DASY/EASY - Parameters of Probe: EX3DV4 - SN:7381

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.41	0.43	0.42	± 10.1 %
DCP (mV)[B]	96.5	97.3	97.3	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	143.0	±3.3 %
		Y	0.0	0.0	1.0		148.6	
		Z	0.0	0.0	1.0		139.1	

Note: For details on UID parameters see Appendix.

Sensor Model Parameters

	C1 fF	C2 fF	α V^{-1}	T1 $ms.V^{-2}$	T2 $ms.V^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
X	44.89	343	37.26	7.442	0.477	4.968	0.385	0.246	1.003
Y	42.6	325	37.25	2.135	0.645	4.974	0	0.313	1.004
Z	41.15	309.4	36.13	5.149	0.484	4.961	1.509	0.064	1.004

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 E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7381

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 [G]	Depth [G] (mm)	Unc (k=2)
750	41.9	0.89	11.23	11.23	11.23	0.40	1.09	± 12.0 %
850	41.5	0.92	10.11	10.11	10.11	0.55	0.81	± 12.0 %
1750	40.1	1.37	8.68	8.68	8.68	0.35	0.81	± 12.0 %
1900	40.0	1.40	8.35	8.35	8.35	0.33	0.80	± 12.0 %
2300	39.5	1.67	7.85	7.85	7.85	0.19	1.14	± 12.0 %
2450	39.2	1.80	7.39	7.39	7.39	0.36	0.80	± 12.0 %
2600	39.0	1.96	7.27	7.27	7.27	0.20	1.23	± 12.0 %
5250	35.9	4.71	5.47	5.47	5.47	0.30	1.80	± 13.1 %
5600	35.5	5.07	4.75	4.75	4.75	0.40	1.80	± 13.1 %
5750	35.4	5.22	5.01	5.01	5.01	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.

[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.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7381

Calibration Parameter Determined in Body Tissue Simulating Media

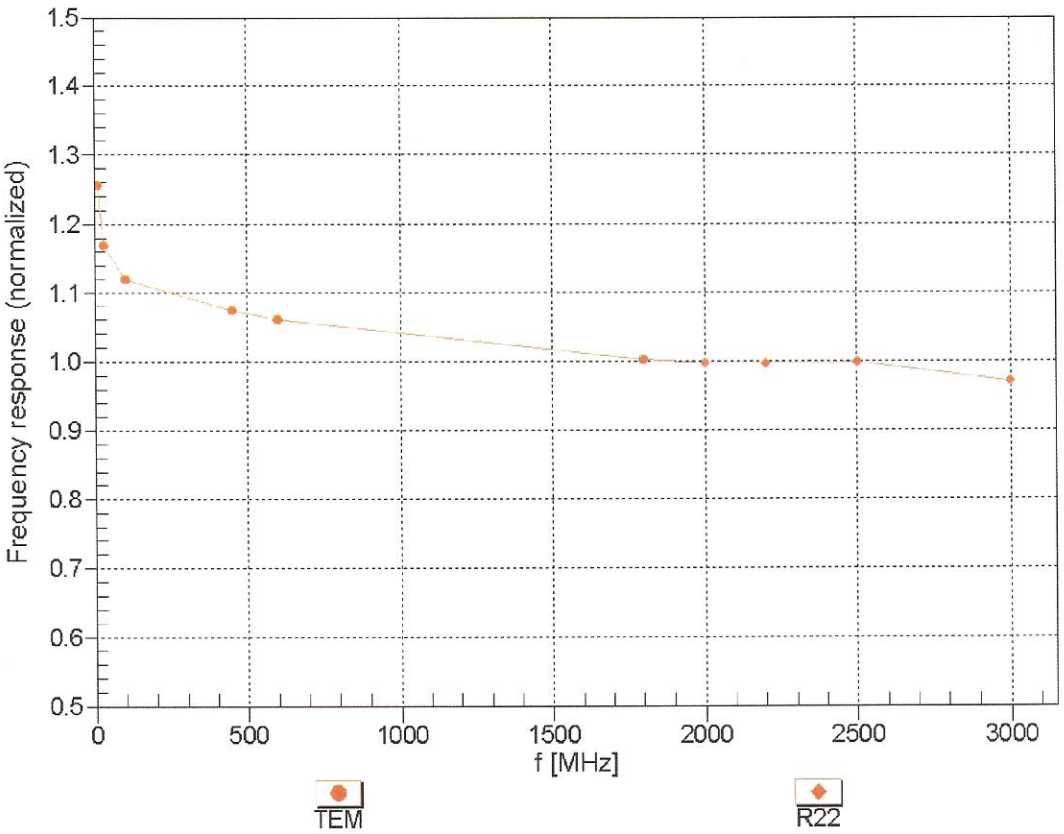
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	55.5	0.96	9.80	9.80	9.80	0.25	1.11	± 12.0 %
850	55.2	0.99	9.78	9.78	9.78	0.42	0.84	± 12.0 %
1750	53.4	1.49	8.08	8.08	8.08	0.30	0.99	± 12.0 %
1900	53.3	1.52	7.95	7.95	7.95	0.20	1.26	± 12.0 %
2300	52.9	1.81	7.67	7.67	7.67	0.34	0.80	± 12.0 %
2450	52.7	1.95	7.45	7.45	7.45	0.34	0.90	± 12.0 %
2600	52.5	2.16	7.19	7.19	7.19	0.31	0.95	± 12.0 %
5250	48.9	5.36	4.56	4.56	4.56	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.78	3.78	3.78	0.60	1.90	± 13.1 %
5750	48.3	5.94	3.97	3.97	3.97	0.60	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.

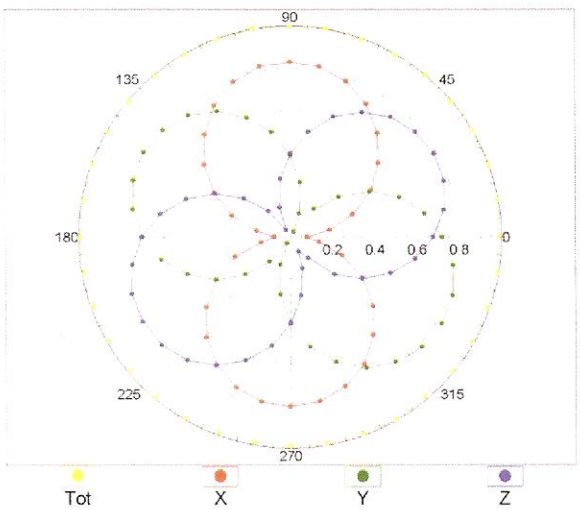
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



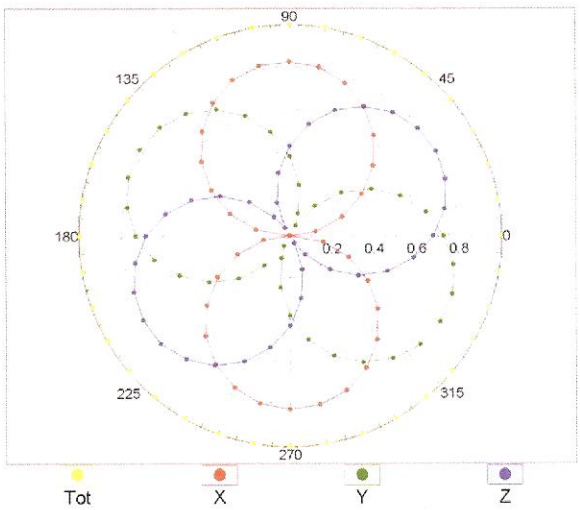
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

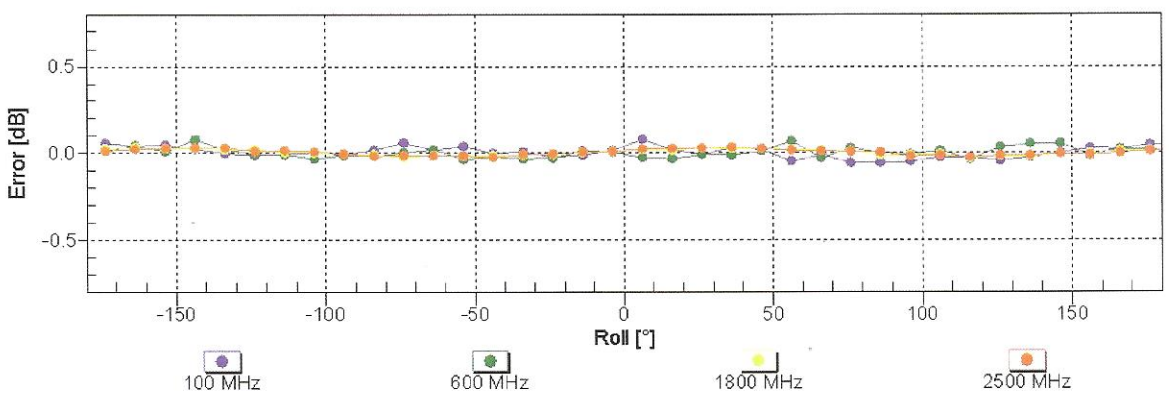
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



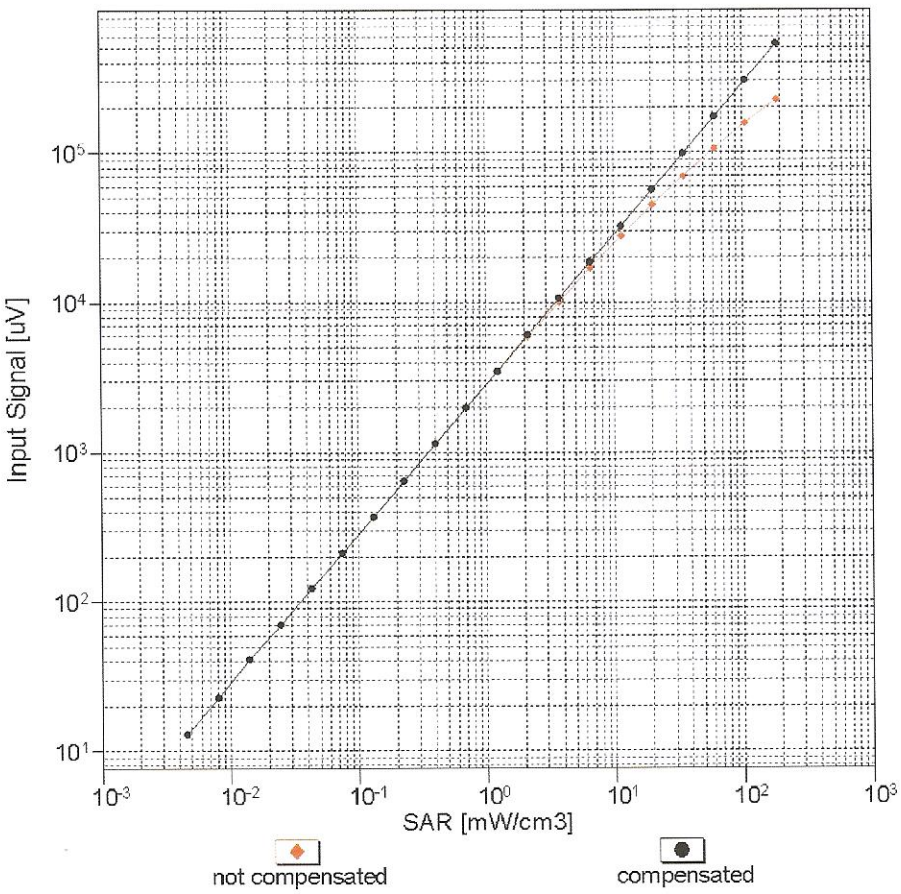
f=1800 MHz,R22

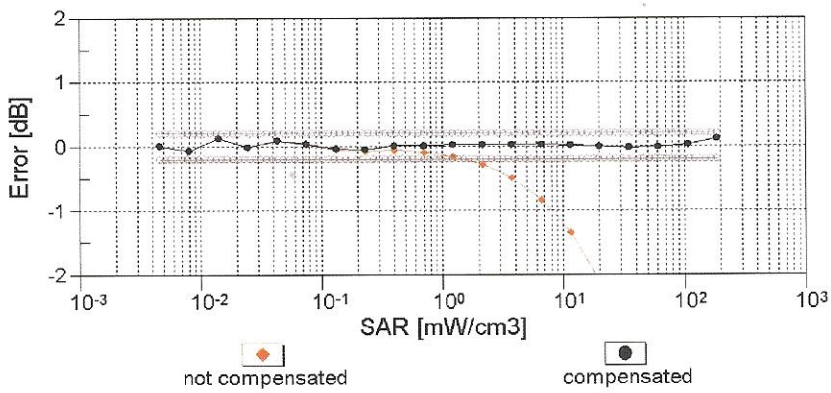




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

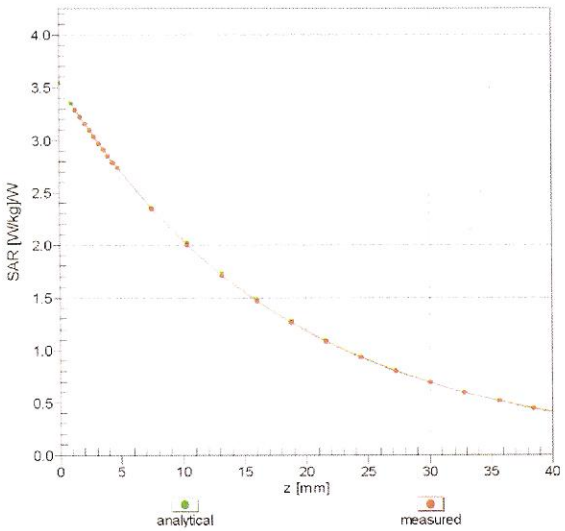




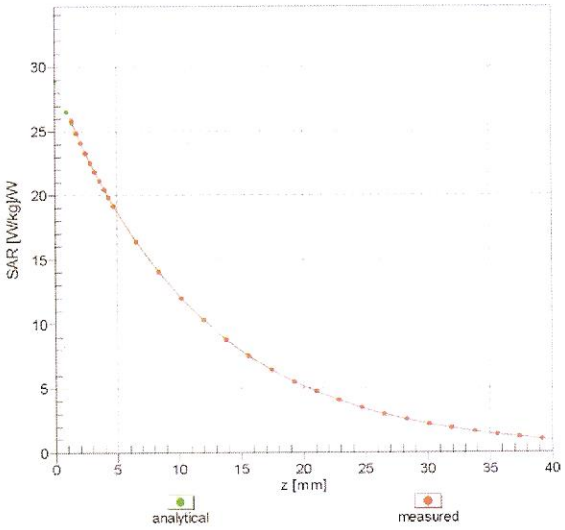
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 850 MHz,WGLS R9 (H_convF)

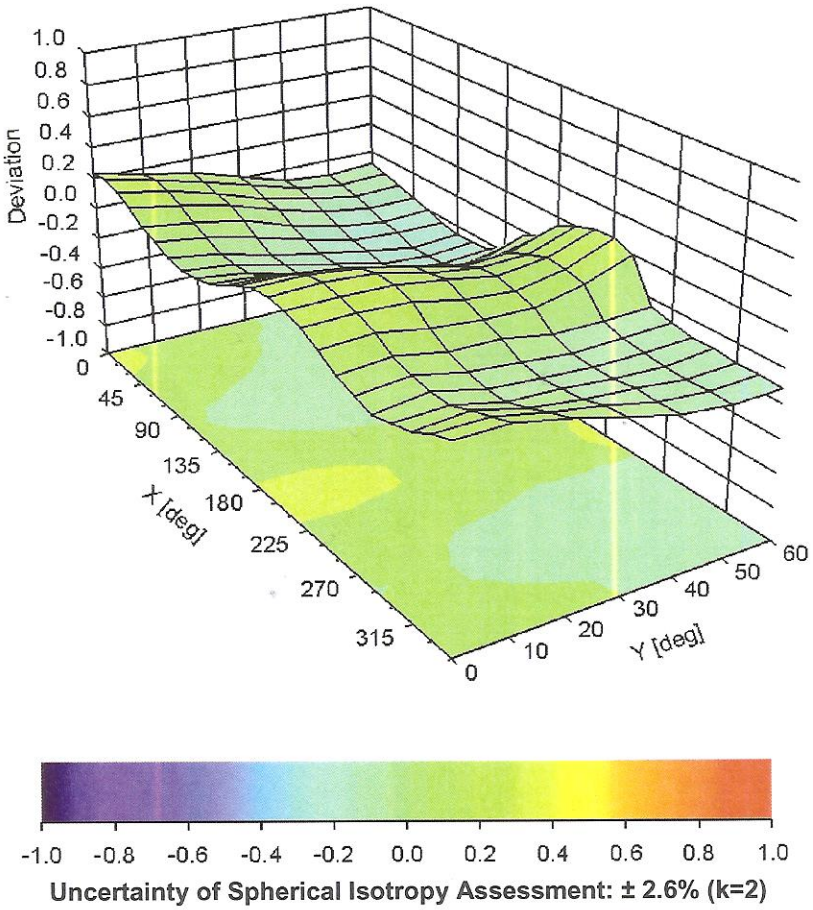


f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7381

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	116.2
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

Appendix: Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max Unc^E (k=2)
0	CW	X	0.00	0.00	1.00	0.00	143.0	± 3.3 %
		Y	0.00	0.00	1.00		148.6	
		Z	0.00	0.00	1.00		139.1	
10010-CAA	SAR Validation (Square, 100ms, 10ms)	X	1.87	63.41	8.60	10.00	20.0	± 9.6 %
		Y	2.16	64.29	9.29		20.0	
		Z	1.87	63.10	8.36		20.0	
10011-CAB	UMTS-FDD (WCDMA)	X	1.26	71.18	17.68	0.00	150.0	± 9.6 %
		Y	1.51	75.12	19.67		150.0	
		Z	1.11	69.16	16.38		150.0	
10012-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	1.18	64.26	15.89	0.41	150.0	± 9.6 %
		Y	1.18	64.88	16.50		150.0	
		Z	1.14	63.73	15.30		150.0	
10013-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	X	4.81	66.53	17.07	1.46	150.0	± 9.6 %
		Y	4.78	66.68	17.20		150.0	
		Z	4.72	66.47	16.88		150.0	
10021-DAB	GSM-FDD (TDMA, GMSK)	X	7.64	78.57	15.86	9.39	50.0	± 9.6 %
		Y	14.78	86.38	18.78		50.0	
		Z	5.00	73.55	13.93		50.0	
10023-DAB	GPRS-FDD (TDMA, GMSK, TN 0)	X	6.18	76.04	15.01	9.57	50.0	± 9.6 %
		Y	9.47	81.04	17.14		50.0	
		Z	4.50	72.15	13.41		50.0	
10024-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	31.84	93.57	18.88	6.56	60.0	± 9.6 %
		Y	100.00	107.28	22.67		60.0	
		Z	4.25	74.61	13.23		60.0	
10025-DAB	EDGE-FDD (TDMA, 8PSK, TN 0)	X	6.58	84.96	33.31	12.57	50.0	± 9.6 %
		Y	4.22	70.11	25.42		50.0	
		Z	5.77	80.29	30.67		50.0	
10026-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1)	X	7.55	88.58	31.44	9.56	60.0	± 9.6 %
		Y	6.07	83.03	29.17		60.0	
		Z	6.67	85.50	30.01		60.0	
10027-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	100.00	104.25	20.61	4.80	80.0	± 9.6 %
		Y	100.00	109.36	22.60		80.0	
		Z	53.53	97.01	18.43		80.0	
10028-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	100.00	106.10	20.78	3.55	100.0	± 9.6 %
		Y	100.00	114.53	23.94		100.0	
		Z	100.00	102.88	19.22		100.0	
10029-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	X	4.61	77.41	25.78	7.80	80.0	± 9.6 %
		Y	3.91	73.86	24.29		80.0	
		Z	4.16	75.20	24.61		80.0	
10030-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	X	15.51	86.57	16.42	5.30	70.0	± 9.6 %
		Y	100.00	105.98	21.50		70.0	
		Z	2.43	70.53	11.23		70.0	
10031-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	X	100.00	105.44	19.36	1.88	100.0	± 9.6 %
		Y	100.00	119.70	24.36		100.0	
		Z	100.00	98.05	16.18		100.0	

10032-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	X	100.00	124.69	26.03	1.17	100.0	± 9.6 %
		Y	100.00	213.77	57.78		100.0	
		Z	100.00	106.22	18.67		100.0	
10033-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	X	4.94	81.54	20.44	5.30	70.0	± 9.6 %
		Y	4.68	81.79	20.78		70.0	
		Z	3.51	76.21	17.97		70.0	
10034-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	X	2.27	74.32	16.92	1.88	100.0	± 9.6 %
		Y	2.54	77.31	18.28		100.0	
		Z	1.66	70.14	14.62		100.0	
10035-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	X	1.87	72.93	16.30	1.17	100.0	± 9.6 %
		Y	2.25	76.71	17.94		100.0	
		Z	1.41	69.22	14.13		100.0	
10036-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	X	6.11	84.90	21.67	5.30	70.0	± 9.6 %
		Y	5.95	85.65	22.20		70.0	
		Z	4.06	78.47	18.89		70.0	
10037-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	X	2.10	73.44	16.54	1.88	100.0	± 9.6 %
		Y	2.25	75.81	17.70		100.0	
		Z	1.56	69.43	14.29		100.0	
10038-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	X	1.89	73.33	16.59	1.17	100.0	± 9.6 %
		Y	2.29	77.33	18.33		100.0	
		Z	1.42	69.48	14.37		100.0	
10039-CAB	CDMA2000 (1xRTT, RC1)	X	3.53	81.73	19.56	0.00	150.0	± 9.6 %
		Y	17.77	104.06	26.01		150.0	
		Z	2.30	75.80	16.79		150.0	
10042-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	X	3.81	72.34	12.74	7.78	50.0	± 9.6 %
		Y	8.30	80.58	15.84		50.0	
		Z	2.60	68.50	11.06		50.0	
10044-CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	X	0.00	104.39	1.95	0.00	150.0	± 9.6 %
		Y	0.00	112.21	1.28		150.0	
		Z	0.00	100.36	0.38		150.0	
10048-CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	X	4.84	69.06	13.68	13.80	25.0	± 9.6 %
		Y	5.92	70.50	14.69		25.0	
		Z	4.51	67.49	12.92		25.0	
10049-CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	X	4.80	71.85	13.65	10.79	40.0	± 9.6 %
		Y	5.89	73.89	14.85		40.0	
		Z	4.26	70.00	12.77		40.0	
10056-CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	X	11.27	87.10	22.00	9.03	50.0	± 9.6 %
		Y	11.36	86.97	22.03		50.0	
		Z	8.58	82.33	19.97		50.0	
10058-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	X	3.64	72.87	23.03	6.55	100.0	± 9.6 %
		Y	3.18	70.25	21.96		100.0	
		Z	3.33	71.14	22.05		100.0	
10059-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	X	1.18	65.02	16.27	0.61	110.0	± 9.6 %
		Y	1.17	65.53	16.86		110.0	
		Z	1.13	64.29	15.58		110.0	
10060-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	X	10.47	107.76	29.35	1.30	110.0	± 9.6 %
		Y	19.68	123.43	34.57		110.0	
		Z	2.79	87.05	22.88		110.0	