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SAR Test Report

Report Number: M120704F

Test Sample: Simoco Push To Talk transmitter

Model Number: SRP9180 KMA

Tested For: ComGroup Australia Pty Ltd

Date of Issue: 19th July 2012

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SAR EVALUATION

Simoco Push To Talk transmitter, **Model:** SRP9180 KMA

1.0 GENERAL INFORMATION

Test Sample:	Simoco Push To Talk transmitter
Model Number:	SRP9180 KMA
Serial Number:	ET9KA1210DCMK
FCC ID:	STZSRP9170KMA
Hardware Version:	Revision 7
Software Version:	V2.13
Manufacturer:	ComGroup Australia Pty Ltd
Device Category:	Portable Transmitter
Test Device:	Production Unit / Prototype Sample
RF exposure Category:	Occupational/ Controlled
Tested for:	ComGroup Australia Pty Ltd
Address:	1270 FerntreeGully Road, Scoresby VIC 3179
Contact:	Bob Stowell
Phone:	9730 3876
Fax:	9730 3968
Email:	bstowell@comgroup.net.au
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) Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands) RSS-102 **EN 62209-2:2010** 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)
Statement Of Compliance:	The Simoco Push To Talk transmitter, model SRP9180 KMA. Complied with the FCC and Canadian Occupational/Controlled RF exposure limits of 8.0mW/g per requirements of 47CFR2.1093(d).
Test Dates:	13th 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 Simoco Push To Talk transmitter, Model: SRP9180 KMA operating in 220 MHz frequency band. It will be referred to as the device under test (DUT) throughout this report. The DUT has an external integral fixed length antenna and was tested in the Face Frontal and Belt Clip configurations of the phantom.

Operating Mode during Testing	: Continuous Wave 100% duty cycle
Operating Mode production sample	: 50% duty cycle
Modulation:	: FM
Device Power Rating for test sample and identical production unit	: 5 W
Device Dimensions (LxWxH)	: 140 x 55 x 40 mm
Antenna type	: Helical
Applicable Head Configurations	: Face Frontal
Applicable Body Configurations	: Belt Clip Position
Battery Options	: 7.4V 3000mAh Li-ion Battery Pack

2.2 Test sample Accessories

The DUT also allows use of handheld antenna Speaker-Microphone model: PAR-9180 LMR4 (as an option), and the DUT can also be used with a leather holster Model: PAR-9180CLBC3. Photographs included in appendix A.

2.2.1 Battery Types

A 7.4V 3000mAh Li-ion Battery Pack is used to power the DUT. The maximum rated power is 5 W. SAR measurements were performed with a standard 7.4 V battery.

2.2.2 Belt Clip

One type of metal-plastic belt clip is sold with the device. The belt clip is fixed to the back of the device and provides a spacing of 12 mm (11mm for SPK-MIC) between the device and flat phantom. This metal-plastic belt-clip was attached to the device during testing in the Belt-Clip position.

2.3 Test Signal, Frequency and Output Power

The DUT operates in the frequency range 220 MHz to 222 MHz. The transmitter was configured into a test mode that ensured a continuous RF transmission for the duration of each SAR scan. The device transmission characteristics were also monitored during testing to confirm the device was transmitting continuously. Only one test channel was chosen, the device was tested in the middle channel at the frequency of 221.075 MHz. This is in accordance with the KDB 643646 which provides the method for calculating number of frequency channels that must be tested. The DUT is supplied with only one size of antenna.
The DUT has a headset output to which a supplied passive speaker/microphone was connected during testing in the belt-clip position. Excluding the speaker/microphone accessory, there were no wires or other connections to the Handheld Transceiver during the SAR measurements.

Table: Test Frequencies

Frequency Range	Nominal Power (W)
220 – 222 MHz	5

2.4 Conducted Power Measurements

The conducted power of the DUT was measured with a calibrated Power Meter. The results of this measurement are listed in table below.

Table: Frequency and Output Power

Measurement Antenna Port	Frequency MHz	Battery Type	Maximum Conducted Output Power dBm
DUT	221.075 MHz	Li-ion	37.22
SPK-MIC	221.075 MHz	Li-ion	35.78

2.5 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 conducted RF at the antenna port before the commencement of each test and again after the completion of the test.

Table: Battery Details

Battery #1:	7.4V 3000 mAh Li-ion	**Battery #2:**	7.4V 3000 mAh Li-ion
Model No.:	PAR-9180 BATL 3x	**Model No.:**	PAR-9180 BATL 3x
Serial No.:	10611	**Serial No.:**	51311

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 to ISO 17025 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 2772.2: RF and microwave radiation hazard measurement

ACMA: Radio communications (Electromagnetic Radiation - Human Exposure) Standard 2003 + Amdt (No. 1):2007

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)

EN 62209-2:2010 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 network signals. The temperature in the laboratory was controlled to within 21 ± 1 °C, the humidity was 42 %. The liquid parameters were measured prior to the commencement of the tests. 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 than 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 EN50361SAR 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. 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 DASY5 was operating within its specifications. The validation was performed at 300 MHz with the SPEAG D300V3 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 @ 300 MHz

The following table lists the dielectric properties of the tissue simulating liquid measured prior to SAR validation. The results of the validation are listed in columns 4 and 5. The forward power into the reference dipole for each SAR validation was adjusted to 400mW.

Table: Validation Results (Dipole: SPEAG D300V2 **SN:** 1012**)**

1. Validation Date	2. ∈r (measured)	3. σ (mho/m) (measured)	4. Measured SAR 1g (mW/g)	5. Measured SAR 10g (mW/g)
13th July 2012	44.9	0.87	1.19	0.79

3.4.2 Deviation from reference validation values

The reference SAR values are derived using a reference dipole and flat phantom suitable for a centre frequency of 300 MHz. These reference SAR values are 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 (D300V3) 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 (%)	IEEE Std 1528 reference SAR value 1g (mW/g)	Deviation From IEEE (%)
300 MHz 13th July 12	1.19	2.98	2.89	2.94	3.0	-0.83

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 15cm with a tolerance of ±0.5cm. The following photo shows the depth of the liquid maintained during the testing.

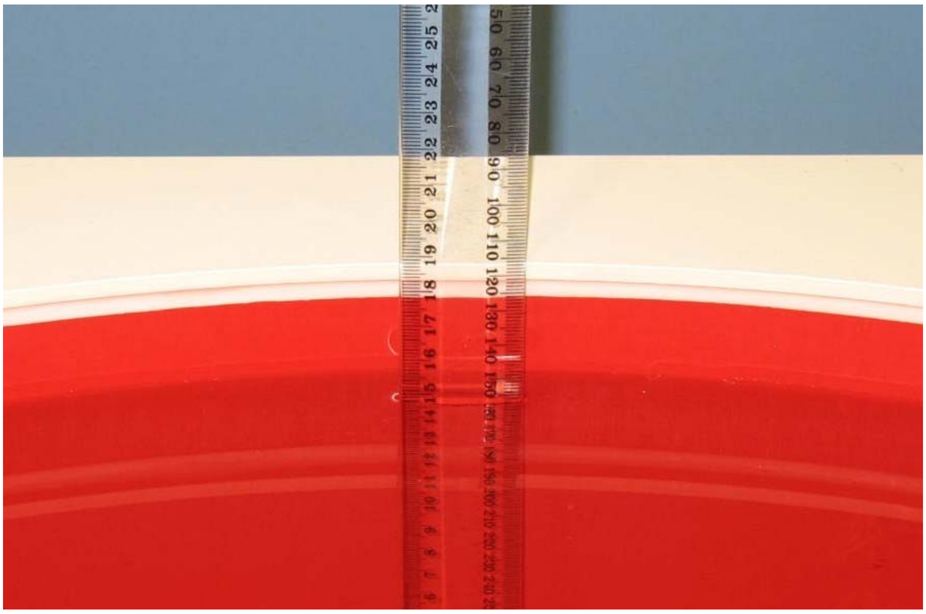

Photo of liquid Depth in Flat Phantom

3.5 Phantom Properties (Size, Shape, Shell Thickness)

For SAR testing in the Face Frontal and Belt Clip positions (also for the System Check) an SPEAG Flat Phantom ELI 4.0 was used. The phantom thickness is 2.0mm +/-0.2 mm and the phantom was filled with the required tissue simulating liquid. Table below provides a summary of the measured phantom properties

Photo 1: Flat Phantom ELI 4.0 2mm

3.6 Tissue Material Properties

The dielectric parameters of the 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: Measured Brain Simulating Liquid Dielectric Values

Frequency Band	∈r (measured range)	∈r (target)	σ (mho/m) (measured range)	σ (target)	ρ kg/m^3
221 MHz	47.8	47.6 ±5% (45.2 – 50.0)	0.80	0.83 ±5% (0.79 – 0.87)	1000

Table: Measured Body Simulating Liquid Dielectric Values

Frequency Band	∈r (measured range)	∈r (target)	σ (mho/m) (measured range)	σ (target)	ρ kg/m^3
221 MHz	59.8	59.4 ±5% (56.4 – 62.4)	0.90	0.88 ±5% (0.84 – 0.92)	1000

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

3.6.1 Liquid 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 (%)
13th July 2012	20.5	20.3	42

3.7 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 @ 250MHz
Volume of Liquid: 60 Litres

Approximate Composition	% By Weight
Distilled Water	37.50
Salt	6.41
Sugar	55.56
HEC	0.48
Bactericide	0.05

Table: Tissue Type: Muscle @ 250MHz
Volume of Liquid: 60 Litres

Approximate Composition	% By Weight
Distilled Water	48.43
Salt	2.86
Sugar	48.13
HEC	0.53
Bactericide	0.06

3.8 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 A2-A3 for photographs of device positioning

4.0 SAR MEASUREMENT PROCEDURE USING DASY5

The SAR evaluation was performed with the SPEAG DASY5 system. A summary of the procedure follows:

a) A measurement of the conducted power value at the antenna port is used as a reference value for assessing the power drop of the DUT. Also a measurement of the SAR value at a fixed location is used. The power 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 120 mm x 315 mm surrounding the test device hot spot location. Based on this data, the area of the maximum absorption is determined by Spline interpolation. A pre-scan is performed for each phantom configuration to ensure that entire hot spot is identified.

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

5.0 MEASUREMENT UNCERTAINTY

The uncertainty analysis is based on the template listed in the IEEE Std 1528-2003. The measurement uncertainty of a specific device is evaluated independently and the total uncertainty for the 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	10	N	1.00	1	1	10.00	10.00	∞
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	4.50	R	1.73	1	1	2.60	2.60	∞
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)						14.1	13.9	
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k= 2			28.2	27.9	

Estimated total measurement uncertainty for the DASY5 measurement system was ±14.1%. The extended uncertainty (K = 2) was assessed to be ±28.2% 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	10	N	1.00	1	1	10.00	10.00	∞
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)						12.9	12.7	
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=	2		25.8	25.5	

Estimated total measurement uncertainty for the DASY5 measurement system was ±12.9%. The extended uncertainty (K = 2) was assessed to be ±25.8% based on 95% confidence level. The uncertainty is not added to the Validation measurement result.

6.0 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	

* Calibrated during the test for the relevant parameters.

7.0 SAR TEST METHOD

7.1 Description of the Test Positions (Face Frontal and Belt Clip)

SAR measurements were performed in the “Face Frontal” and “Belt Clip” positions. Both the “Face Frontal” and “Belt Clip” positions were measured in the flat section of the SPEAG ELI 4.0 phantom.
See Appendix A for photos of test positions.

7.1.1 “Face Frontal Position”

The SAR evaluation was performed in the flat section of the SPEAG 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.

7.1.2 “Belt Clip” Position

The device was tested in the (2.00 mm) flat section of the SPEAG phantom for the “Belt Clip” position. A belt clip maintained a distance of approximately 12 mm (11mm for SPK-MIC) 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 of metal and plastic and the device was connected with the speaker/microphone.

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 MEASUREMENT RESULTS

The SAR values averaged over 1 g tissue mass were determined for the sample device for the Face Frontal and Belt Clip configurations of the phantom.

Table: SAR MEASUREMENT RESULTS– Face Frontal and Belt Clip positions

1. Test Position	2. Plot No.	4. Test Freq (MHz)	5. Measured 1g SAR Results (mW/g)	5.1 Measured 1g SAR Results 50% Duty Cycle (mW/g)	6. Measured Drift (dB)	7. Antenna Range (MHz)	8. Measured RF Power (dBm)
Belt Clip	1	221.0.75	1.66	0.83	-0.19	220 - 222	36.94
Belt Clip with Holster	2	221.0.75	1.50	0.75	-0.15	220 - 222	37.05
Face Frontal	3	221.0.75	1.80	0.90	-0.20	220 - 222	37.22
Belt Clip SPK-MIC	4	221.0.75	2.75	**1.375**	-0.19	220 - 222	35.78
Face Frontal SPK-MIC	5	221.0.75	0.492	0.246	-0.05	220 - 222	35.61

Note: The uncertainty of the system (± 28.2 %) has not been added to the results.

The FCC SAR limit for occupational exposure is 8.0mW/g measurement in a 1g cube of tissue.

9.0 COMPLIANCE STATEMENT

The Simoco Push To Talk transmitter model SRP9180 KMA was tested on behalf of ComGroup Australia Pty Ltd. It complied with the FCC and Canadian SAR requirements

The highest SAR level recorded for continuous transmit was 2.75 mW/g for a 1g cube. After extrapolating to a 50% duty cycle the highest SAR level recorded was 1.375 mW/g for a 1g cube. This value was measured in the "Belt Clip SPK-MIC" position, and was below the controlled limit of 8.0mW/g, even taking into account the measurement uncertainty of 28.2 %, it was also below the uncontrolled limit of 1.6 mW/g but the compliance margin was less than the measurement uncertainty.