

## Appendix B: DAE and Probe Calibration Certificate

EX3DV4- SN:7494

February 26, 2018

10184-CAD	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	2.39	65.99	17.27	3.01	150.0	± 9.6 %
		Y	2.45	66.47	17.56		150.0	
		Z	2.32	65.93	17.36		150.0	
10185-CAD	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	2.85	70.16	19.17	3.01	150.0	± 9.6 %
		Y	3.07	71.40	19.75		150.0	
		Z	2.76	70.51	19.50		150.0	
10186-AAD	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	2.44	67.02	16.66	3.01	150.0	± 9.6 %
		Y	2.56	67.67	16.95		150.0	
		Z	2.33	67.13	16.84		150.0	
10187-CAE	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	2.40	66.06	17.35	3.01	150.0	± 9.6 %
		Y	2.46	66.54	17.64		150.0	
		Z	2.33	66.01	17.45		150.0	
10188-CAE	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	2.92	70.63	19.48	3.01	150.0	± 9.6 %
		Y	3.15	71.97	20.11		150.0	
		Z	2.82	70.99	19.83		150.0	
10189-AAE	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	2.48	67.32	16.90	3.01	150.0	± 9.6 %
		Y	2.60	68.01	17.21		150.0	
		Z	2.37	67.44	17.08		150.0	
10193-CAC	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	X	4.36	66.79	16.12	0.00	150.0	± 9.6 %
		Y	4.24	66.43	15.86		150.0	
		Z	4.25	66.88	16.06		150.0	
10194-CAC	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	X	4.50	67.02	16.25	0.00	150.0	± 9.6 %
		Y	4.38	66.66	16.00		150.0	
		Z	4.38	67.06	16.19		150.0	
10195-CAC	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	X	4.53	67.04	16.27	0.00	150.0	± 9.6 %
		Y	4.41	66.68	16.02		150.0	
		Z	4.40	67.05	16.19		150.0	
10196-CAC	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	4.34	66.79	16.11	0.00	150.0	± 9.6 %
		Y	4.22	66.42	15.84		150.0	
		Z	4.23	66.84	16.03		150.0	
10197-CAC	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	X	4.51	67.03	16.26	0.00	150.0	± 9.6 %
		Y	4.38	66.66	16.01		150.0	
		Z	4.38	67.05	16.19		150.0	
10198-CAC	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	X	4.53	67.04	16.27	0.00	150.0	± 9.6 %
		Y	4.40	66.67	16.02		150.0	
		Z	4.39	67.04	16.19		150.0	
10219-CAC	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	X	4.30	66.83	16.08	0.00	150.0	± 9.6 %
		Y	4.17	66.45	15.81		150.0	
		Z	4.19	66.90	16.01		150.0	
10220-CAC	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	X	4.50	66.99	16.24	0.00	150.0	± 9.6 %
		Y	4.38	66.63	16.00		150.0	
		Z	4.37	67.02	16.18		150.0	
10221-CAC	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	X	4.54	66.98	16.26	0.00	150.0	± 9.6 %
		Y	4.42	66.63	16.01		150.0	
		Z	4.41	67.00	16.19		150.0	
10222-CAC	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	X	4.91	67.06	16.39	0.00	150.0	± 9.6 %
		Y	4.81	66.75	16.20		150.0	
		Z	4.81	67.01	16.35		150.0	

Certificate No: EX3-7494\_Feb18

Page 19 of 39

# Appendix B: DAE and Probe Calibration Certificate

EX3DV4- SN:7494

February 26, 2018

10223-CAC	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	X	5.18	67.25	16.50	0.00	150.0	± 9.6 %
		Y	5.07	66.94	16.31		150.0	
		Z	5.03	67.10	16.40		150.0	
10224-CAC	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	X	4.95	67.17	16.38	0.00	150.0	± 9.6 %
		Y	4.85	66.86	16.19		150.0	
		Z	4.85	67.15	16.34		150.0	
10225-CAB	UMTS-FDD (HSPA+)	X	2.64	66.25	14.92	0.00	150.0	± 9.6 %
		Y	2.47	65.44	14.20		150.0	
		Z	2.51	66.11	14.44		150.0	
10226-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	4.57	81.37	23.38	6.02	65.0	± 9.6 %
		Y	4.90	82.52	23.85		65.0	
		Z	4.15	81.66	23.92		65.0	
10227-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	4.60	80.57	22.40	6.02	65.0	± 9.6 %
		Y	4.89	81.58	22.82		65.0	
		Z	4.14	80.85	22.92		65.0	
10228-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	3.35	77.29	23.65	6.02	65.0	± 9.6 %
		Y	3.36	77.54	23.87		65.0	
		Z	2.92	75.79	23.43		65.0	
10229-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	4.39	80.55	22.98	6.02	65.0	± 9.6 %
		Y	4.67	81.55	23.40		65.0	
		Z	3.96	80.71	23.47		65.0	
10230-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	4.37	79.68	21.99	6.02	65.0	± 9.6 %
		Y	4.61	80.55	22.37		65.0	
		Z	3.91	79.81	22.46		65.0	
10231-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	3.26	76.70	23.33	6.02	65.0	± 9.6 %
		Y	3.26	76.88	23.51		65.0	
		Z	2.84	75.20	23.10		65.0	
10232-CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	4.39	80.53	22.98	6.02	65.0	± 9.6 %
		Y	4.66	81.53	23.40		65.0	
		Z	3.96	80.69	23.47		65.0	
10233-CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	4.36	79.65	21.99	6.02	65.0	± 9.6 %
		Y	4.60	80.51	22.36		65.0	
		Z	3.89	79.77	22.44		65.0	
10234-CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	3.19	76.23	23.02	6.02	65.0	± 9.6 %
		Y	3.18	76.36	23.17		65.0	
		Z	2.78	74.77	22.80		65.0	
10235-CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	4.38	80.55	22.98	6.02	65.0	± 9.6 %
		Y	4.66	81.55	23.41		65.0	
		Z	3.96	80.70	23.48		65.0	
10236-CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	4.40	79.78	22.03	6.02	65.0	± 9.6 %
		Y	4.64	80.65	22.40		65.0	
		Z	3.94	79.92	22.49		65.0	
10237-CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	3.25	76.71	23.34	6.02	65.0	± 9.6 %
		Y	3.26	76.89	23.52		65.0	
		Z	2.83	75.20	23.10		65.0	
10238-CAD	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	4.37	80.51	22.96	6.02	65.0	± 9.6 %
		Y	4.65	81.50	23.39		65.0	
		Z	3.95	80.66	23.46		65.0	

Certificate No: EX3-7494\_Feb18

Page 20 of 39

## Appendix B: DAE and Probe Calibration Certificate

EX3DV4- SN:7494

February 26, 2018

10239-CAD	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	4.34	79.61	21.97	6.02	65.0	± 9.6 %
		Y	4.58	80.47	22.35		65.0	
		Z	3.88	79.72	22.43		65.0	
10240-CAD	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	3.25	76.69	23.33	6.02	65.0	± 9.6 %
		Y	3.25	76.87	23.51		65.0	
		Z	2.83	75.19	23.10		65.0	
10241-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	5.67	76.94	23.64	6.98	65.0	± 9.6 %
		Y	5.73	77.33	23.85		65.0	
		Z	5.41	77.63	24.19		65.0	
10242-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	5.51	76.48	23.38	6.98	65.0	± 9.6 %
		Y	5.15	75.22	22.87		65.0	
		Z	5.17	76.81	23.79		65.0	
10243-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	4.66	73.35	22.88	6.98	65.0	± 9.6 %
		Y	4.37	72.03	22.31		65.0	
		Z	4.40	73.35	23.12		65.0	
10244-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	2.90	67.06	13.06	3.98	65.0	± 9.6 %
		Y	2.71	66.26	12.47		65.0	
		Z	2.39	65.15	11.38		65.0	
10245-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	2.85	66.61	12.78	3.98	65.0	± 9.6 %
		Y	2.68	65.84	12.20		65.0	
		Z	2.36	64.77	11.12		65.0	
10246-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	3.01	71.40	15.89	3.98	65.0	± 9.6 %
		Y	2.36	67.99	13.82		65.0	
		Z	2.41	68.64	13.94		65.0	
10247-CAD	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	3.36	69.51	15.75	3.98	65.0	± 9.6 %
		Y	2.95	67.61	14.45		65.0	
		Z	2.97	68.07	14.42		65.0	
10248-CAD	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	3.34	68.90	15.44	3.98	65.0	± 9.6 %
		Y	2.95	67.15	14.22		65.0	
		Z	2.92	67.38	14.07		65.0	
10249-CAD	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	4.26	76.83	19.56	3.98	65.0	± 9.6 %
		Y	3.47	73.55	17.79		65.0	
		Z	3.81	75.50	18.55		65.0	
10250-CAD	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	4.36	73.05	19.62	3.98	65.0	± 9.6 %
		Y	4.02	71.77	18.85		65.0	
		Z	4.18	72.90	19.29		65.0	
10251-CAD	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	4.16	70.97	18.24	3.98	65.0	± 9.6 %
		Y	3.84	69.74	17.45		65.0	
		Z	3.91	70.51	17.72		65.0	
10252-CAD	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	4.83	77.80	21.42	3.98	65.0	± 9.6 %
		Y	4.26	75.76	20.36		65.0	
		Z	4.64	77.86	21.33		65.0	
10253-CAD	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	4.40	70.58	18.61	3.98	65.0	± 9.6 %
		Y	4.13	69.58	18.00		65.0	
		Z	4.22	70.40	18.37		65.0	
10254-CAD	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	4.70	71.50	19.34	3.98	65.0	± 9.6 %
		Y	4.41	70.53	18.77		65.0	
		Z	4.51	71.38	19.13		65.0	

Certificate No: EX3-7494\_Feb18

Page 21 of 39



# Appendix B: DAE and Probe Calibration Certificate

EX3DV4- SN:7494

February 26, 2018

10255-CAD	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	4.76	74.95	20.56	3.98	65.0	± 9.6 %
		Y	4.35	73.52	19.81		65.0	
		Z	4.59	75.06	20.58		65.0	
10256-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	2.08	63.27	9.80	3.98	65.0	± 9.6 %
		Y	1.95	62.60	9.21		65.0	
		Z	1.70	61.73	8.15		65.0	
10257-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	2.07	62.91	9.50	3.98	65.0	± 9.6 %
		Y	1.94	62.29	8.92		65.0	
		Z	1.69	61.46	7.88		65.0	
10258-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	2.01	65.63	11.91	3.98	65.0	± 9.6 %
		Y	1.65	63.35	10.17		65.0	
		Z	1.59	63.25	9.83		65.0	
10259-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	3.78	71.05	17.26	3.98	65.0	± 9.6 %
		Y	3.37	69.33	16.13		65.0	
		Z	3.46	70.13	16.31		65.0	
10260-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	3.81	70.78	17.12	3.98	65.0	± 9.6 %
		Y	3.41	69.12	16.02		65.0	
		Z	3.48	69.84	16.15		65.0	
10261-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	4.32	76.55	20.03	3.98	65.0	± 9.6 %
		Y	3.68	73.97	18.61		65.0	
		Z	4.03	75.96	19.43		65.0	
10262-CAD	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	4.35	72.98	19.56	3.98	65.0	± 9.6 %
		Y	4.00	71.69	18.79		65.0	
		Z	4.16	72.81	19.23		65.0	
10263-CAD	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	4.15	70.95	18.23	3.98	65.0	± 9.6 %
		Y	3.83	69.72	17.45		65.0	
		Z	3.90	70.49	17.72		65.0	
10264-CAD	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	4.78	77.59	21.30	3.98	65.0	± 9.6 %
		Y	4.21	75.55	20.24		65.0	
		Z	4.59	77.63	21.21		65.0	
10265-CAD	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	4.45	70.90	18.87	3.98	65.0	± 9.6 %
		Y	4.17	69.87	18.27		65.0	
		Z	4.26	70.67	18.67		65.0	
10266-CAD	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	4.79	71.96	19.72	3.98	65.0	± 9.6 %
		Y	4.50	70.98	19.16		65.0	
		Z	4.60	71.84	19.58		65.0	
10267-CAD	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	4.98	75.63	20.70	3.98	65.0	± 9.6 %
		Y	4.53	74.10	19.92		65.0	
		Z	4.81	75.72	20.78		65.0	
10268-CAD	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	5.11	71.08	19.43	3.98	65.0	± 9.6 %
		Y	4.84	70.20	18.97		65.0	
		Z	4.92	70.93	19.36		65.0	
10269-CAD	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	5.13	70.76	19.32	3.98	65.0	± 9.6 %
		Y	4.87	69.92	18.86		65.0	
		Z	4.96	70.66	19.25		65.0	
10270-CAD	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	5.11	73.33	19.86	3.98	65.0	± 9.6 %
		Y	4.76	72.19	19.29		65.0	
		Z	4.96	73.43	19.98		65.0	

Certificate No: EX3-7494\_Feb18

Page 22 of 39

## Appendix B: DAE and Probe Calibration Certificate

EX3DV4- SN:7494

February 26, 2018

10274-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	X	2.48	66.86	14.99	0.00	150.0	± 9.6 %
		Y	2.30	65.90	14.17		150.0	
		Z	2.37	66.79	14.57		150.0	
10275-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	X	1.53	68.05	15.40	0.00	150.0	± 9.6 %
		Y	1.32	66.12	13.91		150.0	
		Z	1.45	67.75	14.99		150.0	
10277-CAA	PHS (QPSK)	X	1.30	58.93	4.20	9.03	50.0	± 9.6 %
		Y	1.32	58.56	3.87		50.0	
		Z	1.18	58.32	3.49		50.0	
10278-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.5)	X	2.49	64.91	10.26	9.03	50.0	± 9.6 %
		Y	2.32	63.55	9.26		50.0	
		Z	2.17	63.27	8.86		50.0	
10279-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.38)	X	2.57	65.18	10.47	9.03	50.0	± 9.6 %
		Y	2.38	63.76	9.44		50.0	
		Z	2.22	63.44	9.03		50.0	
10290-AAB	CDMA2000, RC1, SO55, Full Rate	X	1.01	65.74	11.23	0.00	150.0	± 9.6 %
		Y	0.67	61.70	8.06		150.0	
		Z	0.69	62.65	8.67		150.0	
10291-AAB	CDMA2000, RC3, SO55, Full Rate	X	0.64	64.08	10.26	0.00	150.0	± 9.6 %
		Y	0.41	60.32	6.85		150.0	
		Z	0.48	61.84	8.06		150.0	
10292-AAB	CDMA2000, RC3, SO32, Full Rate	X	0.93	69.17	13.09	0.00	150.0	± 9.6 %
		Y	0.46	61.72	7.96		150.0	
		Z	0.63	65.19	10.18		150.0	
10293-AAB	CDMA2000, RC3, SO3, Full Rate	X	2.58	81.84	18.38	0.00	150.0	± 9.6 %
		Y	0.61	64.42	9.84		150.0	
		Z	1.45	74.16	14.40		150.0	
10295-AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	X	16.38	93.11	24.71	9.03	50.0	± 9.6 %
		Y	16.06	90.60	23.14		50.0	
		Z	41.75	104.48	26.91		50.0	
10297-AAC	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	2.56	69.49	16.58	0.00	150.0	± 9.6 %
		Y	2.33	68.15	15.68		150.0	
		Z	2.43	69.17	16.39		150.0	
10298-AAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	1.18	65.35	11.77	0.00	150.0	± 9.6 %
		Y	0.89	62.40	9.35		150.0	
		Z	0.90	63.00	9.64		150.0	
10299-AAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	1.36	63.05	9.42	0.00	150.0	± 9.6 %
		Y	1.26	62.26	8.62		150.0	
		Z	1.05	61.24	7.54		150.0	
10300-AAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	1.15	60.99	7.59	0.00	150.0	± 9.6 %
		Y	1.07	60.46	6.94		150.0	
		Z	0.89	59.75	5.99		150.0	
10301-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	X	4.25	64.73	16.86	4.17	50.0	± 9.6 %
		Y	4.21	64.78	16.74		50.0	
		Z	4.10	64.79	16.69		50.0	
10302-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL symbols)	X	4.74	65.43	17.63	4.96	50.0	± 9.6 %
		Y	4.66	65.24	17.38		50.0	
		Z	4.60	65.49	17.44		50.0	

Certificate No: EX3-7494\_Feb18

Page 23 of 39

## Appendix B: DAE and Probe Calibration Certificate

EX3DV4- SN:7494

February 26, 2018

10303-AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	X	4.49	65.00	17.39	4.96	50.0	± 9.6 %
		Y	4.44	65.13	17.34		50.0	
		Z	4.36	65.13	17.21		50.0	
10304-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	X	4.34	65.04	16.98	4.17	50.0	± 9.6 %
		Y	4.25	64.81	16.70		50.0	
		Z	4.21	65.16	16.81		50.0	
10305-AAA	IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)	X	3.71	65.40	17.85	6.02	35.0	± 9.6 %
		Y	3.72	65.71	17.67		35.0	
		Z	3.59	65.50	17.36		35.0	
10306-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18 symbols)	X	4.14	65.15	17.96	6.02	35.0	± 9.6 %
		Y	4.12	65.33	17.82		35.0	
		Z	4.02	65.33	17.66		35.0	
10307-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)	X	4.01	65.07	17.81	6.02	35.0	± 9.6 %
		Y	3.99	65.26	17.66		35.0	
		Z	3.89	65.22	17.49		35.0	
10308-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	X	3.97	65.21	17.93	6.02	35.0	± 9.6 %
		Y	3.96	65.42	17.79		35.0	
		Z	3.86	65.37	17.62		35.0	
10309-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols)	X	4.16	65.22	18.05	6.02	35.0	± 9.6 %
		Y	4.14	65.39	17.90		35.0	
		Z	4.03	65.36	17.74		35.0	
10310-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)	X	4.09	65.15	17.92	6.02	35.0	± 9.6 %
		Y	4.07	65.35	17.79		35.0	
		Z	3.97	65.35	17.65		35.0	
10311-AAC	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	2.92	68.73	16.23	0.00	150.0	± 9.6 %
		Y	2.68	67.45	15.43		150.0	
		Z	2.78	68.38	16.08		150.0	
10313-AAA	iDEN 1:3	X	2.23	70.71	15.35	6.99	70.0	± 9.6 %
		Y	1.69	66.90	13.17		70.0	
		Z	2.30	71.64	15.93		70.0	
10314-AAA	iDEN 1:6	X	4.08	80.89	22.31	10.00	30.0	± 9.6 %
		Y	3.04	75.07	19.42		30.0	
		Z	4.65	83.62	23.48		30.0	
10315-AAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	X	1.04	63.55	14.98	0.17	150.0	± 9.6 %
		Y	0.94	62.52	14.02		150.0	
		Z	1.03	63.50	14.81		150.0	
10316-AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	X	4.37	66.68	16.19	0.17	150.0	± 9.6 %
		Y	4.26	66.34	15.95		150.0	
		Z	4.26	66.72	16.11		150.0	
10317-AAC	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	X	4.37	66.68	16.19	0.17	150.0	± 9.6 %
		Y	4.26	66.34	15.95		150.0	
		Z	4.26	66.72	16.11		150.0	
10400-AAD	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	X	4.46	67.02	16.23	0.00	150.0	± 9.6 %
		Y	4.33	66.64	15.97		150.0	
		Z	4.31	66.98	16.13		150.0	
10401-AAD	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	X	5.12	66.82	16.24	0.00	150.0	± 9.6 %
		Y	5.01	66.51	16.06		150.0	
		Z	4.99	66.73	16.17		150.0	

Certificate No: EX3-7494\_Feb18

Page 24 of 39



## Appendix B: DAE and Probe Calibration Certificate

EX3DV4- SN:7494

February 26, 2018

10402-AAD	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc duty cycle)	X	5.47	67.39	16.42	0.00	150.0	± 9.6 %
		Y	5.37	67.08	16.25		150.0	
		Z	5.37	67.35	16.39		150.0	
10403-AAB	CDMA2000 (1xEV-DO, Rev. 0)	X	1.01	65.74	11.23	0.00	115.0	± 9.6 %
		Y	0.67	61.70	8.06		115.0	
		Z	0.69	62.65	8.67		115.0	
10404-AAB	CDMA2000 (1xEV-DO, Rev. A)	X	1.01	65.74	11.23	0.00	115.0	± 9.6 %
		Y	0.67	61.70	8.06		115.0	
		Z	0.69	62.65	8.67		115.0	
10406-AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	X	13.40	94.87	22.42	0.00	100.0	± 9.6 %
		Y	37.24	104.89	24.38		100.0	
		Z	100.00	114.79	25.79		100.0	
10410-AAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9, Subframe Conf=4)	X	2.95	79.35	18.40	3.23	80.0	± 9.6 %
		Y	3.69	82.30	19.32		80.0	
		Z	3.87	84.90	20.56		80.0	
10415-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	1.00	63.14	14.62	0.00	150.0	± 9.6 %
		Y	0.91	62.12	13.65		150.0	
		Z	0.99	63.08	14.44		150.0	
10416-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	X	4.35	66.77	16.19	0.00	150.0	± 9.6 %
		Y	4.23	66.41	15.93		150.0	
		Z	4.24	66.81	16.11		150.0	
10417-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	X	4.35	66.77	16.19	0.00	150.0	± 9.6 %
		Y	4.23	66.41	15.93		150.0	
		Z	4.24	66.81	16.11		150.0	
10418-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preamble)	X	4.35	66.98	16.25	0.00	150.0	± 9.6 %
		Y	4.23	66.61	15.99		150.0	
		Z	4.23	67.03	16.19		150.0	
10419-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preamble)	X	4.36	66.91	16.23	0.00	150.0	± 9.6 %
		Y	4.24	66.55	15.97		150.0	
		Z	4.25	66.96	16.17		150.0	
10422-AAB	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	X	4.47	66.89	16.24	0.00	150.0	± 9.6 %
		Y	4.35	66.53	15.99		150.0	
		Z	4.35	66.92	16.18		150.0	
10423-AAB	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	X	4.59	67.14	16.33	0.00	150.0	± 9.6 %
		Y	4.47	66.78	16.08		150.0	
		Z	4.46	67.16	16.25		150.0	
10424-AAB	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	X	4.52	67.09	16.31	0.00	150.0	± 9.6 %
		Y	4.40	66.73	16.05		150.0	
		Z	4.39	67.09	16.23		150.0	
10425-AAB	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	X	5.15	67.27	16.49	0.00	150.0	± 9.6 %
		Y	5.05	66.98	16.31		150.0	
		Z	5.01	67.17	16.41		150.0	
10426-AAB	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	X	5.17	67.36	16.53	0.00	150.0	± 9.6 %
		Y	5.08	67.12	16.38		150.0	
		Z	5.05	67.33	16.49		150.0	

Certificate No: EX3-7494\_Feb18

Page 25 of 39

## Appendix B: DAE and Probe Calibration Certificate

EX3DV4- SN:7494

February 26, 2018

10427-AAB	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	X	5.13	67.15	16.42	0.00	150.0	± 9.6 %
		Y	5.03	66.85	16.24		150.0	
		Z	5.01	67.11	16.38		150.0	
10430-AAB	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	X	4.23	72.27	18.34	0.00	150.0	± 9.6 %
		Y	3.99	71.49	17.71		150.0	
		Z	4.17	72.80	18.15		150.0	
10431-AAB	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	X	3.96	67.36	16.06	0.00	150.0	± 9.6 %
		Y	3.81	66.88	15.67		150.0	
		Z	3.81	67.37	15.87		150.0	
10432-AAB	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	X	4.29	67.19	16.23	0.00	150.0	± 9.6 %
		Y	4.15	66.79	15.93		150.0	
		Z	4.15	67.22	16.13		150.0	
10433-AAB	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	X	4.54	67.13	16.33	0.00	150.0	± 9.6 %
		Y	4.42	66.76	16.08		150.0	
		Z	4.41	67.14	16.25		150.0	
10434-AAA	W-CDMA (BS Test Model 1, 64 DPCH)	X	4.34	73.15	18.13	0.00	150.0	± 9.6 %
		Y	3.97	71.83	17.20		150.0	
		Z	4.17	73.19	17.60		150.0	
10435-AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	2.84	78.74	18.13	3.23	80.0	± 9.6 %
		Y	3.48	81.45	18.98		80.0	
		Z	3.64	83.98	20.20		80.0	
10447-AAB	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	X	3.20	67.15	14.91	0.00	150.0	± 9.6 %
		Y	2.99	66.28	14.17		150.0	
		Z	2.97	66.77	14.26		150.0	
10448-AAB	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	X	3.83	67.16	15.94	0.00	150.0	± 9.6 %
		Y	3.68	66.67	15.55		150.0	
		Z	3.69	67.18	15.75		150.0	
10449-AAB	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	X	4.13	67.03	16.13	0.00	150.0	± 9.6 %
		Y	4.00	66.61	15.83		150.0	
		Z	4.00	67.05	16.03		150.0	
10450-AAB	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	X	4.34	66.91	16.19	0.00	150.0	± 9.6 %
		Y	4.22	66.53	15.92		150.0	
		Z	4.23	66.92	16.11		150.0	
10451-AAA	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	X	2.99	66.88	14.14	0.00	150.0	± 9.6 %
		Y	2.74	65.78	13.23		150.0	
		Z	2.69	66.07	13.18		150.0	
10456-AAB	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle)	X	6.06	67.78	16.63	0.00	150.0	± 9.6 %
		Y	6.00	67.55	16.51		150.0	
		Z	6.07	68.05	16.78		150.0	
10457-AAA	UMTS-FDD (DC-HSDPA)	X	3.71	65.53	15.92	0.00	150.0	± 9.6 %
		Y	3.61	65.20	15.66		150.0	
		Z	3.65	65.68	15.87		150.0	
10458-AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	X	3.70	71.13	16.64	0.00	150.0	± 9.6 %
		Y	3.25	69.16	15.28		150.0	
		Z	3.15	69.17	14.95		150.0	
10459-AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	X	4.84	69.11	17.84	0.00	150.0	± 9.6 %
		Y	4.69	68.77	17.48		150.0	
		Z	4.58	68.84	17.14		150.0	

Certificate No: EX3-7494\_Feb18

Page 26 of 39



# Appendix B: DAE and Probe Calibration Certificate

EX3DV4- SN:7494

February 26, 2018

10460-AAA	UMTS-FDD (WCDMA, AMR)	X	0.88	68.39	16.07	0.00	150.0	± 9.6 %
		Y	0.70	65.56	13.77		150.0	
		Z	0.84	67.99	15.62		150.0	
10461-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	1.57	72.49	16.91	3.29	80.0	± 9.6 %
		Y	2.31	77.86	18.85		80.0	
		Z	1.89	76.90	18.97		80.0	
10462-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	0.65	60.00	7.36	3.23	80.0	± 9.6 %
		Y	0.67	60.00	7.26		80.0	
		Z	0.57	60.00	7.02		80.0	
10463-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.67	60.00	6.67	3.23	80.0	± 9.6 %
		Y	0.68	60.00	6.58		80.0	
		Z	0.60	60.00	6.22		80.0	
10464-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	1.23	69.24	14.93	3.23	80.0	± 9.6 %
		Y	1.59	72.66	16.19		80.0	
		Z	1.42	72.83	16.69		80.0	
10465-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	0.65	60.00	7.28	3.23	80.0	± 9.6 %
		Y	0.67	60.00	7.19		80.0	
		Z	0.57	60.00	6.95		80.0	
10466-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.67	60.00	6.62	3.23	80.0	± 9.6 %
		Y	0.69	60.00	6.54		80.0	
		Z	0.60	60.00	6.18		80.0	
10467-AAC	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	1.28	69.83	15.22	3.23	80.0	± 9.6 %
		Y	1.71	73.64	16.62		80.0	
		Z	1.51	73.74	17.10		80.0	
10468-AAC	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	0.65	60.00	7.31	3.23	80.0	± 9.6 %
		Y	0.66	60.00	7.22		80.0	
		Z	0.57	60.00	6.98		80.0	
10469-AAC	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.67	60.00	6.62	3.23	80.0	± 9.6 %
		Y	0.68	60.00	6.54		80.0	
		Z	0.60	60.00	6.18		80.0	
10470-AAC	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	1.27	69.83	15.21	3.23	80.0	± 9.6 %
		Y	1.71	73.66	16.62		80.0	
		Z	1.50	73.77	17.11		80.0	
10471-AAC	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	0.65	60.00	7.29	3.23	80.0	± 9.6 %
		Y	0.66	60.00	7.20		80.0	
		Z	0.57	60.00	6.96		80.0	
10472-AAC	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.67	60.00	6.60	3.23	80.0	± 9.6 %
		Y	0.68	60.00	6.52		80.0	
		Z	0.31	55.91	4.03		80.0	
10473-AAC	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	1.27	69.80	15.19	3.23	80.0	± 9.6 %
		Y	1.70	73.59	16.59		80.0	
		Z	1.50	73.71	17.08		80.0	
10474-AAC	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	0.65	60.00	7.29	3.23	80.0	± 9.6 %
		Y	0.66	60.00	7.20		80.0	
		Z	0.57	60.00	6.96		80.0	
10475-AAC	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.67	60.00	6.60	3.23	80.0	± 9.6 %
		Y	0.68	60.00	6.52		80.0	
		Z	0.31	55.90	4.03		80.0	

Certificate No: EX3-7494\_Feb18

Page 27 of 39

# Appendix B: DAE and Probe Calibration Certificate

EX3DV4-- SN:7494

February 26, 2018

10477-AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	0.65	60.00	7.26	3.23	80.0	± 9.6 %
		Y	0.66	60.00	7.17		80.0	
		Z	0.57	60.00	6.93		80.0	
10478-AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.67	60.00	6.59	3.23	80.0	± 9.6 %
		Y	0.68	60.00	6.51		80.0	
		Z	0.31	55.89	4.01		80.0	
10479-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.24	76.16	18.67	3.23	80.0	± 9.6 %
		Y	4.42	80.82	20.23		80.0	
		Z	4.39	82.21	20.82		80.0	
10480-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	2.03	66.76	12.73	3.23	80.0	± 9.6 %
		Y	2.05	66.92	12.60		80.0	
		Z	1.85	67.01	12.43		80.0	
10481-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.62	63.96	11.04	3.23	80.0	± 9.6 %
		Y	1.57	63.66	10.70		80.0	
		Z	1.32	63.18	10.24		80.0	
10482-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	1.53	65.20	12.69	2.23	80.0	± 9.6 %
		Y	1.10	61.56	10.21		80.0	
		Z	1.14	62.42	10.54		80.0	
10483-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.45	61.38	9.71	2.23	80.0	± 9.6 %
		Y	1.32	60.52	8.97		80.0	
		Z	1.16	60.00	8.17		80.0	
10484-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.44	61.07	9.53	2.23	80.0	± 9.6 %
		Y	1.32	60.25	8.82		80.0	
		Z	1.19	60.00	8.15		80.0	
10485-AAC	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	2.16	69.31	16.02	2.23	80.0	± 9.6 %
		Y	1.69	66.06	14.04		80.0	
		Z	1.93	68.38	15.12		80.0	
10486-AAC	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	2.10	65.45	13.37	2.23	80.0	± 9.6 %
		Y	1.71	62.92	11.64		80.0	
		Z	1.73	63.60	11.80		80.0	
10487-AAC	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	2.11	65.08	13.16	2.23	80.0	± 9.6 %
		Y	1.73	62.69	11.49		80.0	
		Z	1.73	63.23	11.57		80.0	
10488-AAC	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	2.58	69.55	17.35	2.23	80.0	± 9.6 %
		Y	2.27	67.73	16.25		80.0	
		Z	2.45	69.44	17.18		80.0	
10489-AAC	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	2.75	67.17	16.06	2.23	80.0	± 9.6 %
		Y	2.49	65.86	15.18		80.0	
		Z	2.63	67.13	15.78		80.0	
10490-AAC	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	2.83	67.06	16.01	2.23	80.0	± 9.6 %
		Y	2.57	65.81	15.15		80.0	
		Z	2.69	66.99	15.69		80.0	
10491-AAC	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	2.92	68.61	17.17	2.23	80.0	± 9.6 %
		Y	2.65	67.28	16.37		80.0	
		Z	2.77	68.48	17.08		80.0	
10492-AAC	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.13	66.69	16.33	2.23	80.0	± 9.6 %
		Y	2.92	65.77	15.72		80.0	
		Z	3.01	66.69	16.19		80.0	

Certificate No: EX3-7494\_Feb18

Page 28 of 39



# Appendix B: DAE and Probe Calibration Certificate

EX3DV4- SN:7494

February 26, 2018

10493-AAC	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.19	66.60	16.28	2.23	80.0	± 9.6 %
		Y	2.99	65.70	15.69		80.0	
		Z	3.07	66.59	16.12		80.0	
10494-AAC	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.09	69.75	17.58	2.23	80.0	± 9.6 %
		Y	2.78	68.23	16.72		80.0	
		Z	2.93	69.54	17.51		80.0	
10495-AAC	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.15	66.91	16.53	2.23	80.0	± 9.6 %
		Y	2.94	65.97	15.94		80.0	
		Z	3.03	66.87	16.43		80.0	
10496-AAC	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.24	66.76	16.49	2.23	80.0	± 9.6 %
		Y	3.04	65.88	15.93		80.0	
		Z	3.12	66.74	16.39		80.0	
10497-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	0.93	60.00	8.57	2.23	80.0	± 9.6 %
		Y	0.90	60.00	7.78		80.0	
		Z	0.86	60.00	7.53		80.0	
10498-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.10	60.00	7.25	2.23	80.0	± 9.6 %
		Y	1.08	60.00	6.57		80.0	
		Z	1.05	60.00	6.14		80.0	
10499-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.12	60.00	7.08	2.23	80.0	± 9.6 %
		Y	1.11	60.00	6.40		80.0	
		Z	1.08	60.00	5.96		80.0	
10500-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	2.33	69.42	16.57	2.23	80.0	± 9.6 %
		Y	1.93	66.88	15.00		80.0	
		Z	2.16	69.02	16.03		80.0	
10501-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	2.42	66.55	14.60	2.23	80.0	± 9.6 %
		Y	2.06	64.46	13.19		80.0	
		Z	2.16	65.57	13.59		80.0	
10502-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	2.46	66.38	14.43	2.23	80.0	± 9.6 %
		Y	2.09	64.32	13.03		80.0	
		Z	2.17	65.33	13.38		80.0	
10503-AAC	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	2.55	69.37	17.25	2.23	80.0	± 9.6 %
		Y	2.24	67.56	16.15		80.0	
		Z	2.42	69.25	17.08		80.0	
10504-AAC	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	2.73	67.07	16.00	2.23	80.0	± 9.6 %
		Y	2.48	65.76	15.11		80.0	
		Z	2.61	67.02	15.71		80.0	
10505-AAC	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	2.82	66.97	15.95	2.23	80.0	± 9.6 %
		Y	2.56	65.72	15.09		80.0	
		Z	2.68	66.89	15.62		80.0	
10506-AAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.07	69.63	17.51	2.23	80.0	± 9.6 %
		Y	2.76	68.11	16.65		80.0	
		Z	2.91	69.41	17.44		80.0	
10507-AAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.14	66.85	16.49	2.23	80.0	± 9.6 %
		Y	2.93	65.91	15.90		80.0	
		Z	3.02	66.81	16.39		80.0	

Certificate No: EX3-7494\_Feb18

Page 29 of 39



## Appendix B: DAE and Probe Calibration Certificate

EX3DV4- SN:7494

February 26, 2018

10508-AAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.23	66.69	16.44	2.23	80.0	± 9.6 %
		Y	3.03	65.82	15.89		80.0	
		Z	3.11	66.67	16.35		80.0	
10509-AAC	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.52	68.96	17.25	2.23	80.0	± 9.6 %
		Y	3.24	67.75	16.57		80.0	
		Z	3.37	68.79	17.22		80.0	
10510-AAC	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.62	66.72	16.61	2.23	80.0	± 9.6 %
		Y	3.43	65.94	16.15		80.0	
		Z	3.50	66.61	16.55		80.0	
10511-AAC	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.70	66.58	16.58	2.23	80.0	± 9.6 %
		Y	3.51	65.85	16.14		80.0	
		Z	3.58	66.51	16.52		80.0	
10512-AAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.56	70.02	17.57	2.23	80.0	± 9.6 %
		Y	3.23	68.54	16.78		80.0	
		Z	3.39	69.70	17.50		80.0	
10513-AAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.50	66.80	16.66	2.23	80.0	± 9.6 %
		Y	3.31	65.98	16.18		80.0	
		Z	3.39	66.65	16.59		80.0	
10514-AAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.56	66.53	16.58	2.23	80.0	± 9.6 %
		Y	3.38	65.75	16.13		80.0	
		Z	3.45	66.40	16.52		80.0	
10515-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	X	0.96	63.31	14.68	0.00	150.0	± 9.6 %
		Y	0.87	62.23	13.64		150.0	
		Z	0.95	63.24	14.49		150.0	
10516-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)	X	0.59	70.32	17.28	0.00	150.0	± 9.6 %
		Y	0.43	66.45	13.92		150.0	
		Z	0.56	69.40	16.67		150.0	
10517-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)	X	0.81	65.09	15.27	0.00	150.0	± 9.6 %
		Y	0.69	63.42	13.73		150.0	
		Z	0.79	64.83	14.98		150.0	
10518-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)	X	4.34	66.88	16.18	0.00	150.0	± 9.6 %
		Y	4.22	66.51	15.92		150.0	
		Z	4.23	66.93	16.12		150.0	
10519-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)	X	4.48	67.04	16.27	0.00	150.0	± 9.6 %
		Y	4.36	66.68	16.01		150.0	
		Z	4.35	67.07	16.19		150.0	
10520-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)	X	4.34	66.97	16.18	0.00	150.0	± 9.6 %
		Y	4.22	66.59	15.92		150.0	
		Z	4.22	66.99	16.11		150.0	
10521-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)	X	4.28	66.94	16.16	0.00	150.0	± 9.6 %
		Y	4.15	66.54	15.89		150.0	
		Z	4.15	66.93	16.07		150.0	
10522-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)	X	4.32	67.05	16.25	0.00	150.0	± 9.6 %
		Y	4.19	66.65	15.97		150.0	
		Z	4.18	66.98	16.13		150.0	

Certificate No: EX3-7494\_Feb18

Page 30 of 39

## Appendix B: DAE and Probe Calibration Certificate

EX3DV4- SN:7494

February 26, 2018

10523-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)	X	4.26	67.08	16.19	0.00	150.0	± 9.6 %
		Y	4.13	66.69	15.91		150.0	
		Z	4.15	67.15	16.14		150.0	
10524-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)	X	4.28	67.03	16.25	0.00	150.0	± 9.6 %
		Y	4.15	66.64	15.98		150.0	
		Z	4.14	67.03	16.17		150.0	
10525-AAB	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)	X	4.31	66.15	15.88	0.00	150.0	± 9.6 %
		Y	4.19	65.75	15.61		150.0	
		Z	4.20	66.20	15.83		150.0	
10526-AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)	X	4.43	66.41	15.99	0.00	150.0	± 9.6 %
		Y	4.30	66.01	15.72		150.0	
		Z	4.30	66.42	15.92		150.0	
10527-AAB	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)	X	4.36	66.39	15.93	0.00	150.0	± 9.6 %
		Y	4.23	65.97	15.65		150.0	
		Z	4.24	66.40	15.86		150.0	
10528-AAB	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)	X	4.38	66.40	15.96	0.00	150.0	± 9.6 %
		Y	4.25	65.99	15.69		150.0	
		Z	4.25	66.41	15.89		150.0	
10529-AAB	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)	X	4.38	66.40	15.96	0.00	150.0	± 9.6 %
		Y	4.25	65.99	15.69		150.0	
		Z	4.25	66.41	15.89		150.0	
10531-AAB	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)	X	4.34	66.42	15.94	0.00	150.0	± 9.6 %
		Y	4.21	65.99	15.65		150.0	
		Z	4.20	66.38	15.85		150.0	
10532-AAB	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)	X	4.23	66.28	15.87	0.00	150.0	± 9.6 %
		Y	4.09	65.84	15.58		150.0	
		Z	4.10	66.26	15.79		150.0	
10533-AAB	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)	X	4.38	66.48	15.97	0.00	150.0	± 9.6 %
		Y	4.25	66.07	15.69		150.0	
		Z	4.25	66.50	15.90		150.0	
10534-AAB	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)	X	4.94	66.38	16.03	0.00	150.0	± 9.6 %
		Y	4.83	66.04	15.82		150.0	
		Z	4.83	66.34	15.98		150.0	
10535-AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	X	4.98	66.50	16.09	0.00	150.0	± 9.6 %
		Y	4.87	66.15	15.88		150.0	
		Z	4.85	66.43	16.03		150.0	
10536-AAB	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc duty cycle)	X	4.87	66.51	16.07	0.00	150.0	± 9.6 %
		Y	4.76	66.13	15.84		150.0	
		Z	4.75	66.43	16.01		150.0	
10537-AAB	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc duty cycle)	X	4.94	66.51	16.07	0.00	150.0	± 9.6 %
		Y	4.83	66.19	15.88		150.0	
		Z	4.83	66.50	16.04		150.0	
10538-AAB	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)	X	5.00	66.46	16.08	0.00	150.0	± 9.6 %
		Y	4.89	66.12	15.88		150.0	
		Z	4.87	66.39	16.02		150.0	
10540-AAB	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc duty cycle)	X	4.93	66.42	16.08	0.00	150.0	± 9.6 %
		Y	4.82	66.06	15.87		150.0	
		Z	4.81	66.35	16.02		150.0	

Certificate No: EX3-7494\_Feb18

Page 31 of 39

## Appendix B: DAE and Probe Calibration Certificate

EX3DV4- SN:7494

February 26, 2018

10541-AAB	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)	X	4.92	66.35	16.03	0.00	150.0	± 9.6 %
		Y	4.81	65.99	15.82		150.0	
		Z	4.81	66.31	15.98		150.0	
10542-AAB	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)	X	5.07	66.45	16.09	0.00	150.0	± 9.6 %
		Y	4.96	66.11	15.90		150.0	
		Z	4.95	66.40	16.04		150.0	
10543-AAB	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc duty cycle)	X	5.15	66.53	16.16	0.00	150.0	± 9.6 %
		Y	5.05	66.25	16.00		150.0	
		Z	5.03	66.51	16.13		150.0	
10544-AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	X	5.29	66.46	16.02	0.00	150.0	± 9.6 %
		Y	5.19	66.11	15.83		150.0	
		Z	5.19	66.38	15.97		150.0	
10545-AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)	X	5.46	66.89	16.19	0.00	150.0	± 9.6 %
		Y	5.37	66.61	16.04		150.0	
		Z	5.35	66.81	16.15		150.0	
10546-AAB	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)	X	5.32	66.57	16.05	0.00	150.0	± 9.6 %
		Y	5.22	66.23	15.86		150.0	
		Z	5.22	66.48	15.99		150.0	
10547-AAB	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)	X	5.40	66.70	16.10	0.00	150.0	± 9.6 %
		Y	5.32	66.42	15.95		150.0	
		Z	5.33	66.71	16.11		150.0	
10548-AAB	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc duty cycle)	X	5.53	67.27	16.37	0.00	150.0	± 9.6 %
		Y	5.44	66.98	16.21		150.0	
		Z	5.38	67.07	16.27		150.0	
10550-AAB	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc duty cycle)	X	5.38	66.78	16.16	0.00	150.0	± 9.6 %
		Y	5.31	66.53	16.02		150.0	
		Z	5.31	66.81	16.17		150.0	
10551-AAB	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)	X	5.31	66.54	16.01	0.00	150.0	± 9.6 %
		Y	5.20	66.17	15.81		150.0	
		Z	5.19	66.41	15.94		150.0	
10552-AAB	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)	X	5.30	66.58	16.03	0.00	150.0	± 9.6 %
		Y	5.19	66.23	15.83		150.0	
		Z	5.20	66.53	15.99		150.0	
10553-AAB	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)	X	5.35	66.52	16.03	0.00	150.0	± 9.6 %
		Y	5.24	66.17	15.83		150.0	
		Z	5.24	66.44	15.97		150.0	
10554-AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 99pc duty cycle)	X	5.71	66.79	16.10	0.00	150.0	± 9.6 %
		Y	5.62	66.47	15.93		150.0	
		Z	5.63	66.70	16.05		150.0	
10555-AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 99pc duty cycle)	X	5.80	67.00	16.19	0.00	150.0	± 9.6 %
		Y	5.71	66.69	16.02		150.0	
		Z	5.70	66.87	16.12		150.0	
10556-AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 99pc duty cycle)	X	5.84	67.12	16.24	0.00	150.0	± 9.6 %
		Y	5.76	66.85	16.09		150.0	
		Z	5.75	67.04	16.20		150.0	
10557-AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 99pc duty cycle)	X	5.79	66.99	16.19	0.00	150.0	± 9.6 %
		Y	5.70	66.66	16.02		150.0	
		Z	5.70	66.88	16.14		150.0	

Certificate No: EX3-7494\_Feb18

Page 32 of 39



## Appendix B: DAE and Probe Calibration Certificate

EX3DV4- SN:7494

February 26, 2018

10558-AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 99pc duty cycle)	X	5.80	67.03	16.23	0.00	150.0	± 9.6 %
		Y	5.69	66.67	16.04		150.0	
		Z	5.67	66.84	16.13		150.0	
10560-AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 99pc duty cycle)	X	5.82	66.97	16.24	0.00	150.0	± 9.6 %
		Y	5.72	66.63	16.06		150.0	
		Z	5.71	66.83	16.16		150.0	
10561-AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 99pc duty cycle)	X	5.76	66.95	16.26	0.00	150.0	± 9.6 %
		Y	5.66	66.63	16.09		150.0	
		Z	5.65	66.81	16.18		150.0	
10562-AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 99pc duty cycle)	X	5.80	67.11	16.34	0.00	150.0	± 9.6 %
		Y	5.70	66.75	16.15		150.0	
		Z	5.68	66.93	16.24		150.0	
10563-AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 99pc duty cycle)	X	5.91	67.11	16.30	0.00	150.0	± 9.6 %
		Y	5.83	66.82	16.15		150.0	
		Z	5.80	66.98	16.24		150.0	
10564-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)	X	4.65	66.88	16.30	0.46	150.0	± 9.6 %
		Y	4.54	66.54	16.07		150.0	
		Z	4.53	66.91	16.24		150.0	
10565-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle)	X	4.85	67.29	16.62	0.46	150.0	± 9.6 %
		Y	4.73	66.97	16.40		150.0	
		Z	4.71	67.32	16.56		150.0	
10566-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty cycle)	X	4.68	67.10	16.42	0.46	150.0	± 9.6 %
		Y	4.56	66.75	16.18		150.0	
		Z	4.55	67.11	16.35		150.0	
10567-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty cycle)	X	4.72	67.51	16.80	0.46	150.0	± 9.6 %
		Y	4.60	67.16	16.57		150.0	
		Z	4.59	67.52	16.75		150.0	
10568-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty cycle)	X	4.57	66.80	16.14	0.46	150.0	± 9.6 %
		Y	4.45	66.43	15.88		150.0	
		Z	4.42	66.71	16.01		150.0	
10569-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty cycle)	X	4.71	67.75	16.95	0.46	150.0	± 9.6 %
		Y	4.59	67.42	16.73		150.0	
		Z	4.60	67.83	16.93		150.0	
10570-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle)	X	4.71	67.51	16.83	0.46	150.0	± 9.6 %
		Y	4.59	67.18	16.60		150.0	
		Z	4.57	67.54	16.78		150.0	
10571-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	X	1.08	63.64	15.05	0.46	130.0	± 9.6 %
		Y	0.98	62.63	14.12		130.0	
		Z	1.06	63.58	14.89		130.0	
10572-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	X	1.08	64.13	15.38	0.46	130.0	± 9.6 %
		Y	0.98	63.05	14.41		130.0	
		Z	1.07	64.06	15.22		130.0	
10573-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	X	1.08	77.41	20.56	0.46	130.0	± 9.6 %
		Y	0.73	71.46	16.79		130.0	
		Z	0.99	75.97	19.89		130.0	
10574-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)	X	1.10	68.88	18.01	0.46	130.0	± 9.6 %
		Y	0.95	66.93	16.52		130.0	
		Z	1.07	68.54	17.74		130.0	

Certificate No: EX3-7494\_Feb18

Page 33 of 39

## Appendix B: DAE and Probe Calibration Certificate

EX3DV4- SN:7494

February 26, 2018

10575-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	X	4.42	66.59	16.28	0.46	130.0	± 9.6 %
		Y	4.31	66.26	16.05		130.0	
		Z	4.30	66.63	16.21		130.0	
10576-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	X	4.45	66.80	16.37	0.46	130.0	± 9.6 %
		Y	4.34	66.48	16.14		130.0	
		Z	4.33	66.87	16.32		130.0	
10577-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)	X	4.61	67.03	16.52	0.46	130.0	± 9.6 %
		Y	4.49	66.71	16.29		130.0	
		Z	4.48	67.07	16.45		130.0	
10578-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)	X	4.51	67.18	16.63	0.46	130.0	± 9.6 %
		Y	4.40	66.85	16.40		130.0	
		Z	4.39	67.23	16.57		130.0	
10579-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)	X	4.26	66.33	15.85	0.46	130.0	± 9.6 %
		Y	4.14	65.96	15.59		130.0	
		Z	4.13	66.29	15.75		130.0	
10580-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)	X	4.29	66.37	15.87	0.46	130.0	± 9.6 %
		Y	4.17	66.01	15.60		130.0	
		Z	4.14	66.28	15.72		130.0	
10581-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)	X	4.43	67.26	16.60	0.46	130.0	± 9.6 %
		Y	4.31	66.92	16.36		130.0	
		Z	4.31	67.34	16.57		130.0	
10582-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)	X	4.19	66.09	15.63	0.46	130.0	± 9.6 %
		Y	4.07	65.73	15.36		130.0	
		Z	4.05	66.04	15.51		130.0	
10583-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	X	4.42	66.59	16.28	0.46	130.0	± 9.6 %
		Y	4.31	66.26	16.05		130.0	
		Z	4.30	66.63	16.21		130.0	
10584-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	X	4.45	66.80	16.37	0.46	130.0	± 9.6 %
		Y	4.34	66.48	16.14		130.0	
		Z	4.33	66.87	16.32		130.0	
10585-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)	X	4.61	67.03	16.52	0.46	130.0	± 9.6 %
		Y	4.49	66.71	16.29		130.0	
		Z	4.48	67.07	16.45		130.0	
10586-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)	X	4.51	67.18	16.63	0.46	130.0	± 9.6 %
		Y	4.40	66.85	16.40		130.0	
		Z	4.39	67.23	16.57		130.0	
10587-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)	X	4.26	66.33	15.85	0.46	130.0	± 9.6 %
		Y	4.14	65.96	15.59		130.0	
		Z	4.13	66.29	15.75		130.0	
10588-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)	X	4.29	66.37	15.87	0.46	130.0	± 9.6 %
		Y	4.17	66.01	15.60		130.0	
		Z	4.14	66.28	15.72		130.0	
10589-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)	X	4.43	67.26	16.60	0.46	130.0	± 9.6 %
		Y	4.31	66.92	16.36		130.0	
		Z	4.31	67.34	16.57		130.0	
10590-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)	X	4.19	66.09	15.63	0.46	130.0	± 9.6 %
		Y	4.07	65.73	15.36		130.0	
		Z	4.05	66.04	15.51		130.0	

Certificate No: EX3-7494\_Feb18

Page 34 of 39



## Appendix B: DAE and Probe Calibration Certificate

EX3DV4- SN:7494

February 26, 2018

10591-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	X	4.58	66.69	16.41	0.46	130.0	± 9.6 %
		Y	4.47	66.39	16.20		130.0	
		Z	4.47	66.76	16.36		130.0	
10592-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	X	4.69	66.97	16.53	0.46	130.0	± 9.6 %
		Y	4.58	66.66	16.32		130.0	
		Z	4.56	67.00	16.47		130.0	
10593-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc duty cycle)	X	4.61	66.84	16.38	0.46	130.0	± 9.6 %
		Y	4.49	66.52	16.16		130.0	
		Z	4.48	66.87	16.32		130.0	
10594-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc duty cycle)	X	4.66	67.02	16.56	0.46	130.0	± 9.6 %
		Y	4.55	66.71	16.34		130.0	
		Z	4.54	67.06	16.50		130.0	
10595-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc duty cycle)	X	4.63	67.00	16.46	0.46	130.0	± 9.6 %
		Y	4.51	66.68	16.25		130.0	
		Z	4.50	67.04	16.41		130.0	
10596-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc duty cycle)	X	4.56	66.95	16.45	0.46	130.0	± 9.6 %
		Y	4.44	66.62	16.22		130.0	
		Z	4.42	66.95	16.38		130.0	
10597-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc duty cycle)	X	4.51	66.82	16.30	0.46	130.0	± 9.6 %
		Y	4.39	66.48	16.06		130.0	
		Z	4.38	66.82	16.22		130.0	
10598-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc duty cycle)	X	4.51	67.06	16.58	0.46	130.0	± 9.6 %
		Y	4.39	66.73	16.35		130.0	
		Z	4.39	67.10	16.52		130.0	
10599-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	X	5.26	67.16	16.67	0.46	130.0	± 9.6 %
		Y	5.19	66.95	16.55		130.0	
		Z	5.18	67.23	16.69		130.0	
10600-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	X	5.35	67.49	16.81	0.46	130.0	± 9.6 %
		Y	5.29	67.35	16.72		130.0	
		Z	5.23	67.44	16.76		130.0	
10601-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle)	X	5.26	67.29	16.73	0.46	130.0	± 9.6 %
		Y	5.19	67.12	16.62		130.0	
		Z	5.20	67.45	16.79		130.0	
10602-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)	X	5.35	67.29	16.64	0.46	130.0	± 9.6 %
		Y	5.27	67.10	16.53		130.0	
		Z	5.22	67.23	16.59		130.0	
10603-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc duty cycle)	X	5.42	67.60	16.94	0.46	130.0	± 9.6 %
		Y	5.33	67.37	16.81		130.0	
		Z	5.26	67.44	16.84		130.0	
10604-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)	X	5.29	67.20	16.71	0.46	130.0	± 9.6 %
		Y	5.19	66.89	16.54		130.0	
		Z	5.14	67.01	16.59		130.0	
10605-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)	X	5.34	67.34	16.78	0.46	130.0	± 9.6 %
		Y	5.26	67.13	16.66		130.0	
		Z	5.20	67.25	16.72		130.0	
10606-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc duty cycle)	X	5.14	66.81	16.37	0.46	130.0	± 9.6 %
		Y	5.06	66.62	16.25		130.0	
		Z	5.05	66.87	16.38		130.0	

Certificate No: EX3-7494\_Feb18

Page 35 of 39



## Appendix B: DAE and Probe Calibration Certificate

EX3DV4- SN:7494

February 26, 2018

10607-AAB	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	X	4.43	66.05	16.06	0.46	130.0	± 9.6 %
		Y	4.31	65.70	15.83		130.0	
		Z	4.32	66.12	16.02		130.0	
10608-AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	X	4.56	66.36	16.20	0.46	130.0	± 9.6 %
		Y	4.44	66.01	15.97		130.0	
		Z	4.43	66.38	16.15		130.0	
10609-AAB	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc duty cycle)	X	4.46	66.19	16.02	0.46	130.0	± 9.6 %
		Y	4.34	65.83	15.77		130.0	
		Z	4.33	66.21	15.96		130.0	
10610-AAB	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc duty cycle)	X	4.51	66.37	16.19	0.46	130.0	± 9.6 %
		Y	4.39	66.01	15.96		130.0	
		Z	4.38	66.40	16.14		130.0	
10611-AAB	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc duty cycle)	X	4.42	66.15	16.03	0.46	130.0	± 9.6 %
		Y	4.30	65.79	15.79		130.0	
		Z	4.29	66.16	15.97		130.0	
10612-AAB	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc duty cycle)	X	4.41	66.27	16.06	0.46	130.0	± 9.6 %
		Y	4.28	65.89	15.81		130.0	
		Z	4.26	66.23	15.98		130.0	
10613-AAB	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc duty cycle)	X	4.40	66.08	15.90	0.46	130.0	± 9.6 %
		Y	4.28	65.70	15.65		130.0	
		Z	4.26	66.05	15.81		130.0	
10614-AAB	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle)	X	4.38	66.33	16.17	0.46	130.0	± 9.6 %
		Y	4.25	65.95	15.92		130.0	
		Z	4.25	66.33	16.10		130.0	
10615-AAB	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc duty cycle)	X	4.41	65.98	15.79	0.46	130.0	± 9.6 %
		Y	4.29	65.61	15.54		130.0	
		Z	4.27	65.99	15.72		130.0	
10616-AAB	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	X	5.07	66.34	16.25	0.46	130.0	± 9.6 %
		Y	4.97	66.04	16.07		130.0	
		Z	4.96	66.31	16.21		130.0	
10617-AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)	X	5.10	66.45	16.28	0.46	130.0	± 9.6 %
		Y	5.00	66.15	16.11		130.0	
		Z	4.98	66.39	16.23		130.0	
10618-AAB	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle)	X	5.02	66.53	16.33	0.46	130.0	± 9.6 %
		Y	4.91	66.19	16.14		130.0	
		Z	4.89	66.45	16.27		130.0	
10619-AAB	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc duty cycle)	X	5.04	66.36	16.18	0.46	130.0	± 9.6 %
		Y	4.96	66.11	16.03		130.0	
		Z	4.94	66.38	16.17		130.0	
10620-AAB	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)	X	5.11	66.35	16.22	0.46	130.0	± 9.6 %
		Y	5.01	66.06	16.05		130.0	
		Z	4.98	66.26	16.16		130.0	
10621-AAB	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc duty cycle)	X	5.12	66.47	16.41	0.46	130.0	± 9.6 %
		Y	5.02	66.16	16.23		130.0	
		Z	5.00	66.43	16.37		130.0	
10622-AAB	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)	X	5.10	66.55	16.44	0.46	130.0	± 9.6 %
		Y	5.00	66.25	16.27		130.0	
		Z	4.99	66.50	16.40		130.0	

Certificate No: EX3-7494\_Feb18

Page 36 of 39

## Appendix B: DAE and Probe Calibration Certificate

EX3DV4- SN:7494

February 26, 2018

10623-AAB	IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)	X	5.00	66.11	16.08	0.46	130.0	± 9.6 %
		Y	4.90	65.81	15.90		130.0	
		Z	4.89	66.10	16.05		130.0	
10624-AAB	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc duty cycle)	X	5.19	66.37	16.28	0.46	130.0	± 9.6 %
		Y	5.10	66.09	16.12		130.0	
		Z	5.07	66.34	16.24		130.0	
10625-AAB	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)	X	5.27	66.50	16.40	0.46	130.0	± 9.6 %
		Y	5.19	66.27	16.28		130.0	
		Z	5.16	66.52	16.40		130.0	
10626-AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)	X	5.40	66.37	16.20	0.46	130.0	± 9.6 %
		Y	5.31	66.07	16.04		130.0	
		Z	5.31	66.31	16.17		130.0	
10627-AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)	X	5.62	66.96	16.47	0.46	130.0	± 9.6 %
		Y	5.56	66.76	16.37		130.0	
		Z	5.52	66.91	16.44		130.0	
10628-AAB	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)	X	5.39	66.34	16.09	0.46	130.0	± 9.6 %
		Y	5.30	66.04	15.92		130.0	
		Z	5.29	66.26	16.04		130.0	
10629-AAB	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)	X	5.50	66.54	16.19	0.46	130.0	± 9.6 %
		Y	5.44	66.36	16.08		130.0	
		Z	5.44	66.63	16.23		130.0	
10630-AAB	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)	X	5.71	67.39	16.62	0.46	130.0	± 9.6 %
		Y	5.64	67.17	16.50		130.0	
		Z	5.64	67.11	16.48		130.0	
10631-AAB	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)	X	5.70	67.46	16.84	0.46	130.0	± 9.6 %
		Y	5.61	67.18	16.70		130.0	
		Z	5.66	67.29	16.76		130.0	
10632-AAB	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)	X	5.63	67.17	16.72	0.46	130.0	± 9.6 %
		Y	5.58	67.02	16.64		130.0	
		Z	5.57	67.27	16.77		130.0	
10633-AAB	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)	X	5.42	66.43	16.17	0.46	130.0	± 9.6 %
		Y	5.32	66.10	15.99		130.0	
		Z	5.30	66.32	16.11		130.0	
10634-AAB	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)	X	5.45	66.63	16.32	0.46	130.0	± 9.6 %
		Y	5.35	66.31	16.16		130.0	
		Z	5.35	66.57	16.29		130.0	
10635-AAB	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)	X	5.30	65.85	15.65	0.46	130.0	± 9.6 %
		Y	5.21	65.54	15.48		130.0	
		Z	5.19	65.76	15.60		130.0	
10636-AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 90pc duty cycle)	X	5.84	66.72	16.29	0.46	130.0	± 9.6 %
		Y	5.76	66.45	16.15		130.0	
		Z	5.76	66.66	16.26		130.0	
10637-AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)	X	5.95	67.01	16.43	0.46	130.0	± 9.6 %
		Y	5.88	66.76	16.30		130.0	
		Z	5.85	66.89	16.37		130.0	
10638-AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 90pc duty cycle)	X	5.98	67.09	16.44	0.46	130.0	± 9.6 %
		Y	5.91	66.84	16.31		130.0	
		Z	5.91	67.08	16.44		130.0	

Certificate No: EX3-7494\_Feb18

Page 37 of 39



## Appendix B: DAE and Probe Calibration Certificate

EX3DV4- SN:7494

February 26, 2018

10639-AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)	X	5.93	66.96	16.42	0.46	130.0	± 9.6 %
		Y	5.85	66.68	16.27		130.0	
		Z	5.84	66.87	16.37		130.0	
10640-AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)	X	5.89	66.83	16.30	0.46	130.0	± 9.6 %
		Y	5.79	66.50	16.13		130.0	
		Z	5.76	66.65	16.20		130.0	
10641-AAC	IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)	X	5.99	66.93	16.36	0.46	130.0	± 9.6 %
		Y	5.93	66.70	16.25		130.0	
		Z	5.89	66.83	16.32		130.0	
10642-AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)	X	6.01	67.13	16.63	0.46	130.0	± 9.6 %
		Y	5.93	66.84	16.49		130.0	
		Z	5.91	67.00	16.57		130.0	
10643-AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)	X	5.86	66.81	16.36	0.46	130.0	± 9.6 %
		Y	5.78	66.52	16.22		130.0	
		Z	5.75	66.66	16.29		130.0	
10644-AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)	X	5.91	66.99	16.47	0.46	130.0	± 9.6 %
		Y	5.82	66.67	16.31		130.0	
		Z	5.80	66.82	16.38		130.0	
10645-AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)	X	6.04	67.04	16.47	0.46	130.0	± 9.6 %
		Y	5.97	66.82	16.36		130.0	
		Z	5.92	66.90	16.40		130.0	
10646-AAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)	X	5.85	87.94	30.48	9.30	60.0	± 9.6 %
		Y	5.37	85.81	29.63		60.0	
		Z	4.49	83.14	29.09		60.0	
10647-AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)	X	5.17	85.51	29.66	9.30	60.0	± 9.6 %
		Y	4.78	83.60	28.89		60.0	
		Z	4.02	80.87	28.26		60.0	
10648-AAA	CDMA2000 (1x Advanced)	X	0.51	61.76	8.43	0.00	150.0	± 9.6 %
		Y	0.38	60.00	6.13		150.0	
		Z	0.38	60.10	6.48		150.0	
10652-AAB	LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	X	3.13	65.98	15.78	2.23	80.0	± 9.6 %
		Y	2.93	65.12	15.15		80.0	
		Z	3.02	66.07	15.57		80.0	
10653-AAB	LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	X	3.69	65.40	16.13	2.23	80.0	± 9.6 %
		Y	3.54	64.83	15.74		80.0	
		Z	3.60	65.47	16.04		80.0	
10654-AAB	LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	X	3.72	65.03	16.17	2.23	80.0	± 9.6 %
		Y	3.58	64.50	15.83		80.0	
		Z	3.65	65.07	16.11		80.0	
10655-AAB	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	X	3.80	64.95	16.21	2.23	80.0	± 9.6 %
		Y	3.67	64.43	15.88		80.0	
		Z	3.74	64.95	16.16		80.0	
10658-AAA	Pulse Waveform (200Hz, 10%)	X	4.43	71.88	12.89	10.00	50.0	± 9.6 %
		Y	2.96	67.08	10.79		50.0	
		Z	4.92	73.02	13.29		50.0	
10659-AAA	Pulse Waveform (200Hz, 20%)	X	21.85	87.99	16.66	6.99	60.0	± 9.6 %
		Y	1.49	64.48	8.54		60.0	
		Z	100.00	101.11	19.71		60.0	

Certificate No: EX3-7494\_Feb18

Page 38 of 39



## Appendix B: DAE and Probe Calibration Certificate

EX3DV4– SN:7494

February 26, 2018

10660-AAA	Pulse Waveform (200Hz, 40%)	X	100.00	100.24	18.17	3.98	80.0	± 9.6 %
		Y	0.44	60.00	5.03		80.0	
		Z	100.00	101.16	18.48		80.0	
10661-AAA	Pulse Waveform (200Hz, 60%)	X	100.00	101.13	17.57	2.22	100.0	± 9.6 %
		Y	0.24	60.00	3.65		100.0	
		Z	100.00	102.26	17.94		100.0	
10662-AAA	Pulse Waveform (200Hz, 80%)	X	100.00	99.08	15.66	0.97	120.0	± 9.6 %
		Y	3.24	108.92	7.51		120.0	
		Z	100.00	98.42	15.34		120.0	

<sup>F</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

## 1.1. 150 Dipole Calibration Certificate

**Calibration Laboratory of**  
**Schmid & Partner**  
**Engineering AG**  
 Zeughausstrasse 43, 8004 Zurich, Switzerland



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
**S** Servizio svizzero di taratura  
**S** Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)  
 The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **CCIC-HTW (Auden)**

Certificate No: **CLA150-4024\_Feb18**

## CALIBRATION CERTIFICATE

Object **CLA150 - SN: 4024**

Calibration procedure(s) **QA CAL-15.v8**  
 Calibration procedure for system validation sources below 700 MHz

Calibration date: **February 21, 2018**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility; environment temperature ( $22 \pm 3$ )°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5277 (20x)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 3877	30-Dec-17 (No. EX3-3877_Dec17)	Dec-18
DAE4	SN: 654	24-Jul-17 (No. DAE4-654_Jul17)	Jul-18
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293674	06-Apr-16 (No. 217-02285/02284)	In house check: Jun-18
Power sensor E4412A	SN: MY41498067	06-Apr-16 (No. 217-02285)	In house check: Jun-18
Power sensor E4412A	SN: 000110210	06-Apr-16 (No. 217-02284)	In house check: Jun-18
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-16)	In house check: Jun-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: February 23, 2018

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: CLA150-4024\_Feb18

Page 1 of 8

**Calibration Laboratory of  
Schmid & Partner  
Engineering AG**  
Zeughausstrasse 43, 8004 Zurich, Switzerland



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
**S** Servizio svizzero di taratura  
**S** Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)  
The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

**Glossary:**

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

**Calibration is Performed According to the Following Standards:**

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- DASY4/5 System Handbook

**Methods Applied and Interpretation of Parameters:**

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:** This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k=2$ , which for a normal distribution corresponds to a coverage probability of approximately 95%.



### Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	ELI4 Flat Phantom	Shell thickness: $2 \pm 0.2$ mm
EUT Positioning	Touch Position	
Zoom Scan Resolution	$dx, dy = \text{mm}, dz = \text{mm}$	Graded Ratio = 1.4 (Z direction)
Frequency	150 MHz $\pm$ 1 MHz	

### Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	52.3	0.76 mho/m
Measured Head TSL parameters	$(22.0 \pm 0.2)$ °C	$50.3 \pm 6 \%$	$0.76 \text{ mho/m} \pm 6 \%$
Head TSL temperature change during test	$< 0.5$ °C	----	----

### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	1 W input power	3.71 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>3.68 W/kg <math>\pm</math> 18.4 % (k=2)</b>
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	1 W input power	2.47 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>2.45 W/kg <math>\pm</math> 18.0 % (k=2)</b>

### Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	61.9	0.80 mho/m
Measured Body TSL parameters	$(22.0 \pm 0.2)$ °C	$62.1 \pm 6 \%$	$0.81 \text{ mho/m} \pm 6 \%$
Body TSL temperature change during test	$< 0.5$ °C	----	----

### SAR result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	1 W input power	3.78 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	<b>3.75 W/kg <math>\pm</math> 18.4 % (k=2)</b>
SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	1 W input power	2.52 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	<b>2.50 W/kg <math>\pm</math> 18.0 % (k=2)</b>

**Appendix (Additional assessments outside the scope of SCS 0108)**

**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	$44.4 \Omega + 3.2 j\Omega$
Return Loss	- 23.2 dB

**Antenna Parameters with Body TSL**

Impedance, transformed to feed point	$48.7 \Omega + 7.0 j\Omega$
Return Loss	- 22.9 dB

**Additional EUT Data**

Manufactured by	SPEAG
Manufactured on	July 10, 2017

## DASY5 Validation Report for Head TSL

Date: 21.02.2018

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: CLA150; Type: CLA150; Serial: CLA150 - SN: 4024**

Communication System: UID 0 - CW; Frequency: 150 MHz

Medium parameters used:  $f = 150$  MHz;  $\sigma = 0.76$  S/m;  $\epsilon_r = 50.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3877; ConvF(12.12, 12.12, 12.12); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 24.07.2017
- Phantom: ELI v4.0; Type: QDOVA001BB; Serial: TP:1003
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

### CLA Calibration for HSL-LF Tissue/CLA150, touch configuration, Pin=1W/Area Scan

**(81x81x1):** Interpolated grid:  $dx=1.500$  mm,  $dy=1.500$  mm

Maximum value of SAR (interpolated) = 5.21 W/kg

### CLA Calibration for HSL-LF Tissue/CLA150, touch configuration, Pin=1W/Zoom Scan,

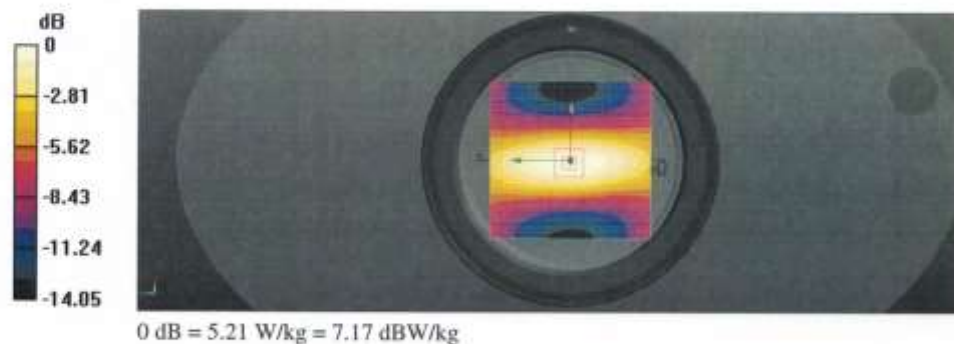
**dist=1.4mm (8x10x7)/Cube 0:** Measurement grid:  $dx=4$ mm,  $dy=4$ mm,  $dz=1.4$ mm

Reference Value = 82.22 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 6.91 W/kg

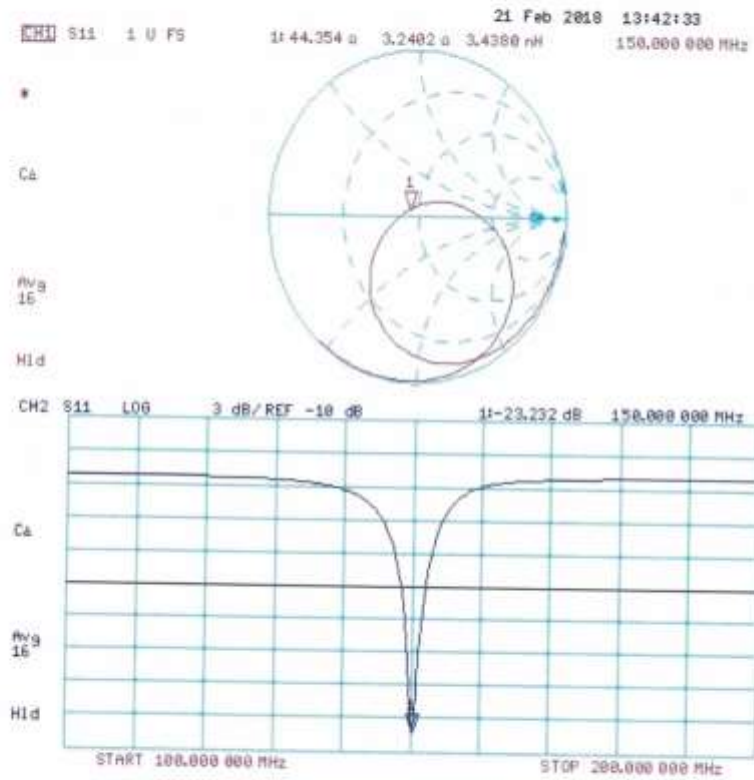
**SAR(1 g) = 3.71 W/kg; SAR(10 g) = 2.47 W/kg**

Maximum value of SAR (measured) = 5.18 W/kg





Impedance Measurement Plot for Head TSL



# DASY5 Validation Report for Body TSL

Date: 21.02.2018

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: CLA150; Type: CLA150; Serial: CLA150 - SN: 4024**

Communication System: UID 0 - CW; Frequency: 150 MHz

Medium parameters used:  $f = 150 \text{ MHz}$ ;  $\sigma = 0.81 \text{ S/m}$ ;  $\epsilon_r = 62.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3877; ConvF(11.57, 11.57, 11.57); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 24.07.2017
- Phantom: ELI v4.0; Type: QDOVA001BB; Serial: TP:1003
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

## **CLA Calibration for MSL-LF Tissue/CLA150, touch configuration, Pin=1W/Area Scan**

**(81x81x1):** Interpolated grid:  $dx=1.500 \text{ mm}$ ,  $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) =  $5.33 \text{ W/kg}$

## **CLA Calibration for MSL-LF Tissue/CLA150, touch configuration, Pin=1W/Zoom Scan,**

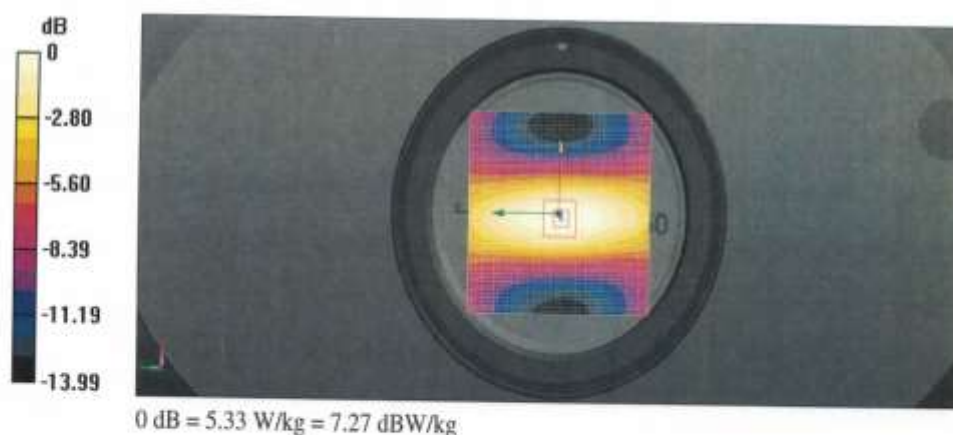
**dist=1.4mm (8x10x7)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=1.4\text{mm}$

Reference Value =  $80.56 \text{ V/m}$ ; Power Drift =  $-0.08 \text{ dB}$

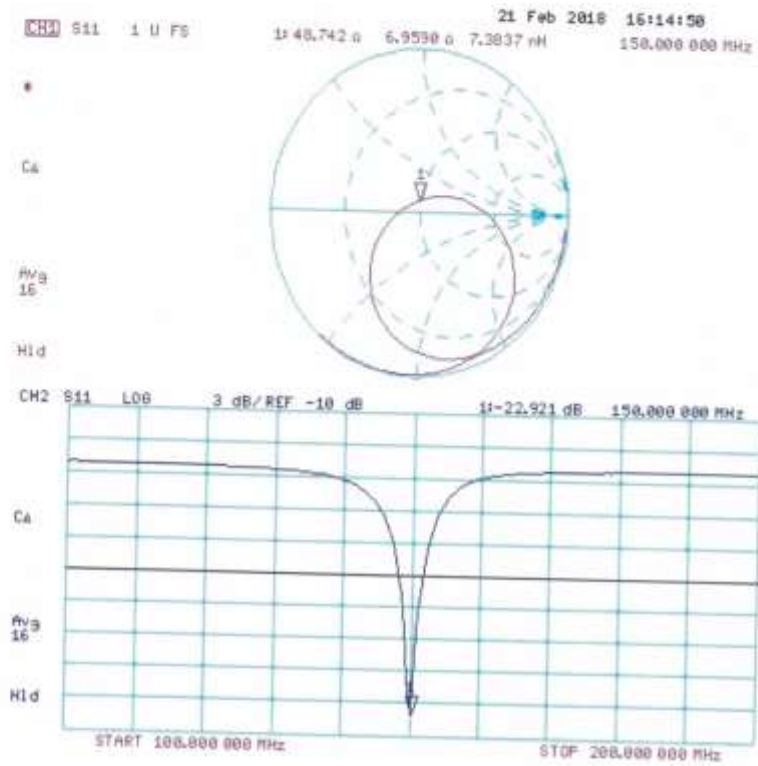
Peak SAR (extrapolated) =  $7.08 \text{ W/kg}$

**SAR(1 g) =  $3.78 \text{ W/kg}$ ; SAR(10 g) =  $2.52 \text{ W/kg}$**

Maximum value of SAR (measured) =  $5.28 \text{ W/kg}$



### Impedance Measurement Plot for Body TSL





## 1.2. 450 Dipole Calibration Certificate

**Calibration Laboratory of  
Schmid & Partner  
Engineering AG**  
Zeughausstrasse 43, 8004 Zurich, Switzerland



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
**S** Servizio svizzero di taratura  
**S** Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Client **CCIC-HTW (Auden)**

Certificate No: **D450V3-1102\_Feb18**

## CALIBRATION CERTIFICATE

Object **D450V3 - SN:1102**

Calibration procedure(s) **QA CAL-15.v8  
Calibration procedure for dipole validation kits below 700 MHz**

Calibration date: **February 23, 2018**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature  $(22 \pm 3)^{\circ}\text{C}$  and humidity  $< 70\%$ .

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5277 (20x)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 3877	30-Dec-17 (No. EX3-3877_Dec17)	Dec-18
DAE4	SN: 654	24-Jul-17 (No. DAE4-654_Jul17)	Jul-18
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (No. 217-02285/02284)	In house check: Jun-18
Power sensor E4412A	SN: MY41498067	06-Apr-16 (No. 217-02285)	In house check: Jun-18
Power sensor E4412A	SN: 000110210	06-Apr-16 (No. 217-02284)	In house check: Jun-18
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-16)	In house check: Jun-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: February 23, 2018

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D450V3-1102\_Feb18

Page 1 of 8

**Calibration Laboratory of**  
**Schmid & Partner**  
**Engineering AG**  
 Zeughausstrasse 43, 8004 Zurich, Switzerland



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
**S** Servizio svizzero di taratura  
**S** Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)  
 The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

**Glossary:**

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

**Calibration is Performed According to the Following Standards:**

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- DASY4/5 System Handbook

**Methods Applied and Interpretation of Parameters:**

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k=2$ , which for a normal distribution corresponds to a coverage probability of approximately 95%.

### Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	ELI4 Flat Phantom	Shell thickness: $2 \pm 0.2$ mm
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	450 MHz $\pm$ 1 MHz	

### Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	43.5	0.87 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	43.7 $\pm$ 6 %	0.87 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.12 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	4.48 W/kg $\pm$ 18.1 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	0.749 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	3.00 W/kg $\pm$ 17.6 % (k=2)

### Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	56.7	0.94 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	56.0 $\pm$ 6 %	0.93 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

### SAR result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.11 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	4.47 W/kg $\pm$ 18.1 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	0.749 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	3.01 W/kg $\pm$ 17.6 % (k=2)



**Appendix (Additional assessments outside the scope of SCS 0108)**

**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	59.6 $\Omega$ - 0.2 j $\Omega$
Return Loss	- 21.1 dB

**Antenna Parameters with Body TSL**

Impedance, transformed to feed point	55.1 $\Omega$ - 6.9 j $\Omega$
Return Loss	- 21.8 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.348 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

**Additional EUT Data**

Manufactured by	SPEAG
Manufactured on	October 05, 2017

# DASY5 Validation Report for Head TSL

Date: 23.02.2018

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 450 MHz D450V3; Type: D450V3; Serial: D450V3 - SN:1102**

Communication System: UID 0 - CW; Frequency: 450 MHz

Medium parameters used:  $f = 450 \text{ MHz}$ ;  $\sigma = 0.87 \text{ S/m}$ ;  $\epsilon_r = 43.7$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3877; ConvF(10.5, 10.5, 10.5); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 24.07.2017
- Phantom: ELI v4.0; Type: QDOVA001BB; Serial: TP:1003
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

## Dipole Calibration for Head Tissue/d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0:

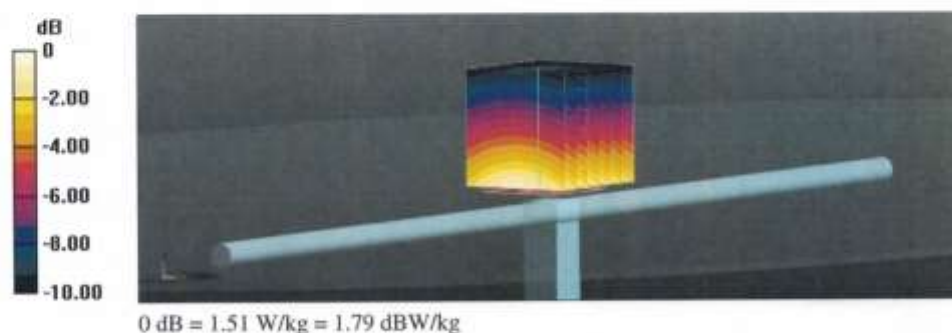
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 43.13 V/m; Power Drift = -0.01 dB

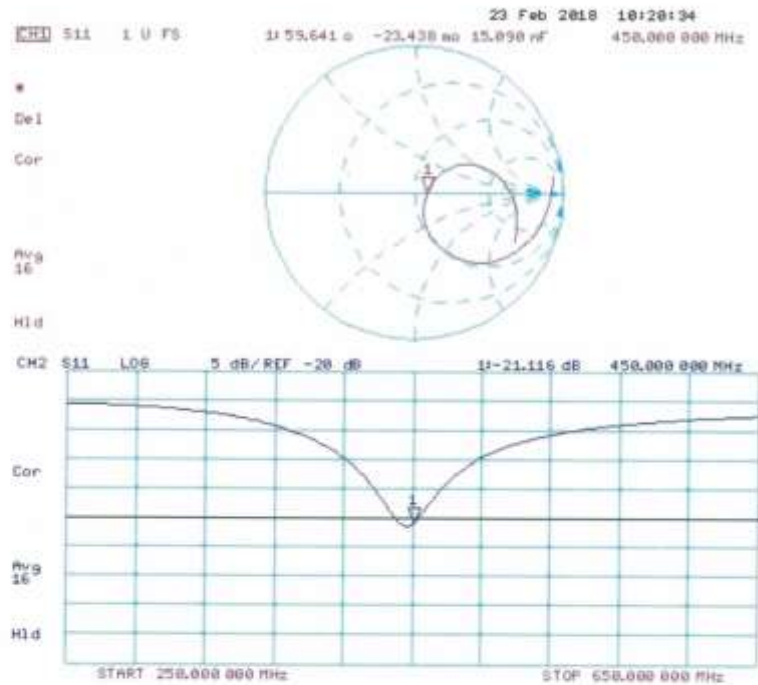
Peak SAR (extrapolated) = 1.73 W/kg

**SAR(1 g) = 1.12 W/kg; SAR(10 g) = 0.749 W/kg**

Maximum value of SAR (measured) = 1.51 W/kg



Impedance Measurement Plot for Head TSL





## DASY5 Validation Report for Body TSL

Date: 23.02.2018

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 450 MHz D450V3; Type: D450V3; Serial: D450V3 - SN:1102**

Communication System: UID 0 - CW; Frequency: 450 MHz

Medium parameters used:  $f = 450$  MHz;  $\sigma = 0.93$  S/m;  $\epsilon_r = 56$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3877; ConvF(10.8, 10.8, 10.8); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 24.07.2017
- Phantom: ELI v4.0; Type: QDOVA001BB; Serial: TP:1003
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

### Dipole Calibration for Body Tissue/d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0:

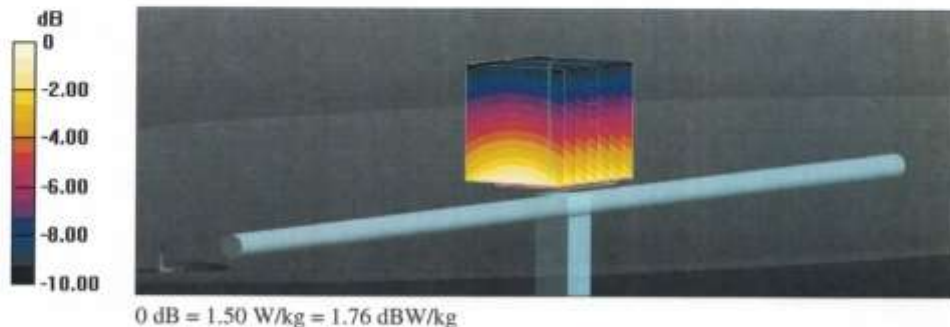
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 41.23 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.71 W/kg

**SAR(1 g) = 1.11 W/kg; SAR(10 g) = 0.749 W/kg**

Maximum value of SAR (measured) = 1.50 W/kg



Impedance Measurement Plot for Body TSL

