

Measured at 11/29/2020 2:55:38 PM

Signal Analyzer Readings

Frequency (Channel A) 40.000 Hz Not limit checked.

### CTA Readings

Gain (Channel A RMS)

-0.644 dB

Not limit checked.

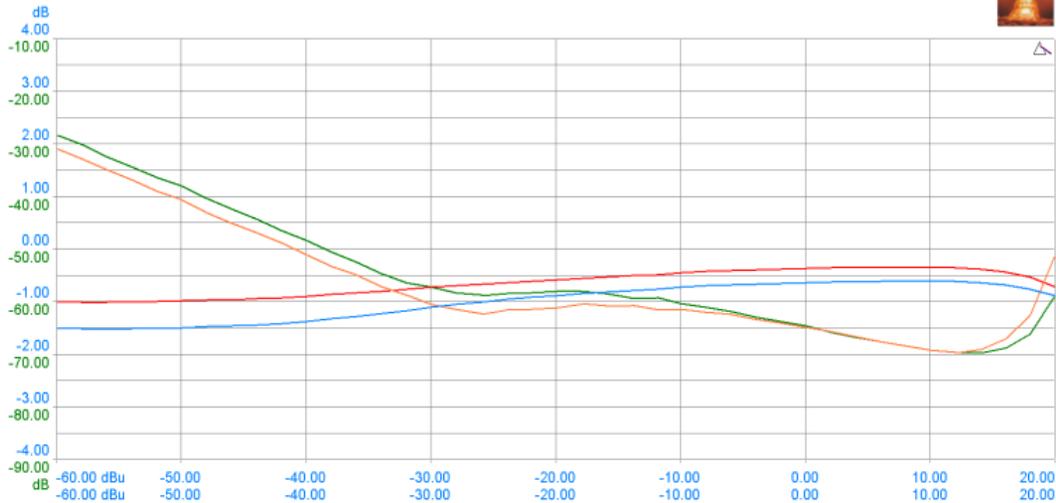
Gain (Channel B RMS)

-0.373 dB

Not limit checked.

Settings: Generator relative, 22 Hz - 22 kHz, unweighted RMS with 1/3rd octave band-pass filter at the generator frequency

#### Gain Linearity and 4+HD+N vs Amplitude - 40 Hz



Line	Name	Points	Log X	Log Y	Cursor X	Cursor Y
1	Ch A Sweep of CT Det : Gain : Ch A	41	☑	☑	☑	☑
2	Ch A Sweep of FFT Det 1 : THD+N - relative : Ch A	41	☑	☑	☑	☑
3	Ch B Sweep of CT Det : Gain : Ch B	41	☑	☑	☑	☑
4	Ch B Sweep of FFT Det 1 : THD+N - relative : Ch B	41	☑	☑	☑	☑

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**A20\_MT\_Analogue\_31Tones:** Not limit checked.

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### Signal Analyzer Readings

RMS amplitude (Channel A)

-20.175 dBu

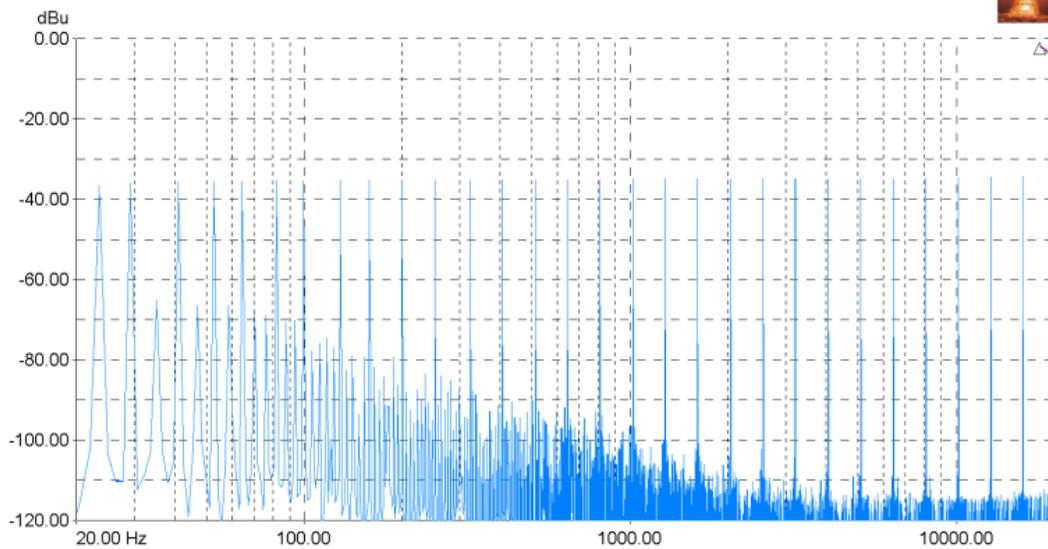
Not limit checked.

RMS amplitude (Channel B)

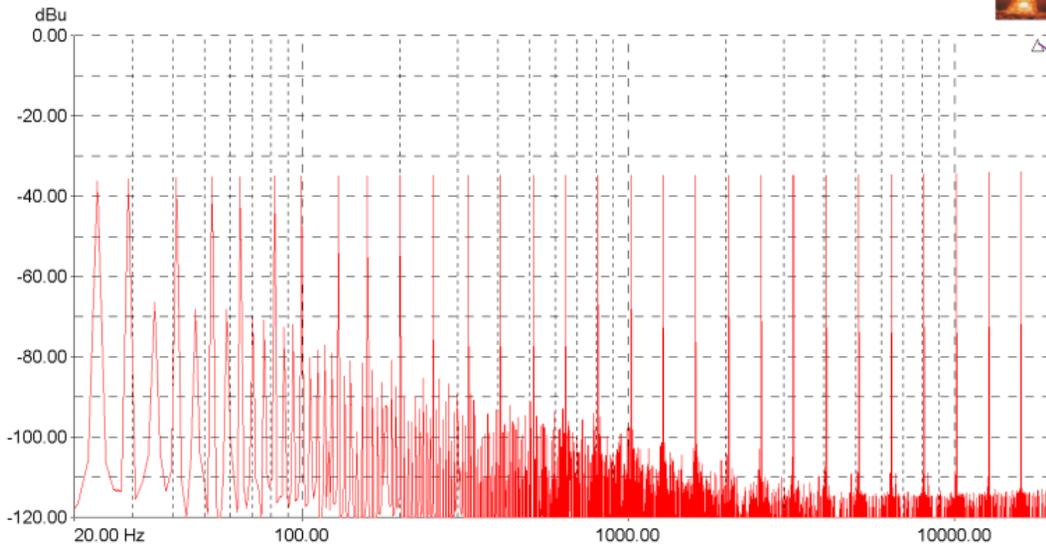
-20.656 dBu

Not limit checked.

#### Multitone 31 tones 64K FFT



Multitone 31 tones 64K FFT



FFT Detector Readings		
User: TD (Channel A)	106.580 dB	Not limit checked.
User: TD (Channel B)	105.601 dB	Not limit checked.
FFTD 1 Settings: User: TD		
User: Noise (Channel A)	-81.209 dBu	Not limit checked.
User: Noise (Channel B)	-82.448 dBu	Not limit checked.
FFTD 2 Settings: User: Noise		
User: TD+N (Channel A)	106.580 dB	Not limit checked.
User: TD+N (Channel B)	105.601 dB	Not limit checked.
FFTD 3 Settings: User: TD+N		
User: LF Rolloff (Channel A)	-6.264 dB	Not limit checked.
User: LF Rolloff (Channel B)	-12.679 dB	Not limit checked.
FFTD 4 Settings: User: LF Rolloff		
User: HF Rolloff (Channel A)	2.155 dB	Not limit checked.
User: HF Rolloff (Channel B)	2.898 dB	Not limit checked.
FFTD 5 Settings: User: HF Rolloff		