

EX3DV4-- SN:3797

November 22, 2017

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3797

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.61	0.56	0.55	$\pm 10.1\%$
DCP (mV) ^B	98.6	98.7	93.8	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Unc ^C (k=2)
0	CW	X	0.0	0.0	1.0	0.00	159.5	$\pm 3.0\%$
		Y	0.0	0.0	1.0		144.5	
		Z	0.0	0.0	1.0		153.6	

Note: For details on UID parameters see Appendix.

Sensor Model Parameters

	C1 fF	C2 fF	σ V ⁻¹	T1 ms.V ⁻²	T2 ms.V ⁻¹	T3 ms	T4 V ⁻²	T5 V ⁻¹	T6
X	44.59	344.0	37.65	12.56	0.469	5.1	0.000	0.545	1.011
Y	45.15	342.4	36.62	15.66	0.128	5.1	0.748	0.385	1.009
Z	41.67	324.0	38.09	10.33	0.420	5.1	0.000	0.515	1.011

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%.

^A The uncertainties of Norm X,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6).

^B Numerical linearization parameter; uncertainty not required.

^C Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

EX3DV4- SN:3797

November 22, 2017

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3797

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^c	Relative Permittivity ^f	Conductivity (S/m) ^f	ConvF X	ConvF Y	ConvF Z	Alpha ^d	Depth ^d (mm)	Unc (k=2)
150	52.3	0.76	11.69	11.69	11.69	0.00	1.00	± 13.3 %
300	45.3	0.67	10.93	10.93	10.93	0.08	1.25	± 13.3 %
450	43.5	0.87	10.34	10.34	10.34	0.15	1.25	± 13.3 %
750	41.9	0.89	9.58	9.58	9.58	0.49	0.80	± 12.0 %
835	41.5	0.90	9.27	9.27	9.27	0.49	0.85	± 12.0 %
900	41.5	0.97	9.08	9.08	9.08	0.47	0.87	± 12.0 %
1450	40.5	1.20	8.00	8.00	8.00	0.38	0.80	± 12.0 %
1750	40.1	1.37	7.93	7.93	7.93	0.39	0.80	± 12.0 %
1900	40.0	1.40	7.85	7.85	7.85	0.39	0.85	± 12.0 %
2300	39.5	1.67	7.51	7.51	7.51	0.38	0.85	± 12.0 %
2450	39.2	1.80	7.15	7.15	7.15	0.36	0.88	± 12.0 %
2600	39.0	1.96	6.97	6.97	6.97	0.38	0.88	± 12.0 %
3500	37.9	2.91	6.68	6.68	6.68	0.25	1.20	± 13.1 %
5250	35.9	4.71	5.10	5.10	5.10	0.35	1.80	± 13.1 %
5600	35.5	5.07	4.56	4.56	4.56	0.40	1.80	± 13.1 %
5750	35.4	5.22	4.74	4.74	4.74	0.40	1.80	± 13.1 %

^c Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

^f At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

^d Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

EX3DV4- SN:3797

November 22, 2017

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3797

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) ^c	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^E	Depth (mm) ^G	Unc (k=2)
150	61.9	0.80	11.16	11.16	11.16	0.00	1.00	± 13.3 %
300	58.2	0.92	10.89	10.89	10.89	0.05	1.15	± 13.3 %
450	56.7	0.94	10.46	10.46	10.46	0.08	1.20	± 13.3 %
750	55.5	0.96	9.53	9.53	9.53	0.41	0.96	± 12.0 %
835	55.2	0.97	9.27	9.27	9.27	0.53	0.80	± 12.0 %
1750	53.4	1.49	7.88	7.88	7.88	0.38	0.86	± 12.0 %
1900	53.3	1.52	7.61	7.61	7.61	0.42	0.85	± 12.0 %
2300	52.9	1.81	7.39	7.39	7.39	0.32	0.96	± 12.0 %
2450	52.7	1.95	7.23	7.23	7.23	0.38	0.88	± 12.0 %
2600	52.5	2.16	7.00	7.00	7.00	0.28	0.98	± 12.0 %
5250	48.9	5.36	4.61	4.61	4.61	0.40	1.90	± 13.1 %
5600	48.5	5.77	4.06	4.06	4.06	0.45	1.90	± 13.1 %
5750	48.3	5.94	4.32	4.32	4.32	0.45	1.90	± 13.1 %

^c Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

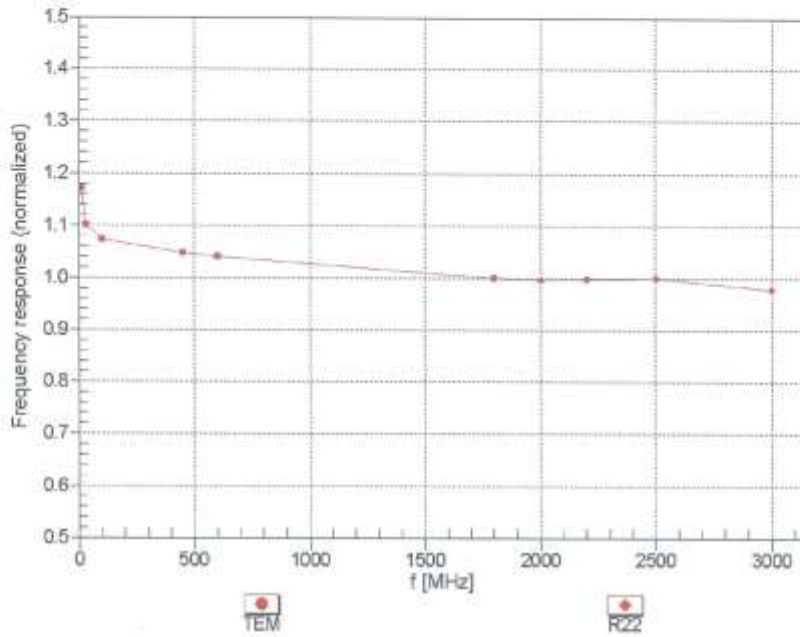
^F At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

EX3DV4- SN:3797

November 22, 2017

Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)

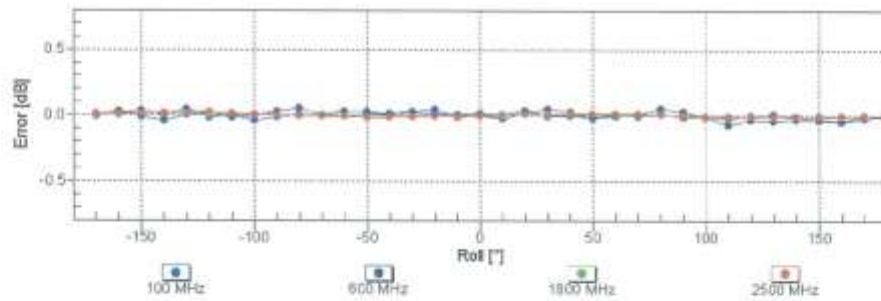
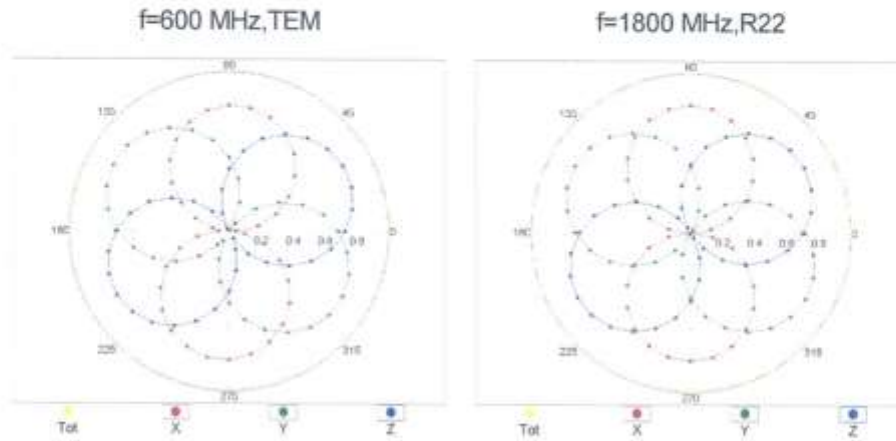


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

EX3DV4- SN:3797

November 22, 2017

Receiving Pattern (ϕ), $\vartheta = 0^\circ$

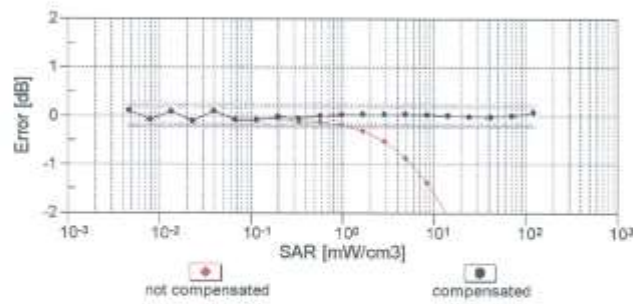
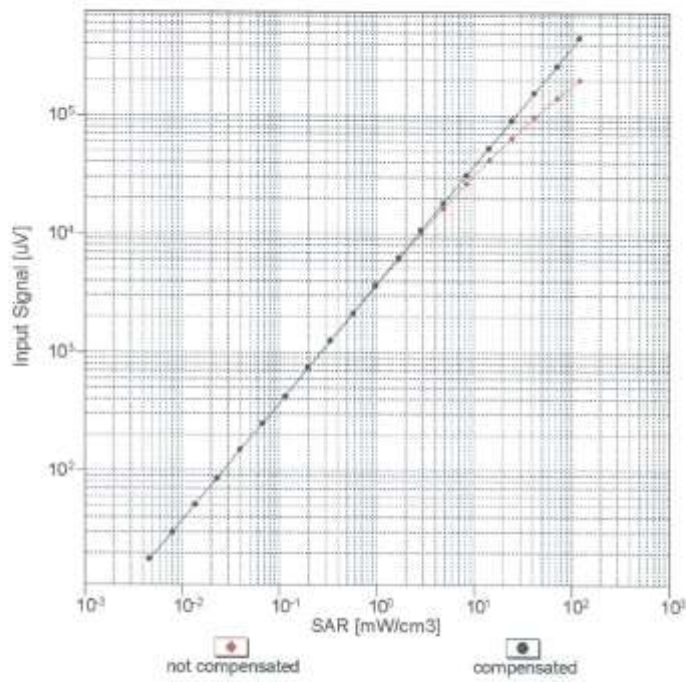


Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

EX3DV4- SN:3797

November 22, 2017

Dynamic Range f(SAR_{head})
(TEM cell , f_{eval}= 1900 MHz)

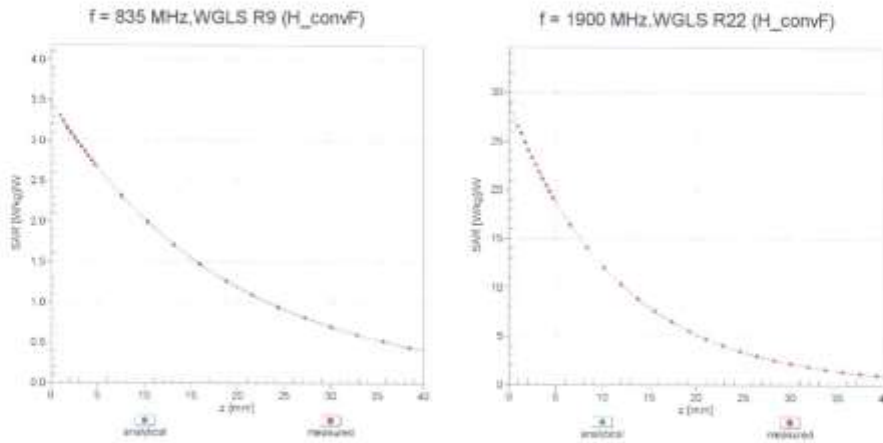


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

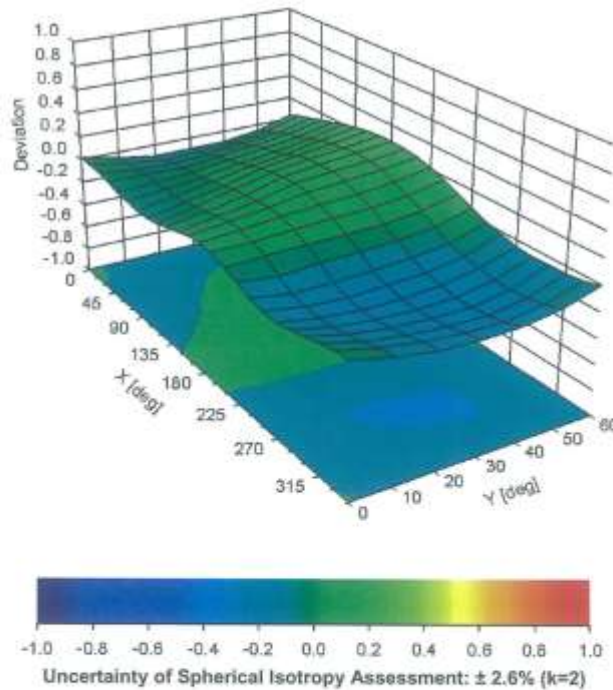
EX3DV4- SN:3797

November 22, 2017

Conversion Factor Assessment



Deviation from Isotropy in Liquid Error (ϕ, θ), f = 900 MHz



EX3DV4- SN:3797

November 22, 2017

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Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	69.9
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

EX3DV4- SN:3797

November 22, 2017

Appendix: Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB μ V	C	D dB	VR mV	Max Unc ^F (k=2)
0	CW	X	0.00	0.00	1.00	0.00	159.5	$\pm 3.0\%$
		Y	0.00	0.00	1.00		144.5	
		Z	0.00	0.00	1.00		153.6	
10010- CAA	SAR Validation (Square, 100ms, 10ms)	X	2.40	66.77	10.69	10.00	20.0	$\pm 9.6\%$
		Y	6.27	76.91	14.32		20.0	
		Z	2.00	64.93	9.58		20.0	
10011- CAB	UMTS-FDD (WCDMA)	X	0.90	65.92	14.03	0.00	150.0	$\pm 9.6\%$
		Y	1.07	66.35	15.78		150.0	
		Z	0.82	64.74	13.07		150.0	
10012- CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	1.09	63.34	14.85	0.41	150.0	$\pm 9.6\%$
		Y	1.18	64.27	15.65		150.0	
		Z	1.05	62.76	14.32		150.0	
10013- CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	X	4.80	66.61	17.13	1.46	150.0	$\pm 9.6\%$
		Y	4.86	66.82	17.30		150.0	
		Z	4.74	66.51	17.02		150.0	
10021- DAC	GSM-FDD (TDMA, GMSK)	X	100.00	115.08	27.69	9.39	50.0	$\pm 9.6\%$
		Y	100.00	115.44	27.54		50.0	
		Z	100.00	113.48	26.80		50.0	
10023- DAC	GPRS-FDD (TDMA, GMSK, TN 0)	X	100.00	114.55	27.49	9.57	50.0	$\pm 9.6\%$
		Y	100.00	114.83	27.29		50.0	
		Z	100.00	112.89	26.58		50.0	
10024- DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	100.00	114.75	26.46	6.56	60.0	$\pm 9.6\%$
		Y	100.00	116.27	27.07		60.0	
		Z	100.00	113.07	25.48		60.0	
10025- DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	X	4.70	74.92	29.30	12.57	50.0	$\pm 9.6\%$
		Y	21.15	131.25	53.99		50.0	
		Z	4.41	73.26	28.44		50.0	
10026- DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	X	9.53	94.85	34.46	9.56	60.0	$\pm 9.6\%$
		Y	16.69	111.85	41.19		60.0	
		Z	7.97	90.88	33.05		60.0	
10027- DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	100.00	115.44	25.96	4.80	80.0	$\pm 9.6\%$
		Y	100.00	118.72	27.45		80.0	
		Z	100.00	113.19	24.70		80.0	
10028- DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	100.00	116.28	25.58	3.55	100.0	$\pm 9.6\%$
		Y	100.00	122.38	28.35		100.0	
		Z	100.00	112.67	23.74		100.0	
10029- DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	X	5.74	82.45	28.35	7.80	80.0	$\pm 9.6\%$
		Y	7.35	89.49	31.67		80.0	
		Z	4.99	79.62	27.22		80.0	
10030- CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	X	100.00	112.88	25.16	5.30	70.0	$\pm 9.6\%$
		Y	100.00	115.19	26.20		70.0	
		Z	100.00	110.73	23.95		70.0	
10031- CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	X	100.00	105.27	19.62	1.88	100.0	$\pm 9.6\%$
		Y	100.00	122.37	26.89		100.0	
		Z	100.00	95.82	15.53		100.0	

EX3DV4- SN:3797

November 22, 2017

10032-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	X	100.00	95.50	14.93	1.17	100.0	± 9.6 %
		Y	100.00	131.76	29.53		100.0	
		Z	0.17	60.00	3.93		100.0	
10033-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	X	97.77	129.47	34.74	5.30	70.0	± 9.6 %
		Y	100.00	131.95	35.84		70.0	
		Z	34.35	112.32	30.19		70.0	
10034-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	X	4.15	81.94	19.60	1.88	100.0	± 9.6 %
		Y	10.01	94.99	24.25		100.0	
		Z	2.54	75.13	16.60		100.0	
10035-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	X	2.08	73.57	16.10	1.17	100.0	± 9.6 %
		Y	3.72	81.89	19.76		100.0	
		Z	1.49	69.26	13.75		100.0	
10036-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	X	100.00	130.33	35.05	5.30	70.0	± 9.6 %
		Y	100.00	132.44	36.07		70.0	
		Z	91.95	127.90	34.01		70.0	
10037-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	X	3.68	80.45	19.06	1.88	100.0	± 9.6 %
		Y	8.46	92.74	23.57		100.0	
		Z	2.31	74.05	16.16		100.0	
10038-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	X	2.12	74.09	16.43	1.17	100.0	± 9.6 %
		Y	3.80	82.52	20.11		100.0	
		Z	1.51	69.62	14.03		100.0	
10039-CAB	CDMA2000 (1xRTT, RC1)	X	1.31	67.83	12.94	0.00	150.0	± 9.6 %
		Y	1.85	72.45	15.57		150.0	
		Z	1.03	65.14	11.07		150.0	
10042-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	X	100.00	110.31	24.73	7.78	50.0	± 9.6 %
		Y	100.00	111.36	25.06		50.0	
		Z	100.00	108.48	23.72		50.0	
10044-CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	X	0.07	121.05	11.94	0.00	150.0	± 9.6 %
		Y	0.00	106.90	3.36		150.0	
		Z	0.11	123.04	5.50		150.0	
10048-CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	X	100.00	112.23	27.93	13.80	25.0	± 9.6 %
		Y	100.00	113.40	27.75		25.0	
		Z	100.00	109.66	26.78		25.0	
10049-CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	X	100.00	113.07	27.15	10.79	40.0	± 9.6 %
		Y	100.00	112.79	26.60		40.0	
		Z	100.00	111.30	26.22		40.0	
10056-CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	X	100.00	125.05	33.89	9.03	50.0	± 9.6 %
		Y	100.00	127.25	34.77		50.0	
		Z	100.00	123.90	33.17		50.0	
10058-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	X	4.41	76.91	25.15	6.55	100.0	± 9.6 %
		Y	5.16	81.07	27.29		100.0	
		Z	3.93	74.75	24.23		100.0	
10059-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	X	1.13	64.54	15.57	0.61	110.0	± 9.6 %
		Y	1.23	65.69	16.49		110.0	
		Z	1.07	63.77	14.95		110.0	
10060-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	X	100.00	136.05	35.44	1.30	110.0	± 9.6 %
		Y	100.00	142.55	37.64		110.0	
		Z	10.92	104.96	27.34		110.0	

EX3DV4- SN:3797

November 22, 2017

10061-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	X	3.44	84.86	24.17	2.04	110.0	± 9.6 %
		Y	5.47	93.54	27.56		110.0	
		Z	2.51	79.74	22.12		110.0	
10062-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	X	4.59	66.51	16.47	0.49	100.0	± 9.6 %
		Y	4.65	66.76	16.66		100.0	
		Z	4.52	66.38	16.34		100.0	
10063-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	X	4.61	66.63	16.59	0.72	100.0	± 9.6 %
		Y	4.67	66.87	16.77		100.0	
		Z	4.53	66.49	16.46		100.0	
10064-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	X	4.89	66.90	16.83	0.86	100.0	± 9.6 %
		Y	4.95	67.13	17.01		100.0	
		Z	4.80	66.76	16.70		100.0	
10065-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	X	4.76	66.82	16.96	1.21	100.0	± 9.6 %
		Y	4.83	67.05	17.14		100.0	
		Z	4.68	66.67	16.83		100.0	
10066-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	X	4.78	66.86	17.15	1.46	100.0	± 9.6 %
		Y	4.85	67.08	17.32		100.0	
		Z	4.70	66.70	17.01		100.0	
10067-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	X	5.08	67.09	17.64	2.04	100.0	± 9.6 %
		Y	5.14	67.30	17.81		100.0	
		Z	5.00	66.98	17.53		100.0	
10068-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	X	5.13	67.12	17.87	2.55	100.0	± 9.6 %
		Y	5.19	67.34	18.05		100.0	
		Z	5.04	66.98	17.75		100.0	
10069-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	X	5.21	67.14	18.07	2.67	100.0	± 9.6 %
		Y	5.27	67.36	18.26		100.0	
		Z	5.12	67.02	17.96		100.0	
10071-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	X	4.90	66.72	17.47	1.99	100.0	± 9.6 %
		Y	4.96	66.93	17.63		100.0	
		Z	4.84	66.62	17.36		100.0	
10072-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	X	4.88	67.06	17.71	2.30	100.0	± 9.6 %
		Y	4.94	67.27	17.88		100.0	
		Z	4.81	66.92	17.59		100.0	
10073-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	X	4.95	67.25	18.07	2.83	100.0	± 9.6 %
		Y	5.00	67.46	18.25		100.0	
		Z	4.87	67.12	17.95		100.0	
10074-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	X	4.94	67.16	18.23	3.30	100.0	± 9.6 %
		Y	4.98	67.35	18.41		100.0	
		Z	4.86	67.04	18.12		100.0	
10075-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	X	4.97	67.27	18.56	3.82	90.0	± 9.6 %
		Y	5.01	67.47	18.75		90.0	
		Z	4.89	67.11	18.43		90.0	
10076-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	X	4.99	67.07	18.69	4.15	90.0	± 9.6 %
		Y	5.02	67.26	18.88		90.0	
		Z	4.92	66.94	18.58		90.0	
10077-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	X	5.01	67.14	18.79	4.30	90.0	± 9.6 %
		Y	5.05	67.33	18.99		90.0	
		Z	4.95	67.02	18.69		90.0	

EX3DV4- SN:3797

November 22, 2017

10081-CAB	CDMA2000 (1xRTT, RC3)	X	0.63	63.16	10.03	0.00	150.0	± 9.6 %
		Y	0.82	66.10	12.30		150.0	
		Z	0.53	61.60	8.52		150.0	
10082-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	X	0.69	60.00	4.31	4.77	80.0	± 9.6 %
		Y	0.71	60.00	4.41		80.0	
		Z	2.75	65.28	5.72		80.0	
10090-DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	X	100.00	114.66	26.53	6.56	60.0	± 9.6 %
		Y	100.00	116.32	27.11		60.0	
		Z	100.00	113.20	25.55		60.0	
10097-CAB	UMTS-FDD (HSDPA)	X	1.69	66.82	14.93	0.00	150.0	± 9.6 %
		Y	1.85	68.13	15.88		150.0	
		Z	1.60	66.09	14.29		150.0	
10098-CAB	UMTS-FDD (HSUPA, Subtest 2)	X	1.66	66.77	14.89	0.00	150.0	± 9.6 %
		Y	1.81	68.10	15.67		150.0	
		Z	1.57	66.03	14.25		150.0	
10099-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	X	9.61	95.05	34.53	9.56	60.0	± 9.6 %
		Y	16.87	112.27	41.32		60.0	
		Z	8.03	91.06	33.12		60.0	
10100-CAD	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	2.93	69.38	16.15	0.00	150.0	± 9.6 %
		Y	3.14	70.54	16.87		150.0	
		Z	2.79	68.63	15.71		150.0	
10101-CAD	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	3.11	66.98	15.61	0.00	150.0	± 9.6 %
		Y	3.22	67.58	16.04		150.0	
		Z	3.02	66.59	15.33		150.0	
10102-CAD	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	3.22	66.98	15.72	0.00	150.0	± 9.6 %
		Y	3.32	67.52	16.11		150.0	
		Z	3.13	66.61	15.46		150.0	
10103-CAD	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	6.36	76.70	21.19	3.98	65.0	± 9.6 %
		Y	6.91	78.27	21.91		65.0	
		Z	5.78	75.35	20.64		65.0	
10104-CAD	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	6.05	73.74	20.72	3.98	65.0	± 9.6 %
		Y	6.54	75.34	21.52		65.0	
		Z	5.66	72.79	20.30		65.0	
10105-CAD	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	5.79	72.70	20.56	3.98	65.0	± 9.6 %
		Y	6.02	73.55	21.03		65.0	
		Z	5.38	71.56	20.04		65.0	
10108-CAE	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	2.55	68.68	15.98	0.00	150.0	± 9.6 %
		Y	2.73	69.81	16.72		150.0	
		Z	2.41	67.94	15.51		150.0	
10109-CAE	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	2.76	66.81	15.45	0.00	150.0	± 9.6 %
		Y	2.88	67.46	15.93		150.0	
		Z	2.66	66.38	15.11		150.0	
10110-CAE	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	2.04	67.77	15.48	0.00	150.0	± 9.6 %
		Y	2.22	69.03	16.35		150.0	
		Z	1.92	66.98	14.91		150.0	
10111-CAE	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	2.45	67.53	15.58	0.00	150.0	± 9.6 %
		Y	2.59	68.33	16.17		150.0	
		Z	2.34	66.95	15.08		150.0	

EX3DV4- SN:3797

November 22, 2017

10112-CAE	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	2.88	66.84	15.53	0.00	150.0	± 9.6 %
		Y	3.00	67.44	15.98		150.0	
		Z	2.79	66.45	15.21		150.0	
10113-CAE	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	2.60	67.72	15.75	0.00	150.0	± 9.6 %
		Y	2.74	66.45	16.29		150.0	
		Z	2.49	67.18	15.28		150.0	
10114-CAB	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	X	5.04	66.99	16.36	0.00	150.0	± 9.6 %
		Y	5.11	67.22	16.53		150.0	
		Z	4.97	66.82	16.24		150.0	
10115-CAB	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	X	5.31	67.08	16.42	0.00	150.0	± 9.6 %
		Y	5.37	67.30	16.57		150.0	
		Z	5.23	66.92	16.31		150.0	
10116-CAB	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	X	5.13	67.16	16.37	0.00	150.0	± 9.6 %
		Y	5.19	67.39	16.54		150.0	
		Z	5.06	67.01	16.26		150.0	
10117-CAB	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	5.00	66.82	16.29	0.00	150.0	± 9.6 %
		Y	5.06	67.06	16.46		150.0	
		Z	4.94	66.70	16.20		150.0	
10118-CAB	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	X	5.39	67.30	16.54	0.00	150.0	± 9.6 %
		Y	5.46	67.51	16.69		150.0	
		Z	5.32	67.14	16.43		150.0	
10119-CAB	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	X	5.12	67.13	16.37	0.00	150.0	± 9.6 %
		Y	5.18	67.36	16.53		150.0	
		Z	5.05	66.98	16.26		150.0	
10140-CAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	3.25	66.98	15.63	0.00	150.0	± 9.6 %
		Y	3.36	67.54	16.03		150.0	
		Z	3.16	66.62	15.37		150.0	
10141-CAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	3.37	67.12	15.83	0.00	150.0	± 9.6 %
		Y	3.48	67.62	16.19		150.0	
		Z	3.29	66.78	15.58		150.0	
10142-CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	1.79	67.53	14.89	0.00	150.0	± 9.6 %
		Y	1.99	69.07	15.96		150.0	
		Z	1.65	66.54	14.12		150.0	
10143-CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	2.26	67.87	14.93	0.00	150.0	± 9.6 %
		Y	2.45	69.06	15.78		150.0	
		Z	2.09	66.92	14.15		150.0	
10144-CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	2.04	65.63	13.31	0.00	150.0	± 9.6 %
		Y	2.20	66.70	14.14		150.0	
		Z	1.90	64.88	12.61		150.0	
10145-CAE	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	0.94	62.52	9.55	0.00	150.0	± 9.6 %
		Y	1.12	64.44	11.11		150.0	
		Z	0.81	61.19	8.21		150.0	
10146-CAE	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	1.66	64.51	10.64	0.00	150.0	± 9.6 %
		Y	1.87	66.02	11.33		150.0	
		Z	1.33	62.57	8.89		150.0	
10147-CAE	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	1.92	66.49	11.60	0.00	150.0	± 9.6 %
		Y	2.22	68.06	12.42		150.0	
		Z	1.44	63.36	9.43		150.0	

EX3DV4- SN:3797

November 22, 2017

10149-CAD	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	2.77	66.87	15.50	0.00	150.0	± 9.6 %
		Y	2.88	67.52	15.98		150.0	
		Z	2.87	66.43	15.16		150.0	
10150-CAD	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	2.89	66.90	15.57	0.00	150.0	± 9.6 %
		Y	3.00	67.50	16.02		150.0	
		Z	2.80	66.50	15.26		150.0	
10151-CAD	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	6.79	79.62	22.46	3.98	65.0	± 9.6 %
		Y	7.82	82.31	23.60		65.0	
		Z	6.13	78.23	21.90		65.0	
10152-CAD	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	5.61	73.85	20.46	3.98	65.0	± 9.6 %
		Y	6.14	75.65	21.36		65.0	
		Z	5.20	72.82	19.96		65.0	
10153-CAD	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	5.99	74.87	21.27	3.98	65.0	± 9.6 %
		Y	6.51	76.56	22.10		65.0	
		Z	5.57	73.86	20.79		65.0	
10154-CAE	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	2.08	68.14	15.72	0.00	150.0	± 9.6 %
		Y	2.26	69.40	16.58		150.0	
		Z	1.95	67.30	15.12		150.0	
10155-CAE	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	2.45	67.55	15.60	0.00	150.0	± 9.6 %
		Y	2.59	68.35	16.19		150.0	
		Z	2.34	66.97	15.11		150.0	
10156-CAE	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	1.82	67.31	14.44	0.00	150.0	± 9.6 %
		Y	1.84	69.14	15.69		150.0	
		Z	1.46	66.09	13.48		150.0	
10157-CAE	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	1.84	65.85	13.09	0.00	150.0	± 9.6 %
		Y	2.04	67.24	14.11		150.0	
		Z	1.69	64.85	12.19		150.0	
10158-CAE	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	2.61	67.79	15.80	0.00	150.0	± 9.6 %
		Y	2.74	68.51	16.34		150.0	
		Z	2.49	67.24	15.32		150.0	
10159-CAE	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	1.93	66.23	13.34	0.00	150.0	± 9.6 %
		Y	2.14	67.63	14.35		150.0	
		Z	1.76	65.14	12.40		150.0	
10160-CAD	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	2.61	68.11	15.91	0.00	150.0	± 9.6 %
		Y	2.75	68.95	16.51		150.0	
		Z	2.50	67.58	15.51		150.0	
10161-CAD	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	2.78	66.83	15.47	0.00	150.0	± 9.6 %
		Y	2.90	67.45	15.94		150.0	
		Z	2.69	66.42	15.12		150.0	
10162-CAD	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	2.89	67.01	15.61	0.00	150.0	± 9.6 %
		Y	3.01	67.81	16.05		150.0	
		Z	2.80	66.62	15.27		150.0	
10166-CAE	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	3.49	69.55	19.33	3.01	150.0	± 9.6 %
		Y	3.59	70.09	19.58		150.0	
		Z	3.35	69.11	19.04		150.0	
10167-CAE	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	4.22	72.27	19.69	3.01	150.0	± 9.6 %
		Y	4.49	73.46	20.20		150.0	
		Z	3.99	71.66	19.32		150.0	

EX3DV4- SN:3797

November 22, 2017

10168-CAE	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	4.73	74.77	21.15	3.01	150.0	± 9.6 %	
			Y	5.00	75.78	21.53		150.0	
			Z	4.47	74.15	20.80		150.0	
10169-CAD	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	2.85	68.45	18.67	3.01	150.0	± 9.6 %	
			Y	2.98	69.48	19.37		150.0	
			Z	2.71	67.70	18.41		150.0	
10170-CAD	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	3.79	73.94	21.08	3.01	150.0	± 9.6 %	
			Y	4.17	75.97	21.89		150.0	
			Z	3.50	72.74	20.47		150.0	
10171-AAD	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	3.14	69.97	18.33	3.01	150.0	± 9.6 %	
			Y	3.44	71.91	19.20		150.0	
			Z	2.93	69.01	17.79		150.0	
10172-CAD	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	8.64	94.15	30.52	6.02	65.0	± 9.6 %	
			Y	11.98	102.04	33.33		65.0	
			Z	6.10	87.68	28.29		65.0	
10173-CAD	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	20.69	106.79	32.39	6.02	65.0	± 9.6 %	
			Y	64.33	128.58	36.13		65.0	
			Z	13.58	99.71	30.29		65.0	
10174-CAD	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	15.94	100.38	29.84	6.02	65.0	± 9.6 %	
			Y	30.16	112.45	33.27		65.0	
			Z	10.47	93.64	27.75		65.0	
10175-CAE	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	2.82	68.16	18.62	3.01	150.0	± 9.6 %	
			Y	2.95	69.20	19.14		150.0	
			Z	2.68	67.43	18.17		150.0	
10176-CAE	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	3.80	73.96	21.09	3.01	150.0	± 9.6 %	
			Y	4.17	76.00	21.90		150.0	
			Z	3.50	72.76	20.48		150.0	
10177-CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	2.84	68.30	18.71	3.01	150.0	± 9.6 %	
			Y	2.97	69.34	19.22		150.0	
			Z	2.70	67.55	18.26		150.0	
10178-CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	3.76	73.77	20.98	3.01	150.0	± 9.6 %	
			Y	4.14	75.81	21.80		150.0	
			Z	3.48	72.60	20.39		150.0	
10179-CAE	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	3.44	71.86	19.58	3.01	150.0	± 9.6 %	
			Y	3.78	73.87	20.44		150.0	
			Z	3.19	70.77	19.00		150.0	
10180-CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	3.14	69.92	18.29	3.01	150.0	± 9.6 %	
			Y	3.43	71.85	19.16		150.0	
			Z	2.93	68.97	17.75		150.0	
10181-CAD	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	2.84	68.28	18.70	3.01	150.0	± 9.6 %	
			Y	2.96	69.32	19.22		150.0	
			Z	2.70	67.54	18.25		150.0	
10182-CAD	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	3.76	73.74	20.97	3.01	150.0	± 9.6 %	
			Y	4.13	75.79	21.79		150.0	
			Z	3.47	72.58	20.38		150.0	
10183-AAC	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	3.13	69.89	18.28	3.01	150.0	± 9.6 %	
			Y	3.43	71.83	19.15		150.0	
			Z	2.92	68.95	17.74		150.0	

EX3DV4--SN:3797

November 22, 2017

10184-CAD	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	2.85	68.33	18.72	3.01	150.0	± 9.6 %
		Y	2.97	69.36	19.24		150.0	
		Z	2.71	67.58	18.27		150.0	
10185-CAD	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	3.78	73.81	21.01	3.01	150.0	± 9.6 %
		Y	4.15	75.66	21.83		150.0	
		Z	3.49	72.64	20.41		150.0	
10186-AAD	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	3.15	69.96	18.31	3.01	150.0	± 9.6 %
		Y	3.44	71.90	19.18		150.0	
		Z	2.93	69.00	17.77		150.0	
10187-CAE	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	2.86	68.38	18.79	3.01	150.0	± 9.6 %
		Y	2.98	69.42	19.30		150.0	
		Z	2.72	67.64	18.34		150.0	
10188-CAE	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	3.89	74.43	21.37	3.01	150.0	± 9.6 %
		Y	4.27	76.48	22.18		150.0	
		Z	3.58	73.21	20.76		150.0	
10189-AAE	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	3.21	70.35	18.58	3.01	150.0	± 9.6 %
		Y	3.52	72.32	19.45		150.0	
		Z	2.99	69.37	18.03		150.0	
10193-CAB	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	X	4.41	66.37	16.00	0.00	150.0	± 9.6 %
		Y	4.49	66.64	16.21		150.0	
		Z	4.35	66.23	15.86		150.0	
10194-CAB	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	X	4.58	66.67	16.13	0.00	150.0	± 9.6 %
		Y	4.65	66.94	16.34		150.0	
		Z	4.50	66.52	16.00		150.0	
10195-CAB	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	X	4.62	66.70	16.15	0.00	150.0	± 9.6 %
		Y	4.70	66.98	16.35		150.0	
		Z	4.54	66.55	16.02		150.0	
10196-CAB	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	4.41	66.42	16.01	0.00	150.0	± 9.6 %
		Y	4.49	66.69	16.22		150.0	
		Z	4.34	66.26	15.86		150.0	
10197-CAB	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	X	4.59	66.69	16.15	0.00	150.0	± 9.6 %
		Y	4.67	66.96	16.35		150.0	
		Z	4.51	66.53	16.01		150.0	
10198-CAB	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	X	4.62	66.72	16.17	0.00	150.0	± 9.6 %
		Y	4.70	66.99	16.37		150.0	
		Z	4.54	66.56	16.03		150.0	
10219-CAB	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	X	4.36	66.43	15.97	0.00	150.0	± 9.6 %
		Y	4.44	66.71	16.18		150.0	
		Z	4.29	66.28	15.82		150.0	
10220-CAB	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	X	4.58	66.65	16.13	0.00	150.0	± 9.6 %
		Y	4.66	66.93	16.34		150.0	
		Z	4.50	66.50	16.00		150.0	
10221-CAB	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	X	4.63	66.65	16.15	0.00	150.0	± 9.6 %
		Y	4.70	66.92	16.35		150.0	
		Z	4.55	66.50	16.02		150.0	
10222-CAB	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	X	4.97	66.82	16.29	0.00	150.0	± 9.6 %
		Y	5.04	67.07	16.46		150.0	
		Z	4.91	66.68	16.18		150.0	

EX3DV4- SN:3797

November 22, 2017

10223-CAB	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	X	5.29	67.12	16.46	0.00	150.0	± 9.6 %
		Y	5.35	67.33	16.61		150.0	
		Z	5.21	66.96	16.35		150.0	
10224-CAB	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	X	5.02	66.93	16.27	0.00	150.0	± 9.6 %
		Y	5.08	67.18	16.44		150.0	
		Z	4.95	66.78	16.16		150.0	
10225-CAB	UMTS-FDD (HSPA+)	X	2.67	65.67	14.89	0.00	150.0	± 9.6 %
		Y	2.77	66.21	15.33		150.0	
		Z	2.58	65.33	14.51		150.0	
10226-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	22.83	108.82	33.07	6.02	65.0	± 9.6 %
		Y	74.83	131.70	39.00		65.0	
		Z	14.75	101.43	30.91		65.0	
10227-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	22.98	107.03	31.84	6.02	65.0	± 9.6 %
		Y	65.65	126.33	36.82		65.0	
		Z	15.24	100.38	29.88		65.0	
10228-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	10.50	98.72	32.15	6.02	65.0	± 9.6 %
		Y	19.10	112.25	36.48		65.0	
		Z	7.48	92.40	30.07		65.0	
10229-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	20.85	106.90	32.42	6.02	65.0	± 9.6 %
		Y	64.70	128.66	38.15		65.0	
		Z	13.68	99.82	30.33		65.0	
10230-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	20.82	105.12	31.21	6.02	65.0	± 9.6 %
		Y	58.81	123.53	36.05		65.0	
		Z	13.97	98.71	29.30		65.0	
10231-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	9.93	97.45	31.66	6.02	65.0	± 9.6 %
		Y	17.77	110.60	35.91		65.0	
		Z	7.14	91.35	29.63		65.0	
10232-CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	20.82	106.89	32.42	6.02	65.0	± 9.6 %
		Y	64.71	128.88	38.16		65.0	
		Z	13.65	99.80	30.32		65.0	
10233-CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	20.74	105.07	31.20	6.02	65.0	± 9.6 %
		Y	56.64	123.50	36.04		65.0	
		Z	13.92	98.66	29.29		65.0	
10234-CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	9.51	96.40	31.19	6.02	65.0	± 9.6 %
		Y	16.79	109.16	35.36		65.0	
		Z	6.89	90.49	29.21		65.0	
10235-CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	20.88	106.96	32.45	6.02	65.0	± 9.6 %
		Y	65.24	128.86	38.21		65.0	
		Z	13.68	99.86	30.34		65.0	
10236-CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	21.13	105.36	31.28	6.02	65.0	± 9.6 %
		Y	58.50	124.03	36.16		65.0	
		Z	14.15	98.92	29.36		65.0	
10237-CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	9.96	97.55	31.70	6.02	65.0	± 9.6 %
		Y	17.92	110.82	35.98		65.0	
		Z	7.15	91.42	29.65		65.0	
10238-CAD	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	20.78	106.87	32.42	6.02	65.0	± 9.6 %
		Y	64.67	128.89	38.16		65.0	
		Z	13.62	99.78	30.32		65.0	

EX3DV4-SN:3797

November 22, 2017

10239-CAD	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	20.67	105.03	31.19	6.02	65.0	± 9.6 %
		Y	56.45	123.47	36.04		65.0	
		Z	13.87	98.62	29.28		65.0	
10240-CAD	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	9.92	97.50	31.68	6.02	65.0	± 9.6 %
		Y	17.83	110.74	35.95		65.0	
		Z	7.13	91.37	29.64		65.0	
10241-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	8.04	82.09	26.27	6.98	65.0	± 9.6 %
		Y	9.11	85.30	27.67		65.0	
		Z	7.47	81.13	25.86		65.0	
10242-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	7.55	80.72	25.62	6.98	65.0	± 9.6 %
		Y	8.09	82.72	26.56		65.0	
		Z	6.91	79.48	25.09		65.0	
10243-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	6.00	76.82	24.89	6.98	65.0	± 9.6 %
		Y	6.22	78.08	25.61		65.0	
		Z	5.55	75.62	24.34		65.0	
10244-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	6.65	78.60	19.80	3.98	65.0	± 9.6 %
		Y	7.35	80.02	20.29		65.0	
		Z	5.39	75.51	18.19		65.0	
10245-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	6.31	77.48	19.30	3.98	65.0	± 9.6 %
		Y	6.95	78.88	19.78		65.0	
		Z	5.14	74.50	17.71		65.0	
10246-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	6.21	81.09	20.78	3.98	65.0	± 9.6 %
		Y	6.51	86.27	22.85		65.0	
		Z	4.81	77.40	19.06		65.0	
10247-CAD	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	4.95	74.42	18.85	3.98	65.0	± 9.6 %
		Y	5.63	76.63	19.94		65.0	
		Z	4.35	72.65	17.82		65.0	
10248-CAD	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	4.87	73.62	18.48	3.98	65.0	± 9.6 %
		Y	5.51	75.74	19.54		65.0	
		Z	4.30	71.95	17.48		65.0	
10249-CAD	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	7.83	85.40	23.46	3.98	65.0	± 9.6 %
		Y	10.58	90.72	25.47		65.0	
		Z	6.38	82.35	22.16		65.0	
10250-CAD	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	5.80	76.85	21.70	3.98	65.0	± 9.6 %
		Y	6.43	78.83	22.63		65.0	
		Z	5.28	75.52	21.04		65.0	
10251-CAD	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	5.46	74.39	20.25	3.98	65.0	± 9.6 %
		Y	6.03	76.31	21.21		65.0	
		Z	5.00	73.21	19.62		65.0	
10252-CAD	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	7.37	83.64	23.95	3.98	65.0	± 9.6 %
		Y	9.10	87.60	25.53		65.0	
		Z	6.41	81.63	23.14		65.0	
10253-CAD	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	5.49	73.31	20.18	3.98	65.0	± 9.6 %
		Y	5.98	75.01	21.05		65.0	
		Z	5.11	72.35	19.69		65.0	
10254-CAD	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	5.84	74.25	20.91	3.98	65.0	± 9.6 %
		Y	6.33	75.67	21.72		65.0	
		Z	5.44	73.29	20.43		65.0	

EX3DV4- SN:3797

November 22, 2017

10255-CAD	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	6.39	78.73	22.32	3.98	65.0	± 9.6 %
		Y	7.30	81.30	23.45		65.0	
		Z	5.80	77.42	21.76		65.0	
10256-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	4.74	73.04	16.35	3.98	65.0	± 9.6 %
		Y	5.28	74.45	16.91		65.0	
		Z	3.71	69.75	14.46		65.0	
10257-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	4.45	71.74	15.67	3.98	65.0	± 9.6 %
		Y	4.92	73.08	16.23		65.0	
		Z	3.53	68.72	13.86		65.0	
10258-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	4.10	74.14	17.04	3.98	65.0	± 9.6 %
		Y	5.41	78.37	18.96		65.0	
		Z	3.14	70.60	15.13		65.0	
10259-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	5.31	75.43	19.92	3.98	65.0	± 9.6 %
		Y	5.97	77.54	20.95		65.0	
		Z	4.75	73.88	19.06		65.0	
10260-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	5.30	75.03	19.75	3.98	65.0	± 9.6 %
		Y	5.93	77.04	20.73		65.0	
		Z	4.76	73.52	18.89		65.0	
10261-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	7.05	83.36	23.21	3.98	65.0	± 9.6 %
		Y	8.98	87.75	24.96		65.0	
		Z	5.99	80.97	22.16		65.0	
10262-CAD	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	5.79	76.78	21.65	3.98	65.0	± 9.6 %
		Y	6.42	78.77	22.59		65.0	
		Z	5.27	75.45	20.99		65.0	
10263-CAD	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	5.44	74.36	20.24	3.98	65.0	± 9.6 %
		Y	6.02	76.28	21.20		65.0	
		Z	4.99	73.18	19.61		65.0	
10264-CAD	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	7.28	83.38	23.83	3.98	65.0	± 9.6 %
		Y	8.98	87.33	25.41		65.0	
		Z	6.33	81.39	23.02		65.0	
10265-CAD	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	5.61	73.85	20.48	3.98	65.0	± 9.6 %
		Y	6.14	75.65	21.37		65.0	
		Z	5.20	72.82	19.97		65.0	
10266-CAD	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	5.99	74.85	21.26	3.98	65.0	± 9.6 %
		Y	6.51	76.54	22.09		65.0	
		Z	5.56	73.84	20.78		65.0	
10267-CAD	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	6.77	79.57	22.43	3.98	65.0	± 9.6 %
		Y	7.80	82.25	23.58		65.0	
		Z	6.11	78.18	21.87		65.0	
10268-CAD	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	6.19	73.56	20.74	3.98	65.0	± 9.6 %
		Y	6.65	75.03	21.48		65.0	
		Z	5.81	72.68	20.34		65.0	
10269-CAD	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	6.17	73.10	20.59	3.98	65.0	± 9.6 %
		Y	6.59	74.51	21.31		65.0	
		Z	5.80	72.27	20.20		65.0	
10270-CAD	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	6.40	76.09	21.16	3.98	65.0	± 9.6 %
		Y	7.02	77.86	21.97		65.0	
		Z	5.93	75.08	20.74		65.0	

EX3DV4-- SN:3797

November 22, 2017

10274-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	X	2.46	66.02	14.78	0.00	150.0	± 9.6 %
		Y	2.58	66.70	15.32		150.0	
		Z	2.38	65.65	14.36		150.0	
10275-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	X	1.46	66.79	14.65	0.00	150.0	± 9.6 %
		Y	1.63	68.49	15.84		150.0	
		Z	1.36	65.86	13.93		150.0	
10277-CAA	PHS (QPSK)	X	1.98	61.24	6.84	9.03	50.0	± 9.6 %
		Y	1.82	61.07	6.53		50.0	
		Z	1.80	60.64	6.21		50.0	
10278-CAA	PHS (QPSK, BW 884MHz, Roll-off 0.5)	X	5.23	74.47	16.31	9.03	50.0	± 9.6 %
		Y	7.42	80.17	18.54		50.0	
		Z	4.01	70.70	14.28		50.0	
10279-CAA	PHS (QPSK, BW 884MHz, Roll-off 0.38)	X	5.40	74.84	16.52	9.03	50.0	± 9.6 %
		Y	7.70	80.63	18.78		50.0	
		Z	4.15	71.06	14.51		50.0	
10290-AAB	CDMA2000, RC1, SO55, Full Rate	X	1.08	65.42	11.50	0.00	150.0	± 9.6 %
		Y	1.40	68.67	13.64		150.0	
		Z	0.89	63.48	9.95		150.0	
10291-AAB	CDMA2000, RC3, SO55, Full Rate	X	0.62	63.02	9.93	0.00	150.0	± 9.6 %
		Y	0.80	65.85	12.16		150.0	
		Z	0.52	61.50	8.44		150.0	
10292-AAB	CDMA2000, RC3, SO32, Full Rate	X	0.74	65.71	11.68	0.00	150.0	± 9.6 %
		Y	1.14	71.30	15.08		150.0	
		Z	0.58	63.15	9.66		150.0	
10293-AAB	CDMA2000, RC3, SO3, Full Rate	X	1.08	70.55	14.39	0.00	150.0	± 9.6 %
		Y	2.18	80.38	19.12		150.0	
		Z	0.75	65.98	11.57		150.0	
10295-AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	X	15.58	94.91	27.14	9.03	50.0	± 9.6 %
		Y	19.82	101.12	29.57		50.0	
		Z	17.74	96.29	27.07		50.0	
10297-AAC	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	2.56	68.77	16.04	0.00	150.0	± 9.6 %
		Y	2.75	69.91	16.78		150.0	
		Z	2.42	68.03	15.57		150.0	
10298-AAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	1.27	65.35	12.24	0.00	150.0	± 9.6 %
		Y	1.51	67.57	13.81		150.0	
		Z	1.10	63.82	10.96		150.0	
10299-AAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	2.46	69.20	13.89	0.00	150.0	± 9.6 %
		Y	2.75	70.48	14.50		150.0	
		Z	1.95	66.39	12.06		150.0	
10300-AAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	1.76	64.29	10.75	0.00	150.0	± 9.6 %
		Y	1.81	65.09	11.22		150.0	
		Z	1.52	62.89	9.54		150.0	
10301-AAA	IEEE 802.16e WIMAX (29.18, 5ms, 10MHz, QPSK, PUSC)	X	4.72	65.57	17.40	4.17	50.0	± 9.6 %
		Y	4.89	66.40	18.00		50.0	
		Z	4.74	66.04	17.58		50.0	
10302-AAA	IEEE 802.16e WIMAX (29.18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL symbols)	X	5.19	66.18	18.12	4.96	50.0	± 9.6 %
		Y	5.27	66.62	18.51		50.0	
		Z	5.09	66.00	17.93		50.0	

EX3DV4- SN:3797

November 22, 2017

10303-AAA	IEEE 802.16e WIMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	X	4.94	65.83	17.95	4.96	50.0	± 9.6 %	
		Y	5.02	66.25	18.34			50.0	
		Z	4.84	65.64	17.73			50.0	
10304-AAA	IEEE 802.16e WIMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	X	4.75	65.66	17.41	4.17	50.0	± 9.6 %	
		Y	4.83	66.08	17.79			50.0	
		Z	4.64	65.47	17.20			50.0	
10305-AAA	IEEE 802.16e WIMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)	X	4.51	68.40	19.79	6.02	35.0	± 9.6 %	
		Y	4.43	68.18	19.99			35.0	
		Z	4.39	68.09	19.40			35.0	
10306-AAA	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18 symbols)	X	4.76	67.12	19.32	6.02	35.0	± 9.6 %	
		Y	4.74	67.09	19.55			35.0	
		Z	4.66	66.93	19.05			35.0	
10307-AAA	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)	X	4.67	67.29	19.28	6.02	35.0	± 9.6 %	
		Y	4.63	67.23	19.50			35.0	
		Z	4.55	67.04	18.98			35.0	
10308-AAA	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	X	4.65	67.54	19.44	6.02	35.0	± 9.6 %	
		Y	4.61	67.47	19.66			35.0	
		Z	4.54	67.29	19.14			35.0	
10309-AAA	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols)	X	4.81	67.33	19.46	6.02	35.0	± 9.6 %	
		Y	4.79	67.33	19.71			35.0	
		Z	4.70	67.11	19.18			35.0	
10310-AAA	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)	X	4.72	67.20	19.30	6.02	35.0	± 9.6 %	
		Y	4.69	67.15	19.52			35.0	
		Z	4.61	67.00	19.03			35.0	
10311-AAC	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	2.91	68.06	15.74	0.00	150.0	± 9.6 %	
		Y	3.11	69.12	16.40			150.0	
		Z	2.77	67.36	15.31			150.0	
10313-AAA	IDEN 1:3	X	4.37	76.96	17.78	6.99	70.0	± 9.6 %	
		Y	8.15	85.72	21.00			70.0	
		Z	3.30	73.81	16.50			70.0	
10314-AAA	IDEN 1:6	X	8.03	89.66	25.25	10.00	30.0	± 9.6 %	
		Y	13.22	99.87	28.91			30.0	
		Z	5.76	84.57	23.46			30.0	
10315-AAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	X	1.00	63.13	14.65	0.17	150.0	± 9.6 %	
		Y	1.08	64.07	15.48			150.0	
		Z	0.96	62.56	14.10			150.0	
10316-AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	X	4.48	66.47	16.20	0.17	150.0	± 9.6 %	
		Y	4.55	66.74	16.40			150.0	
		Z	4.41	66.32	16.06			150.0	
10317-AAB	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	X	4.48	66.47	16.20	0.17	150.0	± 9.6 %	
		Y	4.55	66.74	16.40			150.0	
		Z	4.41	66.32	16.06			150.0	
10400-AAC	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	X	4.56	66.72	16.13	0.00	150.0	± 9.6 %	
		Y	4.64	67.02	16.35			150.0	
		Z	4.48	66.56	15.99			150.0	
10401-AAC	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	X	5.33	67.07	16.41	0.00	150.0	± 9.6 %	
		Y	5.37	67.25	16.55			150.0	
		Z	5.26	66.94	16.31			150.0	

EX3DV4- SN:3797

November 22, 2017

10402-AAC	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc duty cycle)	X	5.54	67.19	16.33	0.00	150.0	± 9.6 %
		Y	5.60	67.43	16.49		150.0	
		Z	5.47	67.04	16.23		150.0	
10403-AAB	CDMA2000 (1xEV-DO, Rev. 0)	X	1.08	65.42	11.50	0.00	115.0	± 9.6 %
		Y	1.40	68.67	13.64		115.0	
		Z	0.89	63.48	9.95		115.0	
10404-AAB	CDMA2000 (1xEV-DO, Rev. A)	X	1.08	65.42	11.50	0.00	115.0	± 9.6 %
		Y	1.40	68.67	13.64		115.0	
		Z	0.89	63.48	9.95		115.0	
10406-AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	X	100.00	124.77	31.67	0.00	100.0	± 9.6 %
		Y	100.00	122.07	30.41		100.0	
		Z	52.66	114.12	28.55		100.0	
10410-AAC	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	129.55	33.64	3.23	80.0	± 9.6 %
		Y	100.00	126.07	32.96		80.0	
		Z	100.00	129.45	33.32		80.0	
10415-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	0.93	62.31	14.01	0.00	150.0	± 9.6 %
		Y	1.00	63.18	14.83		150.0	
		Z	0.90	61.85	13.51		150.0	
10416-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	X	4.42	66.41	16.08	0.00	150.0	± 9.6 %
		Y	4.49	66.68	16.28		150.0	
		Z	4.35	66.26	15.94		150.0	
10417-AAA	IEEE 802.11a/n WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	X	4.42	66.41	16.08	0.00	150.0	± 9.6 %
		Y	4.49	66.68	16.28		150.0	
		Z	4.35	66.26	15.94		150.0	
10418-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preamble)	X	4.41	66.57	16.10	0.00	150.0	± 9.6 %
		Y	4.46	66.85	16.31		150.0	
		Z	4.34	66.43	15.97		150.0	
10419-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preamble)	X	4.43	66.52	16.10	0.00	150.0	± 9.6 %
		Y	4.50	66.80	16.31		150.0	
		Z	4.36	66.38	15.96		150.0	
10422-AAA	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	X	4.54	66.52	16.12	0.00	150.0	± 9.6 %
		Y	4.62	66.79	16.32		150.0	
		Z	4.47	66.38	15.99		150.0	
10423-AAA	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	X	4.69	66.81	16.23	0.00	150.0	± 9.6 %
		Y	4.77	67.09	16.43		150.0	
		Z	4.61	66.66	16.09		150.0	
10424-AAA	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	X	4.62	66.77	16.20	0.00	150.0	± 9.6 %
		Y	4.70	67.04	16.40		150.0	
		Z	4.54	66.61	16.06		150.0	
10425-AAA	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	X	5.24	67.09	16.42	0.00	150.0	± 9.6 %
		Y	5.30	67.31	16.58		150.0	
		Z	5.17	66.96	16.32		150.0	
10426-AAA	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	X	5.27	67.20	16.48	0.00	150.0	± 9.6 %
		Y	5.32	67.40	16.62		150.0	
		Z	5.21	67.08	16.38		150.0	

EX3DV4- SN:3797

November 22, 2017

10427-AAA	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	X	5.26	67.11	16.43	0.00	150.0	± 9.6 %
		Y	5.32	67.33	16.58		150.0	
		Z	5.19	66.94	16.31		150.0	
10430-AAB	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	X	4.10	70.64	17.90	0.00	150.0	± 9.6 %
		Y	4.15	70.65	17.99		150.0	
		Z	3.97	70.32	17.54		150.0	
10431-AAB	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	X	4.07	66.92	15.99	0.00	150.0	± 9.6 %
		Y	4.16	67.26	16.25		150.0	
		Z	3.97	66.72	15.78		150.0	
10432-AAB	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	X	4.38	66.81	16.12	0.00	150.0	± 9.6 %
		Y	4.46	67.11	16.35		150.0	
		Z	4.29	66.64	15.96		150.0	
10433-AAB	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	X	4.63	66.80	16.22	0.00	150.0	± 9.6 %
		Y	4.71	67.07	16.42		150.0	
		Z	4.55	66.64	16.08		150.0	
10434-AAA	W-CDMA (BS Test Model 1, 64 DPCH)	X	4.18	71.39	17.74	0.00	150.0	± 9.6 %
		Y	4.23	71.47	17.90		150.0	
		Z	4.00	70.89	17.26		150.0	
10435-AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	129.32	33.53	3.23	80.0	± 9.6 %
		Y	100.00	127.84	32.85		80.0	
		Z	100.00	129.21	33.20		80.0	
10447-AAB	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	X	3.32	66.73	15.05	0.00	150.0	± 9.6 %
		Y	3.44	67.25	15.47		150.0	
		Z	3.19	66.36	14.65		150.0	
10448-AAB	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	X	3.91	66.69	15.84	0.00	150.0	± 9.6 %
		Y	4.00	67.04	16.12		150.0	
		Z	3.82	66.49	15.63		150.0	
10449-AAB	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	X	4.20	66.63	16.01	0.00	150.0	± 9.6 %
		Y	4.28	66.94	16.24		150.0	
		Z	4.12	66.45	15.84		150.0	
10450-AAB	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	X	4.40	66.55	16.06	0.00	150.0	± 9.6 %
		Y	4.48	66.84	16.28		150.0	
		Z	4.33	66.39	15.92		150.0	
10451-AAA	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	X	3.17	66.71	14.50	0.00	150.0	± 9.6 %
		Y	3.31	67.35	15.00		150.0	
		Z	3.02	66.20	13.98		150.0	
10456-AAA	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle)	X	6.15	67.71	16.63	0.00	150.0	± 9.6 %
		Y	6.19	67.88	16.74		150.0	
		Z	6.12	67.68	16.59		150.0	
10457-AAA	UMTS-FDD (DC-HSDPA)	X	3.71	65.06	15.78	0.00	150.0	± 9.6 %
		Y	3.77	65.33	15.99		150.0	
		Z	3.66	64.95	15.64		150.0	
10458-AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	X	3.78	70.42	16.91	0.00	150.0	± 9.6 %
		Y	3.89	70.79	17.26		150.0	
		Z	3.57	69.69	16.25		150.0	
10459-AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	X	4.94	68.36	17.97	0.00	150.0	± 9.6 %
		Y	4.99	68.35	18.00		150.0	
		Z	4.87	68.39	17.79		150.0	

EX3DV4- SN-3797

November 22, 2017

10460-AAA	UMTS-FDD (WCDMA, AMR)	X	0.77	66.48	14.67	0.00	150.0	± 9.6 %
		Y	0.94	69.39	16.73		150.0	
		Z	0.69	65.04	13.52		150.0	
10461-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	135.17	36.27	3.29	80.0	± 9.6 %
		Y	100.00	134.77	36.05		80.0	
		Z	100.00	134.36	35.65		80.0	
10462-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	111.38	25.26	3.23	80.0	± 9.6 %
		Y	100.00	110.02	24.56		80.0	
		Z	19.71	92.47	20.17		80.0	
10463-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	20.24	90.82	19.37	3.23	80.0	± 9.6 %
		Y	16.86	88.22	18.36		80.0	
		Z	1.56	65.93	11.16		80.0	
10464-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	132.58	34.88	3.23	80.0	± 9.6 %
		Y	100.00	132.18	34.66		80.0	
		Z	100.00	131.46	34.11		80.0	
10465-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	110.55	24.87	3.23	80.0	± 9.6 %
		Y	100.00	109.21	24.18		80.0	
		Z	5.62	79.57	16.55		80.0	
10466-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.58	78.05	15.78	3.23	80.0	± 9.6 %
		Y	6.25	78.66	15.65		80.0	
		Z	1.31	64.25	10.38		80.0	
10467-AAC	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	132.95	35.04	3.23	80.0	± 9.6 %
		Y	100.00	132.52	34.81		80.0	
		Z	100.00	131.85	34.28		80.0	
10468-AAC	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	110.83	25.00	3.23	80.0	± 9.6 %
		Y	100.00	109.48	24.30		80.0	
		Z	7.41	82.44	17.43		80.0	
10469-AAC	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.80	78.44	15.89	3.23	80.0	± 9.6 %
		Y	6.47	79.00	15.75		80.0	
		Z	1.32	64.31	10.41		80.0	
10470-AAC	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	133.00	35.05	3.23	80.0	± 9.6 %
		Y	100.00	132.58	34.83		80.0	
		Z	100.00	131.90	34.29		80.0	
10471-AAC	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	110.75	24.96	3.23	80.0	± 9.6 %
		Y	100.00	109.39	24.26		80.0	
		Z	7.21	82.14	17.32		80.0	
10472-AAC	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.67	78.19	15.80	3.23	80.0	± 9.6 %
		Y	6.33	78.77	15.66		80.0	
		Z	1.31	64.23	10.35		80.0	
10473-AAC	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	132.96	35.03	3.23	80.0	± 9.6 %
		Y	100.00	132.55	34.81		80.0	
		Z	100.00	131.86	34.27		80.0	
10474-AAC	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	110.75	24.96	3.23	80.0	± 9.6 %
		Y	100.00	109.40	24.26		80.0	
		Z	7.05	81.92	17.26		80.0	
10475-AAC	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.54	77.99	15.74	3.23	80.0	± 9.6 %
		Y	6.21	78.60	15.61		80.0	
		Z	1.30	64.19	10.34		80.0	

EX3DV4- SN:3797

November 22, 2017

10477-AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	110.49	24.84	3.23	80.0	± 9.6 %
		Y	100.00	109.14	24.14		80.0	
		Z	5.72	79.73	16.57		80.0	
10478-AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.35	77.61	15.61	3.23	80.0	± 9.6 %
		Y	6.01	78.26	15.50		80.0	
		Z	1.29	64.11	10.29		80.0	
10479-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	43.37	115.66	31.91	3.23	80.0	± 9.6 %
		Y	29.34	109.47	30.36		80.0	
		Z	27.04	107.94	29.57		80.0	
10480-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	44.57	106.12	26.89	3.23	80.0	± 9.6 %
		Y	34.26	102.52	25.93		80.0	
		Z	18.96	94.20	23.28		80.0	
10481-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	23.11	95.94	23.73	3.23	80.0	± 9.6 %
		Y	19.63	93.76	23.10		80.0	
		Z	10.19	85.11	20.15		80.0	
10482-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.02	72.87	16.91	2.23	80.0	± 9.6 %
		Y	4.27	77.91	19.17		80.0	
		Z	2.19	68.80	14.83		80.0	
10483-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	7.43	81.25	19.67	2.23	80.0	± 9.6 %
		Y	6.76	79.97	19.29		80.0	
		Z	4.32	73.95	16.58		80.0	
10484-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	6.11	78.40	18.70	2.23	80.0	± 9.6 %
		Y	5.78	77.63	18.47		80.0	
		Z	3.79	72.04	15.84		80.0	
10485-AAC	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.48	75.06	18.97	2.23	80.0	± 9.6 %
		Y	4.37	78.67	20.63		80.0	
		Z	2.81	72.16	17.54		80.0	
10486-AAC	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.09	69.81	16.08	2.23	80.0	± 9.6 %
		Y	3.59	71.83	17.27		80.0	
		Z	2.63	67.55	14.85		80.0	
10487-AAC	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.06	69.09	15.84	2.23	80.0	± 9.6 %
		Y	3.53	71.17	16.97		80.0	
		Z	2.62	67.13	14.64		80.0	
10488-AAC	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.57	73.39	19.20	2.23	80.0	± 9.6 %
		Y	4.10	75.69	20.32		80.0	
		Z	3.13	71.59	18.33		80.0	
10489-AAC	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.38	69.28	17.42	2.23	80.0	± 9.6 %
		Y	3.65	70.51	18.12		80.0	
		Z	3.10	68.23	16.80		80.0	
10490-AAC	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.46	69.08	17.34	2.23	80.0	± 9.6 %
		Y	3.72	70.24	18.00		80.0	
		Z	3.19	68.09	16.74		80.0	
10491-AAC	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.72	71.40	18.54	2.23	80.0	± 9.6 %
		Y	4.10	73.03	19.37		80.0	
		Z	3.37	70.11	17.90		80.0	
10492-AAC	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.89	68.33	17.36	2.23	80.0	± 9.6 %
		Y	3.91	69.28	17.90		80.0	
		Z	3.46	67.54	16.90		80.0	

EX3DV4- SN:3797

November 22, 2017

10493-AAC	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.75	68.18	17.30	2.23	80.0	± 9.6 %
		Y	3.96	69.09	17.83		80.0	
		Z	3.52	67.43	16.85		80.0	
10494-AAC	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.07	73.04	19.06	2.23	80.0	± 9.6 %
		Y	4.57	74.98	20.00		80.0	
		Z	3.63	71.49	18.35		80.0	
10495-AAC	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.72	68.69	17.57	2.23	80.0	± 9.6 %
		Y	3.95	69.68	18.12		80.0	
		Z	3.48	67.84	17.10		80.0	
10496-AAC	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.79	68.39	17.47	2.23	80.0	± 9.6 %
		Y	4.01	69.31	17.99		80.0	
		Z	3.56	67.62	17.03		80.0	
10497-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	1.83	66.24	12.89	2.23	80.0	± 9.6 %
		Y	2.76	71.40	15.46		80.0	
		Z	1.32	62.65	10.68		80.0	
10498-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.32	60.22	8.74	2.23	80.0	± 9.6 %
		Y	1.59	62.16	10.10		80.0	
		Z	1.24	60.00	8.12		80.0	
10499-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.31	60.00	8.47	2.23	80.0	± 9.6 %
		Y	1.51	61.41	9.55		80.0	
		Z	1.25	60.00	7.96		80.0	
10500-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.45	74.03	18.95	2.23	80.0	± 9.6 %
		Y	4.12	76.91	20.32		80.0	
		Z	2.91	71.77	17.81		80.0	
10501-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.25	69.65	16.67	2.23	80.0	± 9.6 %
		Y	3.63	71.37	17.62		80.0	
		Z	2.87	68.11	15.73		80.0	
10502-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.29	69.45	16.51	2.23	80.0	± 9.6 %
		Y	3.67	71.12	17.44		80.0	
		Z	2.92	67.93	15.57		80.0	
10503-AAC	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.52	73.17	19.09	2.23	80.0	± 9.6 %
		Y	4.05	75.46	20.22		80.0	
		Z	3.09	71.38	18.23		80.0	
10504-AAC	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.36	69.18	17.36	2.23	80.0	± 9.6 %
		Y	3.63	70.42	18.06		80.0	
		Z	3.09	68.13	16.73		80.0	
10505-AAC	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.44	68.98	17.28	2.23	80.0	± 9.6 %
		Y	3.70	70.15	17.95		80.0	
		Z	3.17	67.99	16.68		80.0	
10506-AAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.03	72.88	18.99	2.23	80.0	± 9.6 %
		Y	4.53	74.82	19.92		80.0	
		Z	3.60	71.35	18.28		80.0	
10507-AAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.70	68.62	17.53	2.23	80.0	± 9.6 %
		Y	3.93	69.62	18.09		80.0	
		Z	3.47	67.78	17.06		80.0	

EX3DV4- SN:3797

November 22, 2017

10508-AAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.78	68.32	17.43	2.23	80.0	± 9.6 %
		Y	4.00	69.25	17.95		80.0	
		Z	3.55	67.55	16.99		80.0	
10509-AAC	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.31	71.31	18.34	2.23	80.0	± 9.6 %
		Y	4.69	72.72	19.04		80.0	
		Z	3.97	70.17	17.80		80.0	
10510-AAC	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.17	68.23	17.47	2.23	80.0	± 9.6 %
		Y	4.38	69.07	17.94		80.0	
		Z	3.95	67.52	17.09		80.0	
10511-AAC	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.22	67.97	17.39	2.23	80.0	± 9.6 %
		Y	4.42	68.76	17.84		80.0	
		Z	4.01	67.31	17.04		80.0	
10512-AAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.55	73.00	18.88	2.23	80.0	± 9.6 %
		Y	5.06	74.81	19.74		80.0	
		Z	4.10	71.55	18.23		80.0	
10513-AAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.06	68.49	17.58	2.23	80.0	± 9.6 %
		Y	4.28	69.40	18.08		80.0	
		Z	3.83	67.70	17.17		80.0	
10514-AAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.08	68.05	17.44	2.23	80.0	± 9.6 %
		Y	4.28	68.89	17.91		80.0	
		Z	3.87	67.34	17.07		80.0	
10515-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	X	0.89	62.45	14.03	0.00	150.0	± 9.6 %
		Y	0.98	63.39	14.90		150.0	
		Z	0.86	61.96	13.49		150.0	
10516-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)	X	0.48	67.99	15.03	0.00	150.0	± 9.6 %
		Y	0.70	73.70	18.81		150.0	
		Z	0.41	65.71	13.25		150.0	
10517-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)	X	0.73	63.98	14.31	0.00	150.0	± 9.6 %
		Y	0.82	65.62	15.70		150.0	
		Z	0.68	63.12	13.50		150.0	
10518-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)	X	4.41	66.48	16.05	0.00	150.0	± 9.6 %
		Y	4.48	66.76	16.26		150.0	
		Z	4.34	66.34	15.91		150.0	
10519-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)	X	4.58	66.70	16.17	0.00	150.0	± 9.6 %
		Y	4.66	66.98	16.37		150.0	
		Z	4.50	66.55	16.03		150.0	
10520-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)	X	4.43	66.64	16.08	0.00	150.0	± 9.6 %
		Y	4.51	66.93	16.29		150.0	
		Z	4.35	66.47	15.93		150.0	
10521-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)	X	4.36	66.62	16.06	0.00	150.0	± 9.6 %
		Y	4.44	66.92	16.28		150.0	
		Z	4.28	66.44	15.90		150.0	
10522-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)	X	4.43	66.75	16.16	0.00	150.0	± 9.6 %
		Y	4.51	67.04	16.38		150.0	
		Z	4.34	66.59	16.01		150.0	

EX3DV4- SN:3797

November 22, 2017

10523-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)	X	4.32	66.62	16.01	0.00	150.0	± 9.6 %
		Y	4.40	66.92	16.23		150.0	
		Z	4.24	66.48	15.87		150.0	
10524-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)	X	4.37	66.66	16.13	0.00	150.0	± 9.6 %
		Y	4.45	66.96	16.34		150.0	
		Z	4.29	66.51	15.98		150.0	
10525-AAA	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)	X	4.37	65.72	15.73	0.00	150.0	± 9.6 %
		Y	4.45	66.01	15.94		150.0	
		Z	4.30	65.57	15.59		150.0	
10526-AAA	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)	X	4.52	66.06	15.86	0.00	150.0	± 9.6 %
		Y	4.60	66.36	16.08		150.0	
		Z	4.44	65.89	15.72		150.0	
10527-AAA	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)	X	4.44	66.01	15.80	0.00	150.0	± 9.6 %
		Y	4.53	66.32	16.02		150.0	
		Z	4.36	65.84	15.65		150.0	
10528-AAA	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)	X	4.46	66.03	15.83	0.00	150.0	± 9.6 %
		Y	4.54	66.34	16.05		150.0	
		Z	4.38	65.85	15.68		150.0	
10529-AAA	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)	X	4.46	66.03	15.83	0.00	150.0	± 9.6 %
		Y	4.54	66.34	16.05		150.0	
		Z	4.38	65.85	15.68		150.0	
10531-AAA	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)	X	4.44	66.10	15.83	0.00	150.0	± 9.6 %
		Y	4.53	66.42	16.05		150.0	
		Z	4.35	65.90	15.67		150.0	
10532-AAA	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)	X	4.31	65.95	15.76	0.00	150.0	± 9.6 %
		Y	4.39	66.27	15.98		150.0	
		Z	4.22	65.75	15.59		150.0	
10533-AAA	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)	X	4.47	66.09	15.83	0.00	150.0	± 9.6 %
		Y	4.55	66.40	16.04		150.0	
		Z	4.38	65.92	15.68		150.0	
10534-AAA	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)	X	5.01	66.14	15.93	0.00	150.0	± 9.6 %
		Y	5.08	66.40	16.10		150.0	
		Z	4.95	65.99	15.81		150.0	
10535-AAA	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	X	5.08	66.34	16.02	0.00	150.0	± 9.6 %
		Y	5.15	66.59	16.19		150.0	
		Z	5.01	66.17	15.90		150.0	
10536-AAA	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc duty cycle)	X	4.95	66.29	15.97	0.00	150.0	± 9.6 %
		Y	5.02	66.54	16.15		150.0	
		Z	4.88	66.12	15.85		150.0	
10537-AAA	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc duty cycle)	X	5.01	66.24	15.95	0.00	150.0	± 9.6 %
		Y	5.08	66.50	16.13		150.0	
		Z	4.94	66.08	15.84		150.0	
10538-AAA	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)	X	5.09	66.25	16.00	0.00	150.0	± 9.6 %
		Y	5.16	66.51	16.17		150.0	
		Z	5.02	66.09	15.89		150.0	
10540-AAA	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc duty cycle)	X	5.02	66.25	16.02	0.00	150.0	± 9.6 %
		Y	5.09	66.51	16.19		150.0	
		Z	4.95	66.07	15.89		150.0	

EX3DV4- SN:3797

November 22, 2017

10541-AAA	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)	X	5.00	66.13	15.94	0.00	150.0	± 9.6 %
		Y	5.07	66.39	16.12		150.0	
		Z	4.92	65.95	15.81		150.0	
10542-AAA	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)	X	5.16	66.22	16.01	0.00	150.0	± 9.6 %
		Y	5.22	66.47	16.18		150.0	
		Z	5.08	66.07	15.89		150.0	
10543-AAA	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc duty cycle)	X	5.22	66.24	16.04	0.00	150.0	± 9.6 %
		Y	5.29	66.49	16.21		150.0	
		Z	5.15	66.10	15.94		150.0	
10544-AAA	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	X	5.34	66.25	15.93	0.00	150.0	± 9.6 %
		Y	5.41	66.50	16.09		150.0	
		Z	5.28	66.10	15.82		150.0	
10545-AAA	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)	X	5.54	66.72	16.12	0.00	150.0	± 9.6 %
		Y	5.60	66.94	16.27		150.0	
		Z	5.48	66.58	16.02		150.0	
10546-AAA	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)	X	5.39	66.43	15.99	0.00	150.0	± 9.6 %
		Y	5.46	66.68	16.15		150.0	
		Z	5.32	66.25	15.87		150.0	
10547-AAA	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)	X	5.47	66.50	16.01	0.00	150.0	± 9.6 %
		Y	5.53	66.74	16.17		150.0	
		Z	5.40	66.34	15.91		150.0	
10548-AAA	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc duty cycle)	X	5.71	67.43	16.46	0.00	150.0	± 9.6 %
		Y	5.76	67.63	16.60		150.0	
		Z	5.63	67.22	16.32		150.0	
10550-AAA	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc duty cycle)	X	5.44	66.53	16.05	0.00	150.0	± 9.6 %
		Y	5.50	66.75	16.20		150.0	
		Z	5.38	66.41	15.96		150.0	
10551-AAA	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)	X	5.42	66.49	15.99	0.00	150.0	± 9.6 %
		Y	5.49	66.75	16.16		150.0	
		Z	5.35	66.30	15.87		150.0	
10552-AAA	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)	X	5.35	66.32	15.91	0.00	150.0	± 9.6 %
		Y	5.42	66.57	16.07		150.0	
		Z	5.28	66.16	15.80		150.0	
10553-AAA	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)	X	5.42	66.33	15.95	0.00	150.0	± 9.6 %
		Y	5.49	66.59	16.11		150.0	
		Z	5.35	66.16	15.83		150.0	
10554-AAB	IEEE 802.11ac WiFi (160MHz, MCS0, 99pc duty cycle)	X	5.76	66.63	16.03	0.00	150.0	± 9.6 %
		Y	5.82	66.86	16.18		150.0	
		Z	5.71	66.47	15.93		150.0	
10555-AAB	IEEE 802.11ac WiFi (160MHz, MCS1, 99pc duty cycle)	X	5.89	66.93	16.16	0.00	150.0	± 9.6 %
		Y	5.94	67.16	16.31		150.0	
		Z	5.82	66.77	16.06		150.0	
10556-AAB	IEEE 802.11ac WiFi (160MHz, MCS2, 99pc duty cycle)	X	5.91	66.98	16.18	0.00	150.0	± 9.6 %
		Y	5.97	67.21	16.33		150.0	
		Z	5.85	66.83	16.09		150.0	
10557-AAB	IEEE 802.11ac WiFi (160MHz, MCS3, 99pc duty cycle)	X	5.86	66.85	16.14	0.00	150.0	± 9.6 %
		Y	5.92	67.09	16.29		150.0	
		Z	5.80	66.69	16.03		150.0	

EX3DV4- SN:3797

November 22, 2017

10558-AAB	IEEE 802.11ac WiFi (160MHz, MCS4, 99pc duty cycle)	X	5.91	67.01	16.23	0.00	150.0	± 9.6 %
		Y	5.97	67.25	16.39		150.0	
		Z	5.84	66.83	16.12		150.0	
10560-AAB	IEEE 802.11ac WiFi (160MHz, MCS6, 99pc duty cycle)	X	5.90	66.86	16.19	0.00	150.0	± 9.6 %
		Y	5.96	67.10	16.35		150.0	
		Z	5.84	66.70	16.09		150.0	
10561-AAB	IEEE 802.11ac WiFi (160MHz, MCS7, 99pc duty cycle)	X	5.83	66.86	16.23	0.00	150.0	± 9.6 %
		Y	5.89	67.09	16.38		150.0	
		Z	5.78	66.70	16.13		150.0	
10562-AAB	IEEE 802.11ac WiFi (160MHz, MCS8, 99pc duty cycle)	X	5.93	67.16	16.38	0.00	150.0	± 9.6 %
		Y	6.00	67.41	16.54		150.0	
		Z	5.85	66.94	16.24		150.0	
10563-AAB	IEEE 802.11ac WiFi (160MHz, MCS9, 99pc duty cycle)	X	6.04	67.13	16.33	0.00	150.0	± 9.6 %
		Y	6.11	67.38	16.49		150.0	
		Z	5.85	66.90	16.19		150.0	
10564-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)	X	4.74	66.58	16.23	0.46	150.0	± 9.6 %
		Y	4.81	66.85	16.44		150.0	
		Z	4.67	66.45	16.11		150.0	
10565-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle)	X	4.95	67.01	16.55	0.46	150.0	± 9.6 %
		Y	5.03	67.26	16.74		150.0	
		Z	4.87	66.87	16.43		150.0	
10566-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty cycle)	X	4.79	66.84	16.36	0.46	150.0	± 9.6 %
		Y	4.86	67.11	16.56		150.0	
		Z	4.71	66.69	16.23		150.0	
10567-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty cycle)	X	4.82	67.22	16.72	0.46	150.0	± 9.6 %
		Y	4.89	67.47	16.89		150.0	
		Z	4.73	67.07	16.58		150.0	
10568-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty cycle)	X	4.70	66.63	16.14	0.46	150.0	± 9.6 %
		Y	4.78	66.94	16.37		150.0	
		Z	4.62	66.48	16.00		150.0	
10569-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty cycle)	X	4.78	67.36	16.81	0.46	150.0	± 9.6 %
		Y	4.85	67.59	16.97		150.0	
		Z	4.71	67.22	16.68		150.0	
10570-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle)	X	4.81	67.20	16.73	0.46	150.0	± 9.6 %
		Y	4.88	67.44	16.90		150.0	
		Z	4.73	67.05	16.60		150.0	
10571-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	X	1.08	63.77	15.08	0.46	130.0	± 9.6 %
		Y	1.17	64.82	15.96		130.0	
		Z	1.03	63.10	14.50		130.0	
10572-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	X	1.09	64.31	15.43	0.46	130.0	± 9.6 %
		Y	1.18	65.42	16.33		130.0	
		Z	1.03	63.57	14.81		130.0	
10573-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	X	1.63	82.59	21.48	0.46	130.0	± 9.6 %
		Y	4.67	100.67	28.34		130.0	
		Z	1.02	75.27	18.21		130.0	
10574-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)	X	1.15	69.82	18.12	0.46	130.0	± 9.6 %
		Y	1.32	71.73	19.52		130.0	
		Z	1.04	67.97	17.04		130.0	

EX3DV4- SN:3797

November 22, 2017

10575-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	X	4.53	66.40	16.31	0.46	130.0	± 9.6 %
		Y	4.60	66.66	16.51		130.0	
		Z	4.46	66.26	16.18		130.0	
10576-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	X	4.55	66.57	16.38	0.46	130.0	± 9.6 %
		Y	4.62	66.82	16.57		130.0	
		Z	4.48	66.43	16.25		130.0	
10577-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)	X	4.74	66.84	16.54	0.46	130.0	± 9.6 %
		Y	4.81	67.09	16.73		130.0	
		Z	4.66	66.69	16.41		130.0	
10578-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)	X	4.64	66.99	16.64	0.46	130.0	± 9.6 %
		Y	4.71	67.22	16.82		130.0	
		Z	4.56	66.83	16.50		130.0	
10579-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)	X	4.40	66.24	15.93	0.46	130.0	± 9.6 %
		Y	4.48	66.56	16.17		130.0	
		Z	4.32	66.07	15.78		130.0	
10580-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)	X	4.45	66.31	15.97	0.46	130.0	± 9.6 %
		Y	4.53	66.64	16.22		130.0	
		Z	4.37	66.15	15.82		130.0	
10581-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)	X	4.54	67.02	16.59	0.46	130.0	± 9.6 %
		Y	4.61	67.28	16.77		130.0	
		Z	4.46	66.87	16.45		130.0	
10582-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)	X	4.34	66.01	15.72	0.46	130.0	± 9.6 %
		Y	4.43	66.35	15.98		130.0	
		Z	4.26	65.85	15.57		130.0	
10583-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	X	4.53	66.40	16.31	0.46	130.0	± 9.6 %
		Y	4.60	66.66	16.51		130.0	
		Z	4.46	66.26	16.18		130.0	
10584-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	X	4.55	66.57	16.38	0.46	130.0	± 9.6 %
		Y	4.62	66.82	16.57		130.0	
		Z	4.48	66.43	16.25		130.0	
10585-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)	X	4.74	66.84	16.54	0.46	130.0	± 9.6 %
		Y	4.81	67.09	16.73		130.0	
		Z	4.66	66.69	16.41		130.0	
10586-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)	X	4.64	66.99	16.64	0.46	130.0	± 9.6 %
		Y	4.71	67.22	16.82		130.0	
		Z	4.56	66.83	16.50		130.0	
10587-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)	X	4.40	66.24	15.93	0.46	130.0	± 9.6 %
		Y	4.48	66.56	16.17		130.0	
		Z	4.32	66.07	15.78		130.0	
10588-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)	X	4.45	66.31	15.97	0.46	130.0	± 9.6 %
		Y	4.53	66.64	16.22		130.0	
		Z	4.37	66.15	15.82		130.0	
10589-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)	X	4.54	67.02	16.59	0.46	130.0	± 9.6 %
		Y	4.61	67.28	16.77		130.0	
		Z	4.46	66.87	16.45		130.0	
10590-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)	X	4.34	66.01	15.72	0.46	130.0	± 9.6 %
		Y	4.43	66.35	15.98		130.0	
		Z	4.26	65.85	15.57		130.0	

EX3DV4- SN:3797

November 22, 2017

10591-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	X	4.68	66.47	16.42	0.46	130.0	± 9.6 %
		Y	4.75	66.71	16.60		130.0	
		Z	4.61	66.34	16.30		130.0	
10592-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	X	4.82	66.79	16.55	0.46	130.0	± 9.6 %
		Y	4.89	67.04	16.73		130.0	
		Z	4.74	66.65	16.43		130.0	
10593-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc duty cycle)	X	4.74	66.68	16.42	0.46	130.0	± 9.6 %
		Y	4.81	66.94	16.61		130.0	
		Z	4.66	66.53	16.29		130.0	
10594-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc duty cycle)	X	4.80	66.86	16.56	0.46	130.0	± 9.6 %
		Y	4.87	67.10	16.76		130.0	
		Z	4.72	66.71	16.45		130.0	
10595-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc duty cycle)	X	4.76	66.81	16.48	0.46	130.0	± 9.6 %
		Y	4.83	67.07	16.67		130.0	
		Z	4.68	66.67	16.35		130.0	
10596-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc duty cycle)	X	4.70	66.80	16.48	0.46	130.0	± 9.6 %
		Y	4.77	67.07	16.68		130.0	
		Z	4.62	66.65	16.35		130.0	
10597-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc duty cycle)	X	4.65	66.69	16.35	0.46	130.0	± 9.6 %
		Y	4.72	66.96	16.55		130.0	
		Z	4.57	66.53	16.21		130.0	
10598-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc duty cycle)	X	4.63	66.91	16.61	0.46	130.0	± 9.6 %
		Y	4.70	67.16	16.79		130.0	
		Z	4.55	66.74	16.46		130.0	
10599-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	X	5.37	67.02	16.67	0.46	130.0	± 9.6 %
		Y	5.42	67.22	16.82		130.0	
		Z	5.31	66.93	16.60		130.0	
10600-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	X	5.51	67.51	16.89	0.46	130.0	± 9.6 %
		Y	5.56	67.66	17.02		130.0	
		Z	5.45	67.42	16.81		130.0	
10601-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle)	X	5.39	67.21	16.76	0.46	130.0	± 9.6 %
		Y	5.44	67.40	16.90		130.0	
		Z	5.33	67.10	16.67		130.0	
10602-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)	X	5.51	67.34	16.74	0.46	130.0	± 9.6 %
		Y	5.56	67.52	16.88		130.0	
		Z	5.46	67.26	16.67		130.0	
10603-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc duty cycle)	X	5.58	67.60	17.00	0.46	130.0	± 9.6 %
		Y	5.62	67.76	17.13		130.0	
		Z	5.52	67.53	16.94		130.0	
10604-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)	X	5.43	67.20	16.79	0.46	130.0	± 9.6 %
		Y	5.48	67.36	16.92		130.0	
		Z	5.41	67.23	16.78		130.0	
10605-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)	X	5.51	67.42	16.90	0.46	130.0	± 9.6 %
		Y	5.55	67.59	17.04		130.0	
		Z	5.44	67.31	16.81		130.0	
10606-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc duty cycle)	X	5.22	66.63	16.36	0.46	130.0	± 9.6 %
		Y	5.28	66.85	16.53		130.0	
		Z	5.18	66.57	16.29		130.0	

EX3DV4- SN:3797

November 22, 2017

10607-AAA	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	X	4.52	65.76	16.04	0.46	130.0	± 9.6 %
		Y	4.59	66.04	16.24		130.0	
		Z	4.45	65.64	15.91		130.0	
10608-AAA	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	X	4.69	66.16	16.21	0.46	130.0	± 9.6 %
		Y	4.77	66.43	16.40		130.0	
		Z	4.61	66.01	16.07		130.0	
10609-AAA	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc duty cycle)	X	4.58	66.00	16.03	0.46	130.0	± 9.6 %
		Y	4.66	66.29	16.24		130.0	
		Z	4.50	65.84	15.89		130.0	
10610-AAA	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc duty cycle)	X	4.63	66.16	16.20	0.46	130.0	± 9.6 %
		Y	4.71	66.43	16.39		130.0	
		Z	4.55	66.00	16.06		130.0	
10611-AAA	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc duty cycle)	X	4.55	65.97	16.05	0.46	130.0	± 9.6 %
		Y	4.62	66.25	16.25		130.0	
		Z	4.47	65.80	15.91		130.0	
10612-AAA	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc duty cycle)	X	4.55	66.12	16.09	0.46	130.0	± 9.6 %
		Y	4.63	66.42	16.31		130.0	
		Z	4.46	65.94	15.95		130.0	
10613-AAA	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc duty cycle)	X	4.55	65.97	15.96	0.46	130.0	± 9.6 %
		Y	4.63	66.28	16.18		130.0	
		Z	4.46	65.79	15.81		130.0	
10614-AAA	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle)	X	4.50	66.16	16.19	0.46	130.0	± 9.6 %
		Y	4.58	66.44	16.39		130.0	
		Z	4.42	65.98	16.04		130.0	
10615-AAA	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc duty cycle)	X	4.55	65.80	15.82	0.46	130.0	± 9.6 %
		Y	4.63	66.12	16.05		130.0	
		Z	4.46	65.65	15.68		130.0	
10616-AAA	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	X	5.18	66.24	16.26	0.46	130.0	± 9.6 %
		Y	5.24	66.47	16.42		130.0	
		Z	5.11	66.09	16.15		130.0	
10617-AAA	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)	X	5.26	66.47	16.35	0.46	130.0	± 9.6 %
		Y	5.32	66.68	16.50		130.0	
		Z	5.19	66.32	16.25		130.0	
10618-AAA	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle)	X	5.14	66.45	16.36	0.46	130.0	± 9.6 %
		Y	5.20	66.67	16.51		130.0	
		Z	5.07	66.32	16.25		130.0	
10619-AAA	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc duty cycle)	X	5.15	66.24	16.19	0.46	130.0	± 9.6 %
		Y	5.21	66.48	16.35		130.0	
		Z	5.08	66.11	16.09		130.0	
10620-AAA	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)	X	5.24	66.28	16.26	0.46	130.0	± 9.6 %
		Y	5.30	66.51	16.42		130.0	
		Z	5.17	66.14	16.15		130.0	
10621-AAA	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc duty cycle)	X	5.24	66.41	16.45	0.46	130.0	± 9.6 %
		Y	5.30	66.62	16.58		130.0	
		Z	5.17	66.26	16.33		130.0	
10622-AAA	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)	X	5.26	66.58	16.52	0.46	130.0	± 9.6 %
		Y	5.32	66.79	16.67		130.0	
		Z	5.18	66.40	16.40		130.0	

EX3DV4-SN:3797

November 22, 2017

10623-AAA	IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)	X	5.13	66.09	16.14	0.46	130.0	± 9.6 %
		Y	5.20	66.34	16.32		130.0	
		Z	5.05	65.90	16.02		130.0	
10624-AAA	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc duty cycle)	X	5.32	66.30	16.32	0.46	130.0	± 9.6 %
		Y	5.38	66.52	16.47		130.0	
		Z	5.25	66.16	16.21		130.0	
10625-AAA	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)	X	5.62	67.08	16.76	0.46	130.0	± 9.6 %
		Y	5.68	67.32	16.93		130.0	
		Z	5.46	66.69	16.54		130.0	
10626-AAA	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)	X	5.49	66.30	16.23	0.46	130.0	± 9.6 %
		Y	5.55	66.52	16.38		130.0	
		Z	5.44	66.16	16.13		130.0	
10627-AAA	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)	X	5.75	66.95	16.52	0.46	130.0	± 9.6 %
		Y	5.79	67.12	16.64		130.0	
		Z	5.70	66.84	16.44		130.0	
10628-AAA	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)	X	5.51	66.35	16.15	0.46	130.0	± 9.6 %
		Y	5.58	66.60	16.32		130.0	
		Z	5.44	66.18	16.04		130.0	
10629-AAA	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)	X	5.60	66.45	16.20	0.46	130.0	± 9.6 %
		Y	5.65	66.67	16.35		130.0	
		Z	5.54	66.32	16.11		130.0	
10630-AAA	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)	X	6.03	67.95	16.95	0.46	130.0	± 9.6 %
		Y	6.06	68.09	17.06		130.0	
		Z	5.93	67.70	16.80		130.0	
10631-AAA	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)	X	5.89	67.65	16.99	0.46	130.0	± 9.6 %
		Y	5.95	67.83	17.11		130.0	
		Z	5.80	67.42	16.85		130.0	
10632-AAA	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)	X	5.72	67.01	16.69	0.46	130.0	± 9.6 %
		Y	5.76	67.16	16.79		130.0	
		Z	5.67	66.93	16.62		130.0	
10633-AAA	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)	X	5.57	66.52	16.27	0.46	130.0	± 9.6 %
		Y	5.64	66.76	16.42		130.0	
		Z	5.51	66.38	16.18		130.0	
10634-AAA	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)	X	5.55	66.64	16.33	0.46	130.0	± 9.6 %
		Y	5.62	66.76	16.48		130.0	
		Z	5.49	66.38	16.23		130.0	
10635-AAA	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)	X	5.43	65.87	15.73	0.46	130.0	± 9.6 %
		Y	5.50	66.15	15.93		130.0	
		Z	5.36	65.70	15.62		130.0	
10636-AAB	IEEE 802.11ac WiFi (160MHz, MCS0, 90pc duty cycle)	X	5.92	66.67	16.32	0.46	130.0	± 9.6 %
		Y	5.97	66.88	16.46		130.0	
		Z	5.87	66.55	16.24		130.0	
10637-AAB	IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)	X	6.08	67.09	16.52	0.46	130.0	± 9.6 %
		Y	6.13	67.28	16.65		130.0	
		Z	6.02	66.94	16.42		130.0	
10638-AAB	IEEE 802.11ac WiFi (160MHz, MCS2, 90pc duty cycle)	X	6.08	67.05	16.47	0.46	130.0	± 9.6 %
		Y	6.13	67.25	16.60		130.0	
		Z	6.02	66.92	16.39		130.0	

EX3DV4- SN:3797

November 22, 2017

10639-AAB	IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)	X	6.04	66.96	16.47	0.46	130.0	± 9.6 %
		Y	6.10	67.17	16.61		130.0	
		Z	5.98	66.81	16.38		130.0	
10640-AAB	IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)	X	6.04	66.97	16.42	0.46	130.0	± 9.6 %
		Y	6.10	67.20	16.57		130.0	
		Z	5.98	66.81	16.32		130.0	
10641-AAB	IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)	X	6.11	66.95	16.43	0.46	130.0	± 9.6 %
		Y	6.16	67.15	16.57		130.0	
		Z	6.06	66.84	16.36		130.0	
10642-AAB	IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)	X	6.13	67.13	16.69	0.46	130.0	± 9.6 %
		Y	6.18	67.32	16.81		130.0	
		Z	6.07	66.99	16.60		130.0	
10643-AAB	IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)	X	5.98	66.86	16.45	0.46	130.0	± 9.6 %
		Y	6.03	67.07	16.59		130.0	
		Z	5.93	66.73	16.36		130.0	
10644-AAB	IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)	X	6.10	67.22	16.65	0.46	130.0	± 9.6 %
		Y	6.16	67.46	16.81		130.0	
		Z	6.01	67.00	16.51		130.0	
10645-AAB	IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)	X	6.27	67.37	16.69	0.46	130.0	± 9.6 %
		Y	6.33	67.60	16.84		130.0	
		Z	6.19	67.19	16.58		130.0	
10646-AAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)	X	19.31	114.28	39.96	9.30	60.0	± 9.6 %
		Y	65.32	147.35	49.79		60.0	
		Z	13.53	106.61	37.67		60.0	
10647-AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)	X	16.27	110.85	39.07	9.30	60.0	± 9.6 %
		Y	45.52	139.18	47.88		60.0	
		Z	11.55	103.43	36.79		60.0	
10648-AAA	CDMA2000 (1x Advanced)	X	0.52	61.38	8.46	0.00	150.0	± 9.6 %
		Y	0.64	63.18	10.20		150.0	
		Z	0.45	60.27	7.19		150.0	
10652-AAB	LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	X	3.48	66.73	16.48	2.23	80.0	± 9.6 %
		Y	3.65	67.47	16.95		80.0	
		Z	3.31	66.16	16.07		80.0	
10653-AAB	LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	X	4.00	68.01	16.65	2.23	80.0	± 9.6 %
		Y	4.14	66.58	17.00		80.0	
		Z	3.87	65.59	16.36		80.0	
10654-AAB	LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	X	3.99	65.63	16.65	2.23	80.0	± 9.6 %
		Y	4.12	66.17	16.99		80.0	
		Z	3.87	65.23	16.39		80.0	
10655-AAB	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	X	4.06	65.59	16.69	2.23	80.0	± 9.6 %
		Y	4.18	66.13	17.03		80.0	
		Z	3.94	65.19	16.43		80.0	

² Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

Attachment 7. – Dipole Calibration Data

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



S Schweizerischer Kalibrierdienst
S Service suisse d'étalonnage
C 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 **HCT (Dymstec)**

Certificate No: **D750V3-1014_Aug18**

CALIBRATION CERTIFICATE

Object **D750V3 - SN:1014**

Calibration procedure(s) **QA CAL-05.v10
Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **August 14, 2018**

결재	담당자	와인자
	<i>[Signature]</i>	<i>[Signature]</i>
직위/성명	GW 175243	GW 175243
일 자	2018. 10. 23	2018. 10. 23

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 ± 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-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer Agilent EB358A	SN: US41080477	31-Mar-14 (in house check Oct-17)	In house check: Oct-18

Calibrated by:	Name	Function	Signature
	Manu Seitz	Laboratory Technician	<i>[Signature]</i>
Approved by:	Katja Pokovic	Technical Manager	<i>[Signature]</i>

Issued: August 14, 2018

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Zeughausstrasse 43, 8004 Zurich, Switzerland



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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:

- a) 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
- b) 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
- c) 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
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- e) 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	V52.10.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.9 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.05 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.15 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.30 W/kg ± 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.0 ± 6 %	0.96 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.15 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	8.58 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.41 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	5.63 W/kg ± 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	56.4 Ω + 6.4 j Ω
Return Loss	- 21.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.3 Ω + 1.0 j Ω
Return Loss	- 39.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.035 ns
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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	March 22, 2010

DASY5 Validation Report for Head TSL

Date: 14.08.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1014

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used: $f = 750$ MHz; $\sigma = 0.89$ S/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.22, 10.22, 10.22) @ 750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

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

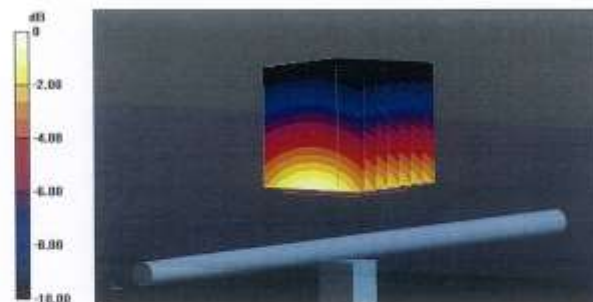
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 59.30 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 3.10 W/kg

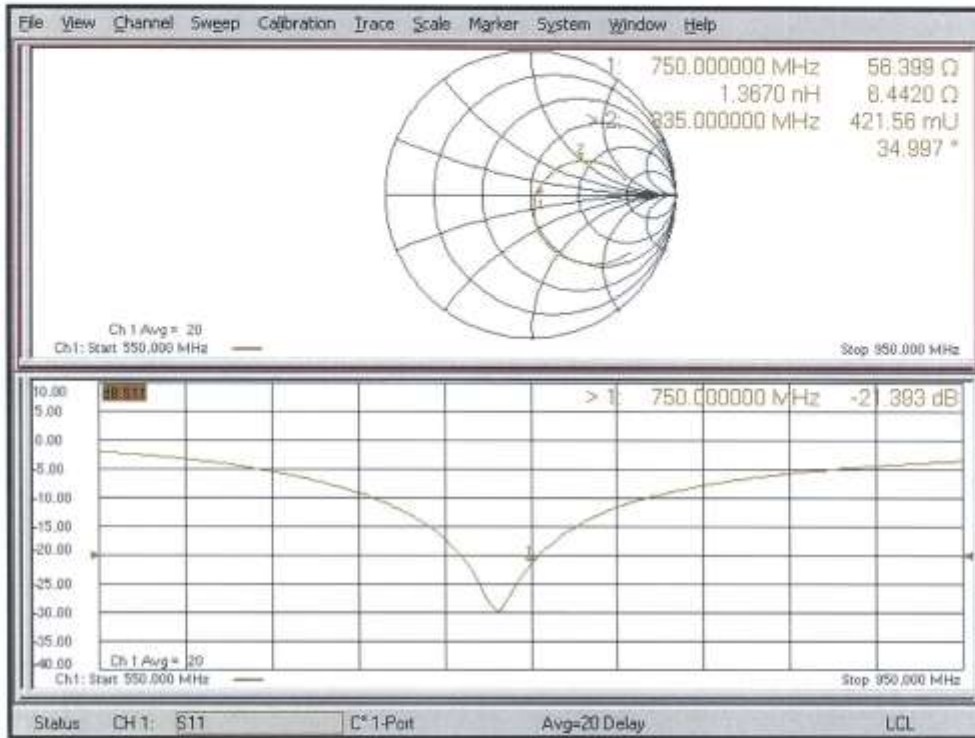
SAR(1 g) = 2.05 W/kg; SAR(10 g) = 1.33 W/kg

Maximum value of SAR (measured) = 2.76 W/kg



0 dB = 2.76 W/kg = 4.41 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 14.08.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1014

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.96 \text{ S/m}$; $\epsilon_r = 55$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.19, 10.19, 10.19) @ 750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

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

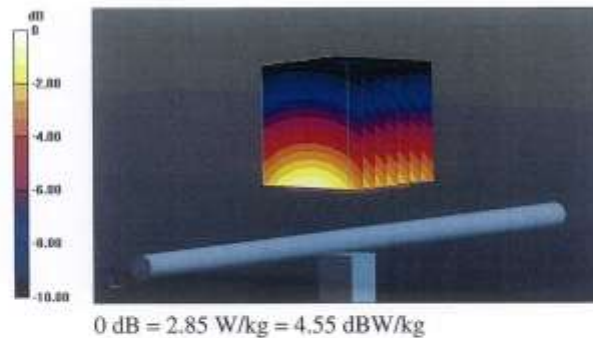
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.92 V/m; Power Drift = -0.02 dB

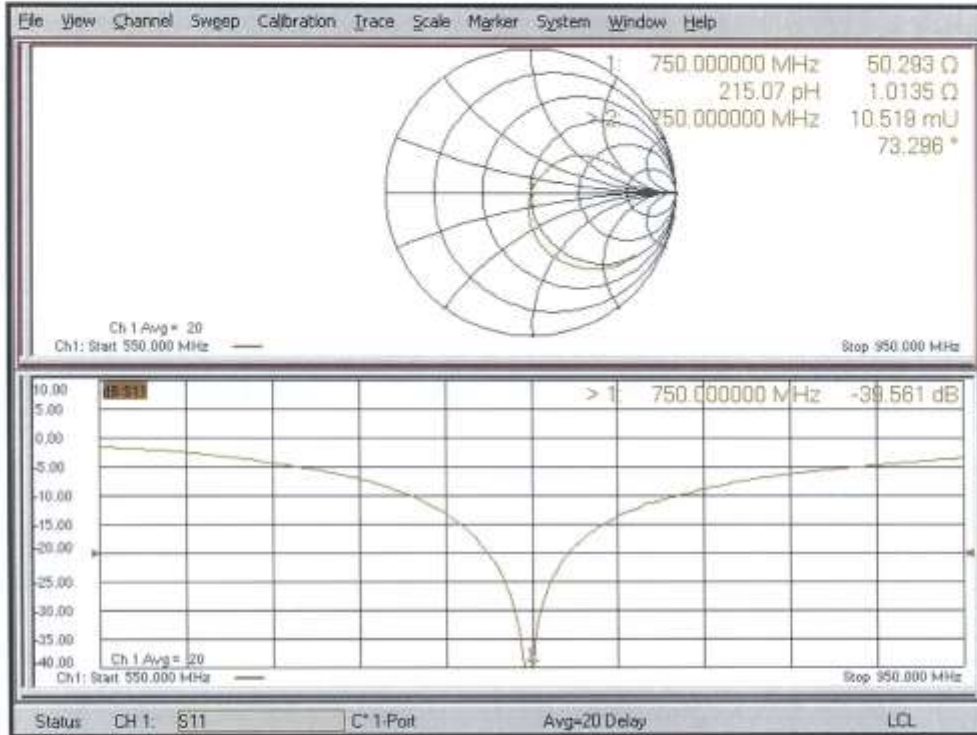
Peak SAR (extrapolated) = 3.20 W/kg

SAR(1 g) = 2.15 W/kg; SAR(10 g) = 1.41 W/kg

Maximum value of SAR (measured) = 2.85 W/kg



Impedance Measurement Plot for Body TSL



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Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)**

Certificate No: **D835V2-4d165_Sep18**

CALIBRATION CERTIFICATE

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Object	D835V2 - SN:4d165																																																											
Calibration procedure(s)	QA CAL-05.v10 Calibration procedure for dipole validation kits above 700 MHz	이위성명 SW 1기재주	KT / 김동현																																																									
Calibration date:	September 18, 2018	일자 2018 / 10 / 05	2018 / 10 - 5																																																									
<p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.</p> <p>Calibration Equipment used (M&TE critical for calibration)</p> <table border="1"> <thead> <tr> <th>Primary Standards</th> <th>ID #</th> <th>Cal Date (Certificate No.)</th> <th>Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>Power meter NRP</td> <td>SN: 104778</td> <td>04-Apr-18 (No. 217-02672/02673)</td> <td>Apr-19</td> </tr> <tr> <td>Power sensor NRP-Z91</td> <td>SN: 103244</td> <td>04-Apr-18 (No. 217-02672)</td> <td>Apr-19</td> </tr> <tr> <td>Power sensor NRP-Z91</td> <td>SN: 103245</td> <td>04-Apr-18 (No. 217-02673)</td> <td>Apr-19</td> </tr> <tr> <td>Reference 20 dB Attenuator</td> <td>SN: 5058 (20k)</td> <td>04-Apr-18 (No. 217-02682)</td> <td>Apr-19</td> </tr> <tr> <td>Type-N mismatch combination</td> <td>SN: 5047.2 / 06327</td> <td>04-Apr-18 (No. 217-02683)</td> <td>Apr-19</td> </tr> <tr> <td>Reference Probe EX3DV4</td> <td>SN: 7349</td> <td>30-Dec-17 (No. EX3-7349_Dec17)</td> <td>Dec-18</td> </tr> <tr> <td>DAE4</td> <td>SN: 601</td> <td>26-Oct-17 (No. DAE4-601_Oct17)</td> <td>Oct-18</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Secondary Standards</th> <th>ID #</th> <th>Check Date (in house)</th> <th>Scheduled Check</th> </tr> </thead> <tbody> <tr> <td>Power meter EPM-442A</td> <td>SN: GB37480704</td> <td>07-Oct-15 (in house check Oct-16)</td> <td>In house check: Oct-18</td> </tr> <tr> <td>Power sensor HP 8481A</td> <td>SN: US37292783</td> <td>07-Oct-15 (in house check Oct-16)</td> <td>In house check: Oct-18</td> </tr> <tr> <td>Power sensor HP 8481A</td> <td>SN: MY41092317</td> <td>07-Oct-15 (in house check Oct-16)</td> <td>In house check: Oct-18</td> </tr> <tr> <td>RF generator R&S SMT-06</td> <td>SN: 100972</td> <td>15-Jun-15 (in house check Oct-16)</td> <td>In house check: Oct-18</td> </tr> <tr> <td>Network Analyzer Agilent E8358A</td> <td>SN: US41080477</td> <td>31-Mar-14 (in house check Oct-17)</td> <td>In house check: Oct-18</td> </tr> </tbody> </table>					Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration	Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19	Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19	Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19	Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19	Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19	Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18	DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18	Secondary Standards	ID #	Check Date (in house)	Scheduled Check	Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18	Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18	Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18	RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18	Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-17)	In house check: Oct-18
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Calibrated by:	Name: Jeton Kastrati Function: Laboratory Technician	Signature:																																																										
Approved by:	Name: Katja Pokovic Function: Technical Manager	Signature:																																																										
Issued: September 18, 2018																																																												
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- c) 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
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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- *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	V52.10.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.6 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.41 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.53 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.06 W/kg ± 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.4 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.41 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	9.50 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.57 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	6.21 W/kg ± 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.5 Ω - 5.3 j Ω
Return Loss	- 25.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.5 Ω - 7.6 j Ω
Return Loss	- 20.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.436 ns
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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	December 28, 2012

DASY5 Validation Report for Head TSL

Date: 18.09.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d165

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.91 \text{ S/m}$; $\epsilon_r = 40.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.9, 9.9, 9.9) @ 835 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

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

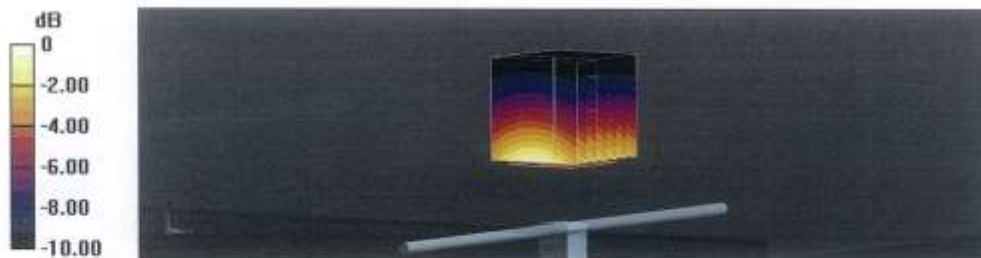
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 65.64 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 3.70 W/kg

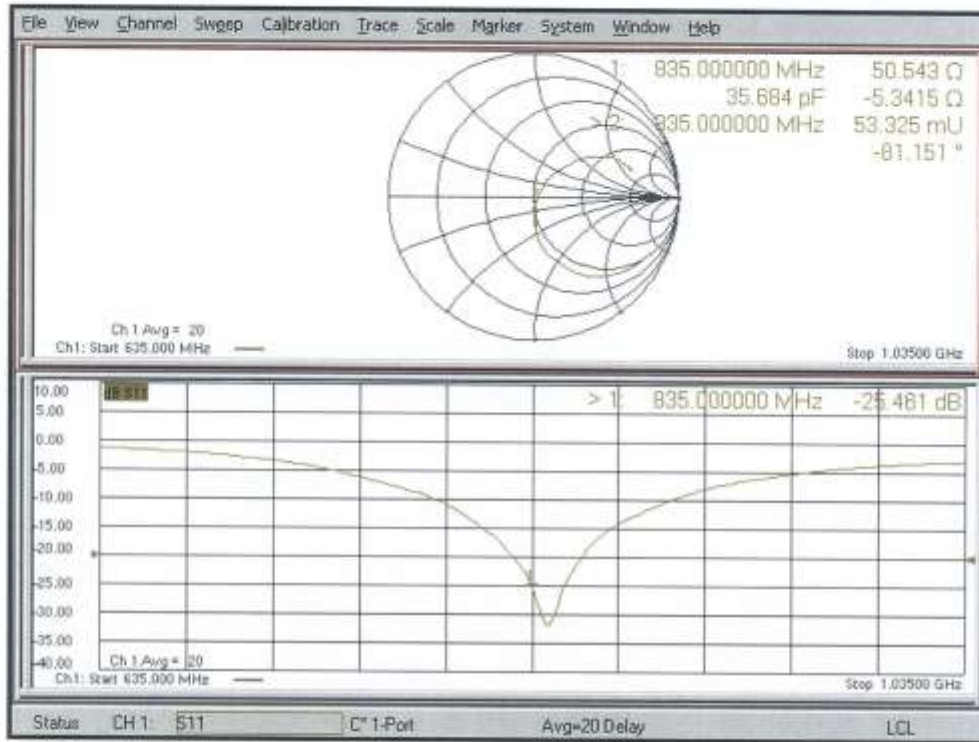
SAR(1 g) = 2.38 W/kg; SAR(10 g) = 1.53 W/kg

Maximum value of SAR (measured) = 3.24 W/kg



0 dB = 3.24 W/kg = 5.11 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 18.09.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d165

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.99 \text{ S/m}$; $\epsilon_r = 55.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.05, 10.05, 10.05) @ 835 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

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

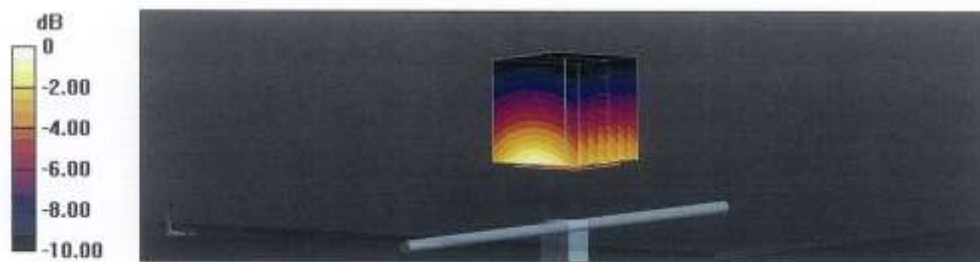
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 60.86 V/m; Power Drift = -0.08 dB

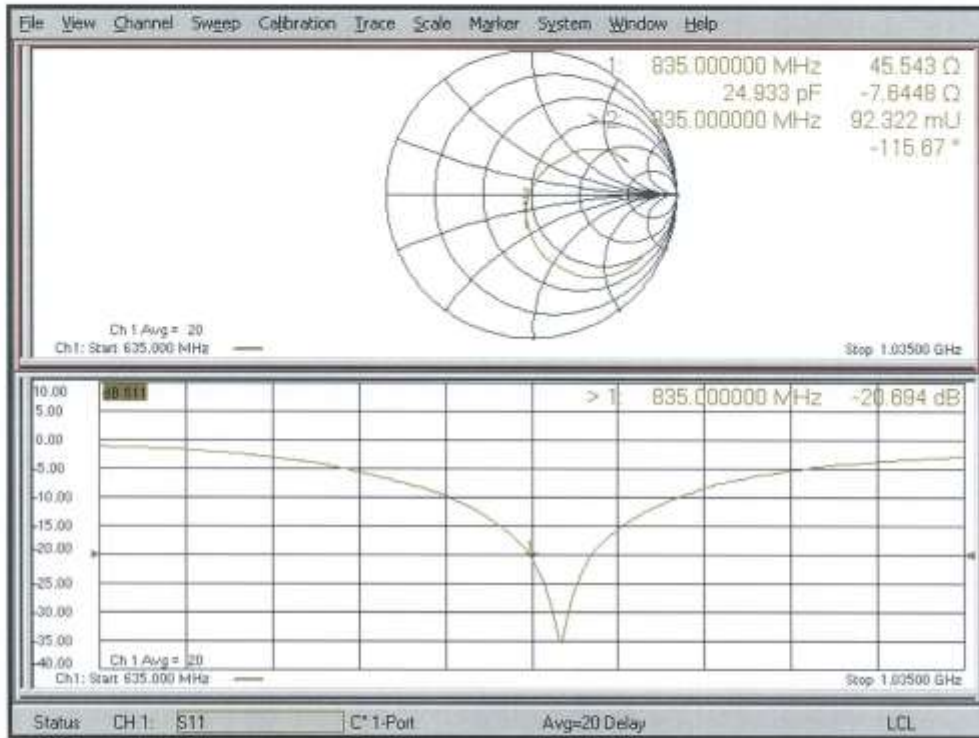
Peak SAR (extrapolated) = 3.62 W/kg

SAR(1 g) = 2.41 W/kg; SAR(10 g) = 1.57 W/kg

Maximum value of SAR (measured) = 3.22 W/kg



Impedance Measurement Plot for Body TSL



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)**

Certificate No: **D1800V2-2d006_Nov17**

CALIBRATION CERTIFICATE

Object	D1800V2 - SN:2d006	<table border="1"> <tr> <td>설 재</td> <td>담당자 S.W. 김서준 2017. 11. 15</td> <td>확인자 HCT 인종남 2017. 12. 15</td> </tr> </table>		설 재	담당자 S.W. 김서준 2017. 11. 15	확인자 HCT 인종남 2017. 12. 15																																																					
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Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz																																																										
Calibration date:	November 15, 2017																																																										
<p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.</p> <p>Calibration Equipment used (M&TE critical for calibration)</p> <table border="1"> <thead> <tr> <th>Primary Standards</th> <th>ID #</th> <th>Cal Date (Certificate No.)</th> <th>Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>Power meter NRP</td> <td>SN: 104778</td> <td>04-Apr-17 (No. 217-02521/02522)</td> <td>Apr-18</td> </tr> <tr> <td>Power sensor NRP-Z91</td> <td>SN: 103244</td> <td>04-Apr-17 (No. 217-02521)</td> <td>Apr-18</td> </tr> <tr> <td>Power sensor NRP-Z91</td> <td>SN: 103245</td> <td>04-Apr-17 (No. 217-02522)</td> <td>Apr-18</td> </tr> <tr> <td>Reference 20 dB Attenuator</td> <td>SN: 5058 (20k)</td> <td>07-Apr-17 (No. 217-02528)</td> <td>Apr-18</td> </tr> <tr> <td>Type-N mismatch combination</td> <td>SN: 5047.2 / 06327</td> <td>07-Apr-17 (No. 217-02529)</td> <td>Apr-18</td> </tr> <tr> <td>Reference Probe EX3DV4</td> <td>SN: 7349</td> <td>31-May-17 (No. EX3-7349_May17)</td> <td>May-18</td> </tr> <tr> <td>DAE4</td> <td>SN: 601</td> <td>26-Oct-17 (No. DAE4-601_Oct17)</td> <td>Oct-18</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Secondary Standards</th> <th>ID #</th> <th>Check Date (in house)</th> <th>Scheduled Check</th> </tr> </thead> <tbody> <tr> <td>Power meter EPM-442A</td> <td>SN: G837480704</td> <td>07-Oct-15 (in house check Oct-16)</td> <td>In house check: Oct-18</td> </tr> <tr> <td>Power sensor HP 8481A</td> <td>SN: US37292783</td> <td>07-Oct-15 (in house check Oct-16)</td> <td>In house check: Oct-18</td> </tr> <tr> <td>Power sensor HP 8481A</td> <td>SN: MY41092317</td> <td>07-Oct-15 (in house check Oct-16)</td> <td>In house check: Oct-18</td> </tr> <tr> <td>RF generator R&S SMT-06</td> <td>SN: 100972</td> <td>15-Jun-15 (in house check Oct-16)</td> <td>In house check: Oct-18</td> </tr> <tr> <td>Network Analyzer HP 8753E</td> <td>SN: US37390585</td> <td>18-Oct-01 (in house check Oct-17)</td> <td>In house check: Oct-18</td> </tr> </tbody> </table>				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: 5058 (20k)	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: 7349	31-May-17 (No. EX3-7349_May17)	May-18	DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18	Secondary Standards	ID #	Check Date (in house)	Scheduled Check	Power meter EPM-442A	SN: G837480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18	Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18	Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18	RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18	Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18
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Calibrated by:	Name: Michael Weber Function: Laboratory Technician	Signature:																																																									
Approved by:	Name: Kalja Pokovic Function: Technical Manager	Signature:																																																									
<p>Issued: November 15, 2017</p>																																																											
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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:

- a) 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
- b) 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
- c) 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
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- e) 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	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1800 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.7 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.63 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	38.8 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.01 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.1 W/kg ± 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.5 ± 6 %	1.52 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.75 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	38.9 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.09 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.3 W/kg ± 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	46.6 Ω - 7.3 $j\Omega$
Return Loss	- 21.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	42.9 Ω - 6.0 $j\Omega$
Return Loss	- 20.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.208 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	July 23, 2001

DASY5 Validation Report for Head TSL

Date: 15.11.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:2d006

Communication System: UID 0 - CW; Frequency: 1800 MHz

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.38$ S/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.56, 8.56, 8.56); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

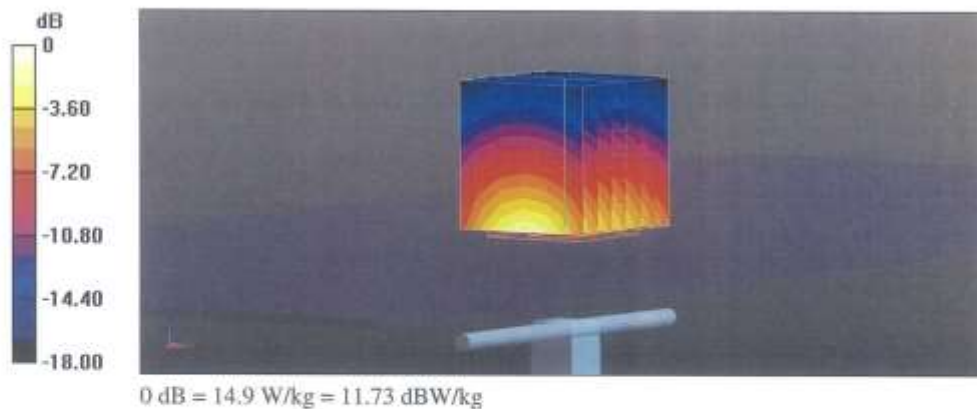
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 108.6 V/m; Power Drift = -0.06 dB

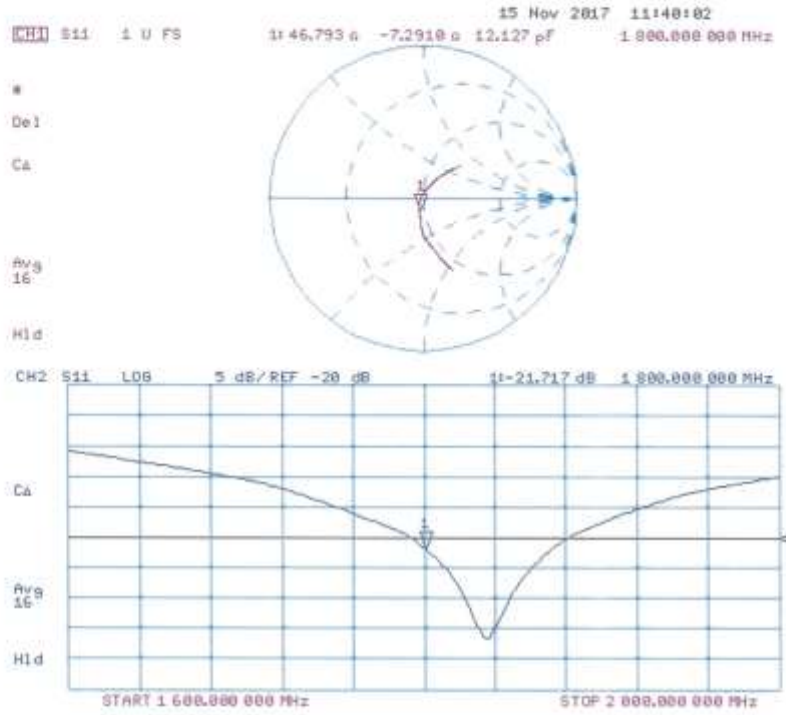
Peak SAR (extrapolated) = 18.2 W/kg

SAR(1 g) = 9.63 W/kg; SAR(10 g) = 5.01 W/kg

Maximum value of SAR (measured) = 14.9 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 15.11.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:2d006

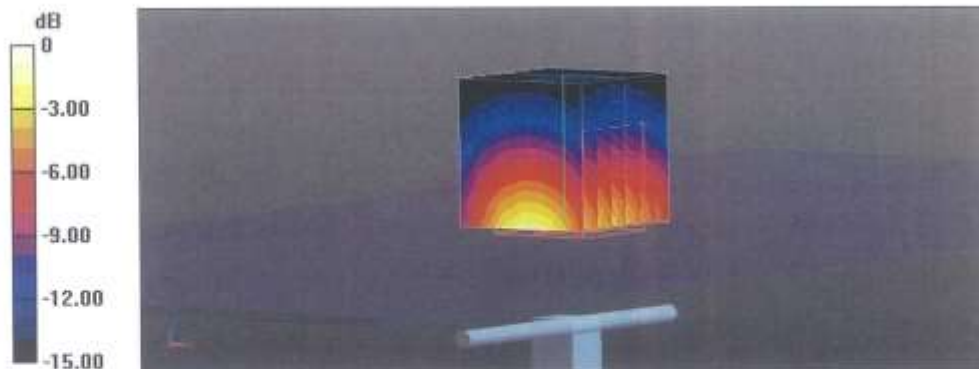
Communication System: UID 0 - CW; Frequency: 1800 MHz
Medium parameters used: $f = 1800$ MHz; $\sigma = 1.52$ S/m; $\epsilon_r = 52.5$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.38, 8.38, 8.38); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

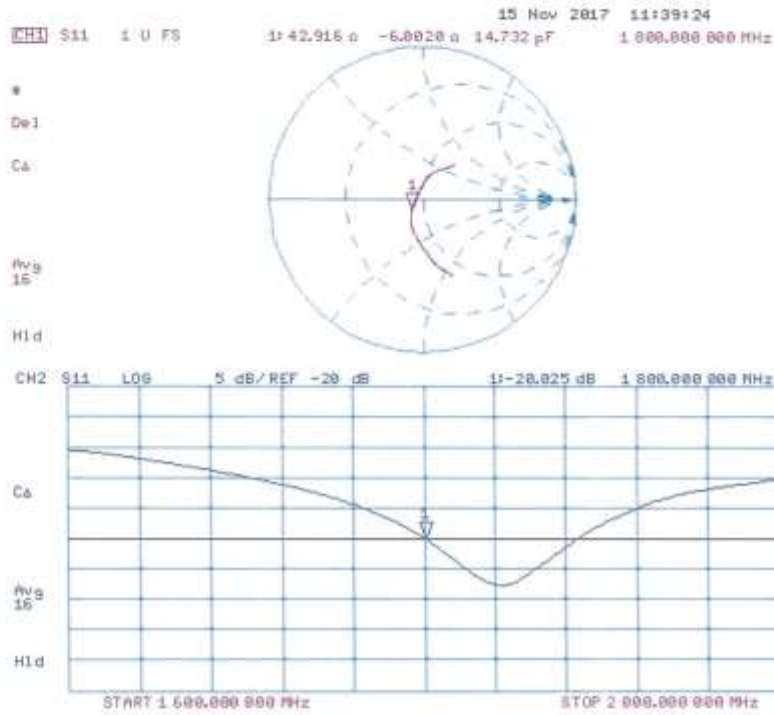
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 102.8 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 17.5 W/kg
SAR(1 g) = 9.75 W/kg; SAR(10 g) = 5.09 W/kg
Maximum value of SAR (measured) = 14.5 W/kg



0 dB = 14.5 W/kg = 11.61 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client **HCT (Dymstec)**

Certificate No: D1900V2-5d061_Mar18

CALIBRATION CERTIFICATE

Object: D1900V2 - SN:5d061

Calibration procedure(s): QA CAL-05.v10
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: March 15, 2018

결	담당자	확인자
제	<i>[Signature]</i>	<i>[Signature]</i>

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 ± 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: 5068 (20k)	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: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

Calibrated by: Name: Claudio Leubler, Function: Laboratory Technician, Signature: *[Signature]*

Approved by: Name: Katja Pokovic, Function: Technical Manager, Signature: *[Signature]*

Issued: March 15, 2018

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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:

- a) 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
- b) 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
- c) 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
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- e) 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	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.5 ± 6 %	1.37 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.68 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.1 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.19 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	21.0 W/kg ± 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.2 ± 6 %	1.47 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.64 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	39.6 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.14 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.9 W/kg ± 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.4 Ω + 8.2 j Ω
Return Loss	- 24.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.7 Ω + 4.8 j Ω
Return Loss	- 25,1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.194 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	December 10, 2004

DASY5 Validation Report for Head TSL

Date: 15.03.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d061

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.37$ S/m; $\epsilon_r = 40.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.18, 8.18, 8.18); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

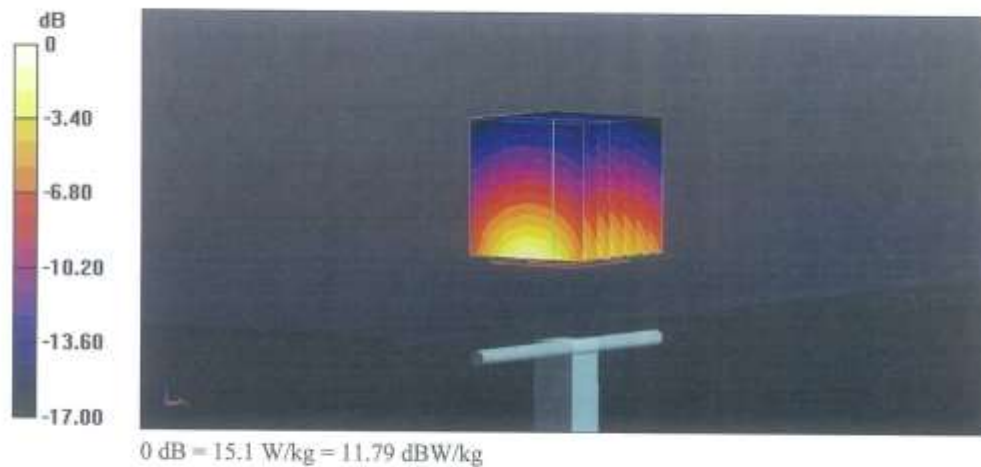
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 107.8 V/m; Power Drift = -0.09 dB

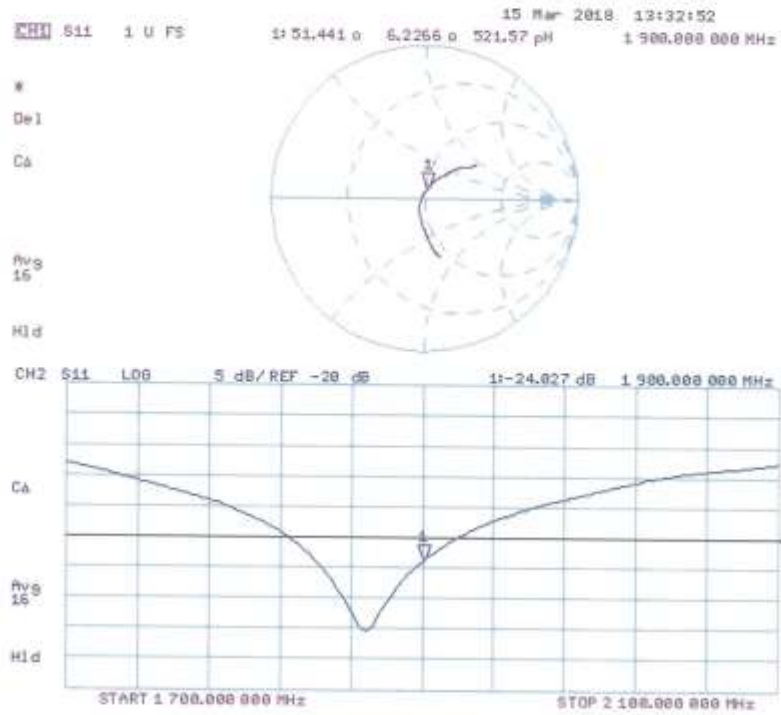
Peak SAR (extrapolated) = 18.3 W/kg

SAR(1 g) = 9.88 W/kg; SAR(10 g) = 5.19 W/kg

Maximum value of SAR (measured) = 15.1 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 15.03.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d061

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.47$ S/m; $\epsilon_r = 55.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.15, 8.15, 8.15); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

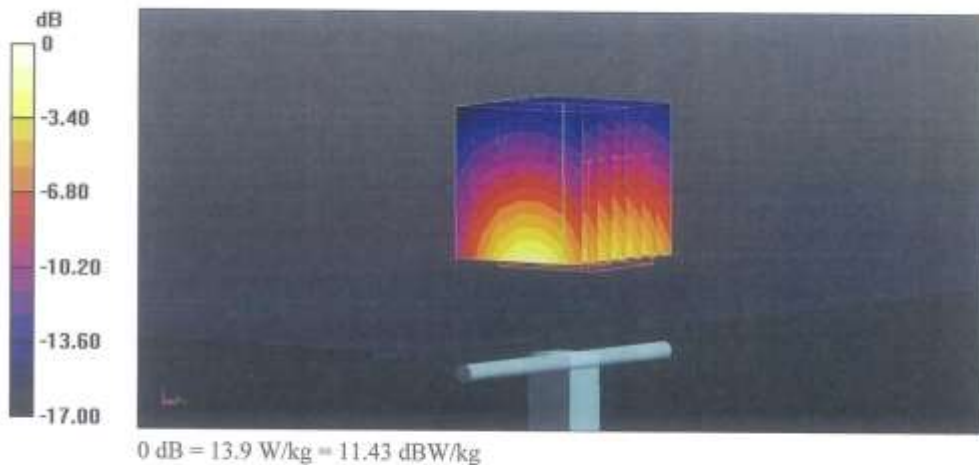
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 101.9 V/m; Power Drift = -0.04 dB

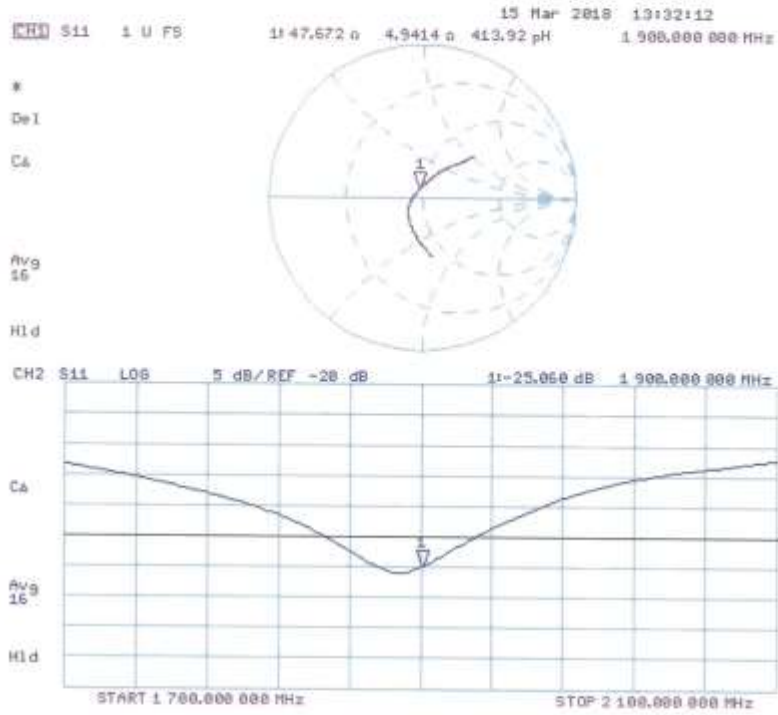
Peak SAR (extrapolated) = 17.1 W/kg

SAR(1 g) = 9.64 W/kg; SAR(10 g) = 5.14 W/kg

Maximum value of SAR (measured) = 13.9 W/kg



Impedance Measurement Plot for Body TSL



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client: **HCT (Dymstec)**

Certificate No: **D2450V2-965_Feb18**

CALIBRATION CERTIFICATE

Object: **D2450V2 - SN:965**

Calibration procedure(s): **QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz.**

Calibration date: **February 16, 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 ± 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: 5058 (20k)	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: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

Calibrated by: **Michael Weber** (Name), **Laboratory Technician** (Function), *M. Weber* (Signature)

Approved by: **Katja Pokovic** (Name), **Technical Manager** (Function), *K. Pokovic* (Signature)

Issued: February 19, 2018

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결	담당자	확인자
재	<i>X Jim</i>	<i>JH</i>
확인일자	6/1 18/03/03	6/1 18/03/03
일 자	2018 1 03.06	2018 1 03.06

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Accreditation No.: **SCS 0108**

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

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:

- a) 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
- b) 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
- c) 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
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- e) 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	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.9 ± 6 %	1.87 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.1 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	51.1 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.07 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.9 W/kg ± 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.4 ± 6 %	2.04 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.9 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	50.2 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.98 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	23.6 W/kg ± 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.9 Ω + 4.2 j Ω
Return Loss	- 24.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.9 Ω + 6.3 j Ω
Return Loss	- 24.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.163 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	November 19, 2014

DASY5 Validation Report for Head TSL

Date: 16.02.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 965

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.87$ S/m; $\epsilon_r = 37.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.88, 7.88, 7.88); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

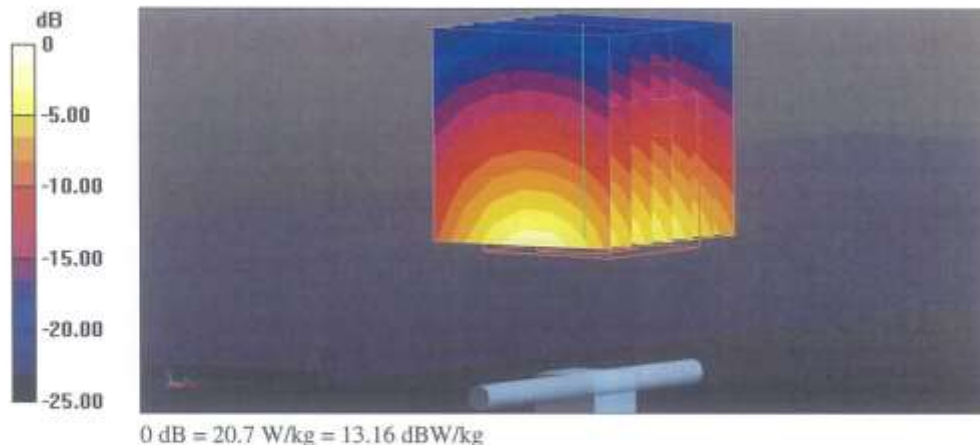
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 112.7 V/m; Power Drift = -0.05 dB

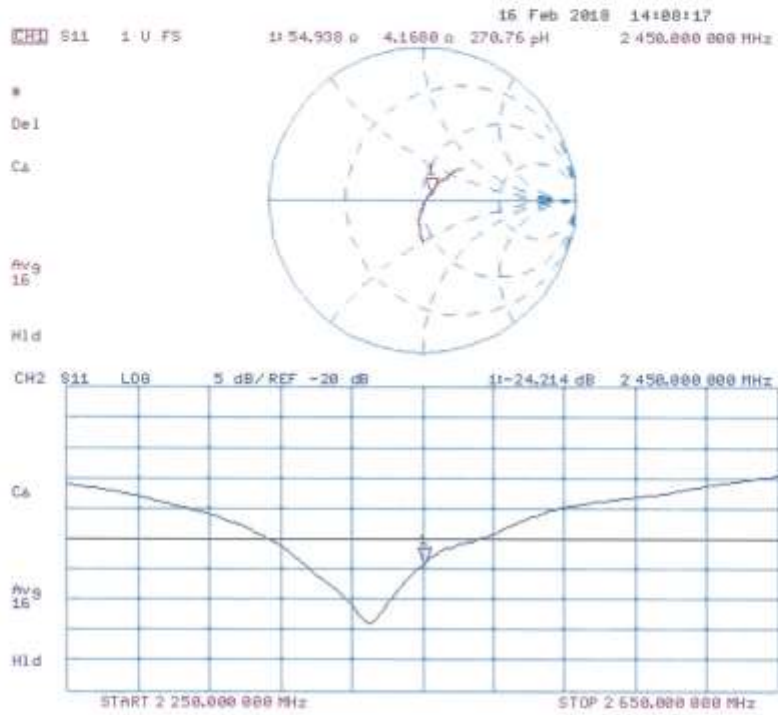
Peak SAR (extrapolated) = 26.2 W/kg

SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.07 W/kg

Maximum value of SAR (measured) = 20.7 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 16.02.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 965

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 2.04$ S/m; $\epsilon_r = 51.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.01, 8.01, 8.01); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

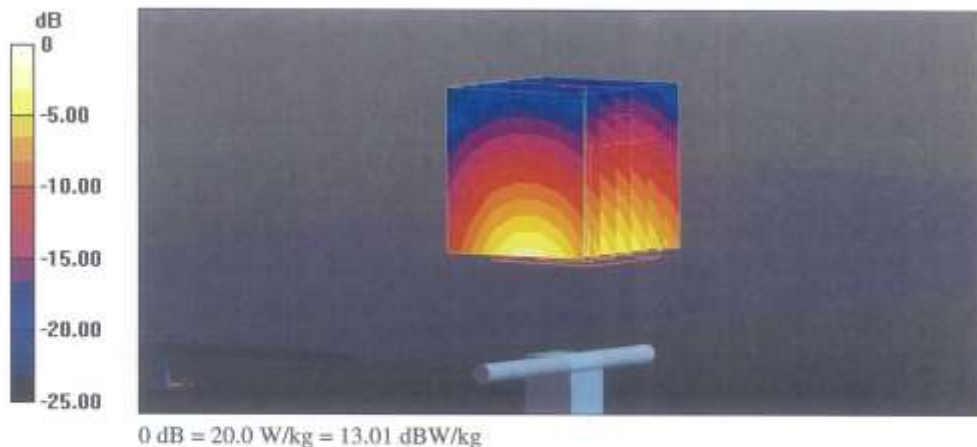
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 104.7 V/m; Power Drift = -0.03 dB

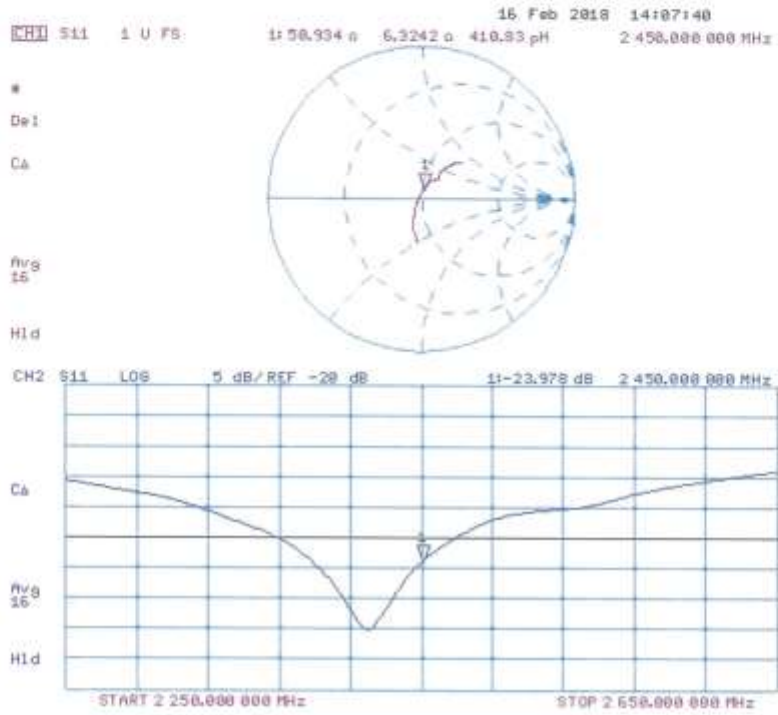
Peak SAR (extrapolated) = 25.8 W/kg

SAR(1 g) = 12.9 W/kg; SAR(10 g) = 5.98 W/kg

Maximum value of SAR (measured) = 20.0 W/kg



Impedance Measurement Plot for Body TSL



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Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)**

Certificate No: **D2600V2-1106_Dec17**

CALIBRATION CERTIFICATE

Object **D2600V2 - SN:1106**

Calibration procedure(s) **QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **December 15, 2017**

결 재	담당자	확인자
	<i>[Signature]</i>	<i>[Signature]</i>
	2018. 01. 04 김정민	2018. 01. 04 김정민

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 ± 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: 5058 (20K)	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: 7349	31-May-17 (No. EX3-7349_May17)	May-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

Calibrated by: **Leif Klysner** (Name), **Laboratory Technician** (Function), *[Signature]* (Signature)

Approved by: **Katja Pokovic** (Name), **Technical Manager** (Function), *[Signature]* (Signature)

Issued: December 18, 2017

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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:

- a) 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
- b) 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
- c) 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
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- e) 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	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.1 ± 6 %	2.03 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	56.4 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	25.0 W/kg ± 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.0 ± 6 %	2.22 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.9 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	54.6 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.13 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	24.2 W/kg ± 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.8 Ω - 8.3 j Ω
Return Loss:	- 21.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	44.7 Ω - 5.9 j Ω
Return Loss:	- 21.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.150 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	February 18, 2015

DASY5 Validation Report for Head TSL

Date: 15.12.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1106

Communication System: UID 0 - CW; Frequency: 2600 MHz

Medium parameters used: $f = 2600$ MHz; $\sigma = 2.03$ S/m; $\epsilon_r = 37.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.96, 7.96, 7.96); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

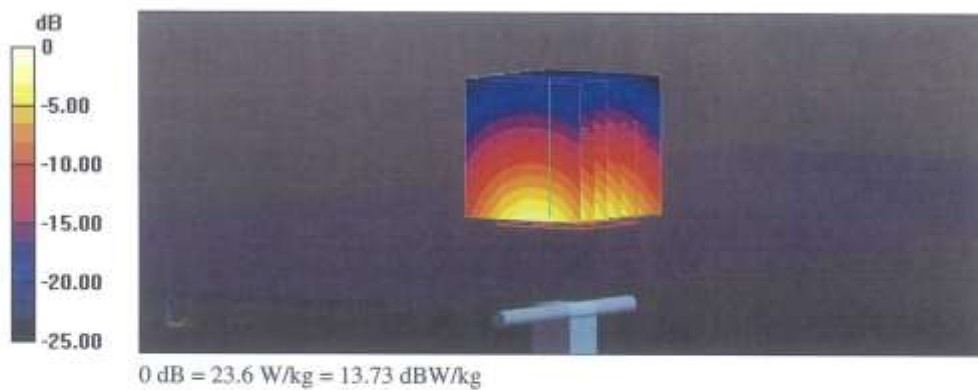
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 113.0 V/m; Power Drift = -0.07 dB

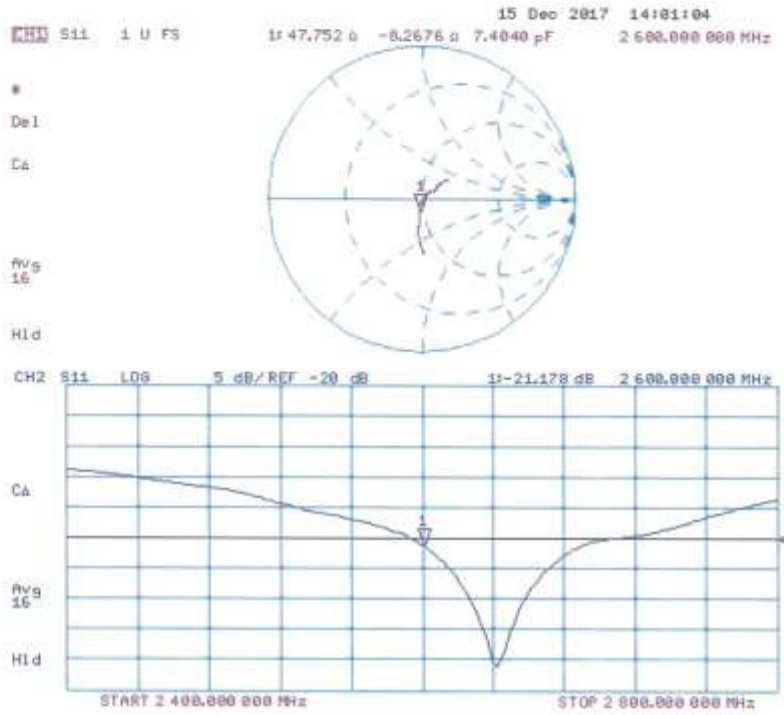
Peak SAR (extrapolated) = 32.1 W/kg

SAR(1 g) = 14.5 W/kg; SAR(10 g) = 6.35 W/kg

Maximum value of SAR (measured) = 23.6 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 15.12.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1106

Communication System: UID 0 - CW; Frequency: 2600 MHz

Medium parameters used: $f = 2600$ MHz; $\sigma = 2.22$ S/m; $\epsilon_r = 51$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.94, 7.94, 7.94); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

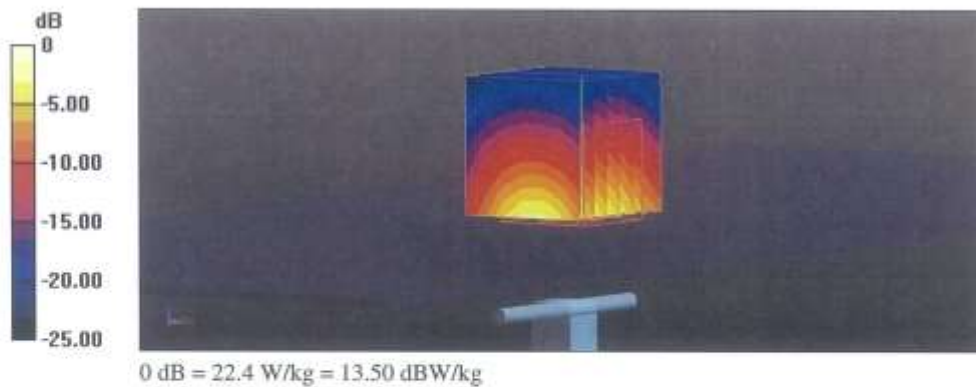
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 104.4 V/m; Power Drift = -0.08 dB

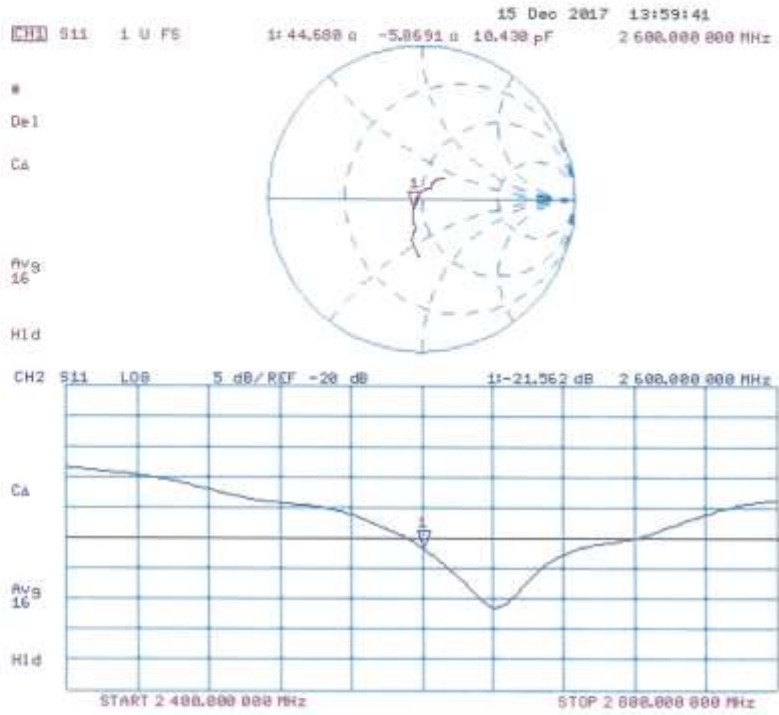
Peak SAR (extrapolated) = 29.9 W/kg

SAR(1 g) = 13.9 W/kg; SAR(10 g) = 6.13 W/kg

Maximum value of SAR (measured) = 22.4 W/kg



Impedance Measurement Plot for Body TSL



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



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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 **HCT (Dymstec)**

Certificate No: **D5GHzV2-1107_Dec17**

CALIBRATION CERTIFICATE

Object: **D5GHzV2 - SN:1107**

Calibration procedure(s): **QA CAL-22.v2
Calibration procedure for dipole validation kits between 3-6 GHz**

Calibration date: **December 14, 2017**

결 재	담당자 <i>[Signature]</i> 2018. 01. 04 SW 강지호	확인자 <i>[Signature]</i> 2018. 1. 4 61 김동진
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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 ± 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: 104776	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: 5056 (20k)	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: 3503	31-Dec-16 (No. EX3-3503_Dec16)	Dec-17
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

Calibrated by: **Michael Weber** (Name), **Laboratory Technician** (Function), *[Signature]* (Signature)

Approved by: **Katja Pokovic** (Name), **Technical Manager** (Function), *[Signature]* (Signature)

Issued: December 14, 2017

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

**Calibration Laboratory of
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C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

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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:

- a) 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
- b) 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
- c) 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
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- e) 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	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz	

Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.7 ± 6 %	4.56 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.15 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	81.3 W/kg ± 19.9 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.34 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.3 W/kg ± 19.5 % (k=2)

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.2 ± 6 %	4.91 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.43 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	84.0 W / kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.0 W/kg ± 19.5 % (k=2)

Head TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.0 ± 6 %	5.07 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL at 5750 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.09 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	80.6 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.30 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.9 W/kg ± 19.5 % (k=2)

Body TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.36 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.1 ± 6 %	5.51 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL at 5250 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.79 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	77.4 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.17 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	21.5 W/kg ± 19.5 % (k=2)

Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.5 ± 6 %	5.97 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	8.09 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	80.3 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.26 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	22.4 W/kg ± 19.5 % (k=2)

Body TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.3	5.94 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.2 ± 6 %	6.18 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL at 5750 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.65 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	75.9 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.13 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	21.1 W/kg ± 19.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	49.8 Ω - 6.7 jΩ
Return Loss	- 23.5 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	54.6 Ω - 2.4 jΩ
Return Loss	- 26.0 dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	55.6 Ω - 2.6 jΩ
Return Loss	- 24.6 dB

Antenna Parameters with Body TSL at 5250 MHz

Impedance, transformed to feed point	48.4 Ω - 5.2 jΩ
Return Loss	- 25.1 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	55.4 Ω - 2.6 jΩ
Return Loss	- 25.0 dB

Antenna Parameters with Body TSL at 5750 MHz

Impedance, transformed to feed point	55.7 Ω - 3.1 jΩ
Return Loss	- 24.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.196 ns
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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	March 11, 2011

DASY5 Validation Report for Head TSL

Date: 14.12.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1107

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: $f = 5250$ MHz; $\sigma = 4.56$ S/m; $\epsilon_r = 35.7$; $\rho = 1000$ kg/m³,
Medium parameters used: $f = 5600$ MHz; $\sigma = 4.91$ S/m; $\epsilon_r = 35.2$; $\rho = 1000$ kg/m³,
Medium parameters used: $f = 5750$ MHz; $\sigma = 5.07$ S/m; $\epsilon_r = 35$; $\rho = 1000$ kg/m³,
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

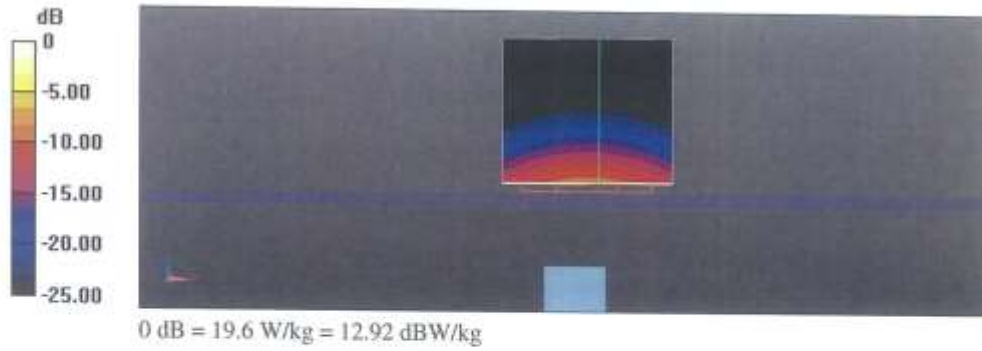
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.58, 5.58, 5.58); Calibrated: 31.12.2016, ConvF(5.09, 5.09, 5.09); Calibrated: 31.12.2016, ConvF(5.02, 5.02, 5.02); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

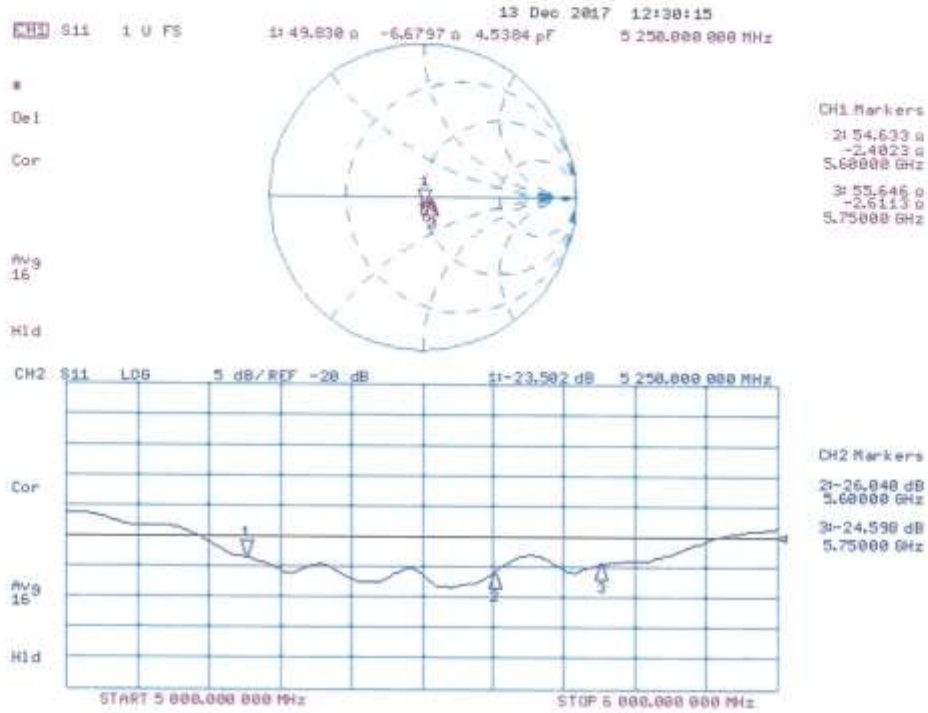
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 71.55 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 30.5 W/kg
SAR(1 g) = 8.15 W/kg; SAR(10 g) = 2.34 W/kg
Maximum value of SAR (measured) = 19.1 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 71.65 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 33.4 W/kg
SAR(1 g) = 8.43 W/kg; SAR(10 g) = 2.41 W/kg
Maximum value of SAR (measured) = 20.2 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 69.75 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 32.8 W/kg
SAR(1 g) = 8.09 W/kg; SAR(10 g) = 2.3 W/kg
Maximum value of SAR (measured) = 19.6 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 13.12.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1107

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: $f = 5250$ MHz; $\sigma = 5.51$ S/m; $\epsilon_r = 47.1$; $\rho = 1000$ kg/m³,
Medium parameters used: $f = 5600$ MHz; $\sigma = 5.97$ S/m; $\epsilon_r = 46.5$; $\rho = 1000$ kg/m³,
Medium parameters used: $f = 5750$ MHz; $\sigma = 6.18$ S/m; $\epsilon_r = 46.2$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.14, 5.14, 5.14); Calibrated: 31.12.2016, ConvF(4.57, 4.57, 4.57); Calibrated: 31.12.2016, ConvF(4.51, 4.51, 4.51); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan,**dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 66.06 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 30.6 W/kg

SAR(1 g) = 7.79 W/kg; SAR(10 g) = 2.17 W/kg

Maximum value of SAR (measured) = 18.5 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan,**dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 64.93 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 34.6 W/kg

SAR(1 g) = 8.09 W/kg; SAR(10 g) = 2.26 W/kg

Maximum value of SAR (measured) = 19.9 W/kg

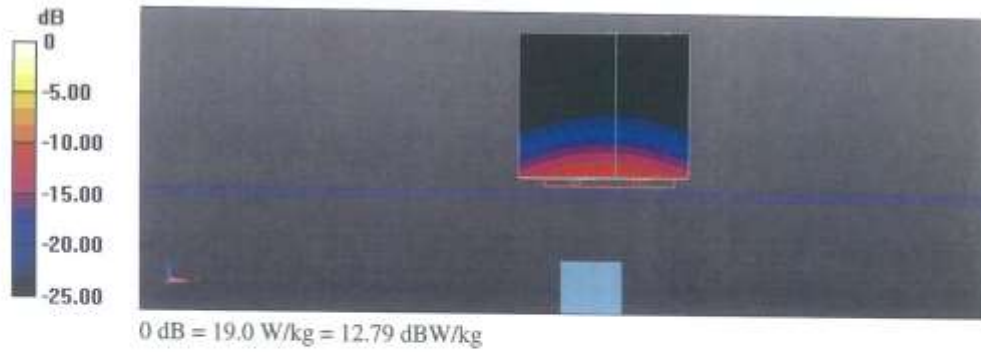
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan,**dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 62.90 V/m; Power Drift = -0.08 dB

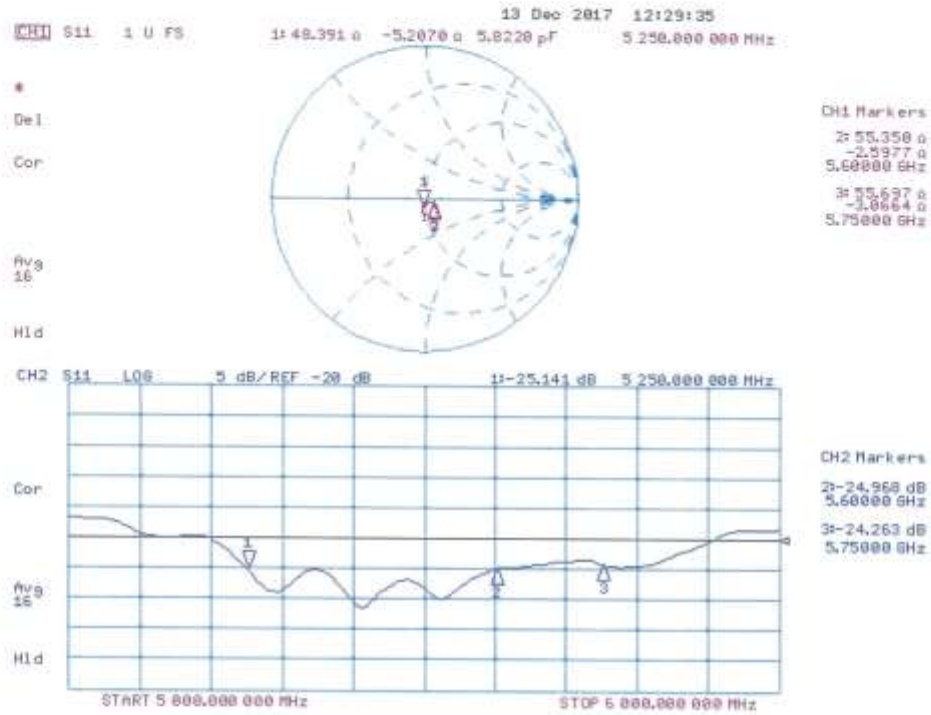
Peak SAR (extrapolated) = 34.0 W/kg

SAR(1 g) = 7.65 W/kg; SAR(10 g) = 2.13 W/kg

Maximum value of SAR (measured) = 19.0 W/kg



Impedance Measurement Plot for Body TSL



Schmid & Partner Engineering AG

s p e a g

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 44 245 9700, Fax +41 44 245 9779
info@speag.com, http://www.speag.com

Certificate of conformity / First Article Inspection

Item	Triple Modular Flat Phantom V5.1
Type No	QD 000 P51 C
Series No	1100 and higher
Manufacturer / Origin	Untersee Composites Knebelstrasse 8, CH-8268 Mannenbach, Switzerland

Tests

The sub-units of item 1100 are identified with the designation 1100/1, 1100/2 and 1100/3. Tests were conducted on all 3 sub-units of this phantom.

Test	Requirement	Details	Units tested
Material thickness	Compliant with the standard requirements.	2 mm +/- 0.2 mm 30 points over the bottom area	all
Material parameters	Dielectric parameters for required frequencies	200 MHz – 6 GHz - Relative permittivity 3 - 5 Loss tangent < 0.05.	Material sample
Material resistivity	The material is compatible with the liquids defined in the standards if handled and cleaned according to the instructions.	DGBE based simulating liquids. Observe Technical Note for material compatibility.	Material Samples
Shape	Internal dimensions	Internal height: > 175 mm Bottom internal length: 280 mm Bottom internal width: 175 mm Nominal filling height: 155 mm Nominal volume: 9.2 l	Pre-series, design
Sagging	Depending on standard	No initial sagging (negative preshaped, change < 0.5 mm)	1100/2

Standards

- [1] IEEE 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- [2] IEC 62209 – 1, "Specific Absorption Rate (SAR) in the frequency range of 300 MHz to 3 GHz – Measurement Procedure, Part 1: Hand-held mobile wireless communication devices", February 2005
- [3] IEC 62209 – 2, "Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation and Procedures, Part 2: Procedure to determine the Specific Absorption Rate (SAR) for ... including accessories and multiple transmitters", March 2010
- [4] KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Conformity

Based on the dimensions and sample tests above, we certify that this item is in compliance with the standards [1] to [4] for frequencies > 700 MHz, if operated according to the specific requirements.

Date 16.07.2015

Signature / Stamp

s p e a g

Schmid & Partner Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 44 245 9700, Fax +41 44 245 9779
info@speag.com, http://www.speag.com