

Declaration of conformity (DoC) according ISO/TR 17534-4:2020

We

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declare under our sole responsibility that the product



IMMI 2024 from April 2024 [551]

correctly and completely implements the calculation of sound propagation in agreement with DIRECTIVES COMMISSION DELEGATED DIRECTIVE (EU) 2021/1226 of 21 December 2020 amending, for the purposes of adapting to scientific and technical progress, Annex II to Directive 2002/49/EC of the European Parliament and of the Council as regards common noise assessment methods

All test cases were calculated in the reference setting "CNOSSOS-EU:2015".

The deviation of the final results with the reference results is documented in the table below.

Wölfel Engineering GmbH + Co. KG

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Table 364 — Deviation of the final results with the reference results in ISO/TR 17534-4: 2020

Test case	In the reference setting "CNOSSOS-EU:2015", the calculated levels in octave-bands 63 Hz to 8 000 Hz do not deviate more than $\pm 0,1$ dB from the levels in ISO/TR 17534-4: 2020, Tables 362 or 363		Lateral diffraction was included – comparison of calculated values with the following tables in ISO/TR 17534-4: 2020		Largest deviation (dB) in frequency band (Hz)	
	Yes	No	Table 362	Table 363	dB	Hz
TC01	✓		✓	✓		
TC02	✓		✓	✓		
TC03	✓		✓	✓		
TC04	✓		✓	✓		
TC05	✓		✓	✓		
TC06	✓		✓	✓		
TC07	✓		✓	✓		
TC08	✓		✓	✓		
TC09	✓		✓	✓		
TC10	✓		✓	✓		
TC11	✓		✓	✓		
TC12	✓		✓	✓		
TC13	✓		✓	✓		
TC14	✓		✓	✓		
TC15	✓		✓	✓		
TC16	✓		✓	✓		
TC17	✓		✓	✓		
TC18	✓		✓	✓		
TC19	✓		✓	✓		
TC20	✓		✓	✓		
TC21	✓		✓	✓		
TC22	✓		✓	✓		
TC23	✓		✓	✓		
TC24	✓		✓	✓		
TC25	✓		✓	✓		
TC26	✓		✓	✓		
TC27	✓		✓	✓		
TC28	✓		✓	✓		

Table 362 — Final results calculated (levels in octave bands and total are A-weighted)

Test suite	Title	ISO/TR 17534-4:2020
	Place and date of publication	Switzerland, Geneva, International Organization for Standardization, 2020-11
Calculation method	Title	Commission Directive (EU) 2015/996 of 19 May 2015 (CNOSSOS-EU:2015), considering the “Uniform and agreed interpretation of ambiguities” of ISO/TR 17534-4:2020, Clause 5.
	Place and date of publication	Official Journal of the European Union, L168/1, 19 May 2015

Test case No.	Centre frequency of octave bands	Limits of certified results (A-weighted) in dB		Software calculation result (A-weighted) in dB*	Results inside tolerance	Comments
		Upper	Lower		yes/no	
TC01	63 Hz	13,85	13,65	13,75	yes	
	125 Hz	23,89	23,69	23,79	yes	
	250 Hz	31,27	31,07	31,17	yes	
	500 Hz	36,50	36,30	36,40	yes	
	1000 Hz	39,36	39,16	39,26	yes	
	2000 Hz	39,39	39,19	39,29	yes	
	4000 Hz	34,71	34,51	34,61	yes	
	8000 Hz	16,27	16,07	16,17	yes	
	Total (63 Hz up to 8000 Hz)	44,22	44,02	44,12	yes	
TC02	63 Hz	11,97	11,77	11,87	yes	
	125 Hz	22,01	21,81	21,91	yes	
	250 Hz	29,39	29,19	29,29	yes	
	500 Hz	33,69	33,49	33,59	yes	
	1000 Hz	34,39	34,19	34,29	yes	
	2000 Hz	37,51	37,31	37,41	yes	
	4000 Hz	32,83	32,63	32,73	yes	
	8000 Hz	14,39	14,19	14,29	yes	
	Total (63 Hz up to 8000 Hz)	41,37	41,17	41,27	yes	
TC03						

Test case No.	Centre frequency of active bands	Limits of certified results (A-weighted) in dB		Software calculation result (A-weighted) in dB*	Results inside tolerance	Comments
		Upper	Lower		yes/no	
	63 Hz	10,11	9,91	10,01	yes	
	125 Hz	20,16	19,96	20,06	yes	
	250 Hz	26,81	26,61	26,71	yes	
	500 Hz	26,61	26,41	26,51	yes	
	1000 Hz	33,80	33,60	33,70	yes	
	2000 Hz	35,66	35,46	35,56	yes	
	4000 Hz	30,97	30,77	30,87	yes	
	8000 Hz	12,54	12,34	12,43	yes	
	Total (63 Hz up to 8000 Hz)	39,24	39,04	39,14	yes	
TC04	63 Hz	11,81	11,61	11,71	yes	
	125 Hz	21,85	21,65	21,75	yes	
	250 Hz	29,23	29,03	29,13	yes	
	500 Hz	33,27	33,07	33,17	yes	
	1000 Hz	34,33	34,13	34,23	yes	
	2000 Hz	37,36	37,16	37,26	yes	
	4000 Hz	32,67	32,47	32,57	yes	
	8000 Hz	14,24	14,04	14,13	yes	
	Total (63 Hz up to 8000 Hz)	41,19	40,99	41,09	yes	
TC05	63 Hz	11,16	10,96	11,06	yes	
	125 Hz	21,21	21,01	21,10	yes	
	250 Hz	28,58	28,38	28,48	yes	
	500 Hz	33,81	33,61	33,71	yes	
	1000 Hz	36,67	36,47	36,57	yes	
	2000 Hz	36,71	36,51	36,60	yes	
	4000 Hz	32,01	31,81	31,91	yes	
	8000 Hz	13,54	13,34	13,43	yes	
	Total (63 Hz up to 8000 Hz)	41,53	41,33	41,43	yes	
TC06	63 Hz	11,43	11,23	11,32	yes	
	125 Hz	21,47	21,27	21,37	yes	

Test case No.	Centre frequency of active bands	Limits of certified results (A-weighted) in dB		Software calculation result (A-weighted) in dB*	Results inside tolerance	Comments
		Upper	Lower		yes/no	
	250 Hz	28,83	28,63	28,73	yes	
	500 Hz	31,89	31,69	31,80	yes	
	1000 Hz	36,70	36,50	36,60	yes	
	2000 Hz	36,97	36,77	36,87	yes	
	4000 Hz	32,28	32,08	32,17	yes	
	8000 Hz	13,82	13,62	13,72	yes	
	Total (63 Hz up to 8000 Hz)	41,41	41,21	41,31	yes	
TC07	63 Hz	6,60	6,40	6,50	yes	
	125 Hz	15,58	15,38	15,48	yes	
	250 Hz	21,49	21,29	21,39	yes	
	500 Hz	24,79	24,59	24,69	yes	
	1000 Hz	24,46	24,26	24,36	yes	
	2000 Hz	22,76	22,56	22,66	yes	
	4000 Hz	15,28	15,08	15,18	yes	
	8000 Hz	-6,05	-6,25	-6,16	yes	
	Total (63 Hz up to 8000 Hz)	29,93	29,73	29,83	yes	
TC08	63 Hz	8,27	8,07	8,17	yes	
	125 Hz	16,96	16,76	16,86	yes	
	250 Hz	22,61	22,41	22,51	yes	
	500 Hz	25,56	25,36	25,46	yes	
	1000 Hz	24,97	24,77	24,87	yes	
	2000 Hz	23,54	23,34	23,44	yes	
	4000 Hz	16,03	15,83	15,93	yes	
	8000 Hz	-5,33	-5,53	-5,44	yes	
	Total (63 Hz up to 8000 Hz)	30,72	30,52	30,62	yes	
TC09	63 Hz	6,51	6,31	6,41	yes	
	125 Hz	14,60	14,40	14,51	yes	
	250 Hz	19,62	19,42	19,52	yes	
	500 Hz	22,19	21,99	22,10	yes	

Test case No.	Centre frequency of active bands	Limits of certified results (A-weighted) in dB		Software calculation result (A-weighted) in dB*	Results inside tolerance	Comments
		Upper	Lower		yes/no	
	1000 Hz	22,26	22,06	22,16	yes	
	2000 Hz	19,38	19,18	19,29	yes	
	4000 Hz	11,72	11,52	11,62	yes	
	8000 Hz	-9,21	-9,41	-9,31	yes	
	Total (63 Hz up to 8000 Hz)	27,49	27,29	27,39	yes	
TC10	63 Hz	19,99	19,79	19,89	yes	
	125 Hz	26,49	26,29	26,40	yes	
	250 Hz	29,94	29,74	29,84	yes	
	500 Hz	32,87	32,67	32,77	yes	
	1000 Hz	34,77	34,57	34,67	yes	
	2000 Hz	35,20	35,00	35,10	yes	
	4000 Hz	34,19	33,99	34,09	yes	
	8000 Hz	30,20	30,00	30,10	yes	
	Total (63 Hz up to 8000 Hz)	41,29	41,09	41,19	yes	
TC11	63 Hz	21,38	21,18	21,28	yes	
	125 Hz	28,49	28,29	28,39	yes	
	250 Hz	32,57	32,37	32,48	yes	
	500 Hz	34,61	34,41	34,51	yes	
	1000 Hz	34,64	34,44	34,54	yes	
	2000 Hz	33,47	33,27	33,37	yes	
	4000 Hz	32,24	32,04	32,14	yes	
	8000 Hz	27,83	27,63	27,73	yes	
	Total (63 Hz up to 8000 Hz)	41,13	40,93	41,03	yes	
TC12	63 Hz	21,91	21,71	21,82	yes	
	125 Hz	29,76	29,56	29,68	yes	
	250 Hz	34,41	34,21	34,32	yes	
	500 Hz	36,24	36,04	36,15	yes	
	1000 Hz	35,67	35,47	35,58	yes	
	2000 Hz	33,82	33,62	33,74	yes	

Test case No.	Centre frequency of active bands	Limits of certified results (A-weighted) in dB		Software calculation result (A-weighted) in dB*	Results inside tolerance	Comments
		Upper	Lower		yes/no	
	4000 Hz	31,22	31,02	31,12	yes	
	8000 Hz	25,47	25,27	25,38	yes	
	Total (63 Hz up to 8000 Hz)	42,00	41,80	41,91	yes	
TC13	63 Hz	5,24	5,04	5,14	yes	
	125 Hz	12,39	12,19	12,29	yes	
	250 Hz	16,49	16,29	16,39	yes	
	500 Hz	18,57	18,37	18,48	yes	
	1000 Hz	18,41	18,21	18,32	yes	
	2000 Hz	16,07	15,87	15,98	yes	
	4000 Hz	9,82	9,62	9,72	yes	
	8000 Hz	-9,82	-10,02	-9,92	yes	
	Total (63 Hz up to 8000 Hz)	24,10	23,90	24,00	yes	
TC14	63 Hz	25,71	25,51	25,62	yes	
	125 Hz	34,16	33,96	34,07	yes	
	250 Hz	39,49	39,29	39,40	yes	
	500 Hz	42,14	41,94	42,05	yes	
	1000 Hz	41,96	41,76	41,88	yes	
	2000 Hz	39,52	39,32	39,43	yes	
	4000 Hz	35,36	35,16	35,28	yes	
	8000 Hz	27,67	27,47	27,59	yes	
	Total (63 Hz up to 8000 Hz)	47,55	47,35	47,47	yes	
TC15	63 Hz	10,85	10,65	10,74	yes	
	125 Hz	16,67	16,47	16,56	yes	
	250 Hz	20,91	20,71	20,81	yes	
	500 Hz	24,61	24,41	24,50	yes	
	1000 Hz	26,65	26,45	26,55	yes	
	2000 Hz	26,88	26,68	26,78	yes	
	4000 Hz	25,14	24,94	25,04	yes	
	8000 Hz	18,60	18,40	18,49	yes	

Test case No.	Centre frequency of active bands	Limits of certified results (A-weighted) in dB		Software calculation result (A-weighted) in dB*	Results inside tolerance	Comments
		Upper	Lower		yes/no	
	Total (63 Hz up to 8000 Hz)	32,60	32,40	32,50	yes	
TC16	63 Hz	13,72	13,52	13,61	yes	
	125 Hz	23,68	23,48	23,58	yes	
	250 Hz	30,81	30,61	30,71	yes	
	500 Hz	35,78	35,58	35,68	yes	
	1000 Hz	38,37	38,17	38,27	yes	
	2000 Hz	38,11	37,91	38,01	yes	
	4000 Hz	33,08	32,88	32,98	yes	
	8000 Hz	15,10	14,90	15,00	yes	
	Total (63 Hz up to 8000 Hz)	43,15	42,95	43,05	yes	
TC17	63 Hz	14,12	13,92	14,02	yes	
	125 Hz	23,94	23,74	23,84	yes	
	250 Hz	31,05	30,85	30,95	yes	
	500 Hz	33,96	33,76	33,91	yes	
	1000 Hz	38,47	38,27	38,38	yes	
	2000 Hz	38,37	38,17	38,27	yes	
	4000 Hz	33,35	33,15	33,24	yes	
	8000 Hz	15,38	15,18	15,27	yes	
	Total (63 Hz up to 8000 Hz)	43,04	42,84	42,95	yes	
TC18	63 Hz	11,79	11,59	11,69	yes	
	125 Hz	21,87	21,67	21,77	yes	
	250 Hz	29,03	28,83	28,93	yes	
	500 Hz	32,81	32,61	32,74	yes	
	1000 Hz	36,93	36,73	36,83	yes	
	2000 Hz	36,93	36,73	36,83	yes	
	4000 Hz	32,22	32,02	32,12	yes	
	8000 Hz	13,76	13,56	13,65	yes	

Test case No.	Centre frequency of active bands	Limits of certified results (A-weighted) in dB		Software calculation result (A-weighted) in dB*	Results inside tolerance	Comments
		Upper	Lower		yes/no	
	Total (63 Hz up to 8000 Hz)	41,59	41,39	41,49	yes	
TC19	63 Hz	6,82	6,62	6,72	yes	
	125 Hz	14,76	14,56	14,66	yes	
	250 Hz	19,44	19,24	19,34	yes	
	500 Hz	21,68	21,48	21,58	yes	
	1000 Hz	21,94	21,74	21,84	yes	
	2000 Hz	19,10	18,90	19,00	yes	
	4000 Hz	11,52	11,32	11,42	yes	
	8000 Hz	-9,28	-9,48	-9,39	yes	
	Total (63 Hz up to 8000 Hz)	27,18	26,98	41,60	yes	
TC20	63 Hz	11,31	11,11	11,21	yes	
	125 Hz	21,35	21,15	21,25	yes	
	250 Hz	28,73	28,53	28,63	yes	
	500 Hz	33,96	33,76	33,86	yes	
	1000 Hz	36,83	36,63	36,73	yes	
	2000 Hz	36,89	36,69	36,78	yes	
	4000 Hz	32,27	32,07	32,17	yes	
	8000 Hz	14,10	13,90	14,00	yes	
	Total (63 Hz up to 8000 Hz)	41,71	41,51	41,60	yes	
TC21	63 Hz	10,54	10,34	10,44	yes	
	125 Hz	20,68	20,48	20,58	yes	
	250 Hz	27,88	27,68	27,77	yes	
	500 Hz	33,19	32,99	33,09	yes	
	1000 Hz	35,94	35,74	35,84	yes	
	2000 Hz	35,83	35,63	35,73	yes	
	4000 Hz	31,01	30,81	30,91	yes	
	8000 Hz	12,58	12,38	12,48	yes	

Test case No.	Centre frequency of active bands	Limits of certified results (A-weighted) in dB		Software calculation result (A-weighted) in dB*	Results inside tolerance	Comments
		Upper	Lower		yes/no	
	Total (63 Hz up to 8000 Hz)	40,74	40,54	40,64	yes	
TC22	63 Hz	-2,86	-3,06	-2,96	yes	
	125 Hz	3,66	3,46	3,57	yes	
	250 Hz	6,83	6,63	6,74	yes	
	500 Hz	11,27	11,07	11,17	yes	
	1000 Hz	13,95	13,75	13,85	yes	
	2000 Hz	13,96	13,76	13,86	yes	
	4000 Hz	9,58	9,38	9,48	yes	
	8000 Hz	-7,54	-7,74	-7,64	yes	
	Total (63 Hz up to 8000 Hz)	19,03	18,83	18,93	yes	
TC23	63 Hz	12,80	12,60	12,68	yes	
	125 Hz	21,17	20,97	21,07	yes	
	250 Hz	27,76	27,56	27,68	yes	
	500 Hz	31,58	31,38	31,48	yes	
	1000 Hz	31,52	31,32	31,42	yes	
	2000 Hz	28,84	28,64	28,74	yes	
	4000 Hz	23,85	23,65	23,75	yes	
	8000 Hz	14,02	13,82	13,92	yes	
	Total (63 Hz up to 8000 Hz)	36,66	36,46	36,57	yes	
TC24	63 Hz	14,41	14,21	14,30	yes	
	125 Hz	21,79	21,59	21,68	yes	
	250 Hz	27,86	27,66	27,76	yes	
	500 Hz	31,62	31,42	31,52	yes	
	1000 Hz	31,59	31,39	31,49	yes	
	2000 Hz	29,28	29,08	29,18	yes	
	4000 Hz	25,49	25,29	25,39	yes	
	8000 Hz	16,68	16,48	16,58	yes	

Test case No.	Centre frequency of active bands	Limits of certified results (A-weighted) in dB		Software calculation result (A-weighted) in dB*	Results inside tolerance	Comments
		Upper	Lower		yes/no	
	Total (63 Hz up to 8000 Hz)	36,93	36,73	36,83	yes	
TC25	63 Hz	18,06	17,86	17,97	yes	
	125 Hz	25,75	25,55	25,65	yes	
	250 Hz	30,66	30,46	30,56	yes	
	500 Hz	33,32	33,12	33,22	yes	
	1000 Hz	33,58	33,38	33,48	yes	
	2000 Hz	31,62	31,42	31,52	yes	
	4000 Hz	27,61	27,41	27,51	yes	
	8000 Hz	17,90	17,70	17,80	yes	
	Total (63 Hz up to 8000 Hz)	39,10	38,90	39,00	yes	
TC26	63 Hz	17,60	17,40	17,50	yes	
	125 Hz	27,62	27,42	27,52	yes	
	250 Hz	34,99	34,79	34,89	yes	
	500 Hz	40,24	40,04	40,14	yes	
	1000 Hz	43,20	43,00	43,10	yes	
	2000 Hz	43,69	43,49	43,59	yes	
	4000 Hz	40,65	40,45	40,54	yes	
	8000 Hz	29,25	29,05	29,14	yes	
	Total (63 Hz up to 8000 Hz)	48,52	48,32	48,42	yes	
TC27	63 Hz	16,94	16,74	16,84	yes	
	125 Hz	27,07	26,87	26,98	yes	
	250 Hz	34,89	34,69	34,79	yes	
	500 Hz	40,33	40,13	40,22	yes	
	1000 Hz	38,67	38,47	38,56	yes	
	2000 Hz	38,68	38,48	38,56	yes	
	4000 Hz	39,46	39,26	39,35	yes	
	8000 Hz	29,70	29,50	29,60	yes	

Test case No.	Centre frequency of active bands	Limits of certified results (A-weighted) in dB		Software calculation result (A-weighted) in dB*	Results inside tolerance	Comments
		Upper	Lower		yes/no	
	Total (63 Hz up to 8000 Hz)	45,90	45,70	45,79	yes	
TC28	63 Hz	43,66	43,46	43,56	yes	
	125 Hz	50,69	50,49	50,59	yes	
	250 Hz	54,59	54,39	54,50	yes	
	500 Hz	56,24	56,04	56,14	yes	
	1000 Hz	55,41	55,21	55,31	yes	
	2000 Hz	49,87	49,67	49,77	yes	
	4000 Hz	26,47	26,27	26,37	yes	
	8000 Hz	-59,88	-60,08	-60,00	yes	
	Total (63 Hz up to 8000 Hz)	61,12	60,92	61,02	yes	

* The deviation of the calculated final results from the reference results does not exceed $\pm 0,1$ dB in any octave band.