

ECP Audio T4 Mullard CV4024 300R unBal 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 2 3 4 - THD+N minus 2nd and 3rd harmonics | ✓ |
| 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 | ✓ |

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 Ampl, Phase, Gain: **PASSED**

Measured at 2/6/2020 10:38:55 AM

| Generator Settings | |
|--------------------|------------------------|
| Channel A: | sine, 0 dBu at 1000 Hz |
| Channel B: | sine, 0 dBu at 1000 Hz |

| Signal Analyzer Readings | | |
|---------------------------|------------|---------------------|
| RMS amplitude (Channel A) | -0.227 dBu | < 3 dBu > -3 dBu |
| RMS amplitude (Channel B) | 0.208 dBu | < 3 dBu > -3 dBu |
| Inter-channel phase | -0.02 ° | < 10 ° > -10 ° |

| CTA Readings | | |
|--|-----------|-------------------|
| Gain (Channel A RMS) | -0.228 dB | < 3 dB > -3 dB |
| Gain (Channel B RMS) | 0.208 dB | < 3 dB > -3 dB |
| Settings: Generator relative, 22 Hz - 22 kHz, unweighted RMS with 1/3rd octave band-pass filter at the generator frequency | | |

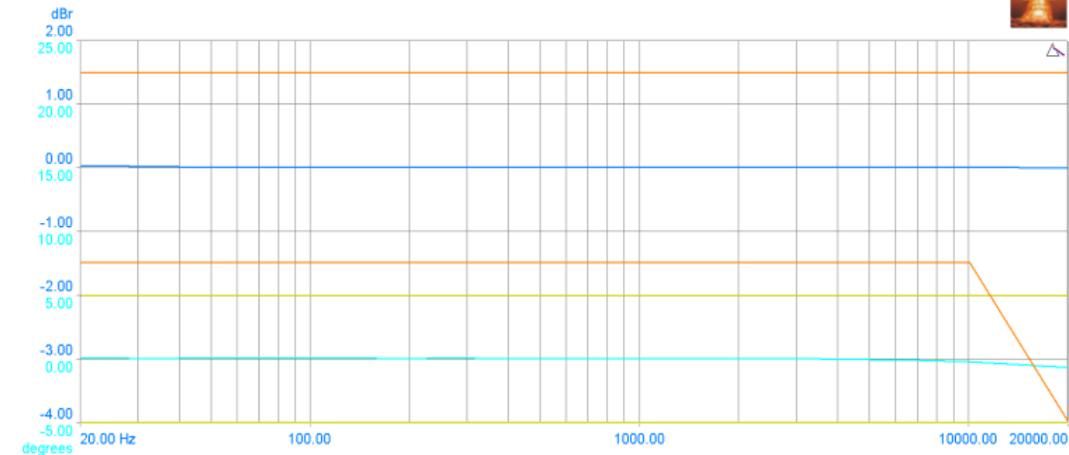
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A02 Ampl, Phase vs Freq: **PASSED**

Measured at 2/6/2020 10:38:57 AM

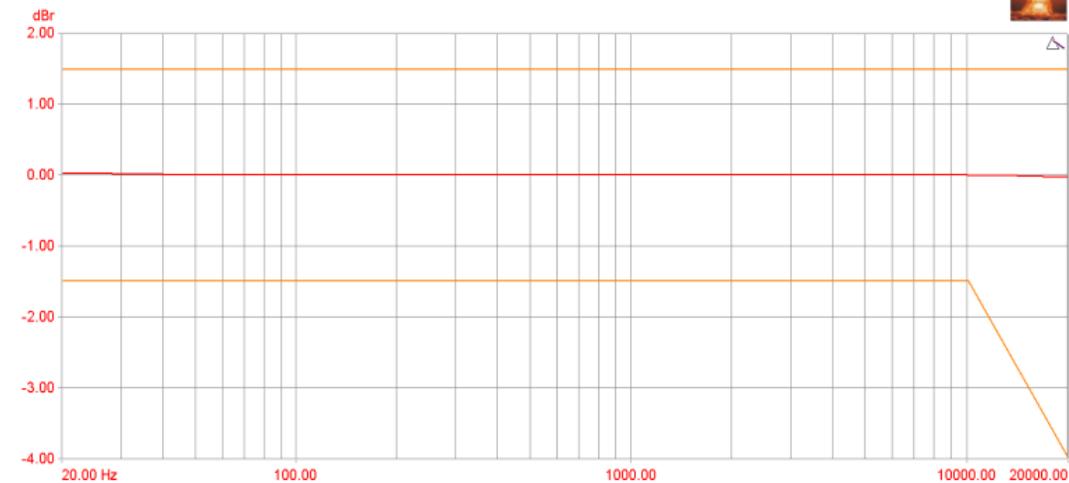
| Generator Settings | |
|--------------------|--------------------------|
| Channel A: | sine, -3 dBFS at 1000 Hz |
| Channel B: | sine, -3 dBFS at 1000 Hz |

Frequency Response and Inter-channel Phase



| Line | Name | Points | Log X | Log Y | Cursor X | Cursor Y |
|------|-----------------------------------|--------|-------------------------------------|-------------------------------------|--------------------------|--------------------------|
| 1 | Sweep of Ch A RMS ampl | 21 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2 | Max limit: Sweep of Ch A RMS ampl | 5 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3 | Min limit: Sweep of Ch A RMS ampl | 5 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4 | Sweep of Phase | 21 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5 | Max limit: Sweep of Phase | 5 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6 | Min limit: Sweep of Phase | 5 | <input checked="" type="checkbox"/> | <input 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 |
|------|-----------------------------------|--------|-------------------------------------|-------------------------------------|--------------------------|--------------------------|
| 1 | Sweep of Ch B RMS ampl | 21 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2 | Max limit: Sweep of Ch B RMS ampl | 5 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3 | Min limit: Sweep of Ch B RMS ampl | 5 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

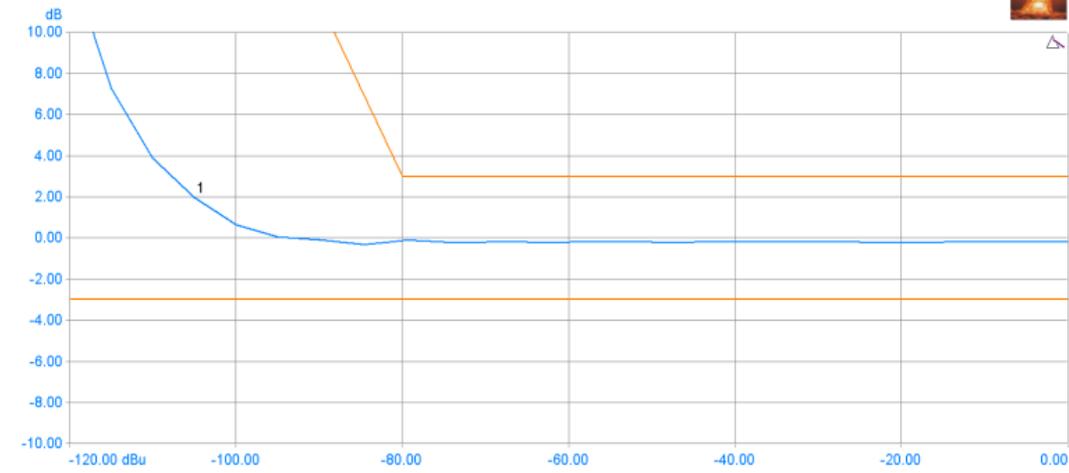
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A03 Gain vs Ampl: PASSED

Measured at 2/6/2020 10:39:06 AM

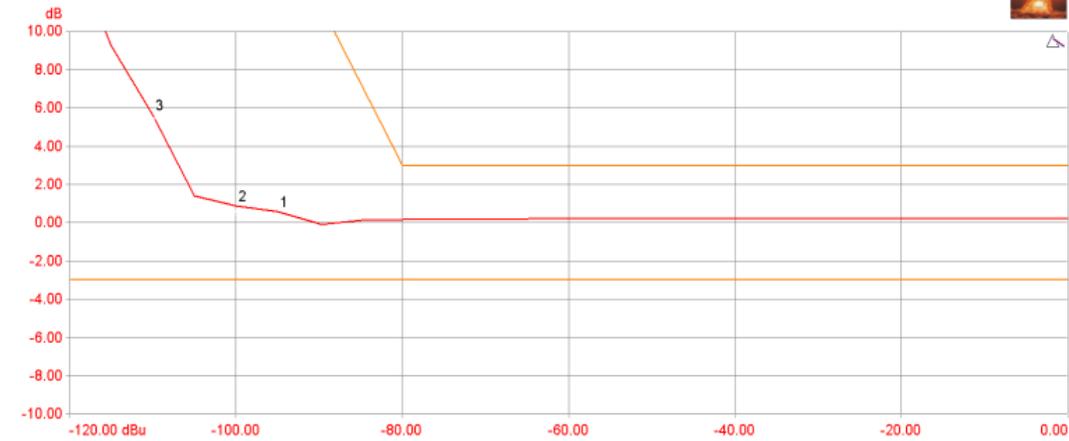
| Generator Settings | |
|--------------------|------------------------|
| Channel A: | sine, 0 dBu at 1000 Hz |
| Channel B: | sine, 0 dBu at 1000 Hz |

Gain vs Amplitude



| Line | Name | Points | Log X | Log Y | Cursor X | Cursor Y | CommentLabel |
|------|---|--------|-------------------------------------|-------------------------------------|--------------------------|--------------------------|--------------------|
| 1 | Sweep of CT Det : Gain : Ch A | 25 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1: Sweep timed out |
| 2 | Max limit Sweep of CT Det : Gain : Ch A | 3 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 3 | Min limit Sweep of CT Det : 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 | CommentLabel |
|------|---|--------|-------------------------------------|-------------------------------------|--------------------------|--------------------------|--|
| 1 | Sweep of CT Det : Gain : Ch B | 25 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1: Sweep timed out 2: Sweep timed out 3: Sweep timed out |
| 2 | Max limit Sweep of CT Det : Gain : Ch B | 3 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 3 | Min limit Sweep of CT Det : 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 2 3 4 - THD+N minus 2nd and 3rd harmonics: **PASSED**

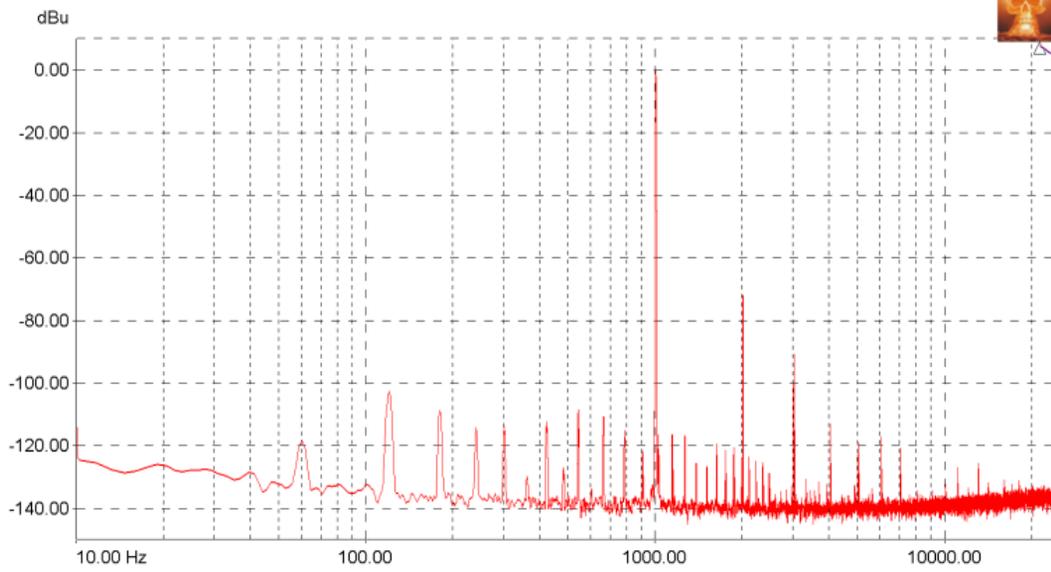
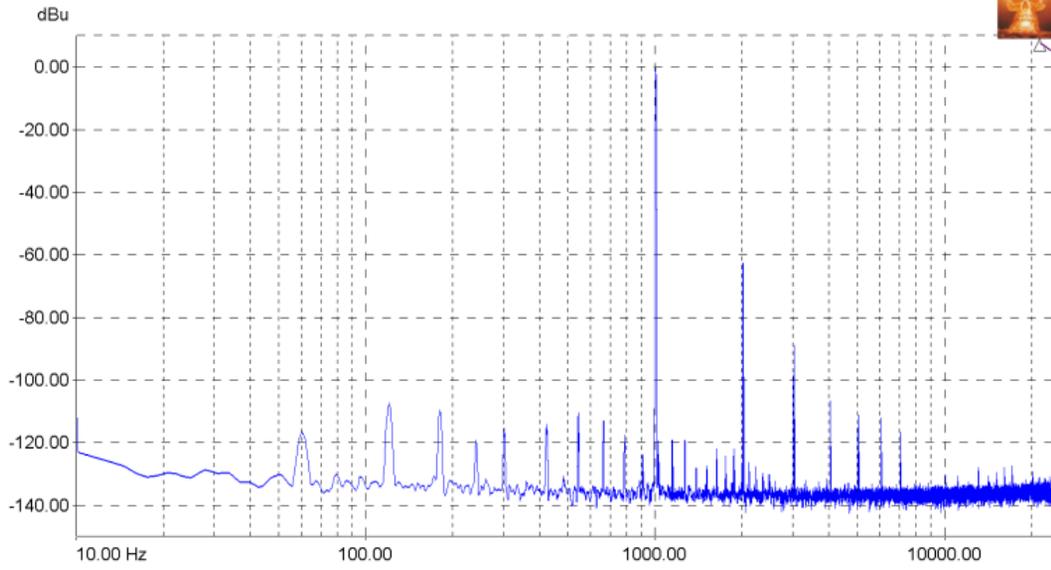
Measured at 2/6/2020 10:39:22 AM

| Generator Settings | |
|--------------------|------------------------|
| Channel A: | sine, 0 dBu at 1000 Hz |
| Channel B: | sine, 0 dBu at 1000 Hz |

| Signal Analyzer Readings | | |
|---------------------------|------------|--------------------|
| RMS amplitude (Channel A) | -0.230 dBu | Not limit checked. |
| RMS amplitude (Channel B) | 0.208 dBu | Not limit checked. |

| CTA Readings | | |
|----------------------------------|-----------|------------------|
| THD+N - relative (Channel A RMS) | 0.07098 % | < 200 % > 0 % |
| THD+N - relative (Channel B RMS) | 0.02299 % | < 200 % > 0 % |

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



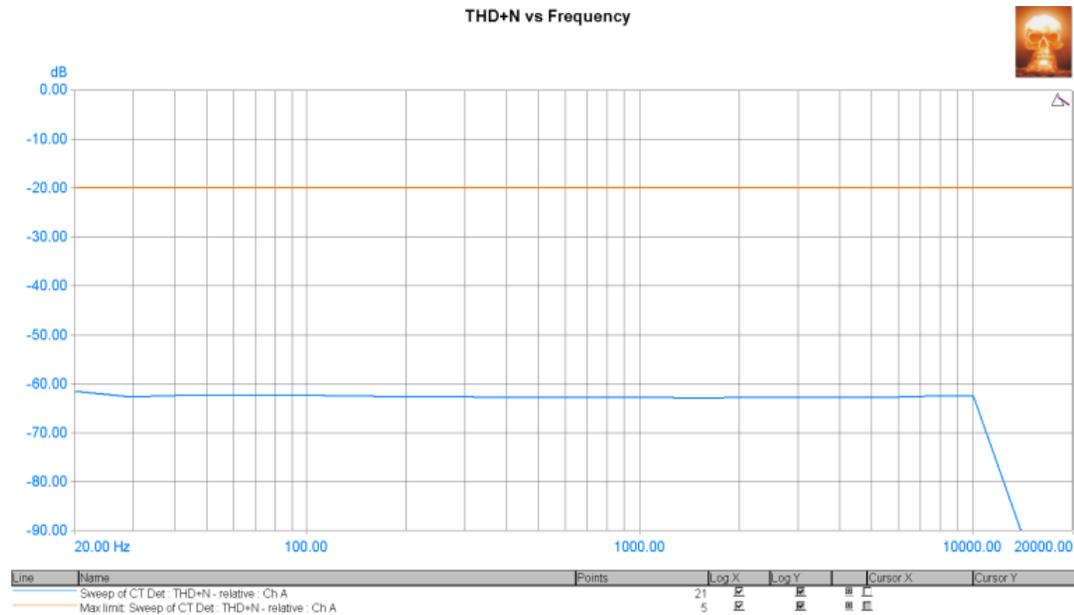
| FFT Detector Readings | | |
|---|-----------|-----------------------|
| THD (Channel A) | 0.07597 % | < 200 % > 0 % |
| THD (Channel B) | 0.02440 % | < 200 % > 0 % |
| FFTD 1 Settings: Self relative, 22 Hz - 22 kHz, unweighted with band-pass notch filters from the 2nd to 10th harmonics | | |
| 2nd Harmonic Distortion (Channel A) | 0.07588 % | < 200 % > 0 % |
| 2nd Harmonic Distortion (Channel B) | 0.02425 % | < 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) | 0.00353 % | < 200 % > 0 % |
| 3rd Harmonic Distortion (Channel B) | 0.00269 % | < 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) | 0.00048 % | Not limit checked. |
| 4th Harmonic Distortion (Channel B) | 0.00022 % | 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) | 0.00028 % | Not limit checked. |
| 5th Harmonic Distortion (Channel B) | 0.00011 % | 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) | 0.00158 % | < 0.05 % > 0 % |
| 4+HD + N (Channel B) | 0.00144 % | < 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) | 0.00016 % | < 0.017783 % > 0 % |
| Hum (Channel B) | 0.00012 % | < 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) | 0.00145 % | < 0.017783 % > 0 % |
| Noise (residual) (Channel B) | 0.00141 % | < 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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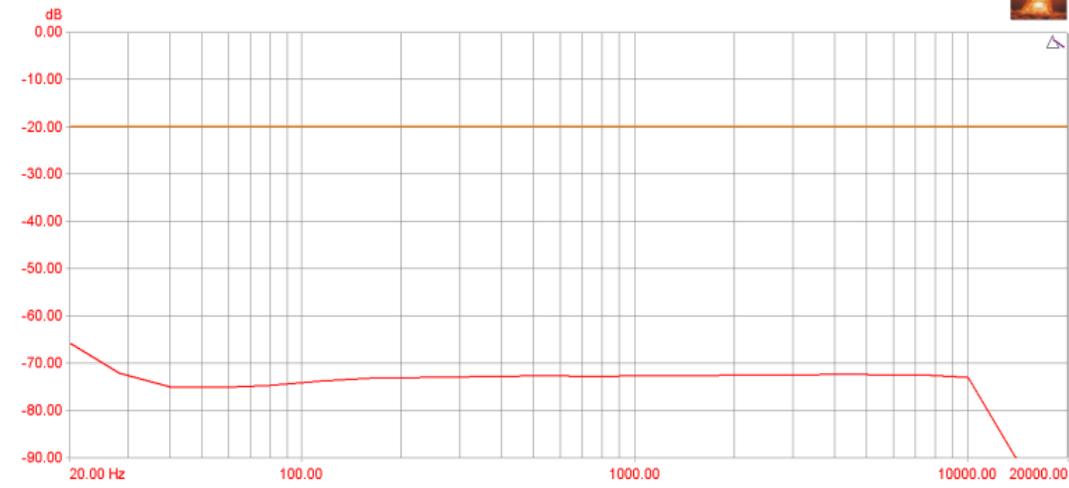
A05 THD+N vs Freq: PASSED

Measured at 2/6/2020 10:40:24 AM

| Generator Settings | |
|--------------------|------------------------|
| Channel A: | sine, 0 dBu at 1000 Hz |
| Channel B: | sine, 0 dBu at 1000 Hz |



THD+N vs Frequency



| Line | Name | Points | Log X | Log Y | Cursor X | Cursor Y | Comment/Label |
|------|--|--------|-------------------------------------|-------------------------------------|--------------------------|--------------------------|---------------|
| 1 | Sweep of CT Det : 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 CT Det : THD+N - relative : Ch B | 5 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |

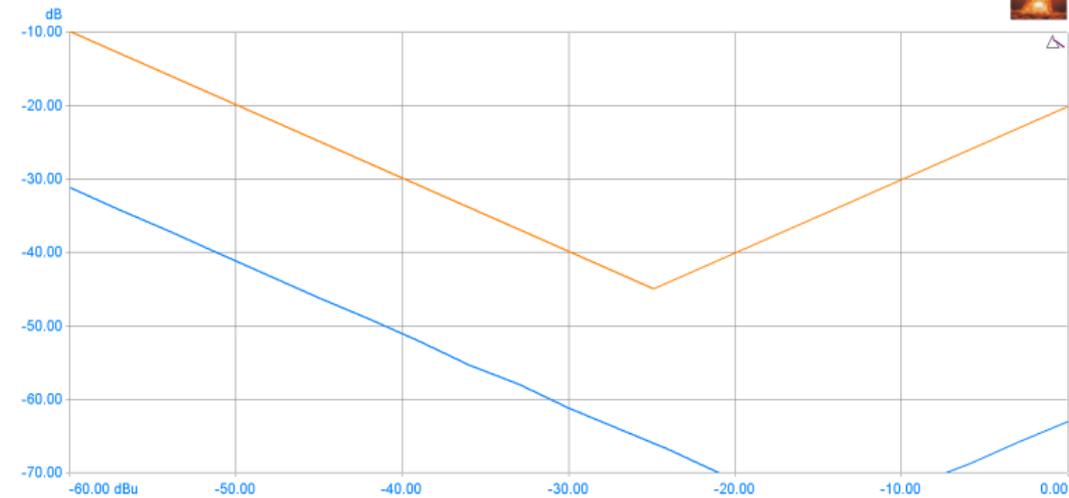
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A06 THD+N vs Ampl: PASSED

Measured at 2/6/2020 10:40:35 AM

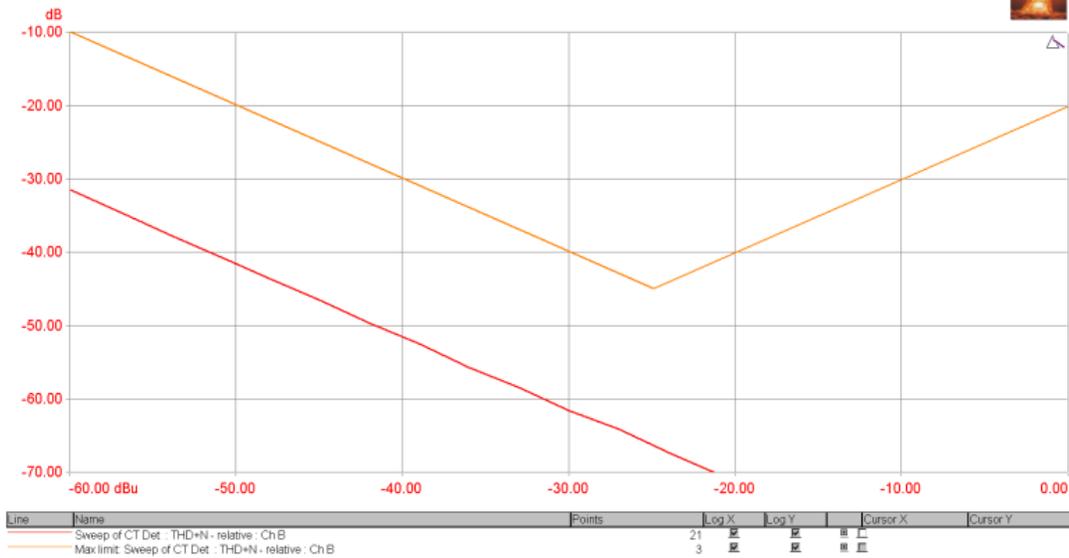
| Generator Settings | |
|--------------------|------------------------|
| Channel A: | sine, 0 dBu at 1000 Hz |
| Channel B: | sine, 0 dBu at 1000 Hz |

THD+N vs Amplitude



| Line | Name | Points | Log X | Log Y | Cursor X | Cursor Y |
|------|--|--------|-------------------------------------|-------------------------------------|--------------------------|--------------------------|
| 1 | Sweep of CT Det : 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 CT Det : THD+N - relative : Ch A | 3 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

THD+N vs Amplitude



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A07 Noise, SNR: PASSED

Measured at 2/6/2020 10:40:43 AM

| 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) | -109.040 dBr | < 200 dBr > -200 dBr |
| Noise (unweighted) (Channel B) | -109.073 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) | -109.328 dBr | < 200 dBr > -200 dBr |
| SNR (Channel B) | -109.467 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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A08 Crosstalk A to B: PASSED

Measured at 2/6/2020 10:40:46 AM

| Generator Settings | |
|--------------------|------------------------|
| Channel A: | sine, 0 dBu at 1000 Hz |
| Channel B: | sine, 0 dBu at 1000 Hz |

| CTA Readings | | |
|--|------------|----------|
| Cross-talk (Channel B RMS) | -80.075 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 2/6/2020 10:40:48 AM

| Generator Settings | |
|--------------------|------------------------|
| Channel A: | sine, 0 dBu at 1000 Hz |
| Channel B: | sine, 0 dBu at 1000 Hz |

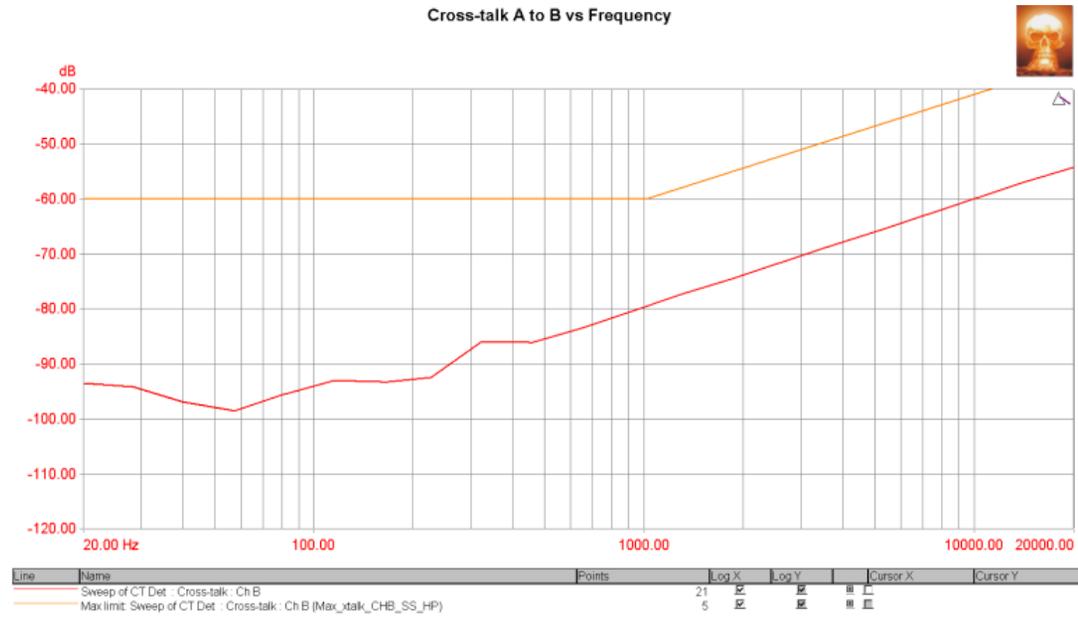
| CTA Readings | | |
|--|------------|----------|
| Cross-talk (Channel A RMS) | -77.015 dB | < -45 dB |
| Settings: Channel relative, 22 Hz - 22 kHz, unweighted RMS with 1/24th octave band-pass filter at the opposite channel generator frequency | | |

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A10 Crosstalk A to B vs Freq: PASSED

Measured at 2/6/2020 10:40:50 AM

| Generator Settings | |
|--------------------|------------------------|
| Channel A: | sine, 0 dBu at 1000 Hz |
| Channel B: | sine, 0 dBu at 1000 Hz |

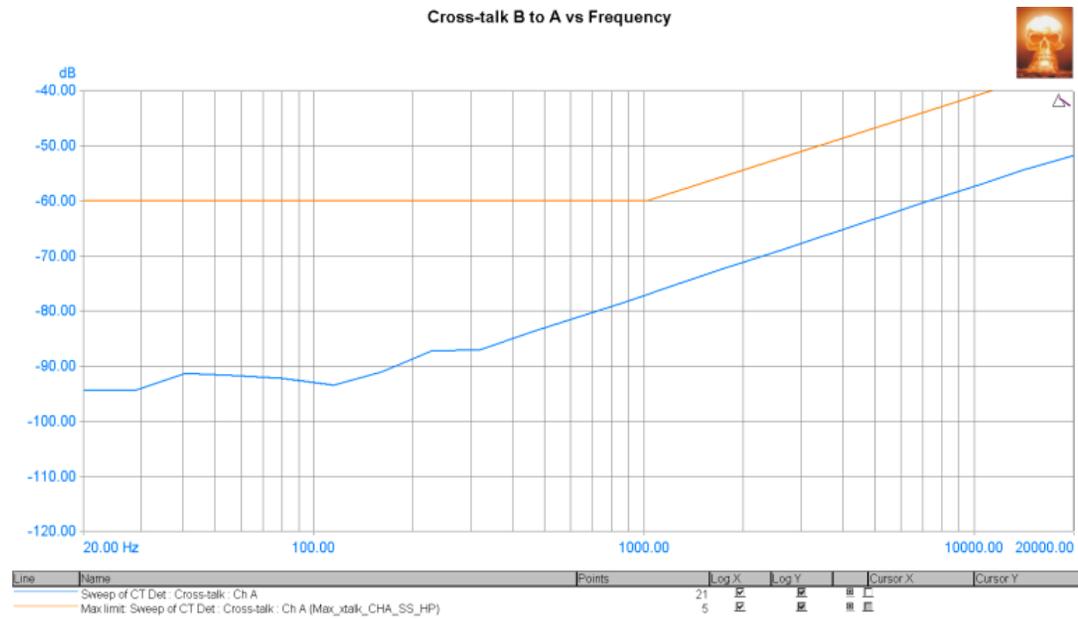


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A11 Crosstalk B to A vs Freq: PASSED

Measured at 2/6/2020 10:40:56 AM

| Generator Settings | |
|--------------------|------------------------|
| Channel A: | sine, 0 dBu at 1000 Hz |
| Channel B: | sine, 0 dBu at 1000 Hz |



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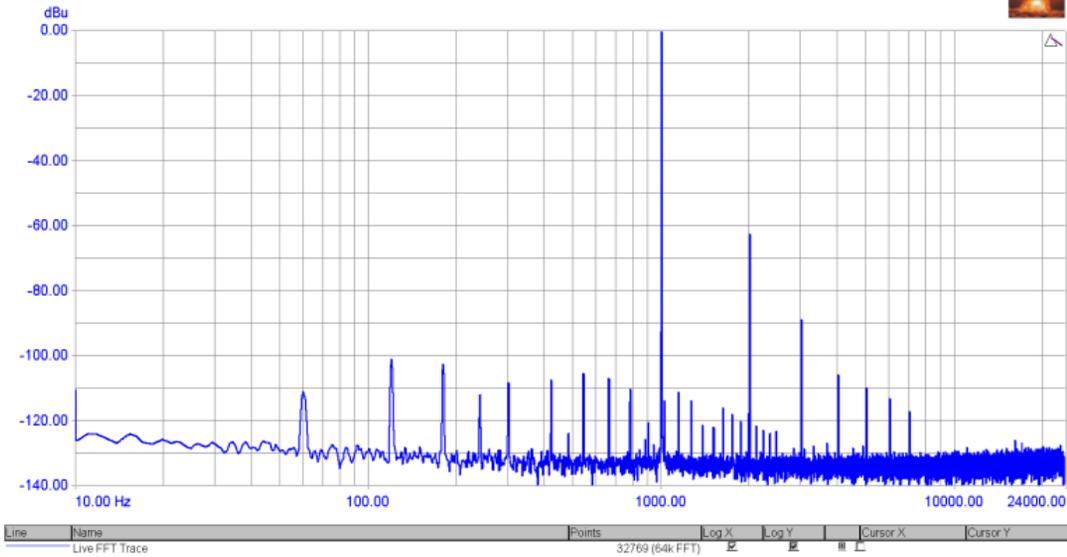
A12 FFT 1000 Hz THD+N: PASSED

| Generator Settings | |
|--------------------|------------------------|
| Channel A: | sine, 0 dBu at 1000 Hz |
| Channel B: | sine, 0 dBu at 1000 Hz |

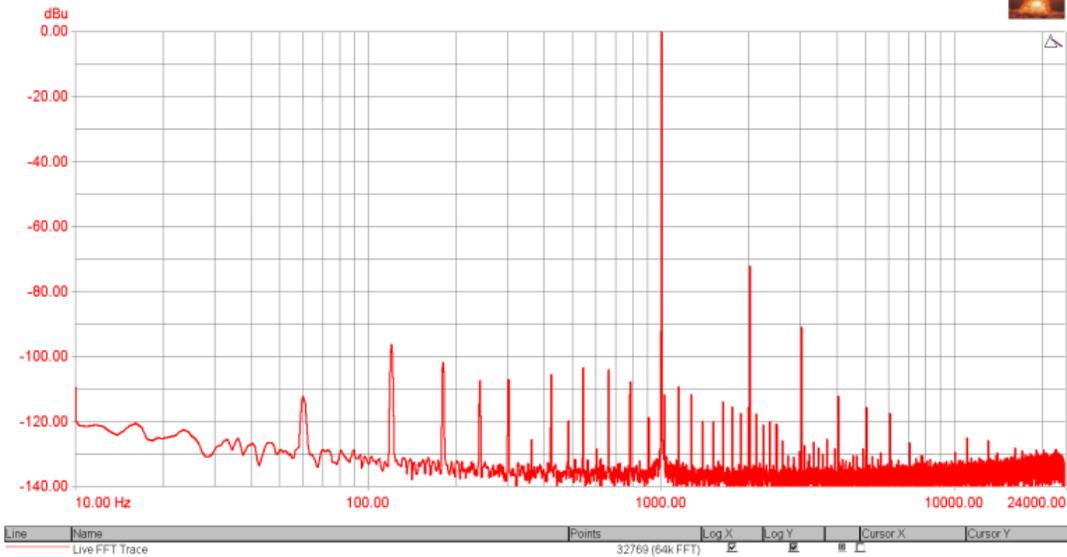
| Signal Analyzer Readings | | |
|-------------------------------------|------------|--------------------|
| RMS amplitude (Selected : Ch A) | -0.231 dBu | Not limit checked. |
| RMS amplitude (Non-selected : Ch A) | 0.211 dBu | Not limit checked. |

| CTA Readings | | |
|---|-----------|----------------|
| THD+N - relative (Selected : Ch ARMS) | 0.07103 % | < 5 % > 0 % |
| THD+N - relative (Non-selected : Ch ARMS) | 0.02307 % | < 5 % > 0 % |
| 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

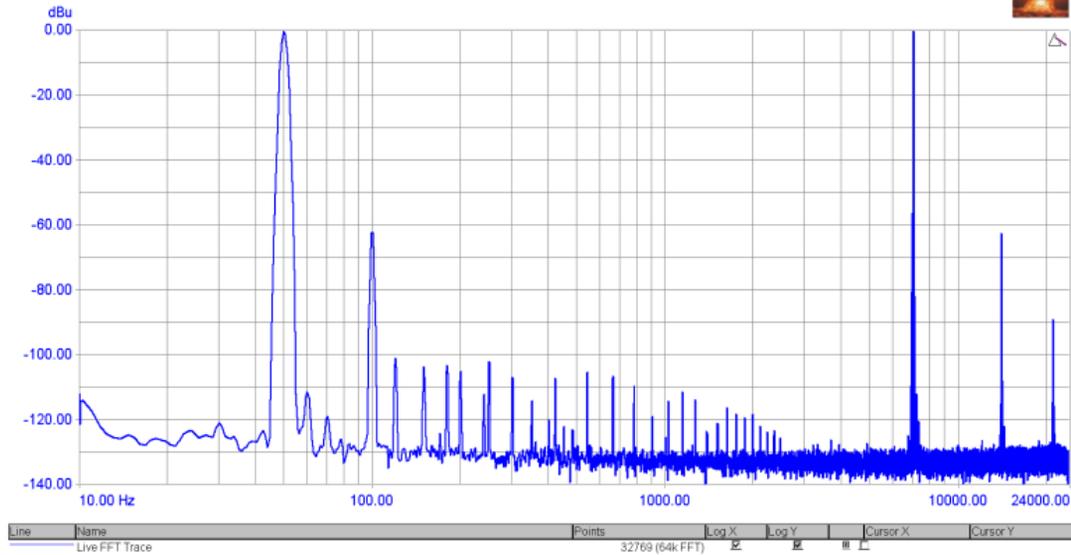
Generator Settings

| | |
|------------|---|
| Channel A: | Twin-tone, 0 dBu at 50 Hz and 1 amplitude ratio at 7000Hz |
| Channel B: | Twin-tone, 0 dBu at 50 Hz and 1 amplitude ratio at 7000Hz |

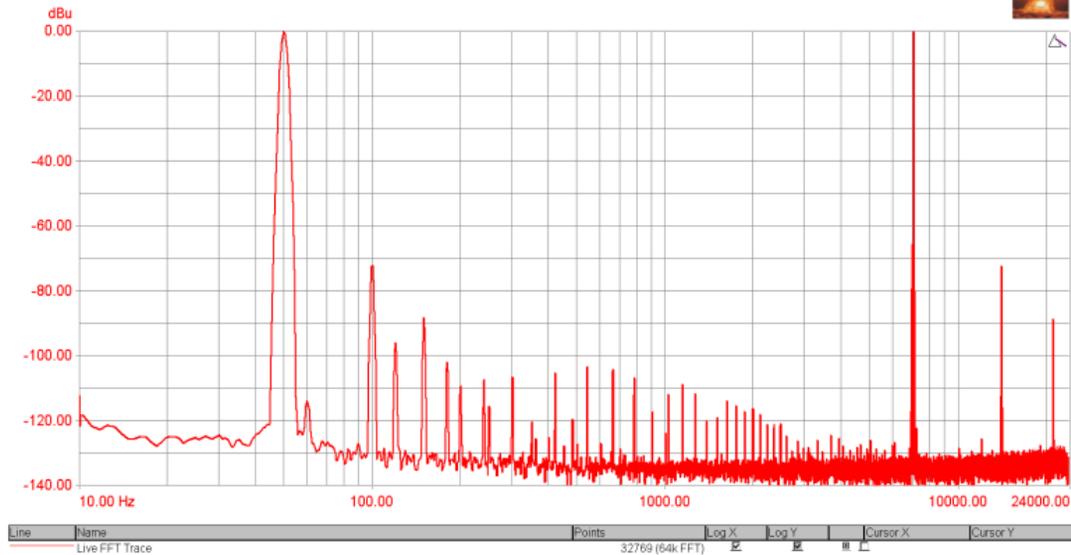
Signal Analyzer Readings

| | | |
|---------------------------|-----------|--------------------|
| RMS amplitude (Channel A) | 2.780 dBu | Not limit checked. |
| RMS amplitude (Channel B) | 3.212 dBu | Not limit checked. |

FFT 50 + 7000 Hz



FFT 50 + 7000 Hz



FFT Detector Readings

| | | |
|---------------------------|-----------|----------------|
| IMD SMPTE-DIN (Channel A) | 0.15241 % | < 7 % > 0 % |
| IMD SMPTE-DIN (Channel B) | 0.05025 % | < 7 % > 0 % |

FFT1 1 Settings: Self relative, 22 Hz - 22 kHz, unweighted with intermodulation notch band reject

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A14 FFT 600+1700 Hz: PASSED

Measured at 2/6/2020 10:41:48 AM

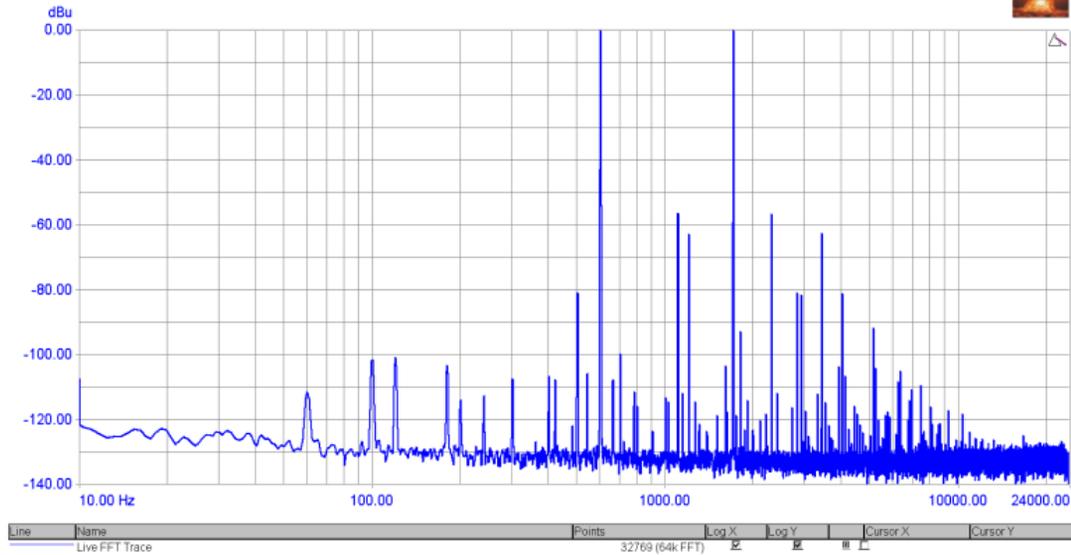
Generator Settings

Channel A: Twin-tone, 0 dBu at 600 Hz and 1 amplitude ratio at 1700Hz
 Channel B: Twin-tone, 0 dBu at 600 Hz and 1 amplitude ratio at 1700Hz

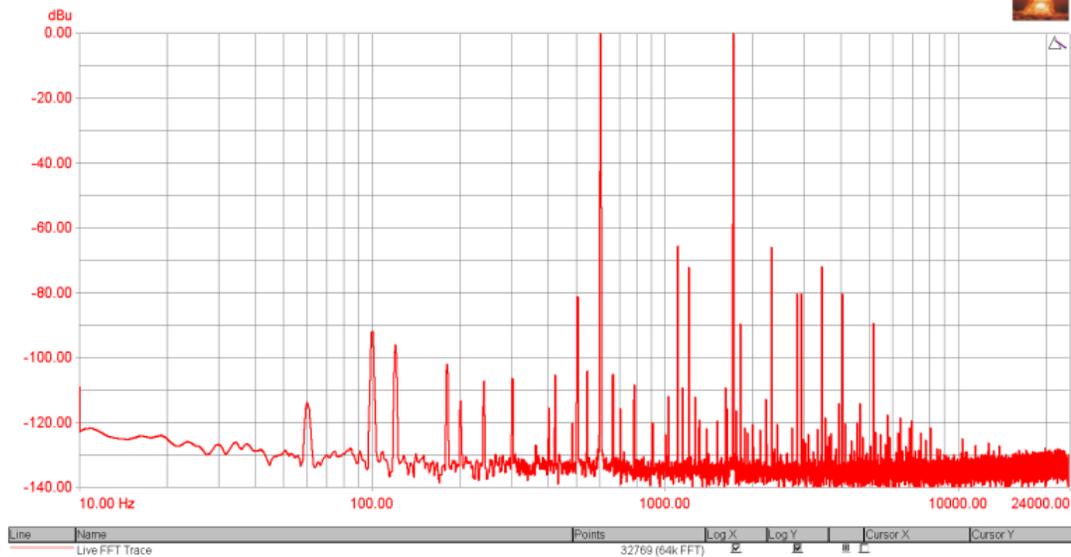
Signal Analyzer Readings

RMS amplitude (Channel A) **2.782 dBu** Not limit checked.
 RMS amplitude (Channel B) **3.196 dBu** Not limit checked.

FFT 600 + 1700 Hz



FFT 600 + 1700 Hz



FFT Detector Readings

IMD SMPTE-DIN (Channel A) **0.16087 %** < 7 %
 > 0 %
 IMD SMPTE-DIN (Channel B) **0.05236 %** < 7 %
 > 0 %

FFT1 Settings: Self relative, 22 Hz - 22 kHz, unweighted with intermodulation notch band reject

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A15 FFT 19+20 KHz: PASSED

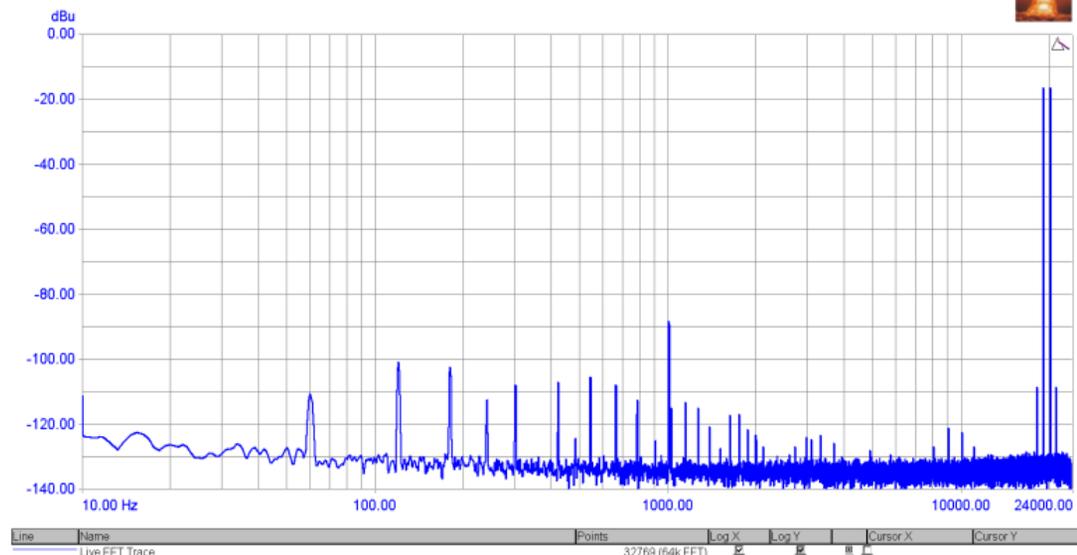
Measured at 2/6/2020 10:42:11 AM

| Generator Settings | |
|--------------------|--|
| Channel A: | Twin-tone, -16 dBu at 19000 Hz and 1 amplitude ratio at 1000 Hz offset |
| Channel B: | Twin-tone, -16 dBu at 19000 Hz and 1 amplitude ratio at 1000 Hz offset |

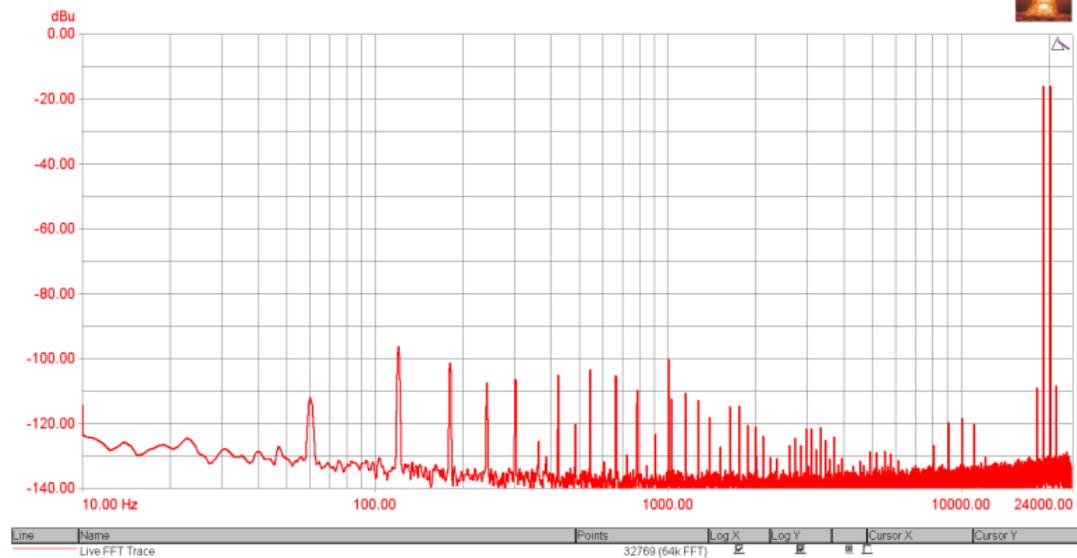
| Signal Analyzer Readings | | |
|---------------------------|-------------|--------------------|
| RMS amplitude (Channel A) | -13.269 dBu | Not limit checked. |
| RMS amplitude (Channel B) | -12.813 dBu | Not limit checked. |

| CTA Readings | | |
|---|-----------|-------|
| IMD CCIF (Channel A RMS) | 0.01808 % | < 1 % |
| IMD CCIF (Channel B RMS) | 0.00411 % | < 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) | 0.01774 % | < 1 % |
| IMD CCIF (Channel B) | 0.00428 % | < 1 % |
| FFT 1 Settings: Self relative, 22 Hz - 22 kHz, unweighted with window notch (14 bins) band-pass filter at the intermodulation difference frequency | | |

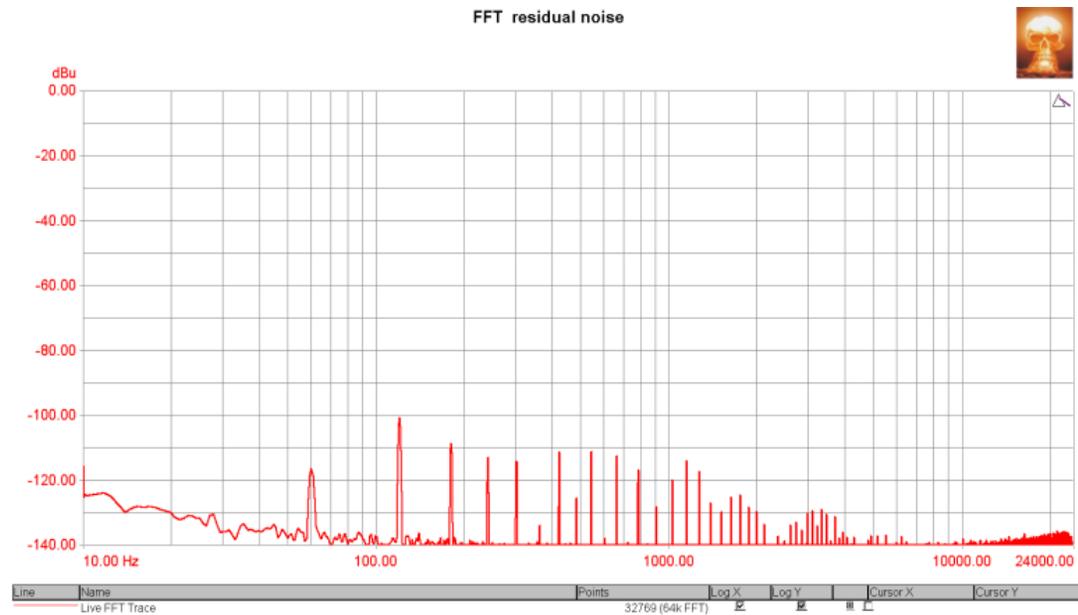
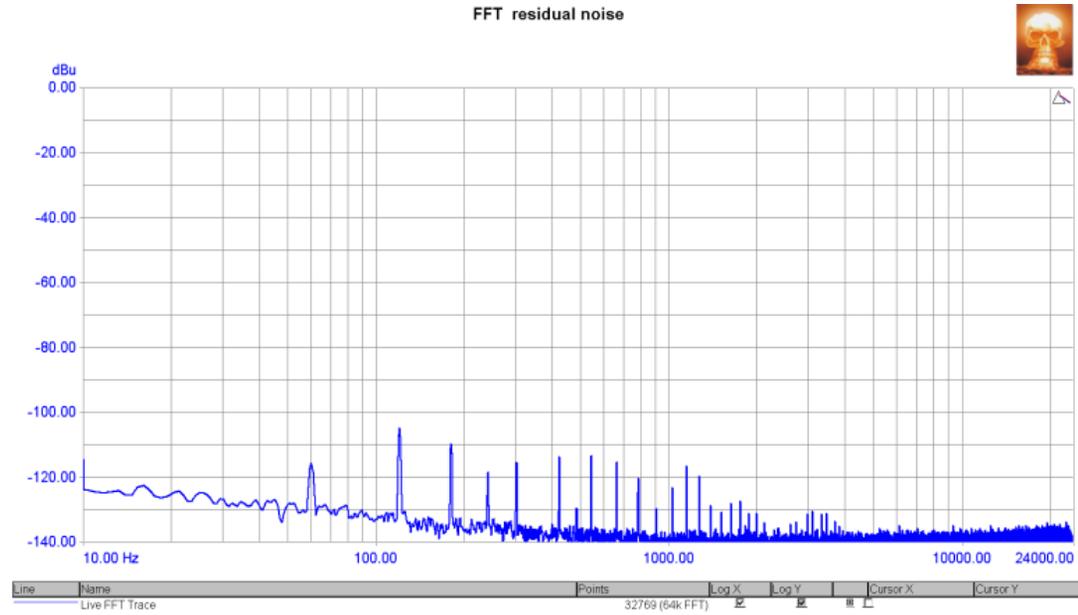
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A16 FFT residual noise: PASSED

Measured at 2/6/2020 10:42:34 AM

| Generator Settings | |
|--------------------|-----|
| Channel A: | Off |
| Channel B: | Off |

| Signal Analyzer Readings | | |
|---------------------------|-------------|--------------------|
| RMS amplitude (Channel A) | -91.254 dBu | Not limit checked. |
| RMS amplitude (Channel B) | -90.832 dBu | Not limit checked. |



| FFT Detector Readings | | |
|------------------------------|-------------|-------------------------|
| Noise (residual) (Channel A) | -96.983 dBu | < -80 dBu > -140 dBu |
| Noise (residual) (Channel B) | -96.838 dBu | < -80 dBu > -140 dBu |

FFTD 1 Settings: 22 Hz - 22 kHz, unweighted with band-reject notch filters, fundamental to the 10th harmonic