EMC Technologies Pty Ltd
ABN 82 057 105 549
176 Harrick Road
Keilor Park
Victoria Australia 3042

Ph: + 613 9365 1000
Fax: + 613 9331 7455
email: melb@emctech.com.au

SAR Test Report

Report Number: M120604F

Test Sample: Mine Site Technologies Minephone

Model Number: MP70

Tested For: Mine Site Technologies

Date of Issue: 25th July 2012

Accreditation No. 5292

Accredited for compliance with ISO/IEC 17025. The results of the test, calibrations and/or measurement included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

CONTENTS

1.0 GENERAL INFORMATION ... **3**
2.0 DESCRIPTION OF DEVICE ... **4**
2.1 Description of Test Sample ... 4
2.2 Test sample Accessories ... 4
2.2.1 Battery Types ... 4
2.3 Test Signal, Frequency and Output Power ... 4
2.4 Conducted Power Measurements ... 4
2.5 Battery Status ... 5
2.6 Details of Test Laboratory ... 5
2.6.1 Location ... 5
2.6.2 Accreditations ... 5
2.6.3 Environmental Factors ... 5
3.0 DESCRIPTION OF SAR MEASUREMENT SYSTEM ... **6**
3.1 Probe Positioning System ... 6
3.2 E-Field Probe Type and Performance ... 6
3.3 Data Acquisition Electronics ... 6
3.4 Calibration and Validation Procedures and Data ... 6
3.4.1 Validation Results (2450 MHz) ... 7
3.4.2 Deviation from reference validation values ... 7
3.4.3 Liquid Depth 15cm ... 7
3.5 Phantom Properties (Size, Shape, Shell Thickness, Tissue Material Properties) ... 7
3.5.1 Temperature and Humidity ... 8
3.6 Simulated Tissue Composition Used for SAR Test ... 9
3.7 Device Holder for DASY5 ... 9
4.0 SAR MEASUREMENT PROCEDURE USING DASY5 ... **10**
5.0 MEASUREMENT UNCERTAINTY ... **11**
6.0 EQUIPMENT LIST AND CALIBRATION DETAILS ... **13**
7.0 SAR TEST METHOD ... **14**
7.1 Description of the Test Positions (Head and Body Sections) ... 14
7.1.1 "Touch Position" ... 14
7.1.2 "Tilted Position" ... 14
7.1.3 "Body Worn Position" ... 14
7.1.4 "Belt Clip" Position ... 14
7.2 List of All Test Cases (Antenna In/Out, Test Frequencies, User Modes etc) ... 14
7.3 FCC and RSS-102 RF Exposure Limits for Occupational/ Controlled Exposure ... 14
7.4 FCC and RSS-102 RF Exposure Limits for Un-controlled/Non–occupational ... 14
8.0 SAR EVALUATION RESULTS ... **15**
8.1 SAR Measurement Results for 2450 MHz ... 15
9.0 COMPLIANCE STATEMENT ... **16**
APPENDIX A1 Test Sample Photographs ... **17**
APPENDIX A2 Test Setup Photographs ... **18**
APPENDIX A3 Test Setup Photographs ... **19**
APPENDIX A4 Test Setup Photograph ... **20**
APPENDIX A5 Test Setup Photograph ... **21**
APPENDIX A6 Test Setup Photograph ... **22**
APPENDIX A7 Test Setup Photograph ... **23**
APPENDIX B Plots Of The SAR Measurements ... **24**
APPENDIX C CALIBRATION DOCUMENTS ... **43**

SAR EVALUATION

Mine Site Technologies Minephone, **Model:** MP70 **Report Number:** M120604F

1.0 GENERAL INFORMATION

Test Sample:	Mine Site Technologies Minephone
Model Number:	MP70
Serial Number:	M120223007
Manufacturer:	Mine Site Technologies China 4F, Building 5, No.1413, Moganshan Road, Hangzhou, CHINA 310015
FCC ID:	N73-MP70
IC Canada:	7449B-MP70
Hardware Version:	MP70 Generation 1
Software Version:	1.4.6.2-RF Test
Device Category:	Portable Transmitter
Test Device:	Production Unit / Prototype Sample
RF exposure Category:	General Public/Unaware user
Tested for:	Mine Site Technologies
Address:	113, Wicks Road Macquarie Park, NSW 2113
Contact:	Steve O'Brien
Phone:	02 9491 6500
Fax:	02 9437 5866
Email:	s.obrien@minesite.com.au

Test Standard/s:

1. Evaluating Compliance with FCC Guidelines For Human Exposure to Radiofrequency Electromagnetic Fields
   Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01)
2. Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
   RSS-102
3. **EN 62209-2:2010.** Human exposure to radio frequency fields from hand-held and body-mounted devices-Human models, instrumentation and procedures.
   Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (300 MHz to 3 GHz)
   Part 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

Statement Of Compliance: The Mine Site Technologies Minephone, Model: MP70. Complied with the FCC and Canadian General public/uncontrolled RF exposure limits of 1.6mW/g for 1g cube of tissue.

Test Dates: 23rd July 2012

Test Officer: Peter Jakubiec

Authorised Signature: Peter Jakubiec

2.0 DESCRIPTION OF DEVICE

2.1 Description of Test Sample

The device tested was a Single Band Minephone operating in the 2450 MHz frequency band. It has one internal antenna. It will be referred to as the Device Under Test (DUT) throughout this report. The test device was tested in the Touch, Tilted and Body Worn Positions

Table: DUT Parameters

Operating Mode during Testing	: See Clause 2.3
Operating Mode production sample	: DSSS 1Mbps – 4% duty cycle : OFDM 24Mbps – 0.16% duty cycle
Operating Mode during testing	: DSSS 1Mbps – above 90% duty cycle : OFDM 24Mbps – above 57% duty cycle
Antenna type	: Internal inverted F type
Applicable Head Configurations	: Touch and Tilted
Applicable Body Worn-Configurations	: Body Worn Position
Battery Options	: One 3.7V 1350 mAh Li-ion Battery

2.2 Test sample Accessories

2.2.1 Battery Types

One type of battery can be used with Cellular Phone. SAR measurements were performed with the standard 3.7V battery.

2.3 Test Signal, Frequency and Output Power

The test was performed on DUT, provided by Mine Site Technologies, for this evaluation. The Minephone was put into test mode using customer supplied programming codes. The channels utilised in the measurements were the traffic channels shown in the table below.

Table: Test Frequencies

Band	Frequency Range	Traffic Channels
2450 MHz	2412 – 2462 MHz	1, 6 and 11

2.4 Conducted Power Measurements

The conducted power of the DUT was measured in the 2450 MHz frequency range. The table below lists the results of the conducted power measurements. Average power was measured with an average power meter. Measurement of conducted power was not possible before and after each SAR test, because the RF output connector is located inside the phone's casing.

Table: Conducted Power Measurements

Frequency (MHz)	Modulation/ Bit-rate	RF Channel	Measured Peak Power (dBm)	Measured Average Power (dBm)
2412	DSSS/1 Mbps	1	16.9	+ 9.95
2437	DSSS/1 Mbps	6	16.4	+ 10.87
2462	DSSS/1 Mbps	11	15.8	+ 10.53
2412	OFDM/24 Mbps	1	18.8	- 2.65
2437	OFDM/24 Mbps	6	18.4	- 1.43
2462	OFDM/24 Mbps	11	17.3	- 1.74

Note: The losses due to cabling and attenuation have been taken into account.

2.5 Battery Status

The Cellular Phone battery was fully charged prior to commencement of each measurement. Each SAR test was completed within 30 minutes. The battery condition was monitored by measuring the RF power at a defined position inside the phantom before the commencement of each test and again after the completion of the test.

Table: Battery Details

Battery:	Li-ion 3.7V 1350 mAh
Model No.:	804060P
Serial No.:	BM110317290

2.6 Details of Test Laboratory

2.6.1 Location

EMC Technologies Pty Ltd
176 Harrick Road
Keilor Park, (Melbourne) Victoria
Australia 3042

Telephone: +61 3 9365 1000
Facsimile: +61 3 9331 7455
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:

ARPANSA Standard AS/NZS 2772.2:	RF and microwave radiation hazard measurement
ACA:	Radio communications (Electromagnetic Radiation - Human Exposure) Standard 2003
FCC:	Guidelines for Human Exposure to RF Electromagnetic Field OET65C 01/01
EN 50360: 2001	Product standard to demonstrate the compliance of Mobile phones with the basic restrictions related to human exposure to electromagnetic fields (300 MHz – 3 GHz)
EN 62209-1:2006	Human Exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models instrumentation and procedures. **Part 1:** Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (300 MHz to 3 GHz)
EN62209-2:2010	Human Exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models instrumentation and procedures **Part 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
IEEE 1528: 2003	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head Due to Wireless Communications Devices: Measurement Techniques.

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 RF signals. The temperature in the laboratory was controlled to within 20 ± 1 °C, the humidity was 41%. See section 3.5.1 for measured temperature and humidity. 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 DASY5 SAR measurement system using the SN1380 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 **DASY5 Version 52** 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 DASY5 fully complies with the OET65 C (01-01), IEEE 1528 and EN50361 SAR measurement requirements.

3.2 E-Field Probe Type and Performance

The SAR measurements were conducted with the dosimetric probe ET3DV6 Serial: 1380 (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.

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 DASY5 was operating within its specifications. The validation was performed at 2450 MHz with the SPEAG 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, and must be within 10%.

3.4.1 Validation Results (2450 MHz)

The following table lists the dielectric properties of the tissue simulating liquid measured prior to each SAR validation. The results of the validation for each day are listed in columns 4 and 5. The forward power into the reference dipole for each SAR validation was adjusted to 250 mW.

Table: Validation Results (SPEAG DV2450V2 SN: 724)

1. Validation Date	2. ∈r (measured)	3. σ (mho/m) (measured)	4. Measured SAR 1g (mW/g)	5. Measured SAR 10g (mW/g)
23rd July 2012	51.8	1.94	15.5	7.19

3.4.2 Deviation from reference validation values

The reference SAR values are derived using a reference dipole and flat phantom suitable for centre frequency of 2450 MHz. This reference SAR value is obtained from the IEEE Std 1528-2003 and are normalized to 1W.

The SPEAG calibration reference SAR value is the SAR validation result obtained in a specific dielectric liquid using the validation dipole during calibration. The measured one-gram SAR should be within 10% of the expected target reference values shown in table below.

Table: Deviation from reference validation values

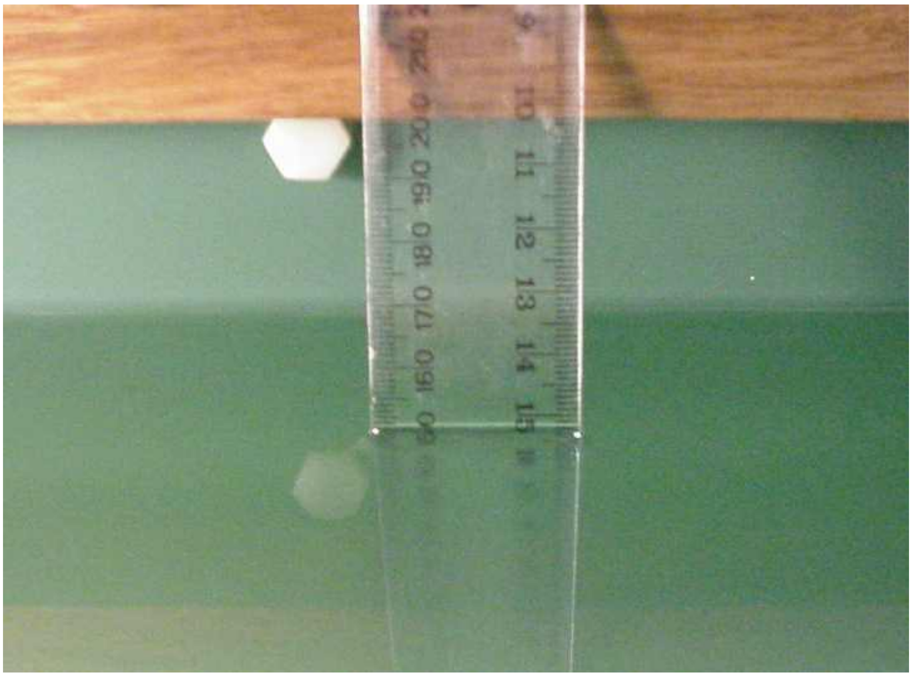
Frequency and Date	Measured SAR 1g (mW/g)	Measured SAR 1g (Normalized to 1W)	SPEAG Calibration reference SAR Value 1g (mW/g)	Deviation From SPEAG (%)
2450 MHz 23rd July 2012	15.5	62.00	60	3.33

Note: All reference validation values are referenced to 1W input power.

3.4.3 Liquid Depth 15cm

During the SAR measurement process the liquid level was maintained to a level of a least 15cm with a tolerance of ± 0.5cm.

Photo of liquid Depth in Flat Phantom



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

The phantom used during the SAR testing and validation was the “SAM” phantom from SPEAG. The phantom thickness is 2.0mm+/-0.2 mm and was filled with the required tissue simulating liquid.

The dielectric parameters of the simulating liquid were measured prior to SAR assessment using the HP85070A dielectric probe kit and HP8753ES Network Analyser. The actual dielectric parameters are shown in the following tables:

Table: Measured Brain Simulating Liquid Dielectric Values at 2450MHz

Frequency Band	∈r (measured range)	∈r (target)	σ (mho/m) (measured range)	σ (target)	ρ kg/m^3
2437 MHz	38.0	39.2 ±5% (37.2 to 41.2)	1.76	1.80 ±5% (1.71 to 1.89)	1000

Note: The brain liquid parameters were within the required tolerances of ±5%.

Table: Measured Body Simulating Liquid Dielectric Values at 2450MHz

Frequency Band	∈r (measured range)	∈r (target)	σ (mho/m) (measured range)	σ (target)	ρ kg/m^3
2437 MHz	52.0	52.7 ±5% (50.1 to 55.3)	1.91	1.95 ±5% (1.85 to 2.05)	1000

Note: The body liquid parameters were within the required tolerances of ±5%.

3.4.5 Temperature and Humidity

The humidity and dielectric/ambient temperatures are recorded during the assessment of the tissue material dielectric parameters. The difference between the ambient temperature of the liquid during the dielectric measurement and the temperature during tests was less than |2|°C.

Table: Temperature and Humidity recorded for each day

Date	Ambient Temperature (°C)	Liquid Temperature (°C)	Humidity (%)
23rd July 2012	20.4	20.1	41

3.5 Simulated Tissue Composition Used for SAR Test

The tissue simulating liquids are created prior to the SAR evaluation and often require slight modification each day to obtain the correct dielectric parameters.

Table: Tissue Type: Brain @ 2450Hz
Volume of Liquid: 30 Litres

Approximate Composition	% By Weight
Distilled Water	62.7
Salt	0.5
Triton X-100	36.8
Bactericide	0.1

Table: Tissue Type: Body @ 2450MHz
Volume of Liquid: 30 Litres

Approximate Composition	% By Weight
Distilled Water	73.2
Salt	0.04
DGBE	26.7
Bactericide	0.1

*Refer "OET Bulletin 65 97/01 P38"

3.6 Device Holder for DASY5

The DASY5 device holder supplied by SPEAG 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 centres for both scales is the ear opening. Thus the device needs no repositioning when changing the angles.

The DASY5 device holder is made of low-loss material having the following dielectric parameters: relative permittivity ε=3 and loss tangent δ=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.

Refer to Appendix A for photograph of device positioning.

4 SAR MEASUREMENT PROCEDURE USING DASY5

The SAR evaluation was performed with the SPEAG DASY5 System (**Version 52**). 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 DUT. 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 or the flat section of the flat phantom 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 15 mm x 15 mm. The actual Area Scan has dimensions of 210 mm x 120 mm 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 4 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 the power drift is recorded.

5 MEASUREMENT UNCERTAINTY

The uncertainty analysis is based on the template listed in the IEEE Std 1528-2003 for both Handset SAR tests and Validation uncertainty. The measurement uncertainty of a specific device is evaluated independently and the total uncertainty for both evaluations (95% confidence level) must be less than 30%.

Table: Uncertainty Budget for DASY5 Version 52 – DUT SAR test

Error Description	Uncert. Value	Prob. Dist.	Div.	C_i (1g)	C_i (10g)	1g u_i	10g u_i	v_i
Measurement System								
Probe Calibration	6	N	1.00	1	1	6.00	6.00	∞
Axial Isotropy	4.7	R	1.73	0.7	0.7	1.90	1.90	∞
Hemispherical Isotropy	9.6	R	1.73	0.7	0.7	3.88	3.88	∞
Boundary Effects	1	R	1.73	1	1	0.58	0.58	∞
Linearity	4.7	R	1.73	1	1	2.71	2.71	∞
System Detection Limits	1	R	1.73	1	1	0.58	0.58	∞
Readout Electronics	0.3	N	1.00	1	1	0.30	0.30	∞
Response Time	0.8	R	1.73	1	1	0.46	0.46	∞
Integration Time	2.6	R	1.73	1	1	1.50	1.50	∞
RF Ambient Noise	3	R	1.73	1	1	1.73	1.73	∞
RF Ambient Reflections	3	R	1.73	1	1	1.73	1.73	∞
Probe Positioner	0.4	R	1.73	1	1	0.23	0.23	∞
Probe Positioning	2.9	R	1.73	1	1	1.67	1.67	∞
Max. SAR Eval.	1	R	1.73	1	1	0.58	0.58	∞
Post Processing	2	R	1.73	1	1	1.15	1.15	∞
Test Sample Related								
Power Scaling	0	R	1.73	1	1	0.00	0.00	∞
Test Sample Positioning	2.9	N	1.00	1	1	2.90	2.90	145
Device Holder Uncertainty	3.6	N	1.00	1	1	3.60	3.60	5
Output Power Variation – SAR Drift Measurement	3.99	R	1.73	1	1	2.30	2.30	∞
Phantom and Setup								
Phantom Uncertainty	7.5	R	1.73	1	1	4.33	4.33	∞
Liquid Conductivity – Deviation from target values	5	R	1.73	0.64	0.43	1.85	1.24	∞
Liquid Permittivity – Deviation from target values	5	R	1.73	0.6	0.49	1.73	1.41	∞
Liquid Conductivity – Measurement uncertainty	2.5	N	1.00	0.64	0.71	1.60	1.78	∞
Liquid Permittivity – Measurement uncertainty	2.5	N	1.00	0.6	0.26	1.50	0.65	∞
Temp.unc. - Conductivity	1.7	R	1.73	0.78	0.71	0.77	0.70	∞
Temp. unc. - Permittivity	0.3	R	1.73	0.23	0.26	0.04	0.05	∞
Combined standard Uncertainty (u_c)						11.5	11.3	
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=	2		23.1	22.7	

Estimated total measurement uncertainty for the DASY5 measurement system was ±11.5%. The extended uncertainty (K = 2) was assessed to be ±23.1% based on 95% confidence level. The uncertainty is not added to the measurement result.

Table: Uncertainty Budget for DASY5 Version 52 – Validation

Error Description	Uncert. Value	Prob. Dist.	Div.	C_i (1g)	C_i (10g)	1g u_i	10g u_i	v_i
Measurement System								
Probe Calibration	6	N	1.00	1	1	6.00	6.00	∞
Axial Isotropy	4.7	R	1.73	1	1	2.71	2.71	∞
Hemispherical Isotropy	9.6	R	1.73	0	0	0.00	0.00	∞
Boundary Effects	1	R	1.73	1	1	0.58	0.58	∞
Linearity	4.7	R	1.73	1	1	2.71	2.71	∞
System Detection Limits	1	R	1.73	1	1	0.58	0.58	∞
Readout Electronics	0.3	N	1.00	1	1	0.30	0.30	∞
Response Time	0	R	1.73	1	1	0.00	0.00	∞
Integration Time	0	R	1.73	1	1	0.00	0.00	∞
RF Ambient Noise	1	R	1.73	1	1	0.58	0.58	∞
RF Ambient Reflections	1	R	1.73	1	1	0.58	0.58	∞
Probe Positioner	0.8	R	1.73	1	1	0.46	0.46	∞
Probe Positioning	6.7	R	1.73	1	1	3.87	3.87	∞
Max. SAR Eval.	2	R	1.73	1	1	1.15	1.15	∞
Post Processing	2	R	1.73	1	1	1.15	1.15	∞
Dipole Related								
Deviation of exp. dipole	5.5	R	1.73	1	1	3.18	3.18	∞
Dipole Axis to Liquid Dist.	2	R	1.73	1	1	1.15	1.15	∞
Input power & SAR drift	3.40	R	1.73	1	1	1.96	1.96	∞
Phantom and Setup								
Phantom Uncertainty	4	R	1.73	1	1	2.31	2.31	∞
Liquid Conductivity – Deviation from target values	5	R	1.73	0.64	0.43	1.85	1.24	∞
Liquid Permittivity – Deviation from target values	5	R	1.73	0.6	0.49	1.73	1.41	∞
Liquid Conductivity – Measurement uncertainty	2.5	N	1.00	0.78	0.71	1.95	1.78	∞
Liquid Permittivity – Measurement uncertainty	2.5	N	1.00	0.26	0.26	0.65	0.65	∞
Temp.unc. - Conductivity	1.7	R	1.73	0.78	0.71	0.77	0.70	∞
Temp. unc. - Permittivity	0.3	R	1.73	0.23	0.26	0.04	0.05	∞
Combined standard Uncertainty (u_c)						10.1	9.9	
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=	2		20.2	19.8	

Estimated total measurement uncertainty for the DASY5 measurement system was ±9.7%. The extended uncertainty (K = 2) was assessed to be ±19.4% based on 95% confidence level. The uncertainty is not added to the Validation measurement result.

6 EQUIPMENT LIST AND CALIBRATION DETAILS

Table: SPEAG DASY5 Version 52

Equipment Type	Manufacturer	Model Number	Serial Number	Calibration Due	Used For this Test?
Robot - Six Axes	Staubli	RX90BL	N/A	Not applicable	✓
Robot Remote Control	SPEAG	CS7MB	RX90B	Not applicable	✓
SAM Phantom	SPEAG	N/A	1260	Not applicable	✓
SAM Phantom	SPEAG	N/A	1060	Not applicable	
Flat Phantom	AndreT	10.1	P 10.1	Not Applicable	
Flat Phantom	AndreT	9.1	P 9.1	Not Applicable	
Flat Phantom	SPEAG	ELI 4.0	1101	Not Applicable	
Data Acquisition Electronics	SPEAG	DAE3 V1	359	21-June-2013	
Data Acquisition Electronics	SPEAG	DAE3 V1	442	05-Dec-2012	✓
Probe E-Field - Dummy	SPEAG	DP1	N/A	Not applicable	
Probe E-Field	SPEAG	ET3DV6	1380	12-Dec-2012	✓
Probe E-Field	SPEAG	ET3DV6	1377	20-June-2013	
Probe E-Field	SPEAG	ES3DV6	3029	Not Used	
Probe E-Field	SPEAG	EX3DV4	3563	21-June-2013	
Probe E-Field	SPEAG	EX3DV4	3657	14-Dec-2012	
Antenna Dipole 300 MHz	SPEAG	D300V3	1012	30-Nov-2012	
Antenna Dipole 450 MHz	SPEAG	D450V3	1074	30-Nov-2012	
Antenna Dipole 750 MHz	SPEAG	D750V2	1051	9-Jan-2014	
Antenna Dipole 900 MHz	SPEAG	D900V2	047	22-June-2014	
Antenna Dipole 1640 MHz	SPEAG	D1640V2	314	20-June-2014	
Antenna Dipole 1800 MHz	SPEAG	D1800V2	242	20-June-2014	
Antenna Dipole 1950 MHz	SPEAG	D1950V3	1113	10-Dec -2012	
Antenna Dipole 2450 MHz	SPEAG	D2450V2	724	09-Dec-2012	✓
Antenna Dipole 2600 MHz	SPEAG	D2600V2	1044	10-Jan-2014	
Antenna Dipole 3500 MHz	SPEAG	D3500V2	1002	13-July-2013	
Antenna Dipole 5600 MHz	SPEAG	D5GHzV2	1008	14-Dec-2013	
RF Amplifier	EIN	603L	N/A	*In test	
RF Amplifier	Mini-Circuits	ZHL-42	N/A	*In test	✓
RF Amplifier	Mini-Circuits	ZVE-8G	N/A	*In test	
Synthesized signal generator	Hewlett Packard	ESG-D3000A	GB37420238	*In test	✓
RF Power Meter	Hewlett Packard	437B	3125012786	23-Aug-2012	✓
RF Power Sensor 0.01 - 18 GHz	Hewlett Packard	8481H	1545A01634	23-Aug-2012	✓
RF Power Meter	Rohde & Schwarz	NRP	101415	18-Aug-2012	
RF Power Sensor	Rohde & Schwarz	NRP - Z81	100174	21-Sept-2012	
RF Power Meter Dual	Hewlett Packard	435A	1733A05847	*In test	✓
RF Power Sensor	Hewlett Packard	8482A	2349A10114	*In test	✓
Network Analyser	Hewlett Packard	8714B	GB3510035	27-Sept-2012	
Network Analyser	Hewlett Packard	8753ES	JP39240130	7-Nov-2012	✓
Dual Directional Coupler	Hewlett Packard	778D	1144 04700	*In test	
Dual Directional Coupler	NARDA	3022	75453	*In test	✓
Radio Communication Test Set	Rohde & Schwarz	CMU200	101573	Not Applicable	
Radio Communication Test Set	Anritsu	MT8820A	6200240559	Not Applicable	
Radio Communication Test Set	Agilent	PXT E6621A	MY51100168	Not Applicable	

* Calibrated during the test for the relevant parameters.

7 SAR TEST METHOD

7.1 Description of the Test Positions (Head and Body Sections)

The SAR measurements are performed on the left and right sides of the head in the Touch/Tilted positions using the centre frequency of the operating band. The configuration giving the maximum mass-averaged SAR is used to test the low-end and high-end frequencies of the transmitting band. Additional SAR measurements were performed in the "Body worn position".
See Appendix A for photos of test positions.

7.1.1 "Touch Position"

The device was positioned with the vertical centre line of the body of the device and the horizontal line crossing the centre of the earpiece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, the vertical centre line was aligned with the reference plane containing the three ear and mouth reference points. (Left Ear, Right Ear and Mouth). The centre of the earpiece was then aligned with the Right Ear and Left Ear.

The Cellular Phone was then moved towards the phantom with the earpiece aligned with the line between the Left Ear and the Right Ear, until the Cellular Phone just touched the ear. With the device maintained in the reference plane, and the Cellular Phone in contact with the ear, the bottom of the Cellular Phone was moved until the front side of the Cellular Phone was in contact with the cheek of the phantom, or until contact with the ear was lost.

7.1.2 "Tilted Position"

The device was positioned in the "Touch" position described above. While maintaining the device in the reference plane describe above, and pivoting against the ear, the device was moved away from the mouth by an angle of 15 degrees or until contact with the ear was lost

7.1.3 "Body Worn Position"

The body-worn operating configuration was tested with a Speaker-Microphone connected to the device and positioned against a flat phantom in normal use configuration. The position chosen for testing was the "Body Worn Position", this position simulated the DUT placed against the body of a user.

7.1.4 "Belt Clip" Position

The device was tested in the (2.00 mm) flat section of the SAM phantom for the "Belt Clip" position. There are two types of belt clip available, one type maintained a distance of approximately 14 mm and the second type 16mm 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 clips contained metallic parts.

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

The SAR was measured at three test channels for each band of operation with the test sample operating as maximum power, as specified in section 2.3.

7.3 FCC and RSS-102 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 and RSS-102 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 SAR EVALUATION RESULTS

The SAR values averaged over 1 g and 10 g tissue masses were determined for the sample device for the Left and Right ear configurations of the phantom. A "Body Worn position" was also assessed and the results for both head and body positions are given in table below.

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

8.1 SAR Measurement Results for 2450 MHz

Table: SAR Measurement Results – 2450 MHz

Test Position	Plot Number	Test Channel	Test Freq. (MHz)	SAR Level for (1g) mW/g	DASY5 Measured Drift (dB)
Tilted Left	1	6	2437 MHz	0.015	-0.05
Touch Left	2	6	2437 MHz	0.015	-0.09
Tilted Right	3	6	2437 MHz	0.015	-0.09
Touch Right	4	6	2437 MHz	0.016	0.02
Body Worn Position Back	5	6	2437 MHz	**0.057**	0.00
Body Worn Position Front	6	6	2437 MHz	0.017	0.17
Body Worn Belt Clip 14mm Spacing	7	6	2437 MHz	0.015	0.12
Body Worn Belt Clip 16mm Spacing	8	6	2437 MHz	0.021	-0.01

Note: The uncertainty of the system (± 23.1%) has not been added to the result.

The maximum measured SAR level in the 2450MHz band was 0.057 mW/g for a 1-gram cube this value was measured in the "Body Worn Back" position at a frequency of 2437 MHz (Channel 6).

The FCC and RSS-102 SAR limit for Non-occupational exposure is 1.6 m W/g measurement in a 1g cube of tissue.

9 COMPLIANCE STATEMENT

The Mine Site Technologies Minephone Model: MP70, was tested on behalf of Mine Site Technologies. It complied with the FCC and Canadian SAR requirements.

The highest SAR level recorded was 0.057 mW/g for a 1g cube. This value was measured in the "Body Worn Back" position, and was below the uncontrolled limit of 1.6 mW/g, even taking into account the measurement uncertainty of 23.1 %.