SAR EVALUATION REPORT

For

GENEX TELECOM CO., LTD.

6F FARMAX B/D 796-27 Bangbae-Dong, Seocho-Gu,
Seoul, 137-830, Korea

FCC ID: PM3GX90

2004-03-10

This Report Concerns: ☒ Original Report	**Equipment Type:** Transceiver, UHF, PTT
Test Engineer:	Eric Hong
Report No.:	R0402183S
Test Date:	2003-02-25
Reviewed By:	Ling Zhang
Prepared By:	Bay Area Compliance Laboratory Corporation 230 Commercial Street Sunnyvale, CA 94085 Tel: (408) 732-9162 Fax: (408) 732 9164

Note: This test report is specially limited to the above client company and the product model only. It may not be duplicated without prior written consent of Bay Area Compliance Laboratory Corporation. This report **must not** be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

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SUMMARY

The US Federal Communications Commission has released the report and order “Guidelines for Evaluating the Environmental Effects of RF Radiation", ET Docket No. 93-62 in August 1996 [1].

The order requires routine SAR evaluation prior to equipment authorization of portable transmitter devices, including portable telephones. For consumer products, the applicable limit is 1.6 mW/g as recommended by the ANSI/IEEE standard C95.3-1992 [6] for an uncontrolled environment and 8 mW/g for occupational population (Paragraph 65). According to the Supplement C of OET Bulletin 65 (01-2001) “Evaluating Compliance with FCC Guide-lines for Human Exposure to Radio frequency Electromagnetic Fields", released on Jun 29, 2001 by the FCC, the device should be evaluated at maximum output power (radiated from the antenna) under “worst-case” conditions for normal or intended use, incorporating normal antenna operating positions, device peak performance frequencies and positions for maximum RF energy coupling.

This report describes the methodology and results of experiments performed on wireless data terminal. The objective was to determine if there is RF radiation and if radiation is found, what is the extent of radiation with respect to safety limits. SAR (Specific Absorption Rate) is the measure of RF exposure determined by the amount of RF energy absorbed by human body (or its parts) – to determine how the RF energy couples to the body or head which is a primary health concern for body worn devices. The limit below which the exposure to RF is considered safe by regulatory bodies in North America is 1.6 mW/g for uncontrolled environment and 8 mW/g for occupational population average over 1 gram of tissue mass.

The test configurations were laid out on a specially designed test fixture to ensure the reproducibility of measurements. Each configuration was scanned for SAR. Analysis of each scan was carried out to characterize the above effects in the device.

The investigation was limited to the worst-case scenario from the device usage point of view. For the clarity of data analysis, and clarity of presentation, only one tissue simulation was used for the head and body simulation. This means that if SAR was found at the headset position, the magnitude of SAR would be overestimated comparing to SAR to a headset placed in the ear region.

There was no SAR of any concern measured on the device for any of the investigated configurations, please see following table for testing result summary:

Ambient=23°C, Liquid Temp=22°C
Relative Humidity (%): 49.3

Worst case SAR reading

EUT position	Frequency (MHz)	Conducted Power (W)	Test Type	Antenna Type	Liquid	Phantom	Notes / Accessories	Measured (mW/g)		Limit (mW/g)	Plot #
								100%	50% duty cycle		
2.5 cm head separation to phantom	451	5.01	Face-held	Built-in	head	flat	none	4.77	2.385	8	1
back in touch with phantom	451	5.01	Body worn	Built-in	body	flat	Belt Clip and Headset	3.25	1.625	8	2

1 - REFERENCE

[1] Federal Communications Commission, \Report and order: Guidelines for evaluating the environmental effects of radiofrequency radiation", Tech. Rep. FCC 96-326, FCC, Washington, D.C. 20554, 1996.

[2] David L. Means Kwok Chan, Robert F. Cleveland, \Evaluating compliance with FCC guidelines for human exposure to radiofrequency electromagnetic fields", Tech. Rep., Federal Communication Commission, O_ce of Engineering & Technology, Washington, DC, 1997.

[3] Thomas Schmid, Oliver Egger, and Niels Kuster, \Automated E-field scanning system for dosimetric assessments", IEEE Transactions on Microwave Theory and Techniques, vol. 44, pp. 105{113, Jan. 1996.

[4] Niels Kuster, Ralph K.astle, and Thomas Schmid, \Dosimetric evaluation of mobile communications equipment with known precision", IEICE Transactions on Communications, vol. E80-B, no. 5, pp. 645{652, May 1997.

[5] CENELEC, \Considerations for evaluating of human exposure to electromagnetic fields (EMFs) from mobile telecommunication equipment (MTE) in the frequency range 30MHz - 6GHz", Tech. Rep., CENELEC, European Committee for Electrotechnical Standardization, Brussels, 1997.

[6] ANSI, ANSI/IEEE C95.1-1992: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz, The Institute of Electrical and Electronics Engineers, Inc., New York, NY 10017, 1992.

[7] Katja Pokovic, Thomas Schmid, and Niels Kuster, \Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies", in ICECOM _ 97, Dubrovnik, October 15{17, 1997, pp. 120-24.

[8] Katja Pokovic, Thomas Schmid, and Niels Kuster, \E-_eld probe with improved isotropy in brain simulating liquids", in Proceedings of the ELMAR, Zadar, Croatia, 23{25 June, 1996, pp. 172-175.

[9] Volker Hombach, Klaus Meier, Michael Burkhardt, Eberhard K. uhn, and Niels Kuster, \The depen-dence of EM energy absorption upon human head modeling at 900 MHz", IEEE Transactions on Microwave Theory and Techniques, vol. 44, no. 10, pp. 1865-1873, Oct. 1996.

[10] Klaus Meier, Ralf Kastle, Volker Hombach, Roger Tay, and Niels Kuster, \The dependence of EM energy absorption upon human head modeling at 1800 MHz", IEEE Transactions on Microwave Theory and Techniques, Oct. 1997, in press.

[11] W. Gander, Computermathematik, Birkhaeuser, Basel, 1992.

[12] W. H. Press, S. A. Teukolsky,W. T. Vetterling, and B. P. Flannery, Numerical Recepies in C, The Art of Scientific Computing, Second Edition, Cambridge University Press, 1992.Dosimetric Evaluation of Sample device, month 1998 9

[13] NIS81 NAMAS, \The treatment of uncertainity in EMC measurement", Tech. Rep., NAMAS Executive, National Physical Laboratory, Teddington, Middlesex, England, 1994.

[14] Barry N. Taylor and Christ E. Kuyatt, \Guidelines for evaluating and expressing the uncertainty of NIST measurement results", Tech. Rep., National Institute of Standards and Technology, 1994. Dosimetric Evaluation of Sample device, month 1998 10

2 - TESTING EQUIPMENT

2.1 Equipment List & Calibration Info

Equipment Type	Model	Manufacturer	Serial No.	Cal. Date
Amplifer, Power	2HL-2-8	Mini-Circuits		N/R
Amplifier, Pre	8449B	Agilent	3008A01978	3/8/2004
Amplifier, Pre, microwave	8449B	HP	3008A00277	3/14/2001
Amplifier, RF Power	503L	ENI	285	N/R
Analyzer, Network	8752C	HP	3410A02356	8/11/2002
Analyzer, Radio Communication	MT88024	Anritsu	84442	9/10/2002
Analyzer, Spectrum , RF	8566A	HP	2240A01930	N/R
Antenna, Dipole	D-1800-S-2	Aprel	BCL-049	3/6/2003
Antenna, Dipole	D-2450-S-1	Aprel	BCL-141	N/R
Antenna, Dipole	D450V2	N/A	1010	1/24/2003
Antenna, Dipole	D900V2	N/A	122	10/3/2003
Antenna, Dipole	DS100V2	N/A	1001	8/18/2003
Antenna, Logperiodic		HTM	N/A	N/R
Calibrator, Digital	ST-089	Electronic Digital Caliper	211371	N/R
CDMA MS test set	E6393A	Agilent	JP1MJ00416	3/7/2003
Controller		STAUBLI	F01/5J72A1/A/01	N/R
DASY3 Professional Dosimetric System	DASY3	SPEAG	N/A	N/R
Generator, Signal	8657A	HP	3217A04699	8/23/2002
Generator, Signal	83650B	HP	3614A00276	1/29/2004
Meter, Power	E4419B	Agilent	MY4121511	10/25/2001
Probe, Dielectric Kit	85070A	Agilent	N/A	self
Probe, Dummy	ET3DV6	SPEAG	1604	N/R
Probe, SPEAG E-Field	ES3DV2	SPEAG	3019	10/9/2003
Robot RX60L	RX60L	SPEAG	F00/5H31A1/A/01	N/R
Scale, Weight	ACS-3D	AI	603101182	N/R
Scale, Weight	MS-7400	Measurement Specialities	N/A	N/R
Sensor, Power	E4412A	Agilent	US384885142	10/17/2002
Sensor, SPEAG Light Alignment	SPEAG Light Alignment Sensor	SPEAG	278	N/R
SPEAG Generic Twin Phantom	SPEAG Generic Twin Phantom	SPEAG	N/A	N/R

2.2 Equipment Calibration

Please see the attached file.

2.2.1 Probe Calibration

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

Client Bay Area Comp. Lab (BACL)

CALIBRATION CERTIFICATE

Object(s)	ES3DV2 - SN:3019
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	October 8, 2003
Condition of the calibrated item	In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E4419B	GB41293874	2-Apr-03 (METAS, No 252-0250)	Apr-04
Power sensor E4412A	MY41495277	2-Apr-03 (METAS, No 252-0250)	Apr-04
Reference 20 dB Attenuator	SN: 5086 (20b)	3-Apr-03 (METAS No. 251-0340	Apr-04
Fluke Process Calibrator Type 702	SN: 6295803	8-Sep-03 (Sintrel SCS No. E-030020)	Sep-04
Power sensor HP 8481A	MY41092180	18-Sep-02 (Agilent, No. 20020918)	In house check: Oct 03
RF generator HP 8684C	US3642U01700	4-Aug-99 (SPEAG, In house check Aug-02)	In house check: Aug-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (Agilent, No. 24BR1033101)	In house check: Oct 03

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Technician	
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: October 9, 2003

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 international Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

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Schmid & Partner Engineering AG s p e a g

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

Probe ES3DV2

SN: 3019

Manufactured: December 5, 2002
Last calibration: July 12, 2003

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

ES3DV2 SN: 3019 July 12, 2003

DASY - Parameters of Probe: ES3DV2 SN: 3019

Sensitivity in Free Space

Diode Compression

NormX	**1.03** $\mu V/(V/m)^2$	DCP X	99
NormY	**1.12** $\mu V/(V/m)^2$	DCP Y	99
NormZ	**0.98** $\mu V/(V/m)^2$	DCP Z	99

Sensitivity in Tissue Simulating Liquid

Head **900 MHz** ε_r = **41.5 ± 5%** σ = **0.97 ± 5% mho/m**

Valid for f=800-1000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**6.4** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.4** ± 9.5% (k=2)	Alpha	**0.68**
ConvF Z	**6.4** ± 9.5% (k=2)	Depth	**1.11**

Head **1800 MHz** ε_r = **40.0 ± 5%** σ = **1.40 ± 5% mho/m**

Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**5.0** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.0** ± 9.5% (k=2)	Alpha	**0.21**
ConvF Z	**5.0** ± 9.5% (k=2)	Depth	**2.78**

Boundary Effect

Head **900 MHz** **Typical SAR gradient: 5 % per mm**

Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	4.3	1.8
SAR_{be} [%]	With Correction Algorithm	0.0	0.1

Head **1800 MHz** **Typical SAR gradient: 10 % per mm**

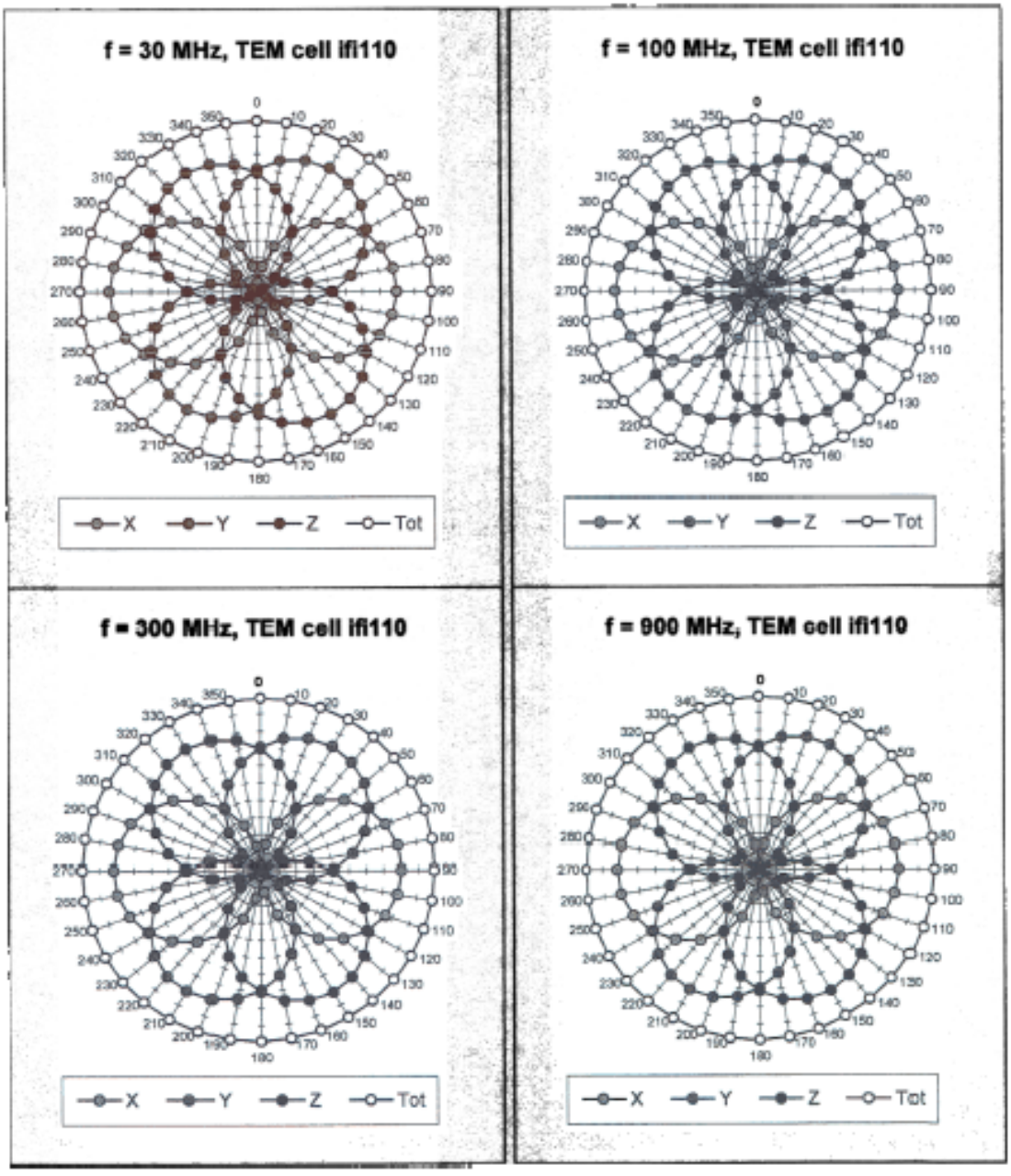
Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	7.4	5.0
SAR_{be} [%]	With Correction Algorithm	0.0	0.1

Sensor Offset

Probe Tip to Sensor Center	**2.1**	mm

ES3DV2 SN: 3019 **July 12, 2003**

Receiving Pattern (ϕ , θ = 0°



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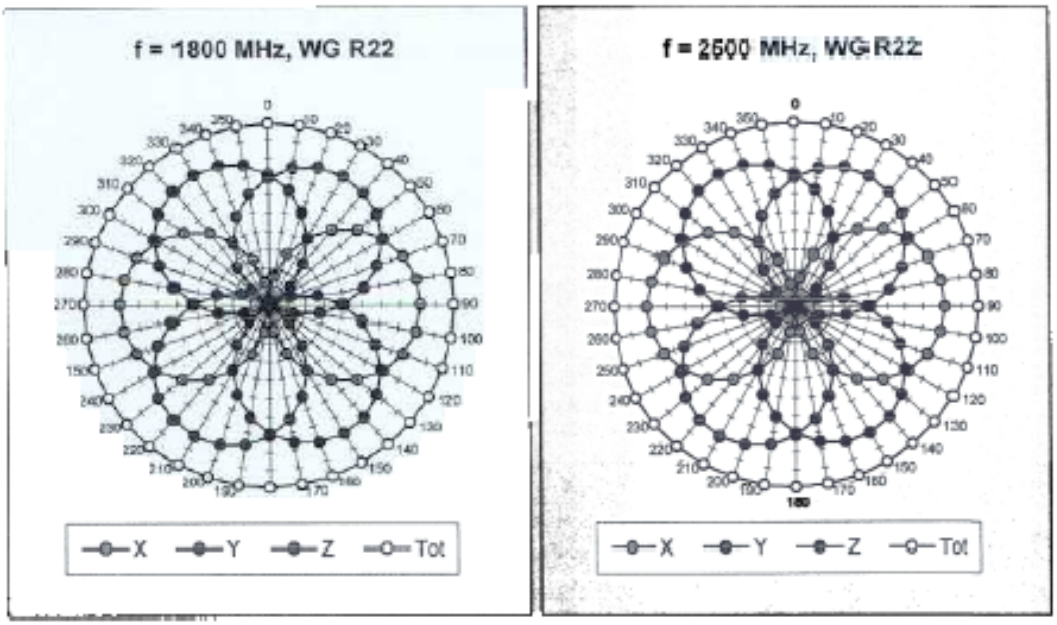
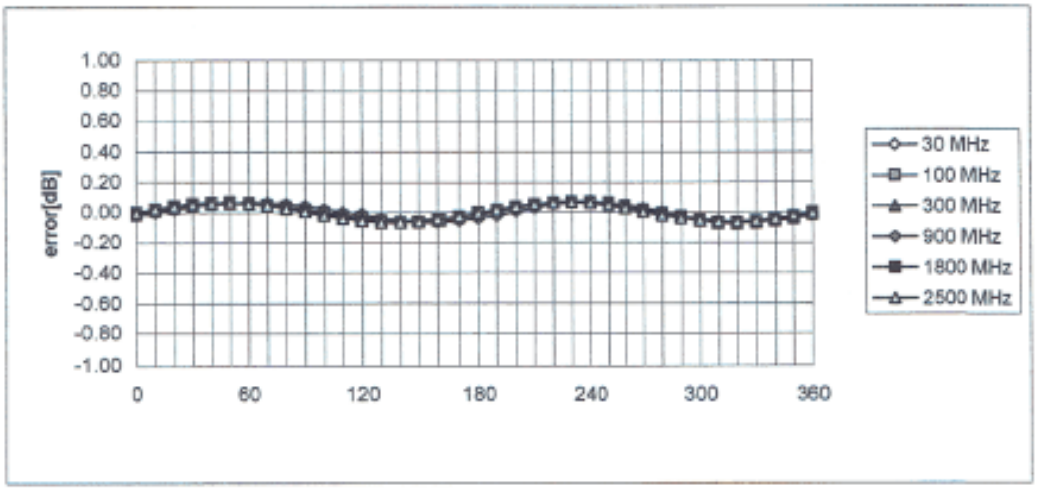


Isotropy Error (ϕ), θ = 0°



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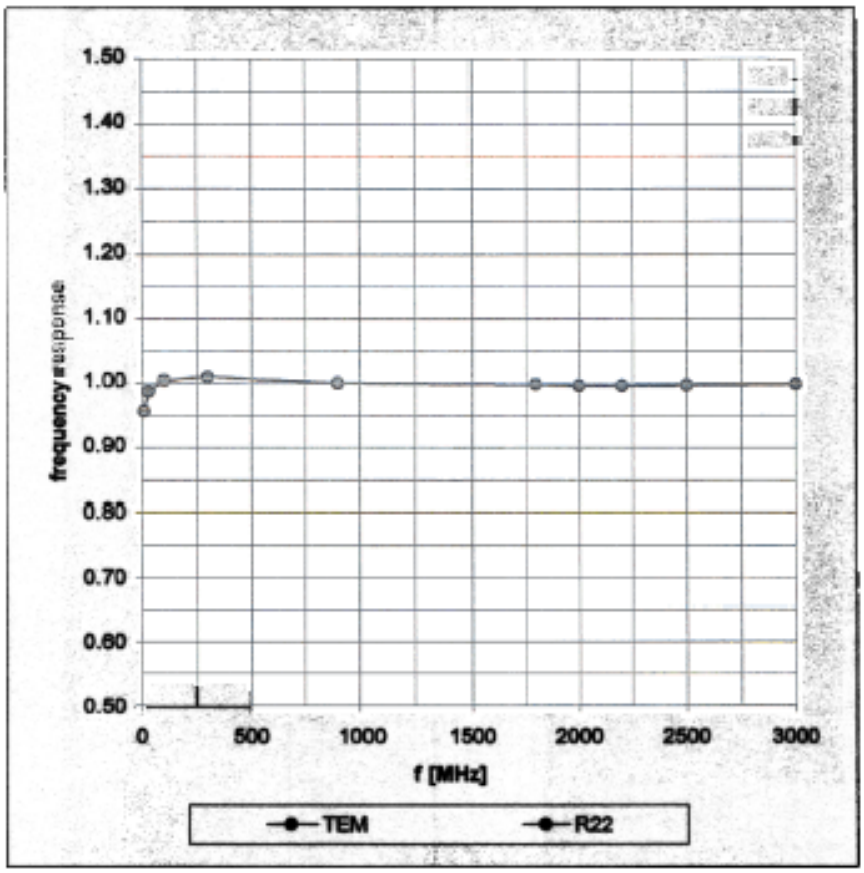
Frequency Response of E-Field

(TEM-Cell:ifi110, Waveguide R22)



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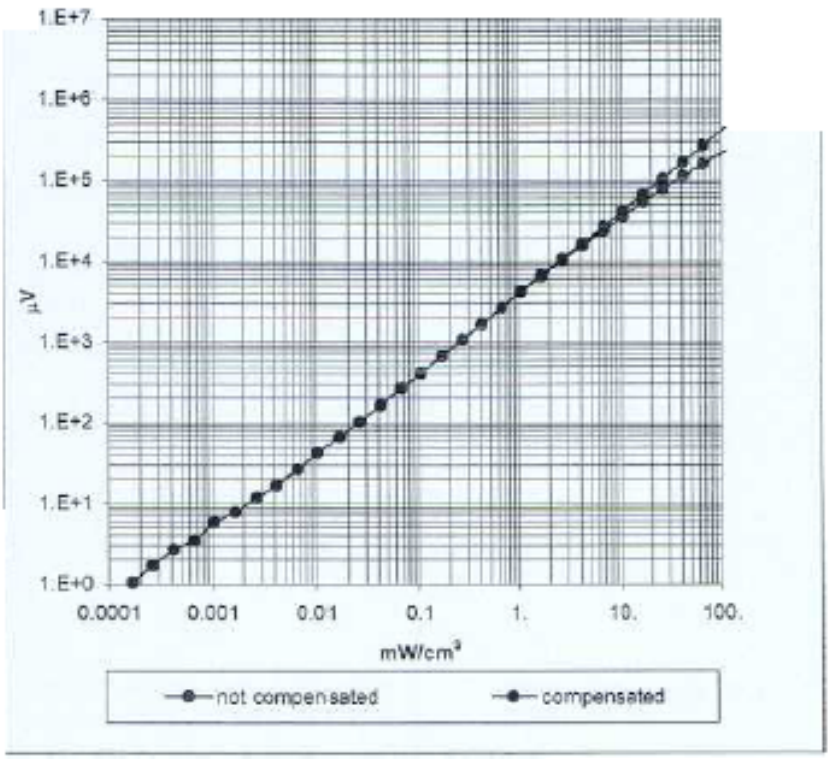
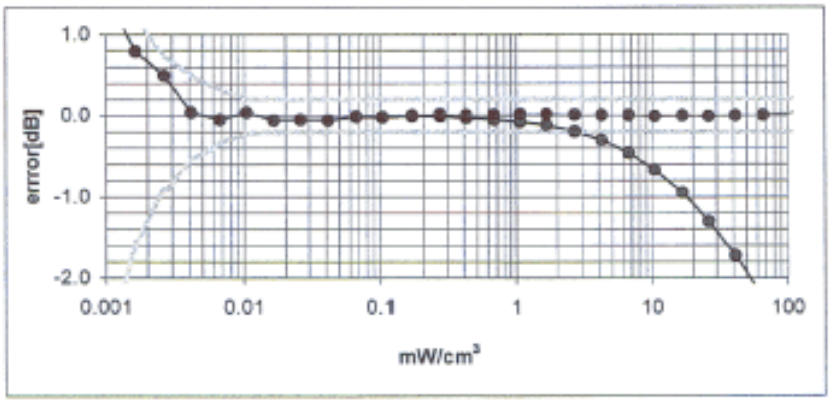
Dynamic Range f(SAR_{brain})

(Waveguide R22)





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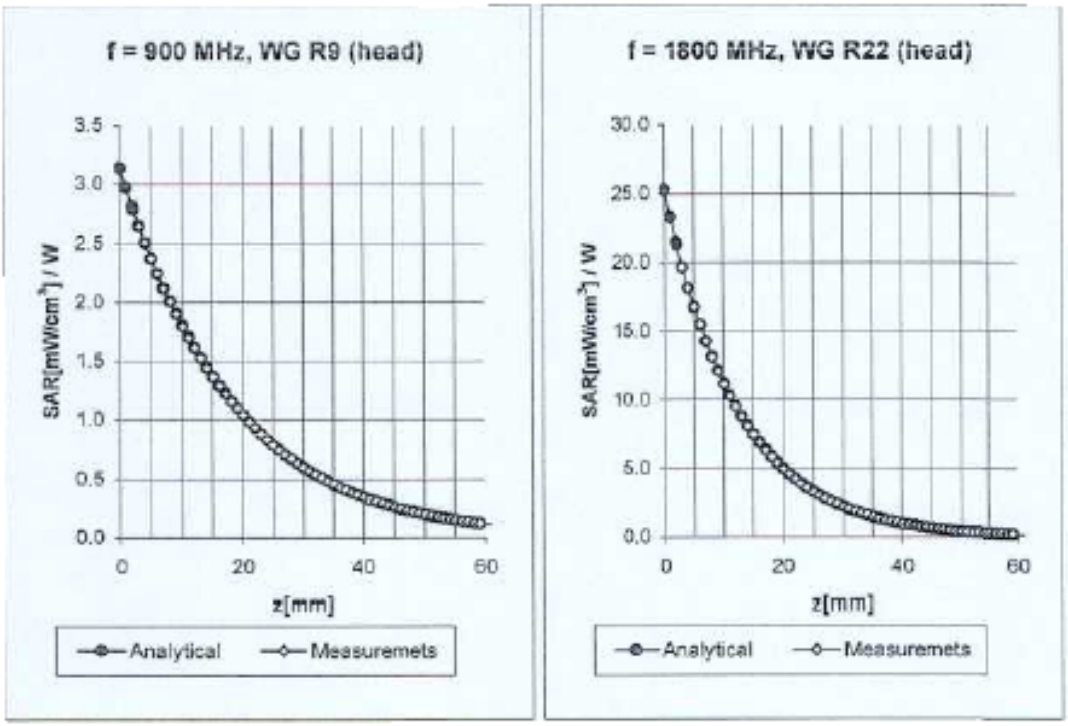
Conversion Factor Assessment



900 MHz ε_r **= 41.5 ± 5%** σ **= 0.97 ± 5% mho/m**

Valid for f=800-1000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**6.4** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.4** ± 9.5% (k=2)	Alpha	**0.68**
ConvF Z	**6.4** ± 9.5% (k=2)	Depth	**1.11**

1800 MHz ε_r **= 40.0 ± 5%** σ **= 1.40 ± 5% mho/m**

Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**5.0** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.0** ± 9.5% (k=2)	Alpha	**0.21**
ConvF Z	**5.0** ± 9.5% (k=2)	Depth	**2.78**

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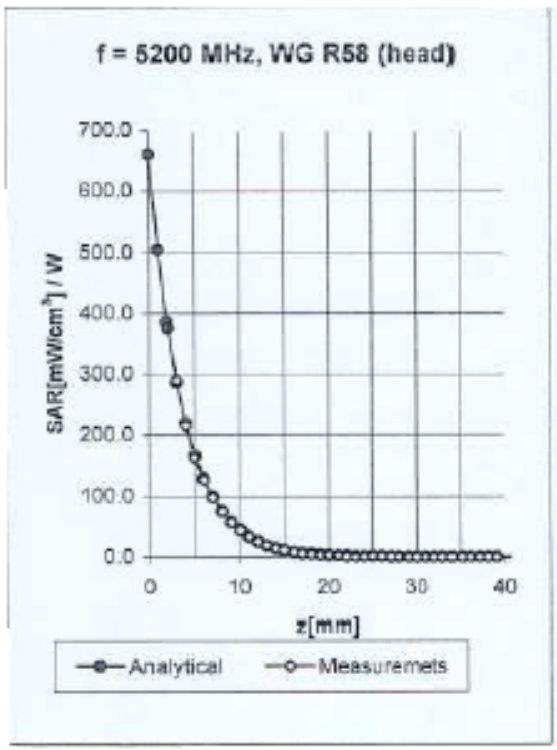
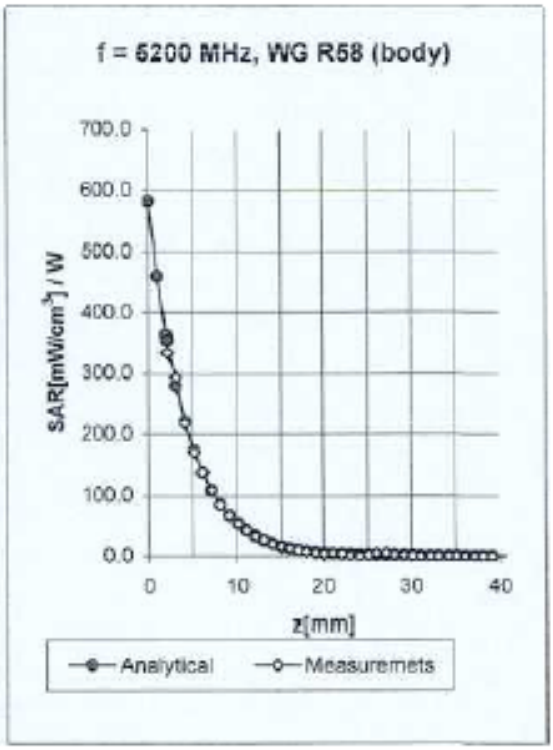
Conversion Factor Assessment





Head **5200** **MHz** ε_r = 36.0 ± 5% σ = 4.66 ± 5% mho/m

Valid for f=4940-5460 MHz with Head Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**2.3** ± 14.6% (k=2)	Boundary effect:	
ConvF Y	**2.3** ± 14.6% (k=2)	Alpha	**1.05**
ConvF Z	**2.3** ± 14.6% (k=2)	Depth	**1.50**

Body **5200** **MHz** ε_r = 49.0 ± 5% σ = 5.30 ± 5% mho/m

Valid for f=4940-5460 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**1.4** ± 14.6% (k=2)	Boundary effect:	
ConvF Y	**1.4** ± 14.6% (k=2)	Alpha	**1.01**
ConvF Z	**1.4** ± 14.6% (k=2)	Depth	**1.85**

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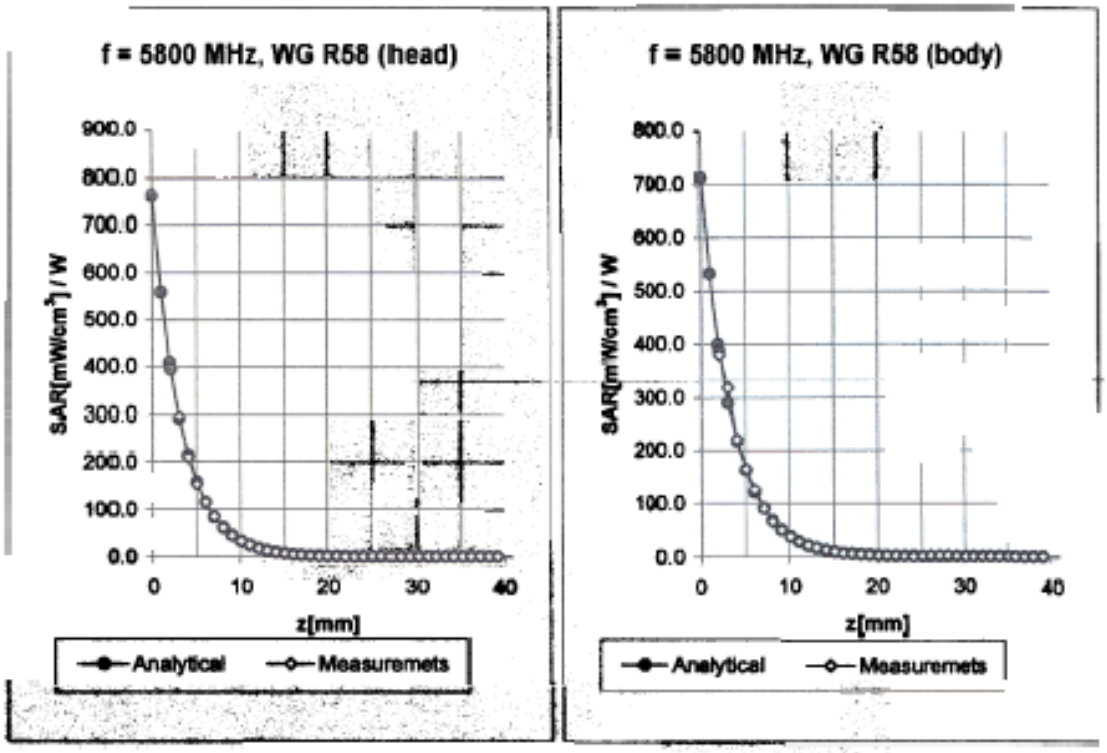
Conversion Factor Assessment



Head **5800** **MHz** ε_r = **35.3 ± 5%** σ = **5.27 ± 5% mho/m**

Valid for f=5510-6090 MHz with Head Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**1.8** ± 14.6% (k=2)	Boundary effect:	
ConvF Y	**1.8** ± 14.6% (k=2)	Alpha	**0.90**
ConvF Z	**1.8** ± 14.6% (k=2)	Depth	**1.90**

Body **5800** **MHz** ε_r = **48.2 ± 5%** σ = **6.00 ± 5% mho/m**

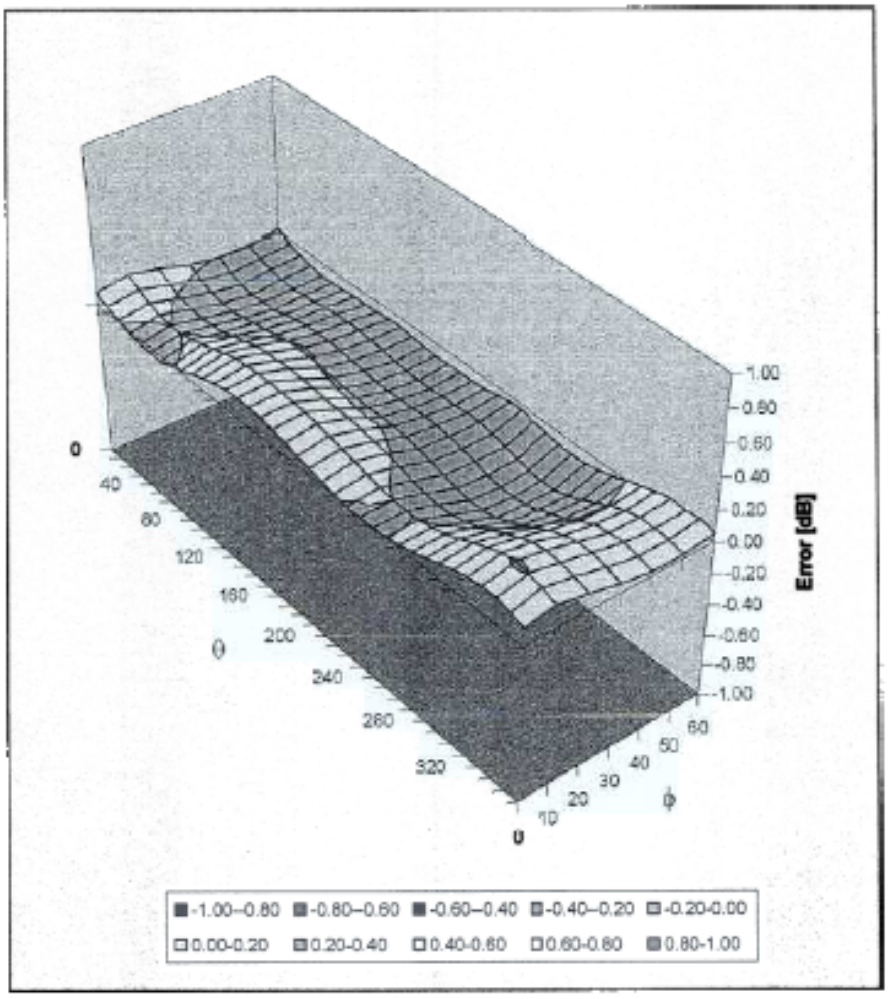
Valid for f=5510-6090 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**1.2** ± 14.6% (k=2)	Boundary effect:	
ConvF Y	**1.2** ± 14.6% (k=2)	Alpha	**1.18**
ConvF Z	**1.2** ± 14.6% (k=2)	Depth	**1.65**

ES3DV2 SN: 3019 **July 12, 2003**

Deviation from Isotropy in HSL

Error (θϕ), f = 900 MHz



Zeughausstrasse 43, 8004 Zürich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

Probe ES3DV2

SN:3019

Additional Conversion Factors

Manufactured:	December 5, 2002
Last calibration:	July 12, 2003
Add. calibration:	October 9, 2003

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ES3DV2 SN:3019

Sensitivity in Free Space

NormX	**1.05** $\mu V/(V/m)^2$
NormY	**1.14** $\mu V/(V/m)^2$
NormZ	**0.98** $\mu V/(V/m)^2$

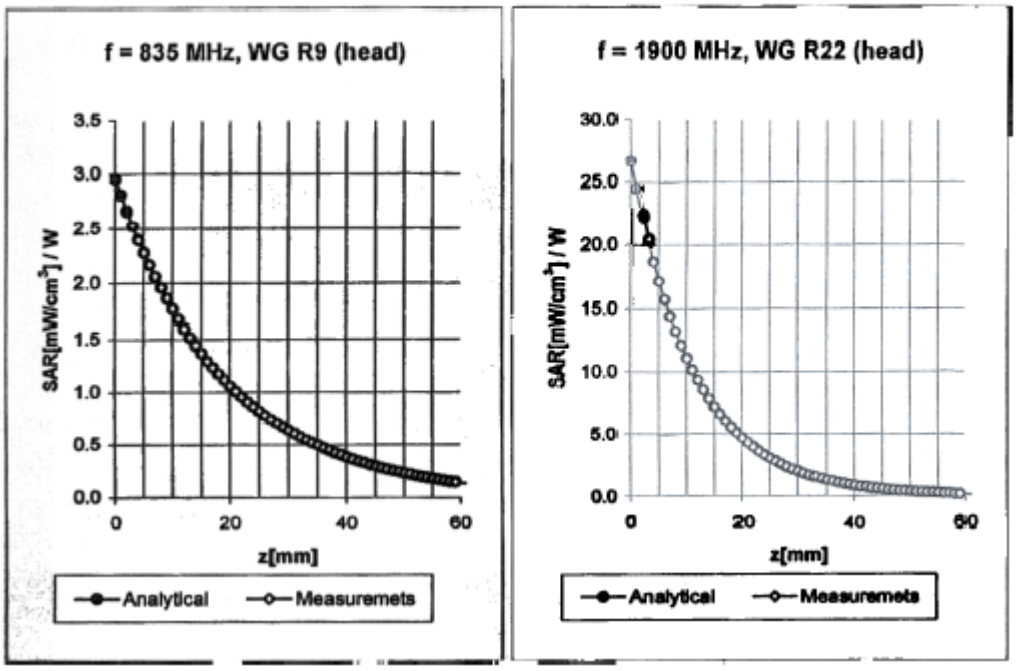
Diode Compression

DCP X	**99**
DCP Y	**99**
DCP Z	**99**

Sensor Offset

Probe Tip to Sensor Center	**2.1**	mm

Conversion Factor Assessment



Head **835 MHz** ε_r = 41.5 ± 5% σ = 0.90 ± 5% mho/m

Valid for f=793-877 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

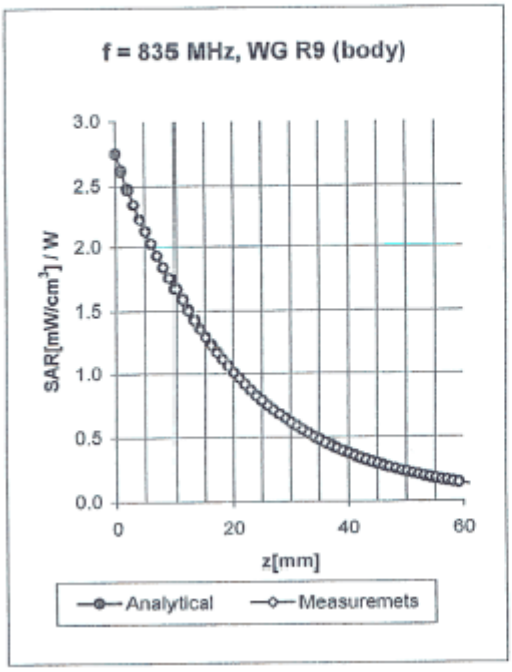
ConvF X	**6.5** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.5** ± 9.5% (k=2)	Alpha	**0.35**
ConvF Z	**6.5** ± 9.5% (k=2)	Depth	**1.46**

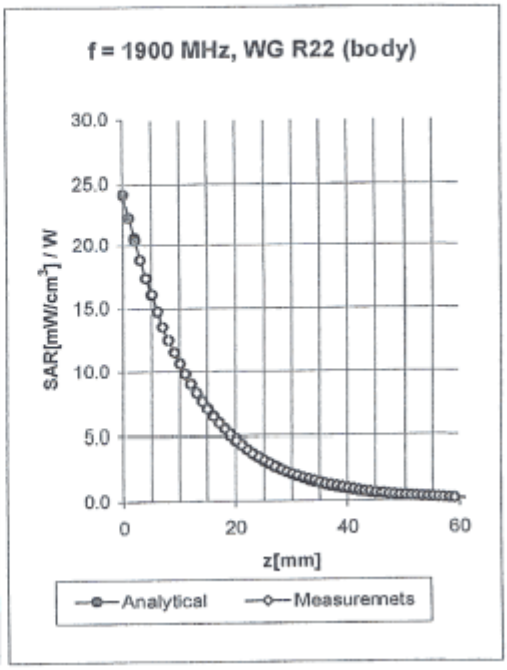
Head **1900 MHz** ε_r = 40.0 ± 5% σ = 1.40 ± 5% mho/m

Valid for f=1805-1995 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**4.7** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.7** ± 9.5% (k=2)	Alpha	**0.22**
ConvF Z	**4.7** ± 9.5% (k=2)	Depth	**3.48**

Conversion Factor Assessment





Body **835 MHz** ε_r **= 55.2 ± 5%** σ **= 0.97 ± 5% mho/m**

Valid for f=793-877 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

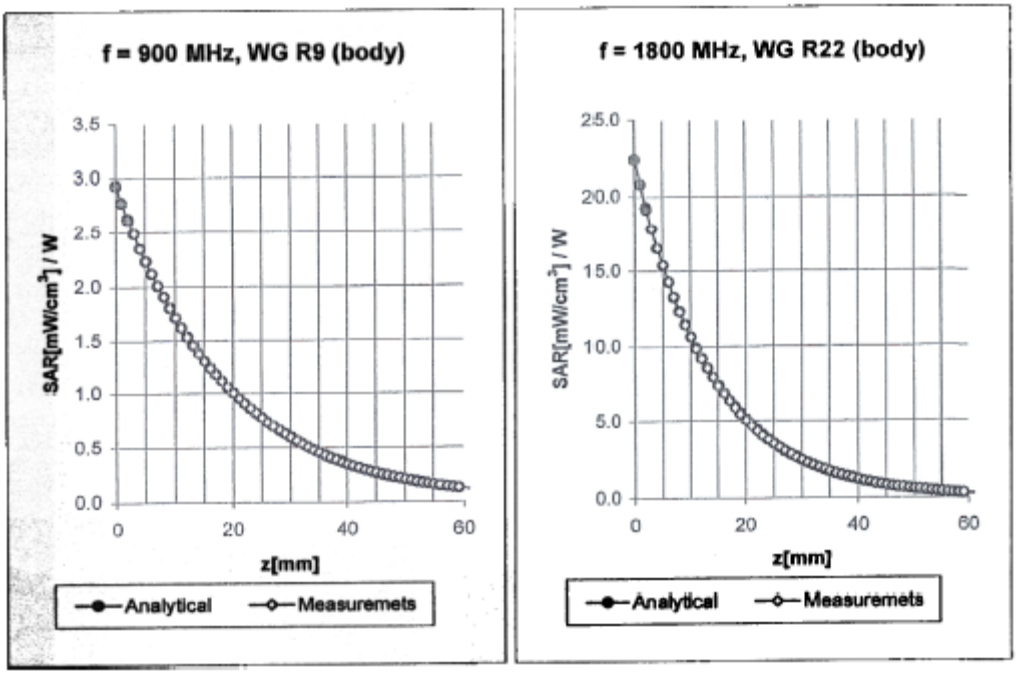
ConvF X	**6.1** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.1** ± 9.5% (k=2)	Alpha	**0.24**
ConvF Z	**6.1** ± 9.5% (k=2)	Depth	**2.00**

Body **1900 MHz** ε_r **= 53.3 ± 5%** σ **= 1.52 ± 5% mho/m**

Valid for f=1805-1995 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**4.6** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.6** ± 9.5% (k=2)	Alpha	**0.24**
ConvF Z	**4.6** ± 9.5% (k=2)	Depth	**2.64**

Conversion Factor Assessment



Body	900 MHz	ε_r = 55.0 ± 5%	σ = 1.05 ± 5% mho/m

Valid for f=855-945 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	6.1 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	6.1 ± 9.5% (k=2)	Alpha	0.27
ConvF Z	6.1 ± 9.5% (k=2)	Depth	1.82

Body	**1800 MHz**	ε_r = 53.3 ± 5%	σ = 1.52 ± 5% mho/m

Valid for f=1710-1890 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**4.7** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.7** ± 9.5% (k=2)	Alpha	**0.23**
ConvF Z	**4.7** ± 9.5% (k=2)	Depth	**2.99**

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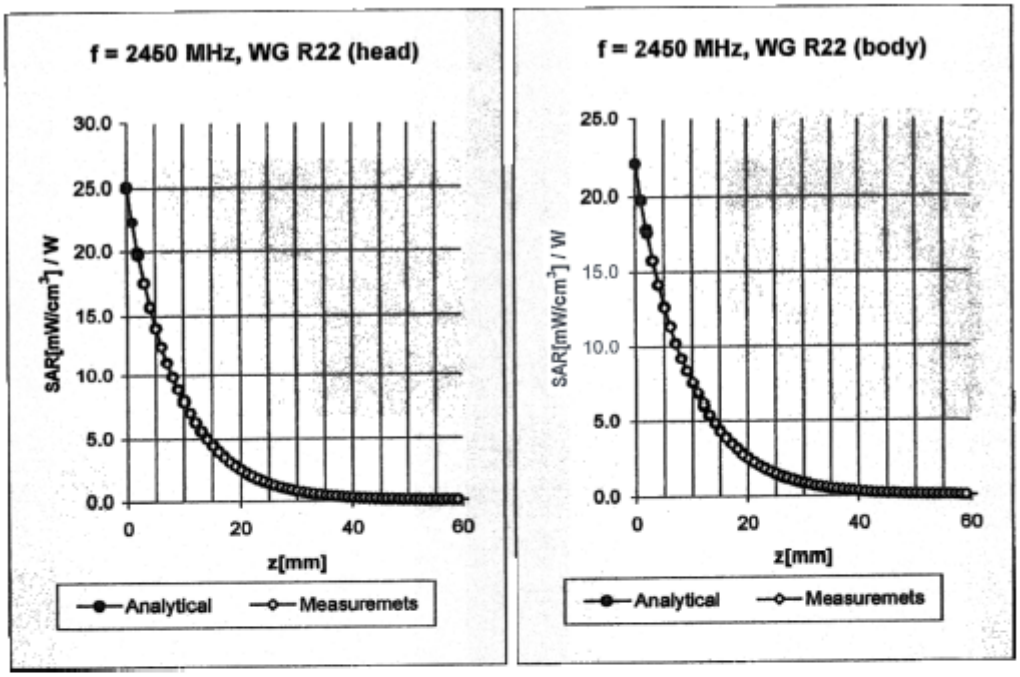
Conversion Factor Assessment



Head **2450 MHz** ε_r = 39.2 ± 5% σ = 1.80 ± 5% mho/m

Valid for f=2400-2500 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**4.5** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.5** ± 9.5% (k=2)	Alpha	**0.40**
ConvF Z	**4.5** ± 9.5% (k=2)	Depth	**1.62**

Body **2450 MHz** ε_r = 52.7 ± 5% σ = 1.95 ± 5% mho/m

Valid for f=2400-2500 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**4.2** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.2** ± 9.5% (k=2)	Alpha	**0.32**
ConvF Z	**4.2** ± 9.5% (k=2)	Depth	**1.98**

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Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	ES3DV2
Serial Number:	3019
Place of Assessment:	Zurich
Date of Assessment:	October 13, 2003
Probe Calibration Date:	October 9, 2003

Schmid & Partner Engineering AG hereby certifies that conversion factor(s) of this probe have been evaluated on the date indicated above. The assessment was performed using the FDTD numerical code SEMCAD of Schmid & Partner Engineering AG. Since the evaluation is coupled with measured conversion factors, it has to be recalculated yearly, i.e., following the re-calibration schedule of the probe. The uncertainty of the numerical assessment is based on the extrapolation from measured value at 900 MHz or at 1800 MHz.

Assessed by:

ES3DV2-SN:3019 October 13, 2003

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Dosimetric E-Field Probe ES3DV2 SN:3019

Conversion factor (± standard deviation)

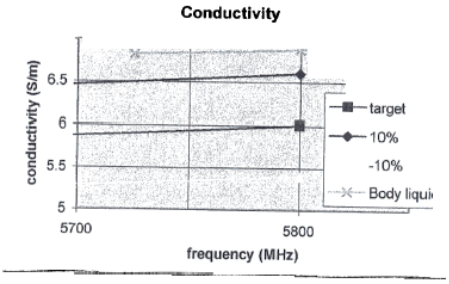
150 MHz	ConvF	**8.7 ± 8%**	$\varepsilon_r = 52.3 \pm 5\%$ $\sigma = 0.76 \pm 5\%$ mho/m (head tissue)
150 MHz	ConvF	**8.3 ± 8%**	$\varepsilon_r = 61.9 \pm 5\%$ $\sigma = 0.80 \pm 5\%$ mho/m (body tissue)
450 MHz	ConvF	**7.4 ± 8%**	$\varepsilon_r = 43.5 \pm 5\%$ $\sigma = 0.87 \pm 5\%$ mho/m (head tissue)
450 MHz	ConvF	**7.3 ± 8%**	$\varepsilon_r = 56.7 \pm 5\%$ $\sigma = 0.94 \pm 5\%$ mho/m (body tissue)

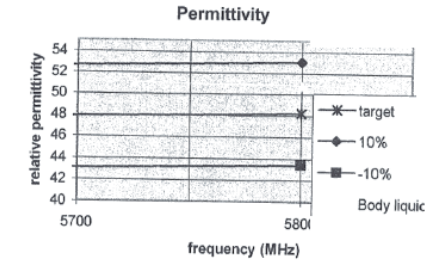
ES3DV2-SN:3019 **October 13, 2003**

Freq. (MHz)	Amplitude (dB)	Phase (deg)	Rel. Perm	Condy (S/m)
5725	-53.5	152	51	6.829
5800	-54	138	50.81	6.891
5825	-54.75	134	50.65	6.996

Freq. (MHz)	Rel. Perm.	Condy (S/m)	
400	45.3	0.87	
835	41.5	0.9	
900	41.5	0.97	
1450	40.5	1.2	
1800	40	1.4	
2000	40	1.4	
2450	39.2	1.8	
3000	38.5	2.4	
5800	48.2	6	
400	49.83	0.96	10
835	45.65	0.99	High %
900	45.65	1.07	
1450	44.55	1.32	
1800	44.00	1.54	
2000	44.00	1.54	
2450	43.12	1.98	
3000	42.35	2.64	
5800	53.02	6.60	
400	40.77	0.78	10
835	37.35	0.81	Low %
900	37.35	0.87	
1450	36.45	1.08	
1800	36.00	1.26	
2000	36.00	1.26	
2450	35.28	1.62	
3000	34.65	2.16	
5800	43.38	5.4	

0

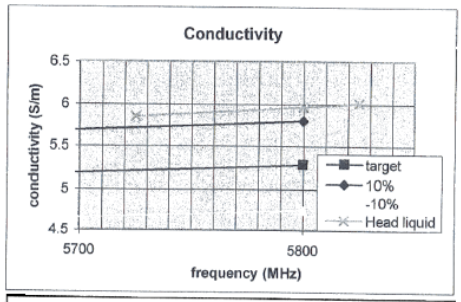


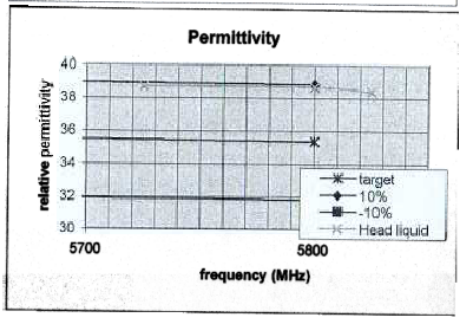


Freq. (MHz)	Amplitude (dB)	Phase (deg)	Rel. Perm.	Condy (S/m)
5725	-51.65	-20.5	38.7	5.849
5800	-52.5	-35	38.68	5.959
5825	-53	-35.6	38.39	6.008

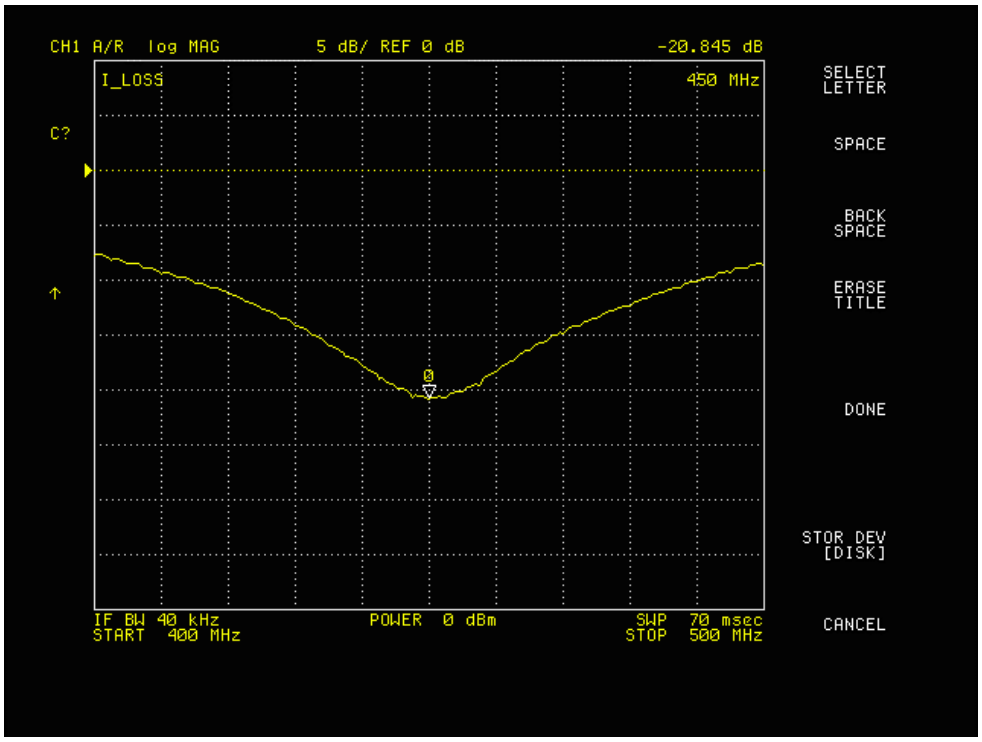
Freq. (MHz)	Rel. Perm.	Condy (S/m)	
400	45.3	0.87	
835	41.5	0.9	
900	41.5	0.97	
1450	40.5	1.2	
1800	40	1.4	
2000	40	1.4	
2450	39.2	1.8	
3000	38.5	2.4	
5800	35.33	5.27	
400	49.83	0.96	10
835	45.65	0.99	High %
900	45.65	1.07	
1450	44.55	1.32	
1800	44.00	1.54	
2000	44.00	1.54	
2450	43.12	1.98	
3000	42.35	2.64	
5800	38.86	5.80	
400	40.77	0.78	10
835	37.35	0.81	Low %
900	37.35	0.87	
1450	36.45	1.08	
1800	36.00	1.26	
2000	36.00	1.26	
2450	35.28	1.62	
3000	34.65	2.16	
5800	31.797	4.743	

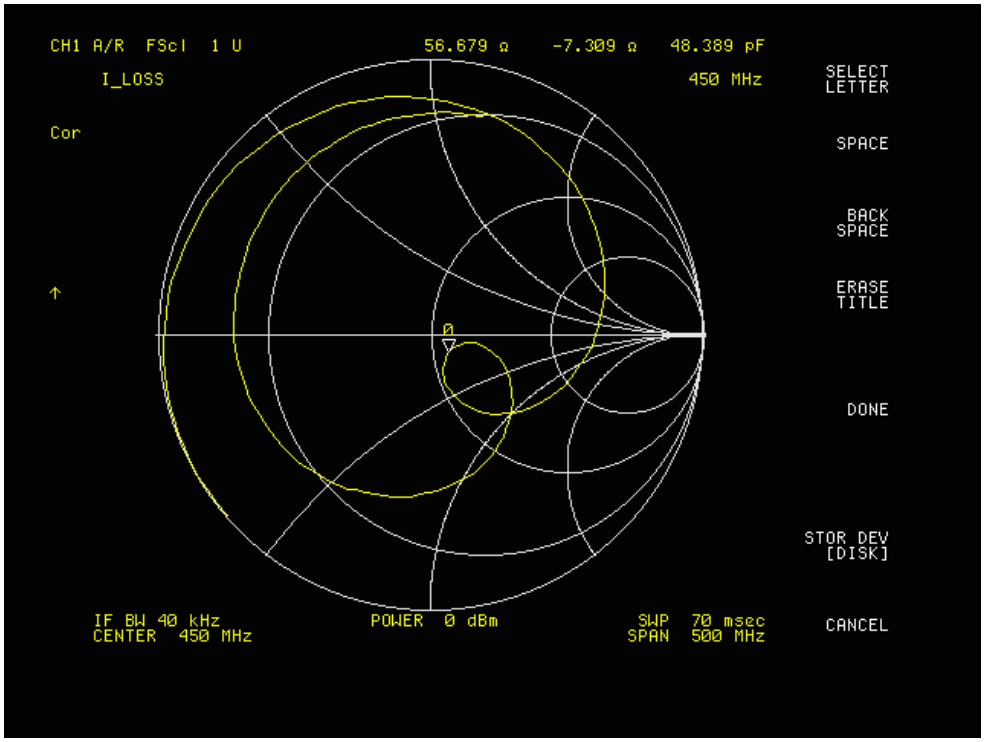
5 0





2.2.2 Dipole Calibration





450 MHz Body Liquid Validation, Ambient=23°C, Liquid Temp=22°C 02/25/04

Frequency	e'	e''
400000000.0000	56.4399	34.0672
402000000.0000	56.5491	34.2034
404000000.0000	56.6540	34.2614
406000000.0000	56.6059	34.3271
408000000.0000	56.5726	34.3268
410000000.0000	56.3287	34.5199
412000000.0000	56.2790	34.4470
414000000.0000	56.3886	34.7459
416000000.0000	56.3475	34.7008
418000000.0000	56.3428	34.7909
420000000.0000	56.3741	34.8708
422000000.0000	56.1465	34.8831
424000000.0000	56.0413	35.0363
426000000.0000	56.0336	35.1553
428000000.0000	55.9642	35.2079
430000000.0000	55.9221	35.3573
432000000.0000	55.8297	35.3709
434000000.0000	55.6672	35.2854
436000000.0000	55.7268	35.5240
438000000.0000	55.5702	35.6141
440000000.0000	55.5504	35.4468
442000000.0000	55.5524	35.6253
444000000.0000	55.5458	35.5574
446000000.0000	55.5101	35.8030
448000000.0000	55.5717	35.7160
450000000.0000	55.5620	35.7659
452000000.0000	55.4422	35.7721
454000000.0000	55.5981	35.9676
456000000.0000	55.5260	35.8110
458000000.0000	55.6407	35.8093
460000000.0000	55.6837	35.8560
462000000.0000	55.7529	35.7955
464000000.0000	55.8517	35.7406
466000000.0000	55.8780	35.7771
468000000.0000	55.9558	35.6999
470000000.0000	55.9856	35.6509
472000000.0000	56.0335	35.6874
474000000.0000	56.1994	35.6745
476000000.0000	56.3887	35.6262
478000000.0000	56.4413	35.7013
480000000.0000	56.5024	35.5523
482000000.0000	56.6398	35.4977
484000000.0000	56.6755	35.5836
486000000.0000	56.8562	35.4942
488000000.0000	56.8949	35.3462
490000000.0000	57.1137	35.4283
492000000.0000	57.1711	35.5596
494000000.0000	57.3190	35.4176
496000000.0000	57.3940	35.4743
498000000.0000	57.4533	35.4815
500000000.0000	57.5219	35.3914

$\sigma = \omega \varepsilon_o \varepsilon'' = 2 \pi f \varepsilon_o \varepsilon'' = 0.90$
where $f = 450$
$\varepsilon_o = 8.854 \times 10^{-12}$
$\varepsilon'' = 35.7659$

450 MHz Body Liquid Validation, Ambient=23°C, Liquid Temp=22°C 02/25/04

Frequency	e'	e''
400000000.0000	45.5307	35.1181
402000000.0000	45.3673	34.9837
404000000.0000	45.2185	34.0736
406000000.0000	45.2482	34.9938
408000000.0000	45.1770	34.0088
410000000.0000	45.0298	34.9347
412000000.0000	44.9890	34.9444
414000000.0000	44.8246	34.8458
416000000.0000	44.9236	34.9239
418000000.0000	44.7834	34.9389
420000000.0000	44.6548	34.7845
422000000.0000	44.5464	34.9102
424000000.0000	44.4076	34.8392
426000000.0000	44.3751	34.8629
428000000.0000	44.3431	34.8149
430000000.0000	44.0373	34.8221
432000000.0000	43.9706	34.8034
434000000.0000	43.9747	34.7346
436000000.0000	43.7810	34.7573
438000000.0000	43.5628	34.5667
440000000.0000	43.6300	34.5024
442000000.0000	43.5964	34.4240
444000000.0000	43.5610	34.5061
446000000.0000	43.5208	34.5265
448000000.0000	43.2965	34.4541
450000000.0000	43.4645	34.3428
452000000.0000	43.4271	34.3702
454000000.0000	43.4287	34.2873
456000000.0000	43.3556	34.3018
458000000.0000	43.3731	34.1963
460000000.0000	43.2725	34.1700
462000000.0000	43.2390	34.0765
464000000.0000	43.2861	34.0469
466000000.0000	43.1095	33.9050
468000000.0000	43.2477	33.8040
470000000.0000	43.2098	33.6879
472000000.0000	43.2917	33.6392
474000000.0000	43.2464	33.6489
476000000.0000	43.2230	33.4095
478000000.0000	43.2569	33.3050
480000000.0000	43.3400	33.2272
482000000.0000	43.3282	33.1424
484000000.0000	43.2641	33.0247
486000000.0000	43.3077	33.9867
488000000.0000	43.2849	32.8232
490000000.0000	43.3200	32.6353
492000000.0000	43.3444	32.6283
494000000.0000	43.3150	32.4945
496000000.0000	43.3498	32.4227
498000000.0000	43.3369	32.3620
500000000.0000	43.3716	32.2909

$\sigma = \omega \varepsilon_o \varepsilon'' = 2 \pi f \varepsilon_o \varepsilon'' = 0.86$
where $f = 450$
$\varepsilon_o = 8.854 \times 10^{-12}$
$\varepsilon'' = 34.3428$

3 - EUT DESCRIPTION

Serial Number:	00000001
Applicant:	GENEX TELECOM CO., LTD.
Product Description:	Transceiver, UHF, PTT Portable, 2-Way Radio
FCC ID:	PM3GX90
Transmitter Frequency:	430.9875 – 469.9875 MHz
Maximum Output Power:	37.00 dBm (5.01 W)
Dimension:	9.9”L x 2.5”W x 1.75”H
RF Exposure environment:	Occupational Population
Applicable Standard	FCC CFR 47, Part 90
Application Type:	Certification

[1] Specific Absorption Rate (SAR) is a measure of the rate of energy absorption due to exposure to an RF transmitting source (wireless portable device).
[2] IEEE/ANSI Std. C95.3-2002 limits are used to determine compliance with FCC ET Docket 93-62.
Note: The test data was good for test sample only. It may have deviation for other test samples.