

TEST PARAMETERS SUMMARY

1. Tests were conducted only for high definition formats.
2. Tests were conducted using bit rates at 38 Mbps high quality contribution (e.g., major events, potential concatenation), at 20 Mbps medium quality contribution and 10.3 Mbps SNG.
3. Tests at 4:2:2 and 4:2:0
4. Tests with four Video Formats:
 - 1080i/59.94
 - 1080i/50
 - 720p/59.9
 - 720p/50
5. Tests with Four Audio Formats:
 - 4 Ch. Audio MPEG-2 (MPEG 1 Layer 2)
 - Dolby E 20 bit mode 8 channels (SMPTE 302 M 2002)
 - PCM (SMPTE 302 M 2002)
 - AAC
6. Latency was tested. If Latency is too extreme for a particular vendor decoder, the decoder may not be interoperable because it cannot effectively be used.

DETAILS OF TEST PARAMETERS

- Video Formats:
 - 1080i/59.94
 - 1080i/50
 - 720p/59.9
 - 720p/50
- Bit Rates:
 - High Quality: 38 Mbps
 - Medium Quality: 20 Mbps
 - SNG: 10.3 Mbps
- Chroma:
 - High Quality: 4:2:2 (Hi 422 @L4 (10 bit if supported, otherwise 8 bit))
 - Medium Quality: 4:2:2 (Hi 422@L4 (10 bit if supported, otherwise 8 bit))
 - SNG: 4:2:0 ((HiP@L4 8 bit))
- or if 4:2:2 not supported:
 - High Quality: 4:2:0 (H:P @ L4 8 bit)
 - Medium Quality: 4:2:0 (H:P @ L4 8 bit)
- Coding Structure:
 - IBBP

- GOP:
- GOP 15 and 16

- Audio Format:
- 4 Ch. Audio MPEG-2 (MPEG 1 Layer 2)
- Dolby E 20 bit mode 8 channels (SMPTE 302 M 2002)
- PCM (SMPTE 302 M 2002)
- AAC

- Lip Sync:
- Test all audio formats

- Latency:
- High – Standard latency
- Medium – Standard latency
- SNG - Low Latency

- Resolution:
- All tests will be done at full resolution:
- 1920 (1800 line) h pixels
- 1280 (720 line) h pixels

TRANSPORT STREAMS AND TESTS

- 28 Transport Streams To Be Provided by Each Vendor
- 280 Potential Transport Streams To Be Tested

TEST PROCEDURES

1. Video Tests
 - Uploaded ASI streams used for tests
(onsite encoders used only if technical problems arise)
 - Pass/fail
(previous tests required expert viewers and ratings)
 - TS sent to all 10 decoders simultaneously
 - Decoder stations have 24” HD 1920x1080
(60Hz/50Hz monitors)
 - Pass/fail assessment done directly at decoder station
 - If video present (pass) but impairment is visible, impairment reported and video patched for larger 24” display for closer scrutiny

2. Audio Tests
 - Uploaded ASI streams used for tests
(onsite encoders used only if technical problems arise)
 - Pass/fail
 - TS sent to all 10 decoders simultaneously
 - Assessments done at central audio station or at decoder site
 - Tests performed with one representative TS in each available audio encoded format (MPEG-2, AAC, PCM, Dolby E)

3. Latency Test
 - Live test using on-site encoder
 - Performed only at 1080i/59.94
 - Tests at 38 Mbps (high quality) with standard latency setting and 10.3 Mbps (SNG quality) with low latency setting
 - Tests at 20 Mbps (medium quality) with standard latency only if vendor does not support 38 Mbps

4. Short Term Lip Sync
 - Uploaded ASI streams used for tests
(onsite encoders to be used only if technical problems arise)
 - Maximum 5 minute duration using 30 second Vistek loop
 - 5 minutes reduced if tests show no significant drift
 - Tests at 1080i/50Hz MPEG 2 and 1080i/60Hz PCM, AAC, Dolby E with representative TS
 - With time as problem, lip sync done by Telesat following week without vendor support

WBU-ISOG – VIDEO AND AUDIO TEST SETUP

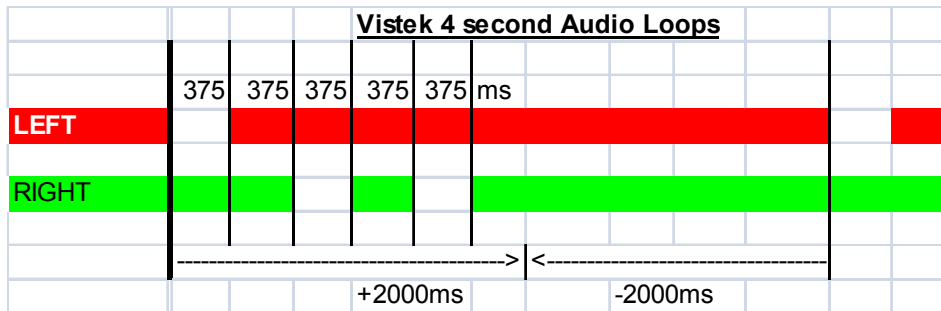
- **Video Testing**
- Each vendors video was evaluated at the decoder stations on 24" LCD displays;
- Rating Pass / Fail with comment;
- Decoder HDSDI output patched to 42" monitors for critical evaluation.

- **Audio Testing**
- Each decoder under test has its audio patched to the test facility for evaluation and pass/fail audio testing

- **Lip Sync Testing**
- Vistek Valid8 signal
- Lip sync monitored over a 5 minute period using a looping 30 second transport stream from the vendor under test.

WBU-ISOG – SYSTEM LATENCY

- End to End System Latency Testing
- Vistek Valid8 HD generator and reader utilized to measure system latency.
- Measurements have a lip sync component as a result of the audio from the decoder being used and referenced to the source video.
- Method will be modified in the future to use the video from the decoder referenced to the source audio.



Encoded Output Transport Stream Files

Vendors shall create transport stream files as shown in table 4.

Table 4: Output Files
Transport Streams To Be Supplied By Vendors

TS #	Video Format	Transport Stream Rate Mbps	Chroma	8/10 bit	GOP	Audio	Duration
1	1080i/59.94	38 Mbps (if not supported, vendor will supply TS's beginning at Number 6)	4:2:2 (Hi 422 @ L4) (if not supported, vendor will supply TS at 4:2:0, 8 bit)	10 bit (if not supported vendor will supply TS at 8 bit)	IBBP/GOP 15	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek
2	1080i/59.94	38 Mbps (if not supported, vendor will supply TS's beginning at Number 6)	4:2:0 (HiP@L4)	8 bit	IBBP/GOP 15	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek
3	1080i/50	38 Mbps (if not supported, vendor will supply TS's beginning at Number 6)	4:2:2 (Hi 422 @ L4) (if not supported, vendor will supply TS at 4:2:0, 8 bit)	10 bit (if not supported vendor will supply TS at 8 bit)	IBBP/GOP 15	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek
4	720p/59.94	38 Mbps (if not supported, vendor will supply TS's beginning at Number 6)	4:2:2 (Hi 422 @ L4) (if not supported, vendor will supply TS at 4:2:0, 8 bit)	10 bit (if not supported vendor will supply TS at 8 bit)	IBBP/GOP 15	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek
5	720p/50	38 Mbps (if not supported, vendor will supply TS's beginning at Number 6)	4:2:2 (Hi 422 @ L4) (if not supported, vendor will supply TS at 4:2:0, 8 bit)	10 bit (if not supported vendor will supply TS at 8 bit)	IBBP/GOP 15	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek

6	1080i/59.94	20 Mbps	4:2:2 (Hi 422 @ L4) (if not supported, vendor will supply TS at 4:2:0, 8 bit)	10 bit (if not supported vendor will supply TS at 8 bit)	IBBBP/G0P16	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek
7	1080i/59.94	20 Mbps	4:2:2 (Hi 422 @ L4) (if not supported, vendor will supply TS at 4:2:0, 8 bit)	10 bit (if not supported vendor will supply TS at 8 bit)	IBBP/GOP 15	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek
8	1080i/59.94	20 Mbps	4:2:2 (Hi 422 @ L4) (if not supported, vendor will supply TS at 4:2:0, 8 bit)	10 bit (if not supported vendor will supply TS at 8 bit)	IBBP/GOP 15	Dolby E (20 bit mode - 8 channels) (SMPTE 302M 2002)	1 minute plus 30 sec. Vistek
9	1080i/59.94	20 Mbps	4:2:2 (Hi 422 @ L4) (if not supported, vendor will supply TS at 4:2:0, 8 bit)	10 bit (if not supported vendor will supply TS at 8 bit)	IBBP/GOP 15	PCM (SMPTE 302M 2002)	1 minute plus 30 sec. Vistek
10	1080i/59.94	20 Mbps	4:2:2 (Hi 422 @ L4) (if not supported, vendor will supply TS at 4:2:0, 8 bit)	10 bit (if not supported vendor will supply TS at 8 bit)	IBBP/GOP 15	AAC (MPEG2 AAC-LC 4CH @ 96Kb/Ch 48KHz sample rate)	1 minute plus 30 sec. Vistek
11	1080i/59.94	20 Mbps	4:2:0 (HiP@L4)	8 bit	IBBP/GOP 15	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek
12	1080i/50	20 Mbps	4:2:2 (Hi 422 @ L4) (if not supported, vendor will supply TS at 4:2:0, 8 bit)	10 bit (if not supported vendor will supply TS at 8 bit)	IBBBP/G0P16	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek
13	1080i/50	20 Mbps	4:2:2 (Hi 422 @ L4) (if not supported, vendor will supply TS at 4:2:0, 8 bit)	10 bit (if not supported vendor will supply TS at 8 bit)	IBBP/GOP 15	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek

14	720p/59.94	20 Mbps	4:2:2 (Hi 422 @ L4) (if not supported, vendor will supply TS at 4:2:0, 8 bit)	10 bit (if not supported vendor will supply TS at 8 bit)	IBBBP/GOP16	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek
15	720p/59.94	20 Mbps	4:2:2 (Hi 422 @ L4) (if not supported, vendor will supply TS at 4:2:0, 8 bit)	10 bit (if not supported vendor will supply TS at 8 bit)	IBBP/GOP 15	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek
16	720p/50	20 Mbps	4:2:2 (Hi 422 @ L4) (if not supported, vendor will supply TS at 4:2:0, 8 bit)	10 bit (if not supported vendor will supply TS at 8 bit)	IBBBP/GOP16	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek
17	720p/50	20 Mbps	4:2:2 (Hi 422 @ L4) (if not supported, vendor will supply TS at 4:2:0, 8 bit)	10 bit (if not supported vendor will supply TS at 8 bit)	IBBP/GOP 15	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek
18	1080i/59	10.3 Mbps	4:2:0 (HiP@L4)	8 bit	IBBBP/GOP16	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek
19	1080i/59	10.3 Mbps	4:2:0 (HiP@L4)	8 bit	IBBP/GOP 15	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek
20	1080i/50	10.3 Mbps	4:2:0 (HiP@L4)	8 bit	IBBBP/GOP16	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek
21	1080i/50	10.3 Mbps	4:2:0 (HiP@L4)	8 bit	IBBP/GOP 15	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek

22	720p/59.94	10.3 Mbps	4:2:0 (HiP@L4)	8 bit	IBBBP/GOP16	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek
23	720p/59.94	10.3 Mbps	4:2:0 (HiP@L4)	8 bit	IBBP/GOP 15	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek
24	720p/59.94	10.3 Mbps	4:2:0 (HiP@L4)	8 bit	IBBP/GOP 15	Dolby E (20 bit mode - 8 channels)(SMPTE 302M 2002)	1 minute plus 30 sec. Vistek
25	720p/59.94	10.3 Mbps	4:2:0 (HiP@L4)	8 bit	IBBP/GOP 15	PCM (SMPTE 302M 2002)	1 minute plus 30 sec. Vistek
26	720p/59.94	10.3 Mbps	4:2:0 (HiP@L4)	8 bit	IBBP/GOP 15	AAC (MPEG2 AAC-LC 4CH @ 96Kb/Ch 48KHz sample rate)	1 minute plus 30 sec. Vistek
27	720p/50	10.3 Mbps	4:2:0 (HiP@L4)	8 bit	IBBBP/GOP16	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek
28	720p/50	10.3 Mbps	4:2:0 (HiP@L4)	8 bit	IBBP/GOP 15	4 ch. MPEG-2 (MPEG-1, Layer 2)	1 minute plus 30 sec. Vistek