

Bifrost-2 Optical 44K Bal REPORT

Overall Result: **PASS**

SUMMARY:	RESULT
A01 Ampl, Phase, Gain	✓
A02 Ampl, Phase vs Freq	✓
A03 Gain vs Ampl	✓
A04 THD+N, THD, nth-HD - analyzer comparison	✓
A04 THD+N, THD, nth-HD	✓
A05 THD+N vs Freq	✓
A06 THD+N vs Ampl	✓
A07 Noise, SNR	✓
A08 Crosstalk A to B	✓
A09 Crosstalk B to A	✓
A10 Crosstalk A to B vs Freq	✓
A11 Crosstalk B to A vs Freq	✓
A12 FFT 1000 Hz THD+N	✓
A13 FFT 50+7000Hz	✓
A14 FFT 600+1700 Hz	✓
A15 FFT 19+20 KHz	✓
A16 FFT residual noise	✓
A17 FFT -90 dBFS	OK
A18 FFT -90 dBFS 16 bit	OK
A19 FFT imaging	OK
A20 FFT inferred jitter	OK

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

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A01 Ampl, Phase, Gain: PASSED

Measured at 1/21/2020 5:00:00 PM

Generator Settings	
Channel A:	sine, 0 dBFS at 1000 Hz
Channel B:	sine, 0 dBFS at 1000 Hz

Signal Analyzer Readings		
RMS amplitude (Channel A)	14.348 dBu	< 24 dBu > 0 dBu
RMS amplitude (Channel B)	14.352 dBu	< 24 dBu > 0 dBu
Inter-channel phase	-0.05 °	< 10 ° > -10 °

CTA Readings		
Gain (Channel A RMS)	-0.001 dB	< 20 dB > -40 dB
Gain (Channel B RMS)	0.003 dB	< 20 dB > -40 dB

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

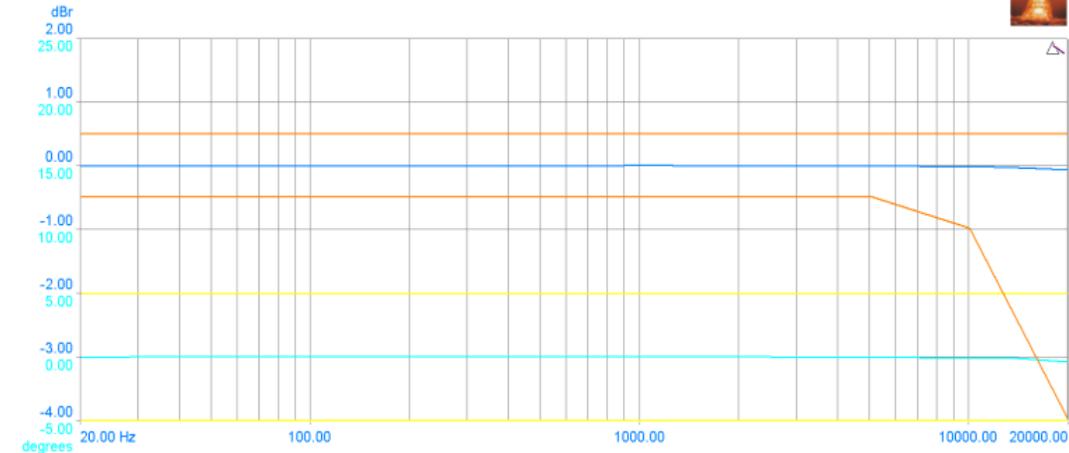
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A02 Ampl, Phase vs Freq: PASSED

Measured at 1/21/2020 5:00:03 PM

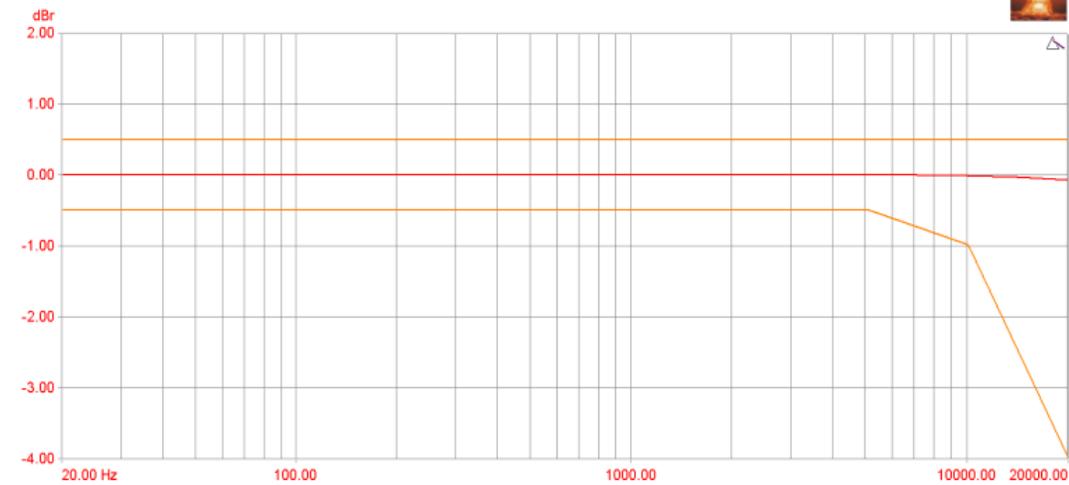
Generator Settings	
Channel A:	sine, -3 dBFS at 1000 Hz
Channel B:	sine, -3 dBFS at 1000 Hz

Frequency Response and Inter-channel Phase



Line	Name	Points	Log X	Log Y	Cursor X	Cursor Y
—	Sweep of Ch A RMS ampl	21	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
—	Max limit: Sweep of Ch A RMS ampl	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
—	Min limit: Sweep of Ch A RMS ampl	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
—	Sweep of Phase	21	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
—	Max limit: Sweep of Phase	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
—	Min limit: Sweep of Phase	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Frequency Response and Inter-channel Phase



Line	Name	Points	Log X	Log Y	Cursor X	Cursor Y
—	Sweep of Ch B RMS ampl	21	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
—	Max limit: Sweep of Ch B RMS ampl	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
—	Min limit: Sweep of Ch B RMS ampl	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

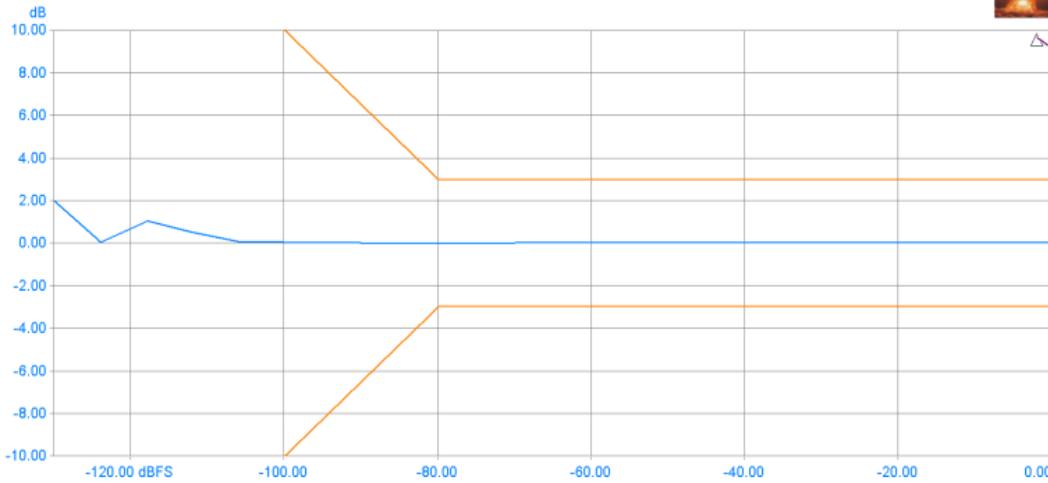
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A03 Gain vs Ampl: PASSED

Measured at 1/21/2020 5:00:10 PM

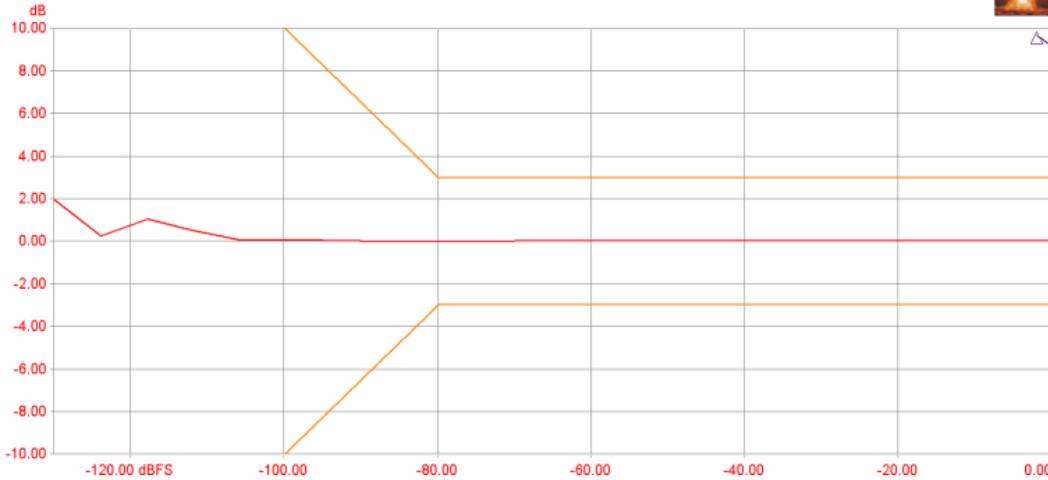
Generator Settings	
Channel A:	sine, -6 dBFS at 1000 Hz
Channel B:	sine, -6 dBFS at 1000 Hz

Gain vs Amplitude



Line	Name	Points	Log X	Log Y	Cursor X	Cursor Y
—	Sweep of FFT Det 1: Gain: Ch A	17	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
—	Max limit: Sweep of FFT Det 1: Gain: Ch A	3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
—	Min limit: Sweep of FFT Det 1: Gain: Ch A	3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Gain vs Amplitude



Line	Name	Points	Log X	Log Y	Cursor X	Cursor Y
—	Sweep of FFT Det 1: Gain: Ch B	17	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
—	Max limit: Sweep of FFT Det 1: Gain: Ch B	3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
—	Min limit: Sweep of FFT Det 1: Gain: Ch B	3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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A04 THD+N,THD, nth-HD - analyzer comparison: **PASSED**

Measured at 1/21/2020 5:01:14 PM

Generator Settings	
Channel A:	sine, -3 dBFS at 999.023 Hz
Channel B:	sine, -3 dBFS at 999.023 Hz

CTA Readings		
THD+N - relative (Channel A RMS)	0.00279 %	< 200 % > 0 %
Settings: Self relative, 22 Hz - 22 kHz, unweighted RMS with 1/3rd octave band-reject filter at the generator frequency		

FFT Detector Readings		
THD (Channel A)	0.00242 %	< 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)	0.00192 %	< 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)	0.00033 %	< 200 % > 0 %
FFTD 3 Settings: Self relative, 22 Hz - 22 kHz, unweighted with band-pass notch filter at the 3rd harmonic		

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A04 THD+N,THD, nth-HD: PASSED

Measured at 1/21/2020 5:01:16 PM

Generator Settings	
Channel A:	sine, -3 dBFS at 1000 Hz
Channel B:	sine, -3 dBFS at 1000 Hz

CTA Readings		
THD+N - relative (Channel A RMS)	0.00276 %	< 200 % > 0 %
THD+N - relative (Channel B RMS)	0.00321 %	< 200 % > 0 %
Settings: Self relative, 22 Hz - 22 kHz, unweighted RMS with 1/3rd octave band-reject filter at the generator frequency		

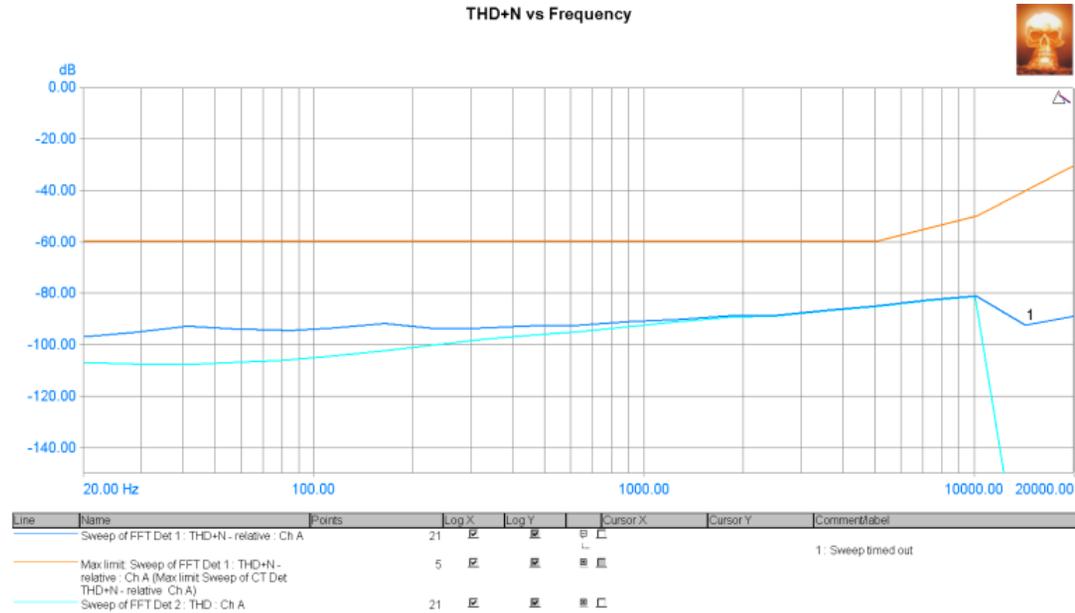
FFT Detector Readings		
THD (Channel A)	0.00243 %	< 200 % > 0 %
THD (Channel B)	0.00295 %	< 200 % > 0 %
FFTD 1 Settings: Self relative, 22 Hz - 22 kHz, unweighted with band-pass notch filters from the 2nd to 10th harmonics		
2nd Harmonic Distortion (Channel A)	0.00192 %	< 200 % > 0 %
2nd Harmonic Distortion (Channel B)	0.00249 %	< 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)	0.00030 %	< 200 % > 0 %
3rd Harmonic Distortion (Channel B)	0.00016 %	< 200 % > 0 %
FFTD 3 Settings: Self relative, 22 Hz - 22 kHz, unweighted with band-pass notch filter at the 3rd harmonic		

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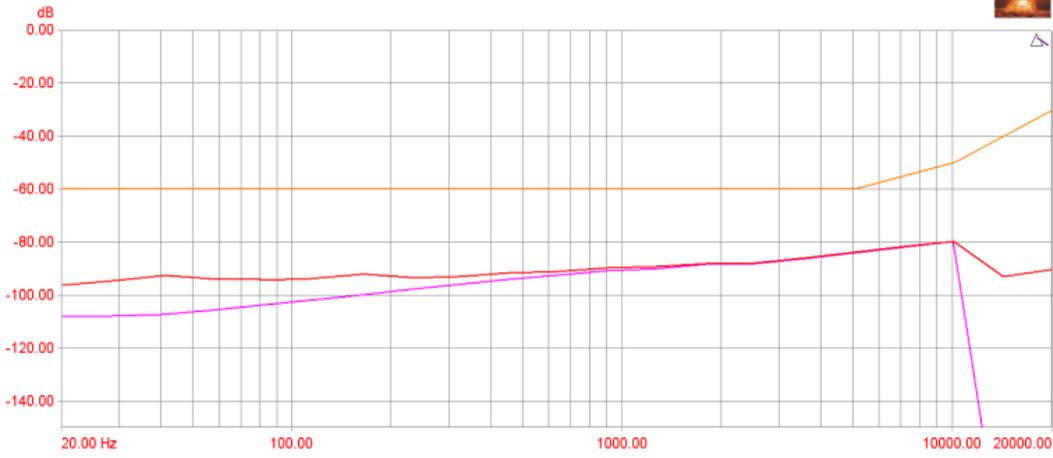
A05 THD+N vs Freq: PASSED

Measured at 1/21/2020 5:01:18 PM

Generator Settings	
Channel A:	sine, -3 dBFS at 1000 Hz
Channel B:	sine, -3 dBFS at 1000 Hz



THD+N vs Frequency



Line	Name	Points	Log X	Log Y	Cursor X	Cursor Y	Comment/Label
1	Sweep of FFT Det 1: THD+N - relative: Ch B	21	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	Max limit: Sweep of FFT Det 1: THD+N - relative: Ch B (Max limit: Sweep of CT Det THD+N - relative: Ch B)	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	Sweep of FFT Det 2: THD: Ch B	21	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

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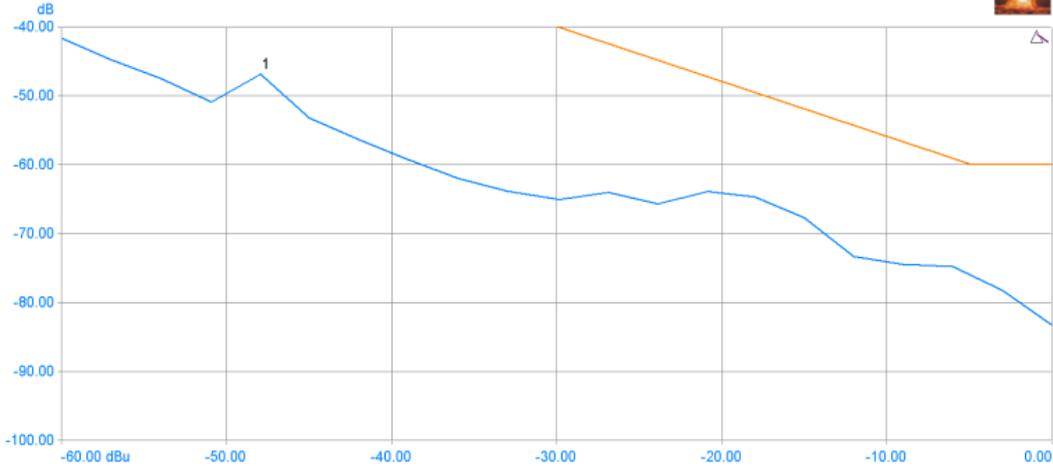
A06 THD+N vs Ampl: PASSED

Measured at 1/21/2020 5:02:22 PM

Generator Settings

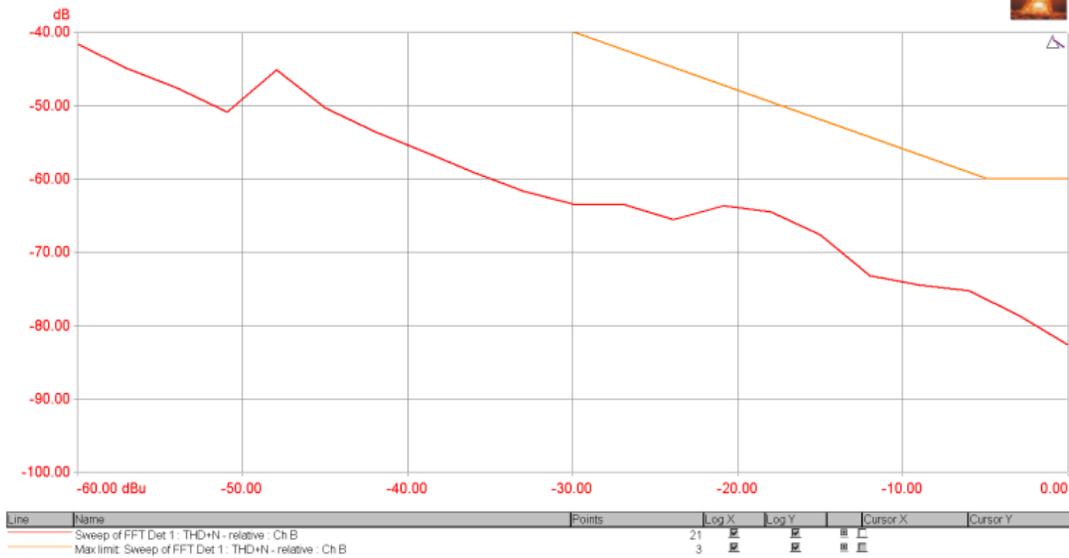
Channel A:	sine, -3 dBFS at 1000 Hz
Channel B:	sine, -3 dBFS at 1000 Hz

THD+N vs Amplitude



Line	Name	Points	Log X	Log Y	Cursor X	Cursor Y	Comment/Label
1	Sweep of FFT Det 1: THD+N - relative: Ch A	21	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	Max limit: Sweep of FFT Det 1: THD+N - relative: Ch A	3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1: Sweep timed out

THD+N vs Amplitude



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A07 Noise, SNR: PASSED

Measured at 1/21/2020 5:02:48 PM

Generator Settings	
Channel A:	sine, -60 dBFS at 1000 Hz
Channel B:	sine, -60 dBFS at 1000 Hz

FFT Detector Readings		
Noise (unweighted) (Channel A)	-98.077 dBr	Not limit checked.
Noise (unweighted) (Channel B)	-95.313 dBr	Not limit checked.
FFTD 1 Settings: 22 Hz - 22 kHz, unweighted with window notch (14 bins) band-reject filter at the generator frequency		
Noise (unweighted) (Channel A)	-98.171 dBr	Not limit checked.
Noise (unweighted) (Channel B)	-95.378 dBr	Not limit checked.
FFTD 2 Settings: 22 Hz - 22 kHz, unweighted with 1/3rd octave band-reject filter at the generator frequency		
User: DAC SNR Residual Async (Channel A)	112.431 dB	< 140 dB > 60 dB
User: DAC SNR Residual Async (Channel B)	109.700 dB	< 140 dB > 60 dB
FFTD 3 Settings: User: DAC SNR Residual Async		

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A08 Crosstalk A to B: PASSED

Measured at 1/21/2020 5:02:51 PM

Generator Settings	
Channel A:	sine, -3 dBFS at 1000 Hz
Channel B:	sine, -3 dBFS at 1000 Hz

CTA Readings		
Cross-talk (Channel B RMS)	-128.717 dB	< -45 dB
Settings: Channel relative, 22 Hz - 22 kHz, unweighted RMS with 1/24th octave band-pass filter at the opposite channel generator frequency		

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A09 Crosstalk B to A: PASSED

Measured at 1/21/2020 5:02:55 PM

Generator Settings	
Channel A:	sine, -3 dBFS at 1000 Hz
Channel B:	sine, -3 dBFS at 1000 Hz

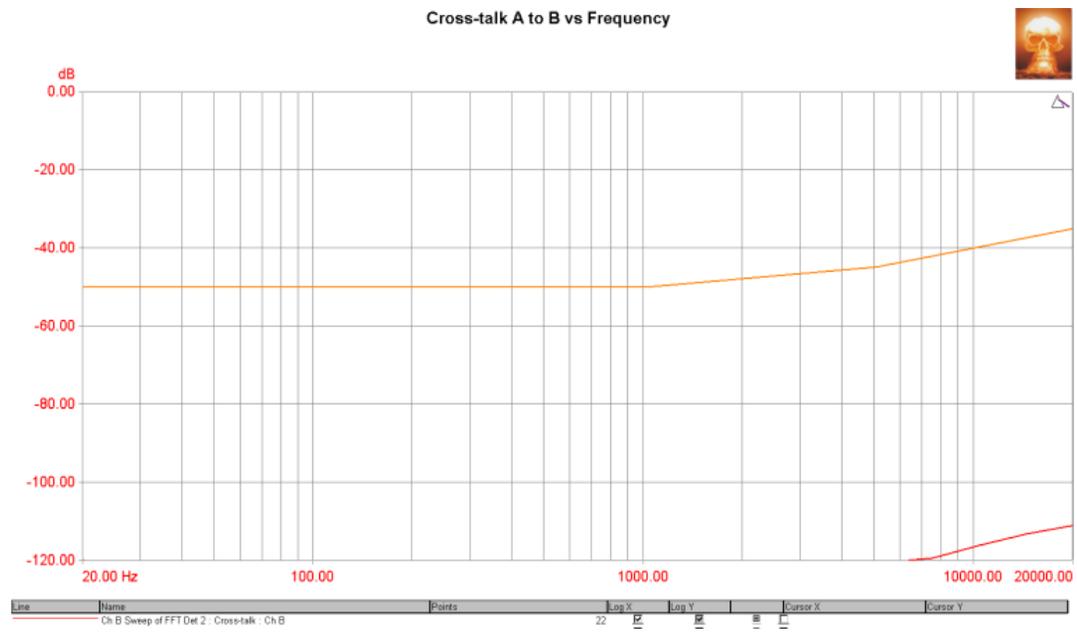
CTA Readings		
Cross-talk (Channel A RMS)	-135.251 dB	< -45 dB
Settings: Channel relative, 22 Hz - 22 kHz, unweighted RMS with 1/24th octave band-pass filter at the opposite channel generator frequency		

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A10 Crosstalk A to B vs Freq: PASSED

Measured at 1/21/2020 5:03:00 PM

Generator Settings	
Channel A:	sine, -3 dBFS at 1000 Hz
Channel B:	sine, -3 dBFS at 1000 Hz



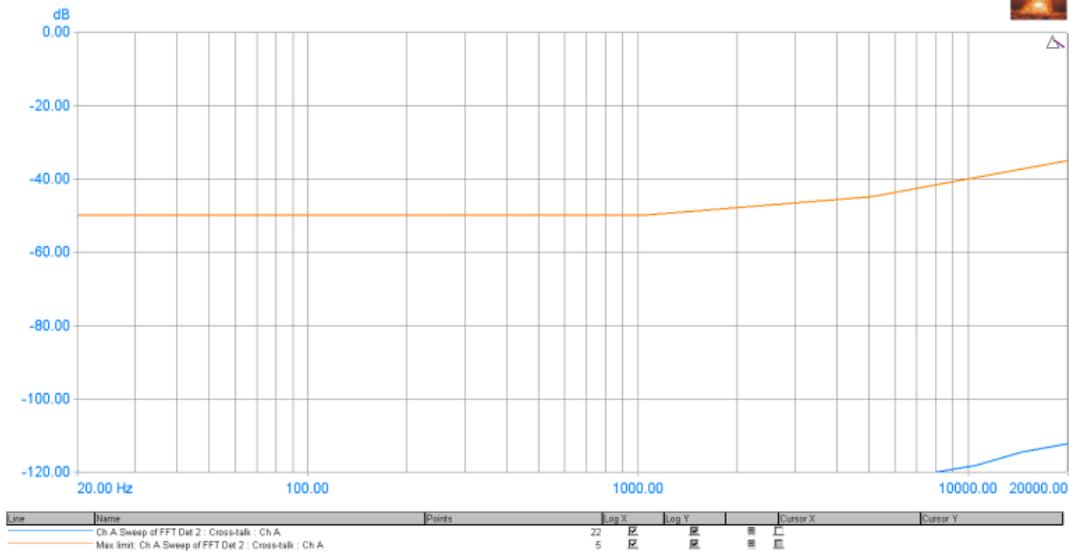
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A11 Crosstalk B to A vs Freq: PASSED

Measured at 1/21/2020 5:03:54 PM

Generator Settings	
Channel A:	sine, -3 dBFS at 1000 Hz
Channel B:	sine, -3 dBFS at 1000 Hz

Cross-talk A to B vs Frequency



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A12 FFT 1000 Hz THD+N: PASSED

Measured at 1/21/2020 5:04:46 PM

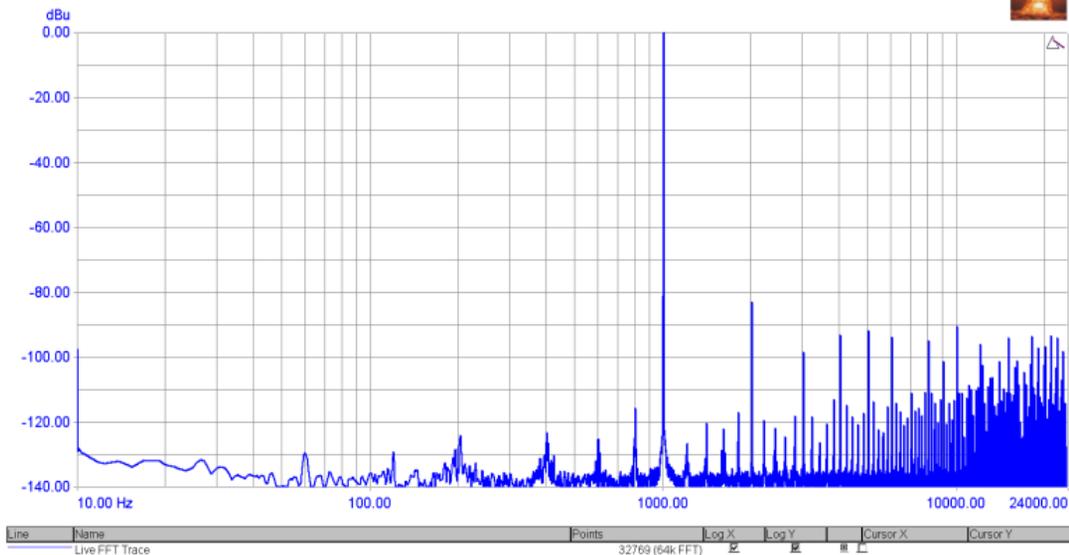
Generator Settings		
Channel A:	sine, -3 dBFS at 1000 Hz	
Channel B:	sine, -3 dBFS at 1000 Hz	

Signal Analyzer Readings		
RMS amplitude (Selected : Ch A)	11.347 dBu	Not limit checked.
RMS amplitude (Non-selected : Ch A)	11.352 dBu	Not limit checked.

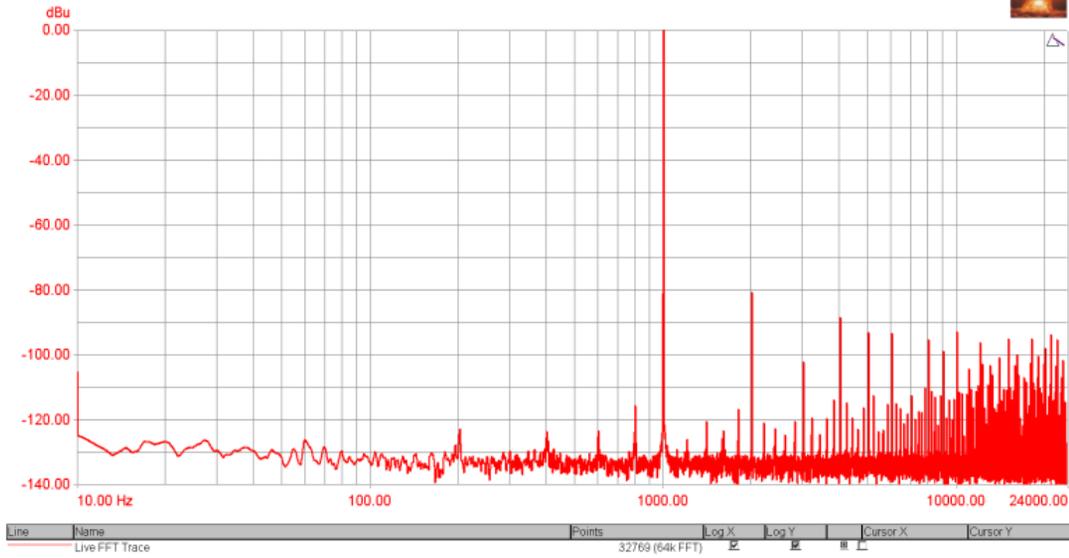
CTA Readings		
THD+N - relative (Selected : Ch A RMS)	0.00275 %	< 0.075 % > 0.00000001 %
THD+N - relative (Non-selected : Ch A RMS)	0.00322 %	< 0.075 % > 0.00000001 %

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

FFT 1000 Hz THD+N



FFT 1000 Hz THD+N



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A13 FFT 50+7000Hz: PASSED

Measured at 1/21/2020 5:05:09 PM

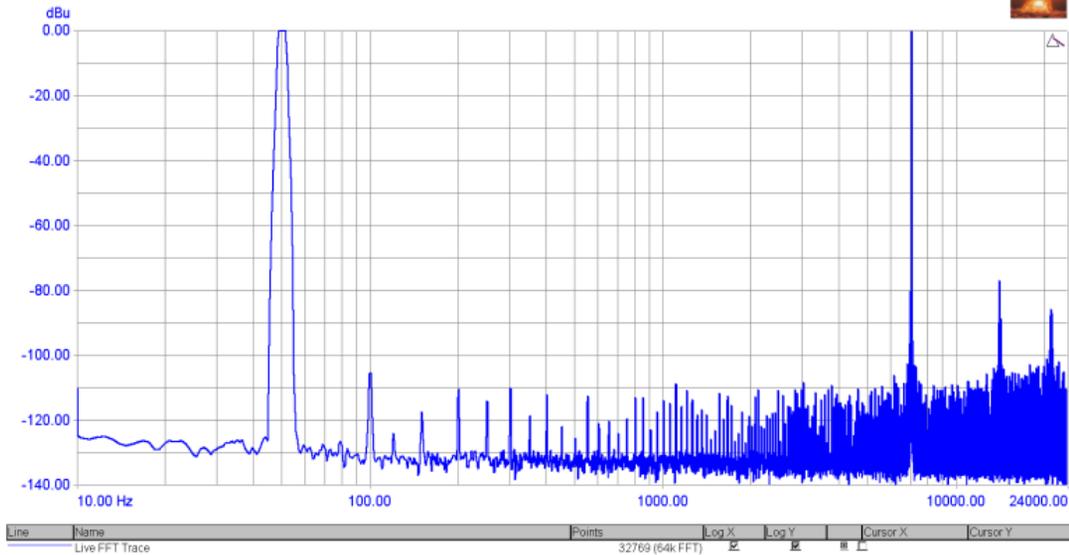
Generator Settings		
Channel A:	Twin-tone, -7 dBFS at 50 Hz and 1 amplitude ratio at 7000Hz	
Channel B:	Twin-tone, -7 dBFS at 50 Hz and 1 amplitude ratio at 7000Hz	

Signal Analyzer Readings		
RMS amplitude (Channel A)	10.354 dBu	Not limit checked.
RMS amplitude (Channel B)	10.356 dBu	Not limit checked.

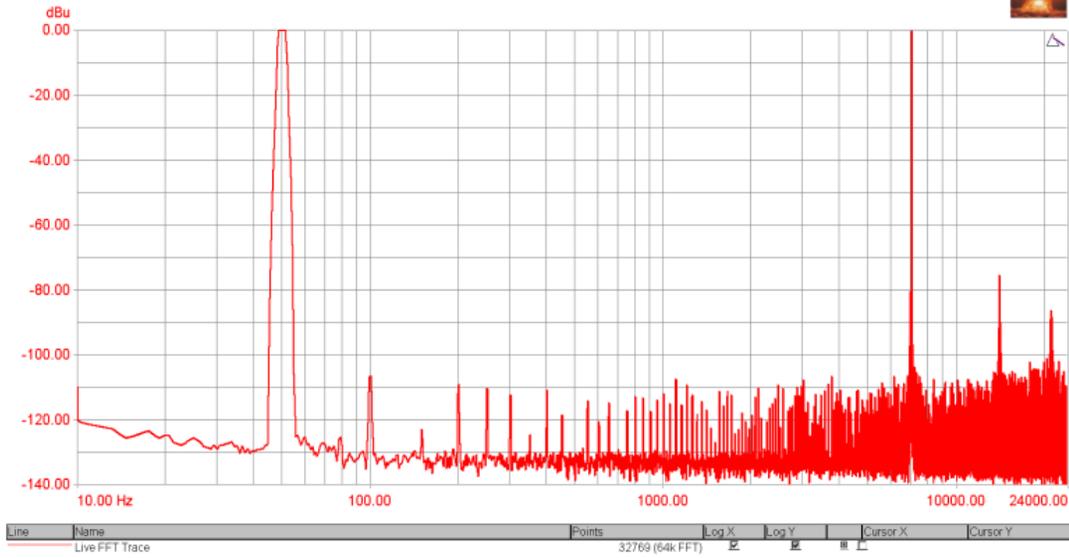
CTA Readings		
IMD SMPTE-DIN (Channel A RMS)	0.00070 %	< 0.05 % > 0 %
IMD SMPTE-DIN (Channel B RMS)	0.00085 %	< 0.05 % > 0 %

Settings: Self relative, 22 Hz - 22 kHz, unweighted RMS using SMPTE-DIN IMD demodulation.

FFT 50 + 7000 Hz



FFT 50 + 7000 Hz



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A14 FFT 600+1700 Hz: PASSED

Measured at 1/21/2020 5:05:31 PM

Generator Settings

Channel A:	Twin-tone, -7 dBFS at 600 Hz and 1 amplitude ratio at 1700Hz
Channel B:	Twin-tone, -7 dBFS at 600 Hz and 1 amplitude ratio at 1700Hz

Signal Analyzer Readings

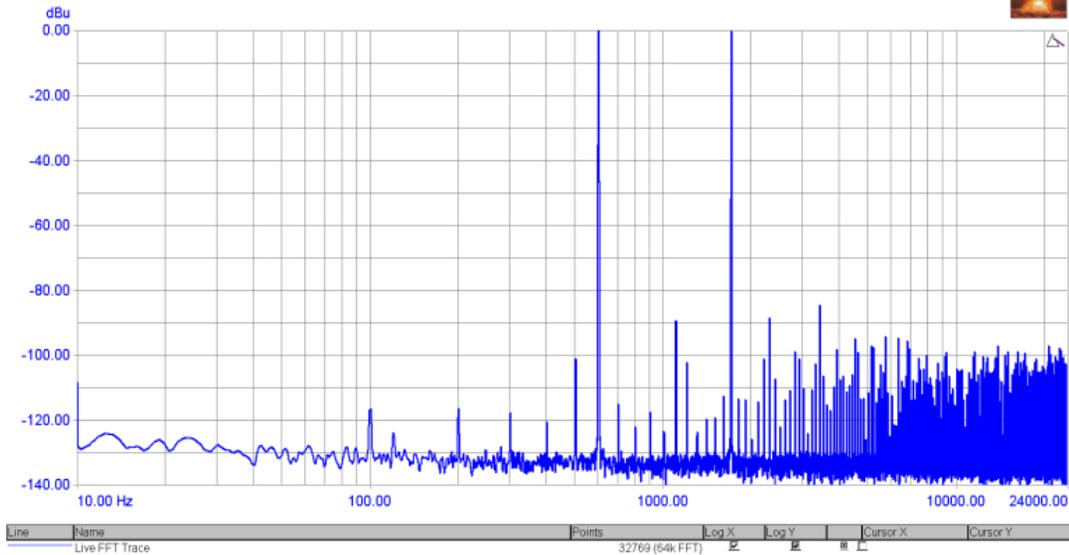
RMS amplitude (Channel A)	10.355 dBu	Not limit checked.
RMS amplitude (Channel B)	10.348 dBu	Not limit checked.

CTA Readings

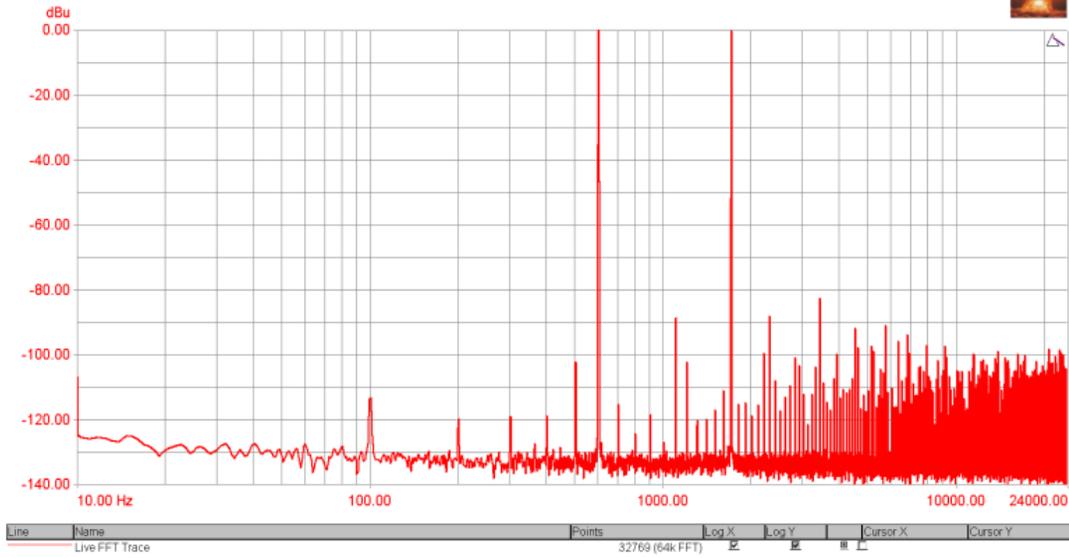
IMD SMPTE-DIN (Channel A RMS)	0.01275 %	< 0.02 % > 0 %
IMD SMPTE-DIN (Channel B RMS)	0.01275 %	< 0.02 % > 0 %

Settings: Self relative, 22 Hz - 22 kHz, unweighted RMS using SMPTE-DIN IMD demodulation.

FFT 600 + 1700 Hz



FFT 600 + 1700 Hz



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A15 FFT 19+20 KHz: PASSED

Measured at 1/21/2020 5:05:53 PM

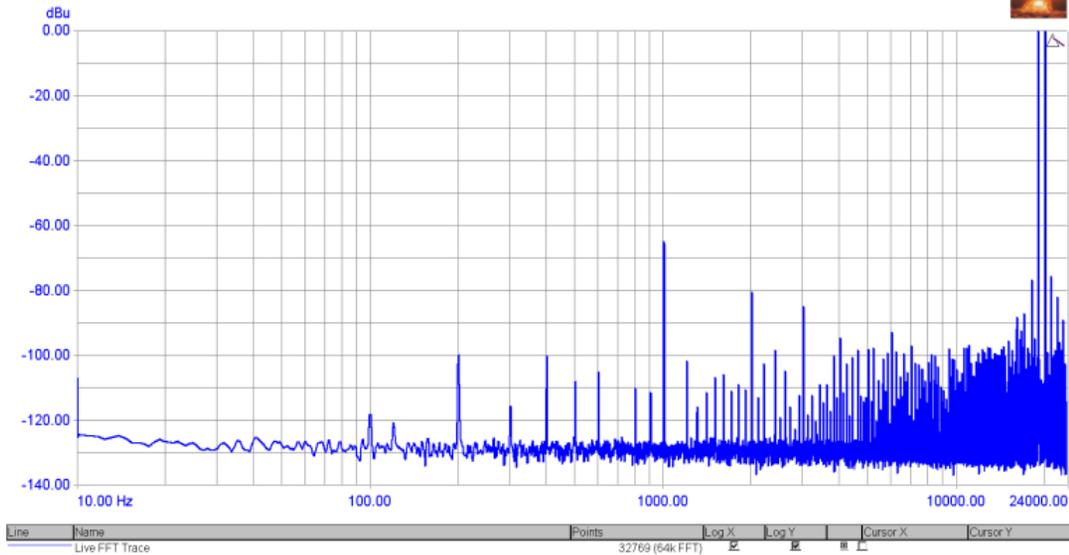
Generator Settings	
Channel A:	Twin-tone, -6.03 dBFS at 19000 Hz and 0 dB offset at 1000 Hz offset
Channel B:	Twin-tone, -6.03 dBFS at 19000 Hz and 0 dB offset at 1000 Hz offset

Signal Analyzer Readings		
RMS amplitude (Channel A)	11.291 dBu	Not limit checked.
RMS amplitude (Channel B)	11.236 dBu	Not limit checked.

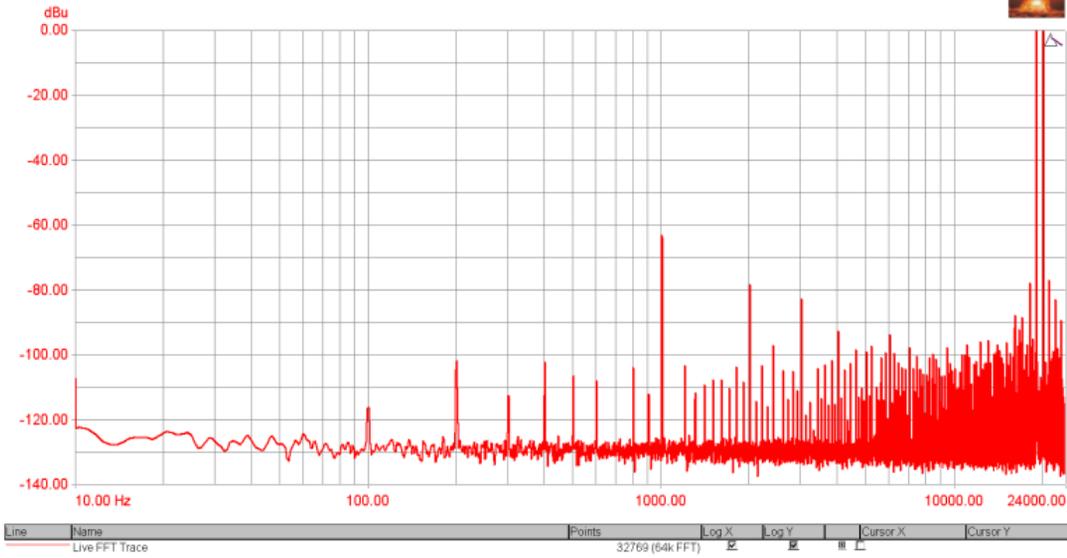
CTA Readings		
IMD CCIF (Channel A RMS)	0.01593 %	< 0.1 %
IMD CCIF (Channel B RMS)	0.01954 %	< 0.1 %

Settings: Self relative, 22 Hz - 22 kHz, unweighted RMS with 1/24th octave band-pass filter at the intermodulation difference frequency

FFT 19 + 20 KHz



FFT 19 + 20 KHz



FFT Detector Readings

IMD CCIF (Channel A)	0.01597 %	< 0.1 %
IMD CCIF (Channel B)	0.01943 %	< 0.1 %

FFTD 1 Settings: Self relative, 22 Hz - 22 kHz, unweighted with window notch (14 bins) band-pass filter at the intermodulation difference frequency

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A16 FFT residual noise: **PASSED**

Measured at 1/21/2020 5:06:17 PM

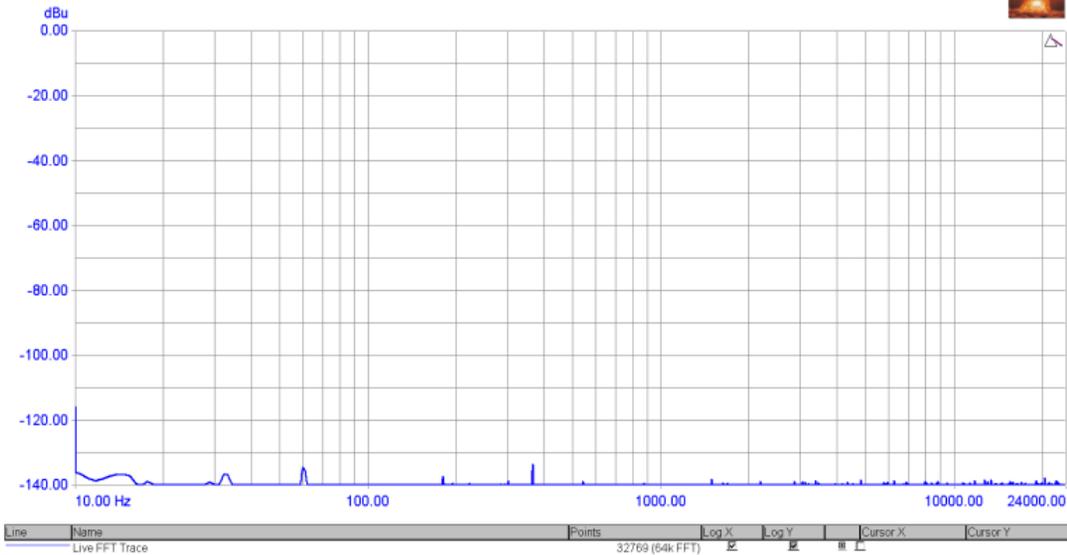
Generator Settings

Channel A:	Off
Channel B:	Off

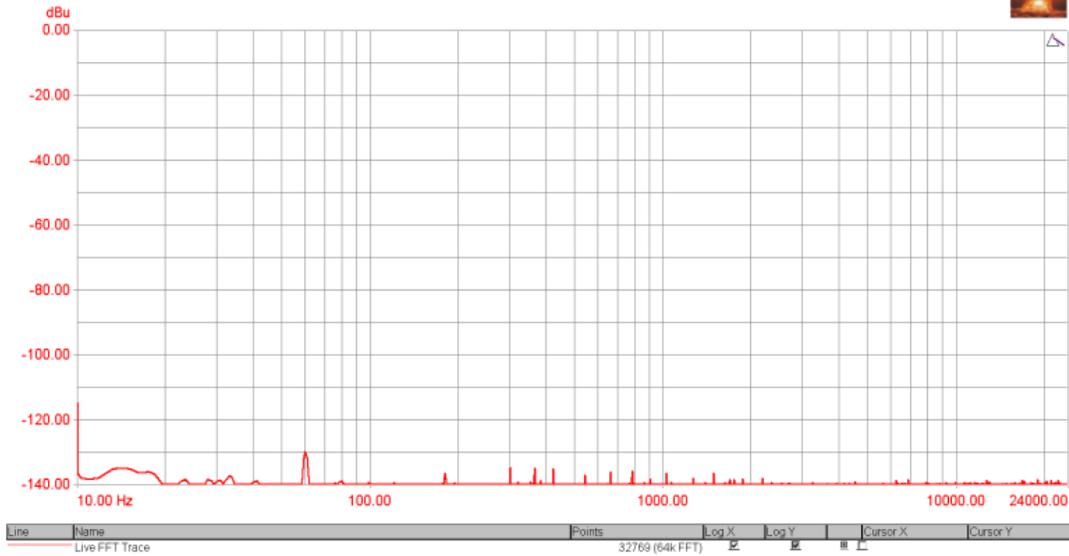
Signal Analyzer Readings

RMS amplitude (Channel A)	-101.620 dBu	Not limit checked.
RMS amplitude (Channel B)	-101.742 dBu	Not limit checked.

FFT residual noise



FFT residual noise



FFT Detector Readings

Noise (residual) (Channel A)	-116.789 dBFS	< -60 dBFS > -150 dBFS
Noise (residual) (Channel B)	-116.770 dBFS	< -60 dBFS > -150 dBFS
FFTD 1 Settings: 22 Hz - 22 kHz, unweighted with band-reject notch filters, fundamental to the 10th harmonic		

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A17 FFT -90 dBFS: Not limit checked.

Measured at 1/21/2020 5:06:40 PM

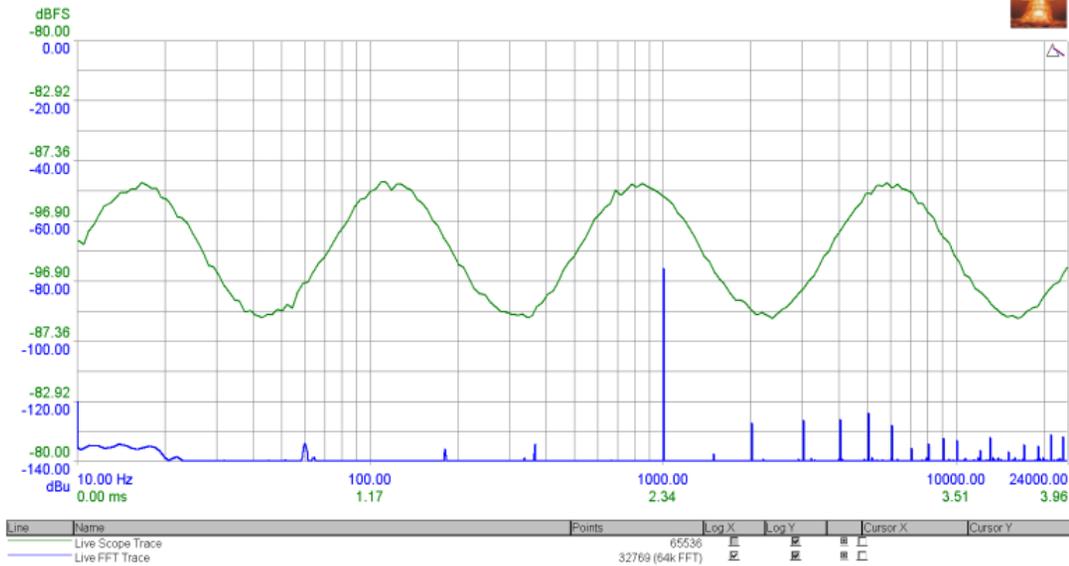
Generator Settings

Channel A:	sine, -90 dBFS at 1000 Hz
Channel B:	sine, -90 dBFS at 1000 Hz

Signal Analyzer Readings

RMS amplitude (Selected : Ch A)	-75.672 dBu	Not limit checked.
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FFT -90 dBFS



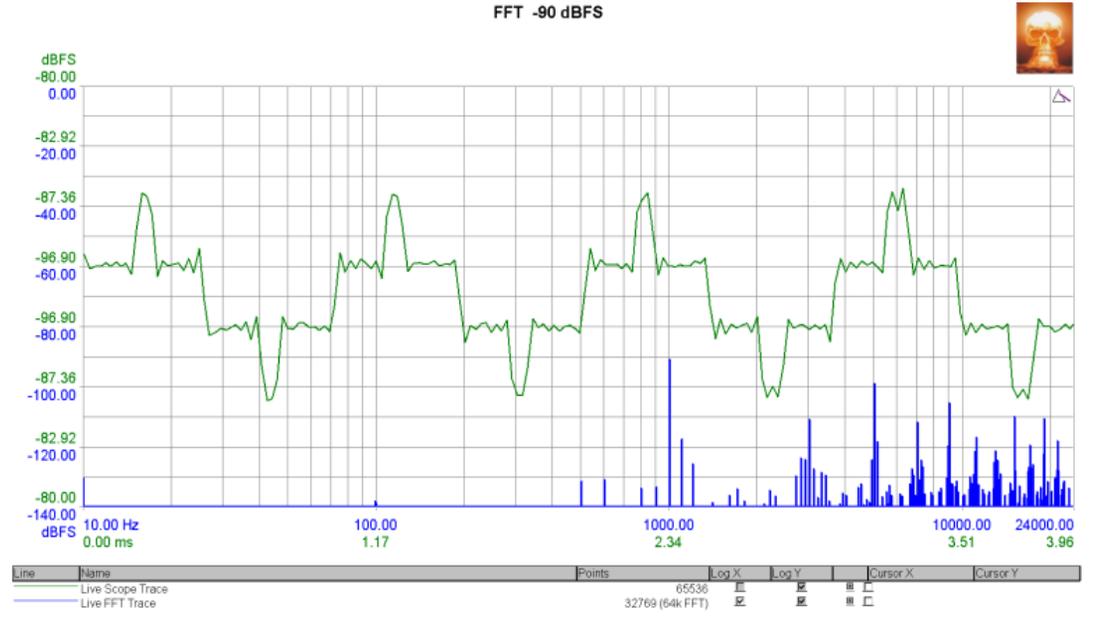
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A18 FFT -90 dBFS 16 bit: Not limit checked.

Measured at 1/21/2020 5:06:53 PM

Generator Settings	
Channel A:	sine, -90 dBFS at 1000 Hz
Channel B:	sine, -90 dBFS at 1000 Hz

Signal Analyzer Readings	
RMS amplitude (Selected : Ch A)	-75.295 dBu Not limit checked.

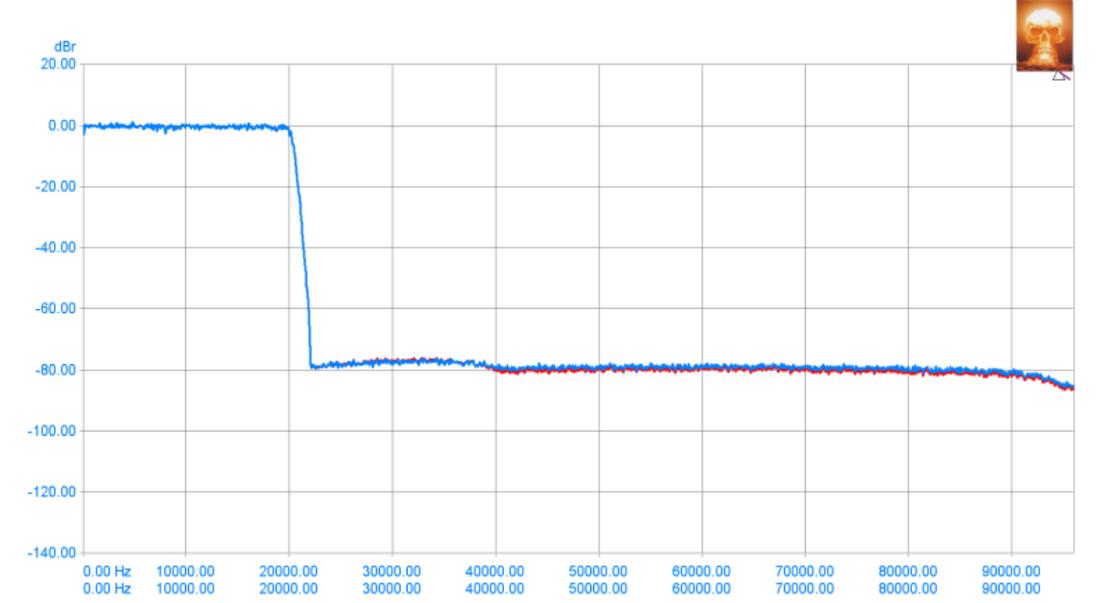


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A19 FFT imaging: Not limit checked.

Measured at 1/21/2020 5:07:08 PM

Generator Settings	
Channel A:	white noise, -6 dBFS
Channel B:	white noise, -6 dBFS (inverted)



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Measured at 1/21/2020 5:07:40 PM

Generator Settings

Channel A:	sine, -6 dBFS at 11025 Hz
Channel B:	sine, -6 dBFS at 11025 Hz (inverted)

