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SAR Evaluation on
450 MHz Handheld Transceiver
Model: 208S
FCC ID: QORX100

For
TRV Motor Sport Inc.
to
FCC OET Bulletin 65 – Supplement C (Edition 01-01)

Report Number: M030212R
(Replacement for report number M030212)

Issue Date: 7th March 2003

This report is not an endorsement of the subject product.
The results within apply to the test sample as tested.

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SAR EVALUATION
TRV Motor Sport Inc. Handheld Transceiver
Model: 208S
Report Number: M030212R
FCC ID: QORX100

1.0 GENERAL INFORMATION

Test Sample:	Handheld Transceiver
Device Category:	Portable Transmitter
Test Device:	Identical Prototype
Model Number:	208S
FCC ID:	QORX100
RF exposure Category:	Occupational/Controlled
Manufacturer:	TRV Motor Sport Inc.
Address:	300 North Westwood Toledo, Ohio 43607 USA
Phone:	+1 41 9535 5665
Fax:	+1 41 9535 6868
Test Standard/s:	Evaluating Compliance with FCC Guidelines For Human Exposure to Radiofrequency Electromagnetic Fields Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01)
Statement Of Compliance:	The TRV Motor sport Inc. Handheld Transceiver model 208S Complied with the FCC occupational/controlled RF exposure limits of 8.0mW/g per requirements of 47CFR2.1093(d).
Test Dates:	24^{th} to 25^{th} February 2003
Tested for:	TRV Motor Sport Inc.
Address:	300 North Westwood Toledo, Ohio 43607 USA
Phone:	+1 41 9535 5665
Fax:	+1 41 9535 6868

Test Officer:

Aaron Sargent
B.Eng

Authorised Signature:

Chris Zombolas
Technical Director, EMC Technologies Pty Ltd

SAR EVALUATION
TRV Motor Sport Inc. Handheld Transceiver
Model: 208S
Report Number: M030212

2.0 DESCRIPTION OF DEVICE

2.1 Description of Test Sample

The device tested was a TRV Motor Sport Inc. Handheld Transceiver operating in the 460 MHz frequency band. It has an integral antenna. The test device can be used in the Belt-Clip configuration and the Face Position.

Operating Mode during Testing	: Continuous Wave 100% duty cycle
Operating Mode production sample	: Simplex or Semi-Duplex 50% duty cycle
Device Power Rating for test sample and identical production unit	: 4W for 12V battery : 2W for 7.2V battery
Antenna type	: Helical Rubber Antenna
Applicable Body Worn-Configurations	: Belt-Clip and Face Position
Battery Options	: 12V or 7.2V 1100mAH battery

2.2 Test sample Accessories

2.2.1 Battery Types

Two different types of batteries are available with the TRV Motor Sport Inc. Handheld Transceiver as accessories. The batteries used with the device include either a 12V or 7.5V battery with the maximum rated power being 4W and 2W respectively. SAR measurements were performed with the 12V battery and then the worst case SAR test position was repeated with the 7.5V battery.

2.2.2 Belt Clip

A *metal* belt clip is sold with the device. The belt clip is fixed to the back of the device and provides a spacing of 6mm between the device and flat phantom. This metal belt-clip was attached to the device during all testing.

2.2.3 External Hand Speaker/Microphone TSM-1

A microphone with a cable length of approximately 53cm is an optional accessory. This accessory was connected to the device during testing in the belt-clip position. See photographs below.

2.3 Test Signal, Frequency and Output Power

The Handheld Transceiver had pre-programmed transmit channels corresponding to the low, middle and high frequencies of operation. This maintained a maximum output signal from the EUT in the frequency range 450.025 MHz to 469.980 MHz. The fixed frequency channels were used in testing and are shown in the table below. The SAR levels of the test sample were measured for the 460 MHz frequency band of operation. Excluding the Microphone accessory there were no wires or other connections to the Handheld Transceiver during the SAR measurements.

Table 1: Frequency and Output Power

Channel	Channel Frequency MHz	Maximum Conducted Output Power Measured
1	450.025	36.17
2	460.030	36.26
3	469.980	36.43

2.4 Battery Status

The device battery was fully charged prior to commencement of measurement. Each SAR test was completed within 30 minutes. The battery condition was monitored by measuring the RF field at a defined position inside the phantom before the commencement of each test and again after the completion of the test. The conducted power output at the antenna port of the device was also measured at the beginning and conclusion of each SAR measurement.

2.5 Modulation scheme

The Modulation scheme was Frequency Modulation

2.6 Details of Test Laboratory

2.6.1 Location

EMC Technologies Pty Ltd - ACN/ABN: 82057105549
57 Assembly Drive
Tullamarine, Victoria
Australia 3043

Telephone:	+61 3 9335 3333
Facsimile:	+61 3 9338 9260
email:	melb@emctech.com.au
website:	www.emctech.com.au

2.6.2 Accreditations

EMC Technologies Pty. Ltd. is accredited by the National Association of Testing Authorities, Australia (NATA). **NATA Accredited Laboratory Number: 5292**

EMC Technologies Pty Ltd is NATA accredited for the following standards:

AS/NZS 2772.1:	RF and microwave radiation hazard measurement
ACA:	Electromagnetic Radiation Human Exposure Standard
FCC:	Guidelines for Human Exposure to RF Electromagnetic Field
CENELEC:	ES59005

Refer to NATA website www.nata.asn.au for the full scope of accreditation.

2.6.3 Environmental Factors

The measurements were performed in a shielded room with no background network signals. The temperature in the laboratory was controlled to within 21±1 °C, the humidity was in the range 50% to 65%. The liquid parameters were measured daily prior to the commencement of each test. Tests were performed to check that reflections within the environment did not influence the SAR measurements. The noise floor of the DASY4 SAR measurement system using the SN1377 probe is less than 5μV in both air and liquid mediums.

3.0 DESCRIPTION OF SAR MEASUREMENT SYSTEM

3.1 Probe Positioning System

The measurements were performed with the state of the art automated near-field scanning system **DASY4 V4.0 Build51** from Schmid & Partner Engineering AG (SPEAG). The system is based on a high precision 6-axis robot (working range greater that 1.1m), which positions the SAR measurement probes with a positional repeatability of better than ±0.02 mm. The DASY4 fully complies with the OET65 C (01-01), IEEE 1528 and EN50361SAR measurement requirements.

3.2 E-Field Probe Type and Performance

The SAR measurements were conducted with the dosimetric probe ET3DV6 Serial: 1377 (manufactured by SPEAG) designed in the classical triangular configuration and optimised for dosimetric evaluation. The probe has been calibrated and found to be accurate to better than ±0.25 dB. The probe is suitable for measurements close to material discontinuity at the surface of the phantom. The sensors of the probe are directly loaded with Schottky diodes and connected via highly resistive lines (length = 300 mm) to the data acquisition unit.

3.3 Data Acquisition Electronics

The data acquisition electronics (DAE3) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. The input impedance of the DAE3 box is 200 MΩ; the inputs are symmetrical and floating. Common mode rejection is above 80dB.Transmission to the PC-card is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.

The mechanical probe-mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.

3.4 Calibration and Validation Procedures and Data

Prior to the SAR assessment, the system validation kit was used to verify that the DASY4 was operating within its specifications. The validation was performed at 450 MHz with the SPEAG D450V2 calibrated dipole.

The validation dipoles are highly symmetric and matched at the centre frequency for the specified liquid and distance to the phantom. The accurate distance between the liquid surface and the dipole centre is achieved with a distance holder that snaps onto the dipole.

System validation is performed by feeding a known power level into a reference dipole, set at a know distance from the phantom. The measured SAR is compared to the theoretically derived level.

3.4.1 Validation Results @ 450MHz

Validation Date 24-Feb-03 Dipole: SPEAG D450V2 SN: 1009

Frequency	ϵ_r (measured)	σ (mho/m) (measured)	Power Into Antenna	Measured SAR 1g	Measured SAR 10g
450MHz	56.2	0.96	250mW	1.31mW/g	0.85mW/g

Validation Date 25-Feb-03 Dipole: SPEAG D450V2 SN: 1009

Frequency	ϵ_r (measured)	σ (mho/m) (measured)	Power Into Antenna	Measured SAR 1g	Measured SAR 10g
450MHz	43.97	0.87	250mW	1.19mW/g	0.776mW/g

3.4.2 Deviation from reference validation values

Frequency	Measured SAR 1g	Measured SAR 1g (Normalized to 1W)	SPEAG Calibration reference SAR Value (1g)	Deviation From SPEAG (1g)	IEEE Std 1528 reference SAR value (1g)	Deviation From IEEE (1g)
450MHz 24-Feb-03	1.31mW/g	5.24mW/g	4.97mW/g	5.4%	4.90mW/g	6.9%
450MHz 25-Feb-03	1.14mW/g	4.56mW/g	4.97mW/g	-8.2%	4.90mW/g	-6.9%

NOTE: All reference validation values are referenced to 1W input power.
NOTE: The measured one-gram SAR should be within 10% of the expected target reference values shown above.

3.4.3 Liquid Depth 15cm

During the SAR measurement process the liquid level was maintained to 15cm with a tolerance of 60.2cm. The following photo shows the depth of the liquid maintained during the testing.

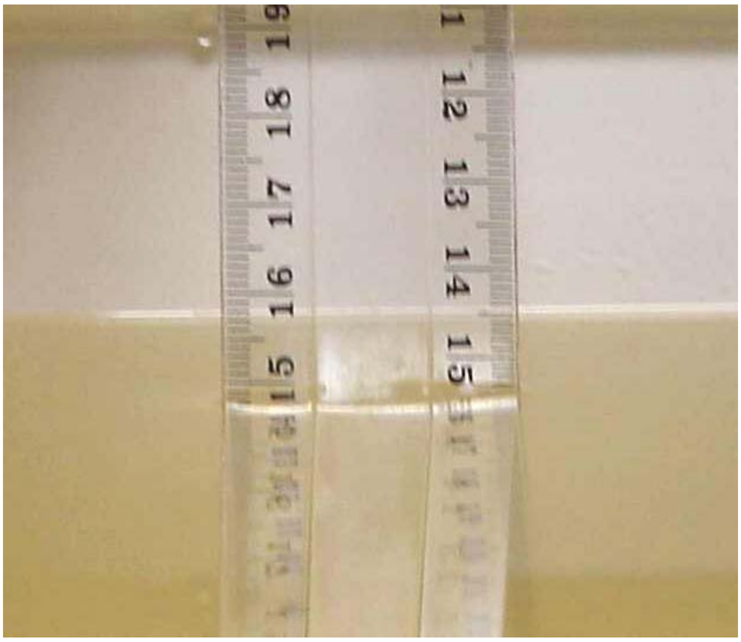


Photo of liquid Depth in Flat Phantom

3.5 Phantom Properties (Size, Shape, Shell Thickness, Tissue Material Properties)

The phantom used was the “Flat Phantom V4.4” from SPEAG. It is a combination 6mm/2mm Flat Phantom and was filled with the tissue simulating liquid. The flat phantom support structures were all non-metallic and spaced more than one device width away in transverse directions.

The dielectric parameters of the brain simulating liquid were measured prior to SAR assessment using the HP85070A dielectric probe kit and HP8714B Network Analyser. The actual dielectric parameters are shown in the following table.

Table 2: Measured Brain Simulating Liquid Dielectric Values

Frequency Band	∈r (measured)	∈r (target)	σ (mho/m) (measured)	σ (target)	ρ kg/m^3
450 MHz Brain	43.97	43.5 ±5% (41.3 to 45.6)	0.87	0.87 ±5% (0.83 to 0.91)	1000
460 MHz Brain	43.82	43.5 ±5% (41.3 to 45.6)	0.88	0.87 ±5% (0.83 to 0.91)	1000
470 MHz Brain	43.72	43.5 ±5% (41.3 to 45.6)	0.89	0.87 ±5% (0.83 to 0.91)	1000

Table 3: Measured Body Simulating Liquid Dielectric Values

Frequency Band	∈r (measured)	∈r (target)	σ (mho/m) (measured)	σ (target)	ρ kg/m^3
450 MHz Muscle	56.20	56.7 ±5% (53.9 to 59.5)	0.96	0.94 ±5% (0.89 to 0.98)	1000
460 MHz Muscle	56.18	56.7 ±5% (53.9 to 59.5)	0.97	0.94 ±5% (0.89 to 0.98)	1000
470 MHz Muscle	56.00	56.7 ±5% (53.9 to 59.5)	0.98	0.94 ±5% (0.89 to 0.98)	1000

The brain and muscle liquid parameters were within the required tolerances of ±5%.

3.5.1 Liquid Temperature and Humidity

Measurement	Date: 24-Feb-03	Date: 25-Feb-03
Ambient Temperature	21.5°C	21.6
Liquid Temperature	20.8°C	20.7°C
Humidity	63%	64%

3.6 Simulated Tissue Properties Used for SAR Test

Tissue Type: Brain @ 450MHz
Volume of Liquid: 60 Litres

Approximate Composition	% By Weight
Distilled Water	38.56
Salt	3.95
Sugar	56.32
HEC	0.98
Bactericide	0.19

Tissue Type: Muscle @ 450MHz
Volume of Liquid: 60 Litres

Approximate Composition	% By Weight
Distilled Water	51.16
Salt	1.49
Sugar	46.78
HEC	0.52
Bactericide	0.05

*Refer “OET Bulletin 65 97/01 P38”

3.7 Device Holder for DASY4

The DASY4 device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The rotation centers for both scales is the ear opening. Thus the device needs no repositioning when changing the angles.

The DASY4 device holder is made of low-loss material having the following dielectric parameters: relative permittivity $\varepsilon=3$ and loss tangent $\delta=0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, to reduce the influence on the clamp on the test results.

A foam spacer is used to raise the device above the clamp of the device holder to minimise any affect on the radiation characteristics of the device. In cases where foam is not used the device is mounted so that the antenna is unobstructed.

Refer to Appendix A2 for photograph of device positioning.

4.0 SAR MEASUREMENT PROCEDURE USING DASY4

The SAR evaluation was performed with the SPEAG DASY4 system. A summary of the procedure follows:

a) A measurement of the SAR value at a fixed location is used as a reference value for assessing the power drop of the phone. The SAR at this point is measured at the start of the test and then again at the end of the test.

b) The SAR distribution at the exposed side of the head is measured at a distance of 3.9 mm from the inner surface of the shell. The area covers the entire dimension of the head and the horizontal grid spacing is 20 mm x 20 mm. The actual Area Scan has dimensions of 150mm x 300mm surrounding the test device. Based on this data, the area of the maximum absorption is determined by Spline interpolation.

c) Around this point, a volume of 30 mm x 30 mm x 30 mm is assessed by measuring 7 x 7 x 7 points. On the basis of this data set, the spatial peak SAR value is evaluated with the following procedure:

   (i) The data at the surface are extrapolated, since the centre of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2 mm. The extrapolation is based on a least square algorithm. A polynomial of the fourth order is calculated through the points in z-axes. This polynomial is then used to evaluate the points between the surface and the probe tip.

   (ii) The maximum interpolated value is searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g and 10 g) are computed using the 3D-Spline interpolation algorithm. The 3D-Spline is composed of three one-dimensional splines with the "Not a knot"- condition (in x, y and z-direction). The volume is integrated with the trapezoidal – algorithm. One thousand points (10 x 10 x 10) are interpolated to calculate the averages.

   (iii) All neighbouring volumes are evaluated until no neighbouring volume with a higher average value is found.

   (iv) The SAR value at the same location as in Step (a) is again measured and recorded and the drift (in dB) on the plot.

5.0 MEASUREMENT UNCERTAINTY

Table 4: Uncertainty Budget for DASY4 Version V4.0 Build 51

a	b	c	d	e= f(d,k)	f	g	h=cxf/e	i=cxg/e	k
Uncertainty Component	Section IEEE P1528	Tol. (6%)	Prob. Dist.	Div.	C_i (1g)	C_i (10g)	1g u_i (6%)	10g u_i (6%)	v_i
Measurement System									
Probe Calibration (k=1) (numerical calibration)	E.2.1	8	N	1	1	1	8	8	∞
Axial Isotropy	E.2.2	4.7	R	√3	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	R	√3	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	0.4	R	√3	1	1	0.23	0.23	∞
Linearity	E.2.4	4.7	R	√3	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	√3	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	1.0	N	1	1	1	1.0	1.0	∞
Response Time	E.2.7	0.8	R	√3	1	1	0.5	0.5	∞
Integration Time	E.2.8	1.4	R	√3	1	1	0.8	0.8	∞
RF Ambient Conditions	E.6.1	3.0	R	√3	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	1.4	R	√3	1	1	0.81	0.81	∞
Probe Positioning with respect to Phantom Shell	E.6.3	2.9	R	√3	1	1	1.7	1.7	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E.5	3.6	R	√3	1	1	2.1	2.1	∞
Test Sample Related					1	1			
Test Sample Positioning	E.4.2	6	N	1	1	1	6.0	6.0	11
Device Holder Uncertainty	E.4.1	3.1	N	1	1	1	3.1	3.1	7
Output Power Variation – SAR Drift Measurement	6.6.2	6	R	√3	1	1	3.5	3.5	∞
Phantom and Tissue Parameters					1	1			
Phantom Uncertainty (shape and thickness tolerances)	E.3.1	4.0	R	√3	1	1	2.3	2.3	∞
Liquid Conductivity – Deviation from target values	E.3.2	5.0	R	√3	0.64	0.43	1.8	1.2	∞
Liquid Conductivity – Measurement uncertainty	E.3.3	10	N	1	0.64	0.43	6.4	4.3	5
Liquid Permittivity – Deviation from target values	E.3.2	5.0	R	√3	0.6	0.49	1.7	2.8	∞
Liquid Permittivity – Measurement uncertainty	E.3.3	2.9	N	1	0.6	0.49	1.7	1.5	5
Combined standard Uncertainty			RSS				14.7	14	154
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				±29.4	±28.0	

Estimated total measurement uncertainty for the DASY4 measurement system was ±14.7%. The expanded uncertainty (K = 2) was assessed to be ±29.4% based on 95% confidence level. The uncertainty is not added to the measurement result.

6.0 EQUIPMENT LIST AND CALIBRATION DETAILS

Table 5 SPEAG DASY4 Version 4.0 Build 51

Equipment Type	Manufacturer	Model Number	Serial Number	Calibration Due
Robot - Six Axes	Staubli	RX90BL	N/A	Not applicable
Robot Remote Control	Schmid & Partner Engineering AG	CS7MB	RX90B	Not applicable
SAM Phantom	Schmid & Partner Engineering AG	N/A	1060	Not applicable
Flat Phantom	Schmid & Partner Engineering AG	V4.4 Combination 6.0mm /2.00 mm	1001	Not Applicable
Flat Phantom	Schmid & Partner Engineering AG	PO1A V4.4e 6mm	1003	Not Applicable
Data Acquisition Electronics	Schmid & Partner Engineering AG	DAE3 V1	442	Oct – 03
Probe E-Field - Dummy	Schmid & Partner Engineering AG	DP1	N/A	Not applicable
Probe E-Field	Schmid & Partner Engineering AG	ET3DV6	1377	6–Sept-03
Antenna Dipole 450 MHz	Schmid & Partner Engineering AG	D450V2	1009	24-Jan-05
RF Amplifier	Mini-Circuits	ZHL-42	N/A	Not applicable
Synthesized signal generator	Hewlett Packard	ESG-D3000A	GB37420238	In test
RF Power Meter Dual	Hewlett Packard	437B	3125012786	23-May-03
RF Power Sensor 0.01 - 18 GHz	Hewlett Packard	8481H	1545A01634	23-May-03
RF Power Meter Dual	Gigaronics	8542B	1830125	10-Sept-03
RF Power Sensor	Gigatronics	80301A	1828805	10-Sept-03
Network Analyser	Hewlett Packard	8714B	GB3510035	10-Sept-03
Dual Directional Coupler	NARDA	3022	75453	In test
Spectrum Analyzer 9 kHz - 22 GHz	Hewlett Packard	8593EM	3412A00105	23-May-03

7.0 OET BULLETIN 65 – SUPPLEMENT C TEST METHOD

7.1 Description of the Test Positions (Belt Clip and In front of face)

SAR measurements were performed in the “Face Position” and “Belt Clip” positions. Both the “Belt Clip” and “Face position” were measured in the flat section of the phantom.

7.1.1 “Belt Clip” Position

The device was tested in the 2.00mm section of the flat phantom for the “Belt Clip” position. A belt clip maintained a distance of approximately 6mm between the back of the device and the flat phantom. The Transceiver was placed at the flat section of the phantom and suspended until the Belt Clip touched the phantom. The belt clip was made entirely of metal. The device was connected with the speaker microphone; the microphone and cable were taped to the phantom. This was equivalent to the device worn at the belt position with the speaker microphone at the shoulder.

7.1.2 “Face Position”

The SAR evaluation was performed in the 2.00mm section of the flat phantom. The device was placed 25mm from the phantom, this position is equivalent to the device placed in front of the nose. The supporting hand was not used.

See Appendix A for photos of test positions.

7.2 List of All Test Cases (Antenna In/Out, Test Frequencies, User Modes)

The device has a fixed antenna. The SAR was measured at three test channels with the test sample operating at maximum power, as specified in section 2.3.

7.3 FCC RF Exposure Limits for Occupational/ Controlled Exposure

Spatial Peak SAR Limits For:	
Partial-Body:	8.0 mW/g (averaged over any 1g cube of tissue)
Hands, Wrists, Feet and Ankles:	20.0 mW/g (averaged over 10g cube of tissue)

7.4 FCC RF Exposure Limits for Un-controlled/Non–occupational

Spatial Peak SAR Limits For:	
Partial-Body:	1.6 mW/g (averaged over any 1g cube of tissue)
Hands, Wrists, Feet and Ankles:	4.0 mW/g (averaged over 10g cube of tissue)

8.0 SAR EVALUATION RESULTS

The SAR values averaged over 1 g and 10 g tissue masses were determined for the sample device for the Face Position and belt-clip configurations of the phantom. The results are given in Table 6, 450 to 470MHz (460 MHz band). The uncertainty of the system has not been added to the any result.

The plots with the corresponding SAR distributions, which reveal information about the location of the maximum SAR with respect to the device, are contained in Appendix B of this report.

Table 6: SAR Measurement Results – 460 MHz Band (450 to 470MHz)

Test Position	Plot No.	**Test Channel**	Battery Voltage	**Test Freq (MHz)**	**SAR Level for (1g)**	**SAR Level for (10g)**	**DASY4 Measured Drift (dB)**	**Conducted Power Measured Before Test (*1) (dBm)**	**Conducted Power Measured After Test (*2) (dBm)**	**Conducted Power Measured Drift (dB)**
Belt Clip Position	1	1	12V	450	*6.60*	4.26	-0.3	35.17	34.81	-0.36
Belt Clip Position	2	2	12V	460	*7.38*	5.10	-0.7	35.26	34.72	-0.54
Belt Clip Position	3	3	12V	470	*7.31*	4.94	-0.8	35.43	34.80	-0.63
Belt-Clip Position	4	3	7.2V	450	*4.06*	2.77	-0.6	33.61	33.05	-0.56
Belt-Clip Position with DC Power supply	5	3	12V	450	*10.6*	7.16	-0.3	36.59	36.41	-0.18
Face Position	6	1	12V	450	*2.04*	1.48	-0.2	35.10	34.68	-0.42
Face Position	7	2	12V	460	*1.66*	1.20	-0.3	35.11	34.77	-0.34
Face Position	8	3	12V	470	*1.74*	1.25	-0.2	35.02	34.86	-0.16
Face Position	9	1	7.2V	450	*1.58*	1.16	-0.4	33.35	33.18	-0.17
Face Position with DC Power supply	10	1	12V	450	*1.06*	0.77	-0.2	36.65	35.71	-0.94

Note *1. The power in dBm measured immediately prior to commencement of SAR scanning and after the 20 minute battery discharge time.
Note *2. The power in dBm measured immediately after the conclusion of the SAR scan. (approximately 28 minutes)

The maximum measured SAR level at the Face position without DC supplemented batteries was 2.04 mW/g for a 1-gram cube of tissue. The maximum measured SAR for the body worn (belt clip) position without DC supplemented batteries was 7.38mW/g for a 1gram cube of tissue.
The test limit set by the FCC is 8.0 mW/g for a 1g cube of tissue for the head and body worn positions.

9.0 FINAL SAR EVALUATION

The SAR values averaged over 1 g and 10 g tissue masses were determined for the sample device for the Face Position and belt-clip configurations of the phantom.

9.1.1 Details of power droop

Because of the power droop of this device, some additional tests were undertaken to ensure that the measured SAR levels were conservative. This testing used an external DC power supply to supplement the battery (12V) while shielded cables and ferrites were used on all wires connecting to the device.

For all measurements using the 12V battery, the conducted power measured at the end of the scan was used to scale the measured SAR value to the maximum recorded conducted power listed in Table 1. This method provides a more conservative assessment of the SAR. The test sample used a fresh battery at the beginning of each SAR scan. The power drainage of the device has been recorded for the first 30 minutes of the scan and a typical “power vs. time” plot can be found in Appendix C. The approximate time to complete a full SAR scan was 28 minutes.
Refer to Appendix A for photos of test setup.

Table 7: Final Extrapolated SAR Results and Additional Tests

Test Position	Plot No.	Test Channel	Battery Voltage	Test Freq (MHz)	SAR Level for (1g) Measured	SAR Scaled up by measured drift (1g)	SAR for an Extrapolated 50% duty Cycle	50% Duty cycle and Including the measurement uncertainty of 29.4%
Belt Clip Position	1	1	12V	450	6.60	9.04	*4.52*	5.85
Belt Clip Position	2	2	12V	460	7.38	10.55	*5.28*	6.83
Belt Clip Position	3	3	12V	470	7.31	10.67	*5.34*	6.91
Belt-Clip Position	4	3	7.2V	450	4.06	N/A	*N/A*	*N/A*
Belt-Clip Position with DC Power supply	5	3	12V	450	10.6	10.64	*5.32*	6.89
Face Position	6	1	12V	450	2.04	2.87	*1.44*	1.86
Face Position	7	2	12V	460	1.66	2.34	*1.17*	1.51
Face Position	8	3	12V	470	1.74	2.37	*1.18*	1.68
Face Position	9	1	7.2V	450	1.58	N/A	*N/A*	*N/A*
Face Position with DC Power supply	10	1	12V	450	1.06	1.49	*0.75*	0.97

NOTE: Extrapolated results relating to SAR testing of the 7.2V battery were not necessary due to significantly lower SAR levels.

The maximum measured SAR level at the Face position without DC supplemented batteries was 2.04 mW/g for a 1-gram cube of tissue measured for channel 1. When the SAR is scaled up by the measured drift and extrapolated for a 50% duty cycle the SAR level is 1.44W/g for a 1g-cube of tissue.

The maximum measured SAR level at the Face position using a DC supply to supplement the batteries was 1.06 mW/g for a 1-gram cube of tissue measured with channel 1. When the SAR is scaled up by the measured drift and extrapolated for a 50% duty cycle the SAR level is 0.75mW/g for a 1g-cube of tissue.

The maximum measured SAR level at the Belt-Clip position without DC supplemented batteries was 7.31 mW/g for a 1-gram cube of tissue measured with channel 3. When the SAR is scaled up by the measured drift and extrapolated for a 50% duty cycle the SAR level is 5.34mW/g for a 1g-cube of tissue.

The maximum measured SAR level at the Belt-Clip position using the DC supplemented batteries was 10.6 mW/g for a 1-gram cube of tissue when measured with channel 3. When the SAR is scaled up by the measured drift and extrapolated for a 50% duty cycle the SAR level is 5.32 mW/g for a 1g-cube of tissue.

The test limit set by the FCC is 8.0 mW/g for a 1g cube of tissue for the head and body worn positions.

10.0 COMPLIANCE STATEMENT

The TRV Motor Sport Inc. Model 208S FCC ID: QORX100 450 MHz Handheld Transceiver was found to comply with the FCC SAR requirements.

After extrapolating to a 50% duty cycle the highest SAR level recorded was 5.32 mW/g for a 1g cube. This value was measured on channel 3 in the Belt-Clip position with the DC power supply supplementing the 12V battery. This was below the limit of 8.0 mW/g, even taking the measurement uncertainty into account.

APPENDIX A1
TEST SAMPLE PHOTOGRAPHS

TRV Motor Sport Inc. Model 208S

APPENDIX A2
TEST SET UP PHOTOGRAPHS

Face Position

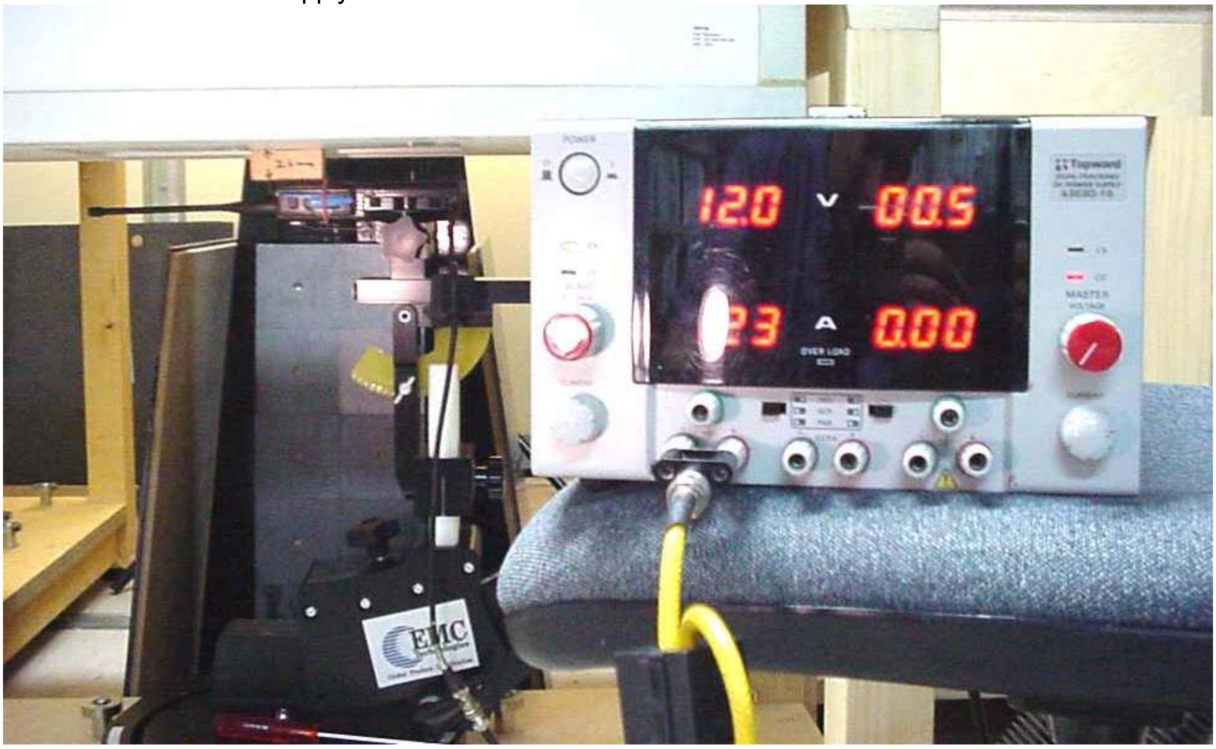
NOTE: Wooden spacer removed during testing

Face Position

NOTE: Wooden spacer removed during testing

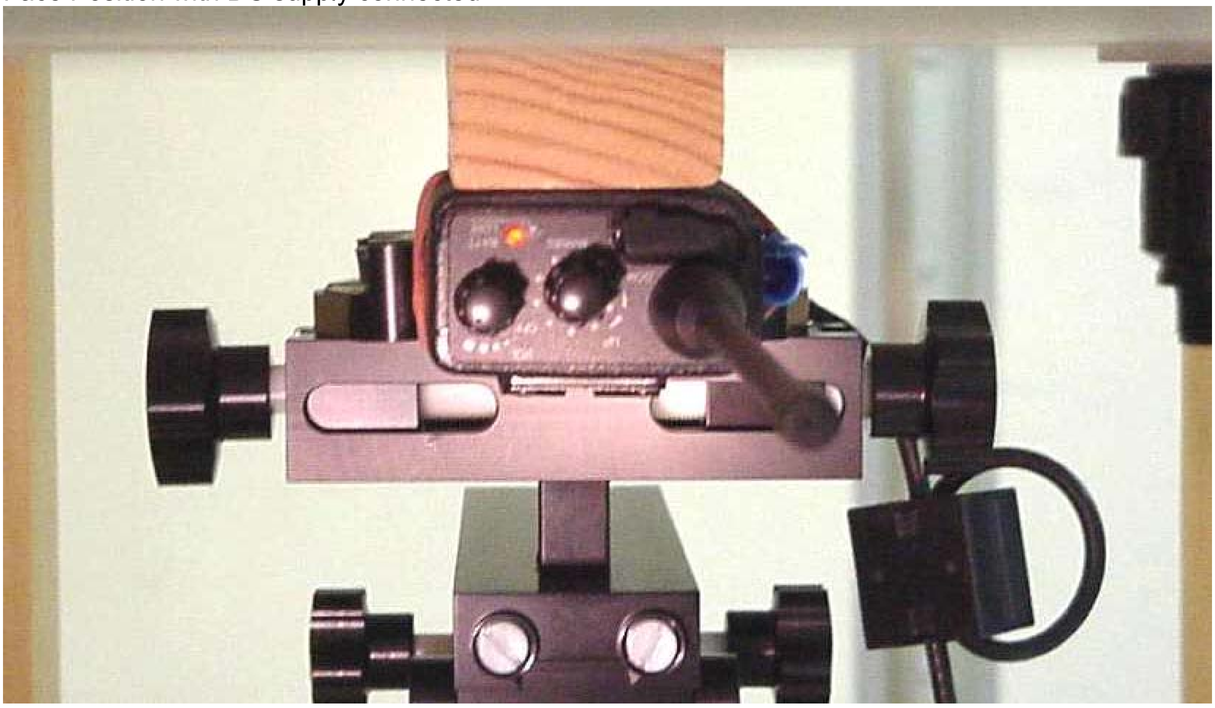
APPENDIX A3
TEST SET UP PHOTOGRAPHS

Face Position with DC supply connected



NOTE: Wooden spacer removed during testing

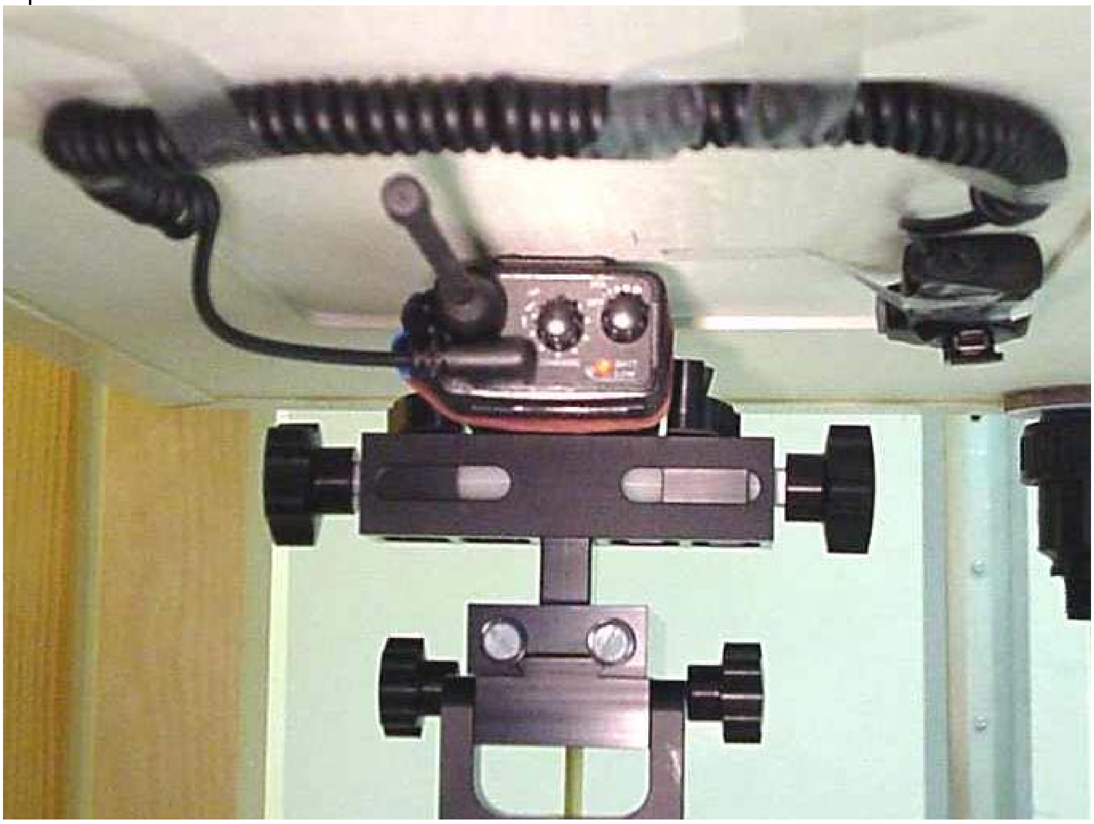
Face Position with DC supply connected



NOTE: Wooden spacer removed during testing

APPENDIX A4
TEST SET UP PHOTOGRAPHS

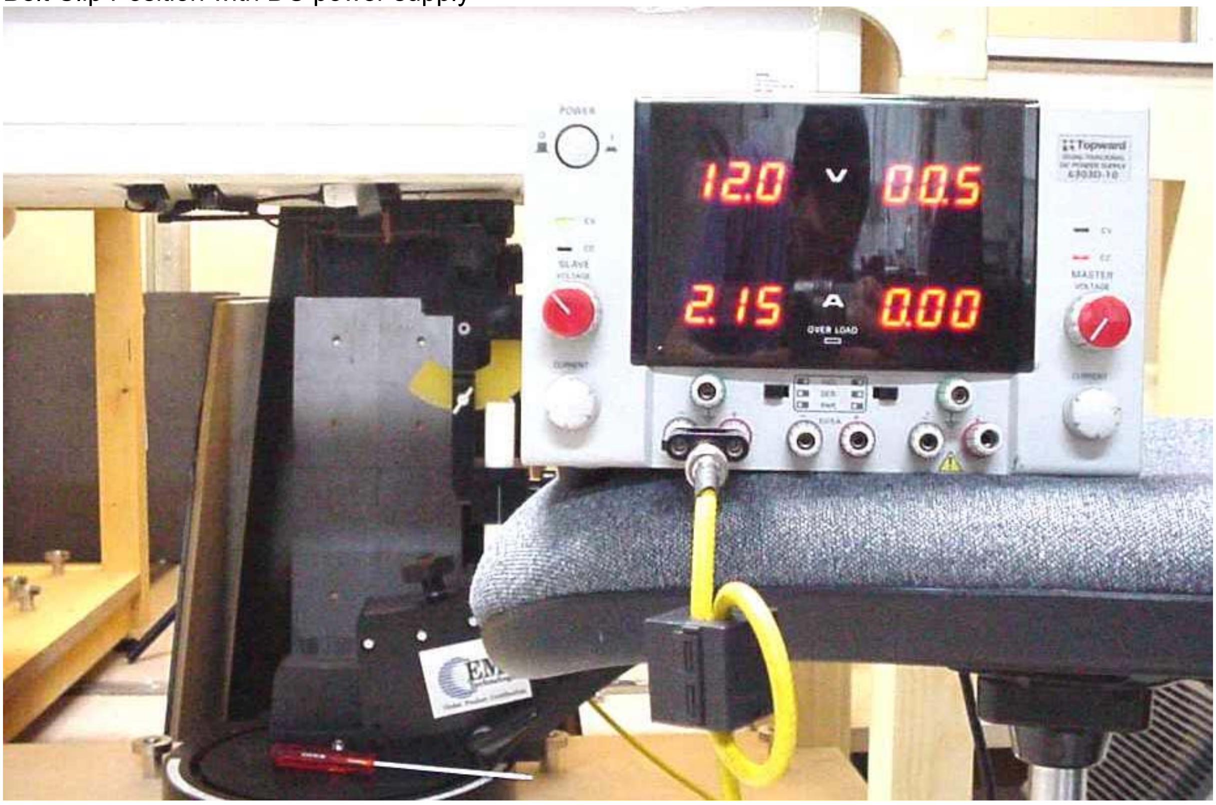
Belt Clip Position



Belt Clip Position

APPENDIX A5
TEST SET UP PHOTOGRAPHS

Belt Clip Position with DC power supply



Belt Clip Position with DC power supply

APPENDIX B
PLOTS OF THE SAR MEASUREMENTS

Plots of the measured SAR distributions inside the phantom are given in this Appendix for all tested configurations. The spatial peak SAR values were assessed with the procedure described in this report.

Note: The graphical visualisation of the phone position onto the plot of the SAR distribution gives only limited information on the RF current distribution on the surface of the device, since the curvature of the head causes graphical distortion.

Tables 6 and 7 contain a numbered list of the SAR plots.

450 MHz Band SAR Results

Plot 1	Belt Clip Position Z-Axis Scan	Channel 1 Channel 1
Plot 2	Belt Clip Position Z-Axis Scan	Channel 2 Channel 2
Plot 3	Belt Clip Position Z-Axis Scan	Channel 3 Channel 3
Plot 4	Belt Clip Position Z-Axis Scan	Channel 3 Channel 3
Plot 5	Belt Clip Position Z-Axis Scan	Channel 3 Channel 3
Plot 6	Face Position Z-Axis Scan	Channel 1 Channel 1
Plot 7	Face Position Z-Axis Scan	Channel 2 Channel 2
Plot 8	Face Position Z-Axis Scan	Channel 3 Channel 3
Plot 9	Face Position Z-Axis Scan	Channel 1 Channel 1
Plot 10	Face Position Z-Axis Scan	Channel 1 Channel 1

450MHz Validation/System Verification

Plot 11	Validation 22-02-03 Z-Axis Scan	450MHz 450MHz
Plot 12	Validation 25-02-03 Z-Axis Scan	450MHz 450MHz