TSS test report
Personal space testing.

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Internal use only.

Quick intro:

TSS is a HRTF based virtual surround system, designed to provide ambience and surround effects from two front speakers. SRS Tru-surround technology is the most widely used virtualiser technology for laptops and televisions.

System comparison:

SRS TruSurround XT,
SRS TruSurround HD,
Involve TSS,
Stereo.

Set-up:

Clip used: Xmen the movie, Chapter 12
Speakers: Logitech X-230 desktop speakers with woofer.
Presentation: Desktop computer screen.
Distance to speakers is approximately 0.5 meters.
Video encoding: XVID
Audio encoding: PCM 44.1KHZ
Test Subjects: 11

Format:

Subject was shown the stereo version of the clip as a reference point, and then subjected to each of three clips, labelled so as to be completely free of information that could identify which virtualiser was used for the encoding.

The subject was then asked to comment on various qualities of the sound, paying attention to
- Audio quality
- Surround effect
- Dimension
- Depth

The subject was then asked if they had a preference to any of the systems in particular, and asked to give reasons for their answer.

Preferences

Note: Some people chose two in preference instead of one. There was no coercion to choose one only.

Stereo:	0
SRS XT:	0
SRS HD:	5
TSS:	7
No Preference:	2

Observable qualitative results:

In the cases where TSS was chosen as the preferred listening system, the most common reason given was an increased dimensional / surround quality and depth in comparison to the other systems, followed by observations that the original sound quality has been compromised less.

In the cases where SRS-HD was chosen as the preferred listening system, the reasons given were an increased sense of "Richness", and better clarity of surround elements.

Note: SRS-HD had by default a vocal clarity enhancement enabled, which may have increased the perception that it had more clarity.

SRS-XT has not yet been preferred by a test case.

Stereo was generally accepted as being clear, but flat to the plane of the speakers with little depth.

Conclusions

The test data so far shows that TSS is an effective way to increase the perceived quality of lower-end PC speakers, adding depth and dimension, separating the sound image from the speakers, as well as surround sound effects for people upon whom HRTF's are effective.

It also shows that while there is varying preference as to which system gives a more enjoyable listening experience, they were generally preferred over stereo.

Virtual surround sound perception tests. - XMEN test

	SRS XT	SRS HD	TSS	STEREO	Preferred?	Reasons / Comments	
	Perceptions	Perceptions	Perceptions	Perceptions			
Subject 1	Image pushed backwards. Voice timbre has changed	Image pushed backwards More echo on initial central voices. Voice sounds sharper, enhanced.	More Depth, More echo. Speech is closer to original timbre.	No comment	None	Different advantages to each	Electronic components salesperson / accounting.
Subject 2	Closer to stereo than surround. Voices quieter, ambience better than stereo	Good side surround, good environmental ambience.	Good side surround, good environmental ambience.	Little or no perception of background sounds.	TSS / SRS HD	Additional level of background / ambient audio	Metal trade and commercial / industrial design.
Subject 3	Bit more dimension than stereo but muddy.	Good dimension, better clarity than TSS	Good dimensions, bit less clarity than TSS	Quite clear, minimal dimension.	1) TSS / 2) HD / 3) STEREO / 4) XT	Better overall dimension and retention of audio quality.	Electrical / Electronics engineering and speaker design.
Subject4	Quiet, missing lots of surround voice echo	Good echo, voices more centered around actor's head.	Good echo, voices more disconnected from the actor's head	Less clear ambience.	1) HD 2) TSS 3) STEREO / XT	Slightly richer perception on SRSHD than TSS	Production management
Subject 5	Flat, less detail.	Good ambience, but smaller sound field compared to TSS	Good ambience, sound coming from the sides.	Flat, less detail.	1) TSS / 2) HD / 3) STEREO / 4) XT	TSS had more dimension / depth.	Electronics and PCB production QA

Subject									
Subject 6		Quieter, more distant.	Some surround feeling but limited	Good surround effects of voices everywhere.	Seemed louder (effect of stereo down mix)		1) TSS 2) HD 3) STEREO 4) XT	TSS had more surround effect feeling.	Sales manager
Subject 7		No comments.	Good clear pinpoint seperation from the speakers.	Surroundy, but more stereo and less precise than SRSHD. Better than XT	Stereo		1) HD 2) TSS 3) STEREO / XT	SRSHD had better surround, more specific placement and maybe clearer. Preferred HD and TSS over XT / STEREO	General management / psychology background
Subject 8		Bottom end of voices absent (possibly lack of woofer signal). Minimal surround ambience.	Good separation from the speakers themselves, good depth. Not very forward.	Much closer to timbre of original recording. Good surround effects, better ambience.	Flat stereo.		1) TSS 2) HD 3) STEREO 4) XT	TSS has to my ears more ambient sound, frequency response is closer to the original intention. Better surround effects.	Electrical / electronic engineering / speaker and audio dsp / design
Subject 9		Similar to TSS	Sounded clearer or richer than TSS or XT, but more stereo.	Sounded 'richer' and more reverb impressions than XT or HD	Stereo. Obviously 2-d and left-right		No preference.	SRSHD sounded slightly more stereo than TSS / SRSXT, but clearer / richer. TSS sounded richer than XT.	Software engineer / web designer
Subject 10		Hard to tell difference b/w this and HD	Hard to tell difference b/w this and XT	Impression of 'reverb' or surround echo.	No comment		TSS	Hard to pick, TSS had more surround / echo-ey sounds.	Logistics manager / electronics background

Subject 11		Better than stereo	Comparable with TSS in terms of dimension.	Good dimensional quality, good audio quality.	No comment		TSS / SRS HD	TSS had slightly better dimensional quality and 'richness' over HD, by a small margin.	Sales manager / speaker and hifi sales background
Subject 12		Similar to HD but not as broad	Clearest sound. Surround elements aren't as close to the head, but are thrown a greater distance	Good deep, surround elements feel closer to the listener, and go further back.	Clear, good quality		SRSHD, TSS, STEREO, XT	HD had better clarity, hence the preference.	Electronic technician background