Appendix A

Volume Control Test Data and Graph for

Report No.: SUES250400063001

The DUT shall have at least one volume control setting that will produce a conversational gain of ≥ 6.

Verdict: Pass.

1.1 For codecs with bit rate, check the bit rate with the worst conversational gain

Codec	Codec Bitrate (kbps)	Conv. Gain(dB)							
		WCDMA B4		LTE B66		NR n77		802.11 b	
		2N	8N	2N	8N	2N	8N	2N	8N
AMR-NB	4.75	8.96	13.32	8.84	13.48	8.93	14.57	9.17	14.10
	5.15	8.99	13.38	8.89	13.53	8.96	14.61	9.22	14.11
	5.90	9.03	13.42	8.93	13.58	8.99	14.68	9.26	14.17
	6.70	9.07	13.49	8.97	13.62	9.14	14.73	9.31	14.22
	7.40	9.12	13.54	9.06	13.69	9.23	14.79	9.38	14.26
	7.95	9.16	13.63	9.12	13.75	9.27	15.11	9.57	14.33
	10.20	9.23	13.77	9.23	13.84	9.34	15.18	9.70	14.46
	12.20	9.26	13.89	9.37	13.92	9.52	15.30	9.94	14.28
AMR-WB	6.60	8.40	12.99	8.23	12.51	8.20	13.96	8.12	12.66
	8.85	8.65	13.18	8.31	12.68	8.23	14.08	8.13	12.69
	12.65	8.72	13.33	8.39	12.84	8.25	14.11	8.14	12.74
EVS-NB	5.90	N/A		8.67	13.43	8.64	14.56	8.99	13.76
	7.20			8.73	13.49	8.68	14.57	9.03	13.82
	8.0			8.79	13.52	8.74	14.61	9.15	13.86
	9.6			8.82	13.58	8.89	14.59	9.22	13.89
	13.20			8.99	13.63	9.09	14.60	9.30	13.91
EVS-WB	5.90			7.65	12.47	7.86	13.85	8.07	12.58
	7.20			7.67	12.51	7.89	13.88	8.12	12.62
	8.0			7.73	12.58	7.91	13.87	8.18	12.67
	9.6			7.83	12.61	7.92	13.91	8.25	12.73
	13.20			7.90	12.66	7.92	13.86	8.30	12.78

1.2 For codecs with bit rate, tested only bit rate with the worst conversational gain

Air Interface	Band	Limit (dB)	Conv. Gain(dB)							
			AMR NB (4.75kbps)		AMR WB (6.6kbps)		EVS NB (5.9kbps)		EVS WB (5.9kbps)	
			2N	8N	2N	8N	2N	8N	2N	8N
WCDMA	B2	6	8.75	13.18	8.34	12.96	N/A			
	B4	6	8.96	13.32	8.40	12.99				
	B5	6	8.69	13.46	8.28	12.87				
LTE	B2	6	9.09	13.59	8.49	13.03	8.78	13.46	7.65	12.28
	B5	6	9.15	13.59	8.52	13.06	9.09	13.40	7.83	12.70
	B7	6	9.03	13.74	8.33	13.14	9.01	13.71	7.85	12.67
	B12(17)	6	8.94	13.59	8.48	13.18	9.03	13.55	7.60	12.42
	B14	6	9.20	13.53	8.83	13.23	8.95	13.43	7.70	12.67
	B30	6	9.15	13.62	8.76	13.24	9.19	13.57	7.79	12.56
	B66(4)	6	8.84	13.48	8.23	12.51	8.67	13.43	7.65	12.47
FR1	N2	6	8.66	14.57	8.26	13.89	8.89	14.60	8.09	13.81
	N5	6	8.96	14.50	8.20	13.86	8.87	14.65	7.95	13.68
	N30	6	8.69	14.51	8.25	13.87	8.76	14.38	8.08	13.77
	N66	6	8.85	14.49	8.31	13.92	8.82	14.64	8.07	13.70
	N77	6	8.93	14.57	8.20	13.96	8.64	14.56	7.86	13.85
WLAN-2.4G	802.11b	6	9.17	14.10	8.12	12.66	8.99	13.76	8.07	12.58
	802.11g	6	8.67	13.41	7.52	12.35	9.03	13.39	7.95	12.42
	802.11n	6	8.78	13.37	7.70	12.80	9.03	13.39	8.05	12.41
WLAN-5G	802.11a	6	8.74	13.51	7.67	12.63	9.02	13.63	8.00	12.66
	802.11n	6	8.79	13.32	7.82	12.35	8.99	13.53	8.00	12.57
	802.11ac	6	8.71	13.52	7.90	12.41	8.96	13.61	8.01	12.76

The noise power shall ≥ 20 when tested over the range of 1/3 octave band center frequencies.
The receive frequency response shall be measured at the DRP in 1/12 octave bands. After translation to the FF, it shall fall between the applicable upper and lower limits.
Volume Control: Max-1, LRP: FF
Verdict: Pass

2.1 Distortion Test Result and Frequency Response for EVS-NB 13.20 kbps and LTE

Air Interface	Band	Limit (dB)	Mounting Force	Minimum PN-SDNR (dB)	Receive Acoustic Frequency Response Performance
LTE	B2	20	2N	22.95	2.42
	B2	20	8N	22.91	1.66
	B5	20	2N	22.68	2.34
	B5	20	8N	23.69	1.88
	B7	20	2N	23.67	2.21
	B7	20	8N	21.43	1.89
	B12(17)	20	2N	22.73	2.32
	B12(17)	20	8N	23.54	1.77
	B14	20	2N	22.38	1.73
	B14	20	8N	22.75	1.71
	B30	20	2N	22.95	1.94
	B30	20	8N	22.76	1.65
	B66(4)	20	2N	22.69	2.05
	B66(4)	20	8N	22.80	1.76

2.2 Distortion Test Result and Frequency Response for EVS-NB 13.20 kbps and FR1

Air Interface	Band	Limit (dB)	Mounting Force	Minimum PN-SDNR (dB)	Receive Acoustic Frequency Response Performance
FR1	N2	20	2N	21.65	1.82
	N2	20	8N	21.96	1.51
	N5	20	2N	23.08	1.72
	N5	20	8N	22.72	1.53
	N30	20	2N	23.45	1.69
	N30	20	8N	23.17	1.55
	N66	20	2N	23.73	1.70
	N66	20	8N	23.05	1.58
	N77	20	2N	24.25	1.93
	N77	20	8N	23.32	1.52

2.3 Distortion Test Result and Frequency Response for EVS-NB 13.20 kbps and WLAN

Air Interface	Band	Limit (dB)	Mounting Force	Minimum PN-SDNR (dB)	Receive Acoustic Frequency Response Performance
WLAN	2.4G - 802.11b	20	2N	22.13	1.31
	2.4G - 802.11b	20	8N	22.96	1.27
	2.4G - 802.11g	20	2N	20.25	1.26
	2.4G - 802.11g	20	8N	21.30	1.27
	2.4G - 802.11n	20	2N	22.28	1.29
	2.4G - 802.11n	20	8N	21.05	1.11
	5G - 802.11a	20	2N	21.99	1.35
	5G - 802.11a	20	8N	22.48	1.28
	5G - 802.11n	20	2N	22.50	1.36
	5G - 802.11n	20	8N	20.38	1.44
	5G - 802.11ac	20	2N	20.89	1.05
	5G - 802.11ac	20	8N	20.70	1.25

2.4 Distortion Test Result and Frequency Response for EVB-WB 13.20 kbps and LTE

Air Interface	Band	Limit (dB)	Mounting Force	Minimum PN-SDNR (dB)	Receive Acoustic Frequency Response Performance
LTE	B2	20	2N	23.26	1.85
	B2	20	8N	23.50	0.92
	B5	20	2N	25.27	1.69
	B5	20	8N	26.52	1.28
	B7	20	2N	27.64	1.10
	B7	20	8N	26.65	1.34
	B12(17)	20	2N	26.65	1.23
	B12(17)	20	8N	23.75	1.33
	B14	20	2N	21.68	1.59
	B14	20	8N	25.57	1.30
	B30	20	2N	25.92	1.42
	B30	20	8N	26.56	0.99
	B66(4)	20	2N	26.88	1.72
	B66(4)	20	8N	25.81	1.27

2.5 Distortion Test Result and Frequency Response for EVS-WB 13.20 kbps and FR1

Air Interface	Band	Limit (dB)	Mounting Force	Minimum PN-SDNR (dB)	Receive Acoustic Frequency Response Performance
FR1	N2	20	2N	26.13	1.05
	N2	20	8N	21.93	1.09
	N5	20	2N	25.74	1.13
	N5	20	8N	21.84	0.78
	N30	20	2N	25.19	1.08
	N30	20	8N	21.69	0.82
	N66	20	2N	25.99	0.64
	N66	20	8N	21.83	1.07
	N77	20	2N	25.17	0.85
	N77	20	8N	21.38	1.25

2.6 Distortion Test Result and Frequency Response for EVB-WB 13.20 kbps and WLAN

Air Interface	Band	Limit (dB)	Mounting Force	Minimum PN-SDNR (dB)	Receive Acoustic Frequency Response Performance
WLAN	2.4G - 802.11b	20	2N	23.80	0.67
	2.4G - 802.11b	20	8N	24.34	1.02
	2.4G - 802.11g	20	2N	23.00	0.94
	2.4G - 802.11g	20	8N	21.66	0.97
	2.4G - 802.11n	20	2N	24.64	0.69
	2.4G - 802.11n	20	8N	21.66	0.92
	5G - 802.11a	20	2N	21.58	0.78
	5G - 802.11a	20	8N	21.01	1.07
	5G - 802.11n	20	2N	22.87	1.12
	5G - 802.11n	20	8N	20.81	1.10
	5G - 802.11ac	20	2N	21.79	0.47
	5G - 802.11ac	20	8N	20.14	1.11