Appendix 5. Simulated Tissues

The body mixture consists of water, Polysorbate (Tween 20) and salt. Visual inspection is made to ensure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the tissue.

Ingredient (% by weight)	Frequency 750/835/850/900 MHz	
	Head	Body
De-Ionized Water	52.87	71.30
Polysorbate 20	46.10	28.00
Salt	1.03	0.70

Ingredient (% by weight)	Frequency 1800/1900 MHz	
	Head	Body
De-Ionized Water	55.40	71.50
Polysorbate 20	44.22	28.00
Salt	0.38	0.50

Ingredient (% by weight)	Frequency 2450/2600 MHz	
	Head	Body
De-Ionized Water	55.75[1]	71.70
Polysorbate 20	45.25[1]	28.00
Salt	0.00	0.30

Stimulating Liquid for 3700 MHz to 5800 MHz are supplied and manufactured by SPEAG

Ingredient (% by weight)	Frequency
	3700 - 5800 MHz Head / Body
De-Ionized Water	~78.00
Mineral Oil	~11.00
Emulsifiers	~9.00
Additives and Salt	~2.00

Note(s):

1. As per the recipe provided by National Physical Laboratory, the 2450 MHz Head Fluid recipe is mixed to the total percentage of weight is by 101.0 %.

Appendix 6. System Check and Dielectric Parameters

Dielectric Property Measurements: The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within ± 2°C of the temperature when the tissue parameters are characterized.

The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.

Tissue dielectric parameters were measured at the low, middle and high frequency of each operating frequency range of the test device.

System Performance Check: Prior to the assessment, the system was verified in the flat region of the phantom, 900 MHz, 1900 MHz, 2450 MHz, 2600 MHz and 5.0 GHz dipoles were used. A forward power of 250 mW was applied to the 900 MHz, 1900 MHz, 2450 MHz, 2600 MHz dipoles and 100 mW was applied to 5.0 GHz dipole and the system was verified to a tolerance of ±5% for the 900MHz, 1900MHz, 2450 MHz, 2600 MHz and 5.0 GHz dipoles.

The applicable verification normalised to 1 Watt.

System Check 900 Head
Date: 09/06/2014
Validation Dipole and Serial Number: D900V2; SN: 035

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Head	900	24.0 ºC	24.0 ºC	ε_r	41.50	41.40	-0.24	5.00
				σ	0.97	0.97	-0.05	5.00
				1g SAR	10.50	10.60	0.95	5.00
				10g SAR	6.69	6.84	2.24	5.00

Date: 11/06/2014
Validation Dipole and Serial Number: D900V3; SN: 035

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Head	900	24.0 ºC	24.0 ºC	ε_r	41.50	40.56	-2.27	5.00
				σ	0.97	0.95	-1.60	5.00
				1g SAR	10.50	10.56	0.57	5.00
				10g SAR	6.69	6.80	1.64	5.00

Date: 16/06/2014
Validation Dipole and Serial Number: D900V2; SN: 035

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Head	900	24.0 ºC	22.0 ºC	ε_r	41.50	39.84	-4.00	5.00
				σ	0.97	0.97	0.05	5.00
				1g SAR	10.50	10.24	-2.48	5.00
				10g SAR	6.69	6.60	-1.35	5.00

System Check 900 Body
Date: 09/06/2014
Validation Dipole and Serial Number: D900V3; SN: 035

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	900	22.7 ºC	22.0 ºC	ε_r	55.00	53.45	-2.82	5.00
				σ	1.05	1.08	2.43	5.00
				1g SAR	10.40	10.12	-2.69	5.00
				10g SAR	6.73	6.56	-2.53	5.00

Date: 11/06/2014
Validation Dipole and Serial Number: D900V3; SN: 035

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	900	22.7 ºC	22.0 ºC	ε_r	55.00	53.30	-3.09	5.00
				σ	1.05	1.05	-0.10	5.00
				1g SAR	10.40	10.12	-2.69	5.00
				10g SAR	6.73	6.60	-1.93	5.00

Date: 16/06/2014
Validation Dipole and Serial Number: D900V3; SN: 035

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	900	23 ºC	22.0 ºC	ε_r	55.00	54.13	-1.58	5.00
				σ	1.05	1.09	3.48	5.00
				1g SAR	10.40	10.24	-1.54	5.00
				10g SAR	6.73	6.56	-2.53	5.00

System Check 1900 Head
Date: 09/06/2014
Validation Dipole and Serial Number: D1900V2: SN:537

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Head	1900	24.0 ºC	24.0 ºC	ε_r	40.00	41.75	4.38	5.00
				σ	1.40	1.38	-1.31	5.00
				1g SAR	39.80	39.16	-1.61	5.00
				10g SAR	20.70	20.12	-2.80	5.00

System Check 1900 Body
Date: 09/06/2014
Validation Dipole and Serial Number: D1900V2: SN: 537

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	1900	23.0 ºC	22.8 ºC	ε_r	53.30	50.86	-4.58	5.00
				σ	1.52	1.50	-1.25	5.00
				1g SAR	40.20	40.40	0.50	5.00
				10g SAR	21.10	21.04	-0.28	5.00

UL Verification Services Ltd.   Report. No.: 1.0
This report shall not be reproduced except in full, without the written approval of UL Verification Services Ltd.

System Check 2450 Head
Date: 11/06/2014
Validation Dipole and Serial Number: D2450V2; SN: 725

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Head	2450	24.0 ºC	22.7 ºC	ε_r	39.20	38.26	-2.40	5.00
				σ	1.80	1.82	0.95	5.00
				1g SAR	52.60	53.60	1.90	5.00
				10g SAR	24.4	24.76	1.48	5.00

System Check 2450 Body
Date: 13/06/2014
Validation Dipole and Serial Number: D2440V2; SN: 701

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	2450	24.0 ºC	24.0 ºC	ε_r	52.70	50.83	-3.55	5.00
				σ	1.95	2.03	3.86	5.00
				1g SAR	51.40	52.40	1.95	5.00
				10g SAR	23.90	24.16	1.09	5.00

System Check 2600 Head
Date: 09/06/2014
Validation Dipole and Serial Number: D2600V2; SN: 1046

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Head	2600	24.0 ºC	22.6 ºC	ε_r	39.00	38.69	-0.79	5.00
				σ	1.96	1.92	-1.98	5.00
				1g SAR	57.60	57.60	0.00	5.00
				10g SAR	25.8	25.44	-1.40	5.00

Date: 12/06/2014
Validation Dipole and Serial Number: D2600V2; SN: 1046

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Head	2600	24.0 ºC	22.6 ºC	ε_r	39.00	37.56	-3.69	5.00
				σ	1.96	1.94	-0.80	5.00
				1g SAR	57.60	60.00	4.17	5.00
				10g SAR	25.8	26.68	3.41	5.00

System Check 2600 Body
Date: 09/06/2014
Validation Dipole and Serial Number: D2600V2; SN: 1046

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	2600	23.4 ºC	22.5ºC	ε_r	52.50	53.67	2.23	5.00
				σ	2.16	2.20	1.98	5.00
				1g SAR	56.80	55.60	-2.11	5.00
				10g SAR	25.20	24.12	-4.29	5.00

Date: 12/06/2014
Validation Dipole and Serial Number: D2600V2; SN: 1046

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	2600	23.4 ºC	22.5ºC	ε_r	52.50	50.62	3.50	5.00
				σ	2.16	2.18	0.90	5.00
				1g SAR	56.80	57.60	1.41	5.00
				10g SAR	25.20	24.84	-1.43	5.00

System Check 5200 Head
Date 12/06/2014
Validation dipole and Serial Number: D5GHzV2 SN: 1016

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Head	5200	24.0ºC	22.8ºC	ε_r	36.00	35.40	-1.64	5.00
				σ	4.66	4.51	-3.17	5.00
				1g SAR	77.40	79.90	3.23	5.00
				10g SAR	22.30	22.90	2.69	5.00

System Check 5500 Head
Date 12/06/2014
Validation dipole and Serial Number: D5GHzV2 SN: 1016

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Head	5200	24.0ºC	22.8ºC	ε_r	35.60	35.02	-1.63	5.00
				σ	4.96	4.78	-3.71	5.00
				1g SAR	84.80	84.20	-0.71	5.00
				10g SAR	24.1	23.60	-2.07	5.00

System Check 5800 Head
Date 12/06/2014
Validation dipole and Serial Number: D5GHzV2 SN: 1016

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Head	5200	24.0ºC	22.8ºC	ε_r	35.30	34.54	-2.15	5.00
				σ	5.27	5.02	-4.80	5.00
				1g SAR	80.10	76.90	4.16	5.00
				10g SAR	22.0	22.70	3.18	5.00

System Check 5200 Body
Date: 09/06/2014
Validation Dipole and Serial Number: D5GHzV2 SN:1016

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	5200	23.0ºC	23.0ºC	ε_r	49.00	48.11	-1.84	5.00
				σ	5.30	5.14	-2.98	5.00
				1g SAR	73.10	72.20	-1.23	5.00
				10g SAR	20.40	20.30	-0.49	5.00

System Check 5500 Body
Date: 09/06/2014
Validation Dipole and Serial Number: D5GHzV2 SN:1016

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	5200	24.0ºC	24.0ºC	ε_r	48.60	47.09	-3.11	5.00
				σ	5.65	5.59	-1.14	5.00
				1g SAR	79.00	81.00	2.53	5.00
				10g SAR	21.9	22.80	4.11	5.00

System Check 5800 Body
Date: 09/06/2014
Validation Dipole and Serial Number: D5GHzV2 SN:1016

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	5200	24.0ºC	24.2ºC	ε_r	48.20	46.36	-3.82	5.00
				σ	6.00	6.02	0.26	5.00
				1g SAR	73.20	71.60	-2.19	5.00
				10g SAR	20.20	19.70	-2.48	5.00

UL Verification Services Ltd.   Report. No.: 1.0
This report shall not be reproduced except in full, without the written approval of UL Verification Services Ltd.

Appendix 7. measurement Uncertainty Table

Measurement uncertainty tables for technologies tested.

A.7.1. Uncertainty -GSM 850 / UMTS FDD 5 / LTE Band 5 Head Configuration 1g

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	$c_{i\,(1g)}$	Standard Uncertainty + u (%)	Standard Uncertainty - u (%)	υ_i or υ_{eff}
B	Probe calibration	6.000	6.000	normal (k=1)	1.0000	1.0000	6.000	6.000	∞
B	Axial Isotropy	0.250	0.250	normal (k=1)	1.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	1.300	1.300	normal (k=1)	1.0000	1.0000	1.300	1.300	∞
B	Spatial Resolution	0.500	0.500	Rectangular	1.7321	1.0000	0.289	0.289	∞
B	Boundary Effect	0.769	0.769	Rectangular	1.7321	1.0000	0.444	0.444	∞
B	Linearity	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.160	0.160	normal (k=1)	1.0000	1.0000	0.160	0.160	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	1.730	1.730	Rectangular	1.7321	1.0000	0.999	0.999	∞
B	RF Ambient conditions	3.000	3.000	Rectangular	1.7321	1.0000	1.732	1.732	∞
B	Probe Positioner Mechanical Restrictions	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Probe Positioning with regard to Phantom Shell	2.850	2.850	Rectangular	1.7321	1.0000	1.645	1.645	∞
B	Extrapolation and integration / Maximum SAR evaluation	5.080	5.080	Rectangular	1.7321	1.0000	2.933	2.933	∞
A	Test Sample Positioning	2.510	2.510	normal (k=1)	1.0000	1.0000	2.510	2.510	10
A	Device Holder uncertainty	0.154	0.154	normal (k=1)	1.0000	1.0000	0.154	0.154	10
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drift of output power	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞
B	Liquid Conductivity (target value)	5.000	5.000	Rectangular	1.7321	0.6400	1.848	1.848	∞
A	Liquid Conductivity (measured value)	2.950	2.950	normal (k=1)	1.0000	0.6400	1.888	1.888	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.6000	1.732	1.732	∞
A	Liquid Permittivity (measured value)	2.840	2.840	normal (k=1)	1.0000	0.6000	1.704	1.704	5
	Combined standard uncertainty			t-distribution			9.58	9.58	>500
	Expanded uncertainty			k = 1.96			18.77	18.77	>500

A.7.2. Uncertainty Rate-GSM / GPRS / EDGE 850 / UMTS FDD 5 / LTE Band 5 Configuration 1g

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	$c_{i\,(1g)}$	Standard Uncertainty + u (%)	Standard Uncertainty - u (%)	υ_i or υ_{eff}
B	Probe calibration	6.000	6.000	normal (k=1)	1.0000	1.0000	6.000	6.000	∞
B	Axial Isotropy	0.250	0.250	normal (k=1)	1.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	1.300	1.300	normal (k=1)	1.0000	1.0000	1.300	1.300	∞
B	Spatial Resolution	0.500	0.500	Rectangular	1.7321	1.0000	0.289	0.289	∞
B	Boundary Effect	0.769	0.769	Rectangular	1.7321	1.0000	0.444	0.444	∞
B	Linearity	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.160	0.160	normal (k=1)	1.0000	1.0000	0.160	0.160	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	1.730	1.730	Rectangular	1.7321	1.0000	0.999	0.999	∞
B	RF Ambient conditions	3.000	3.000	Rectangular	1.7321	1.0000	1.732	1.732	∞
B	Probe Positioner Mechanical Restrictions	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Probe Positioning with regard to Phantom Shell	2.850	2.850	Rectangular	1.7321	1.0000	1.645	1.645	∞
B	Extrapolation and integration /Maximum SAR evaluation	5.080	5.080	Rectangular	1.7321	1.0000	2.933	2.933	∞
A	Test Sample Positioning	2.510	2.510	normal (k=1)	1.0000	1.0000	2.510	2.510	10
A	Device Holder uncertainty	0.154	0.154	normal (k=1)	1.0000	1.0000	0.154	0.154	10
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drift of output power	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞
B	Liquid Conductivity (target value)	5.000	5.000	Rectangular	1.7321	0.6400	1.848	1.848	∞
A	Liquid Conductivity (measured value)	2.000	2.000	normal (k=1)	1.0000	0.6400	1.280	1.280	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.6000	1.732	1.732	∞
A	Liquid Permittivity (measured value)	1.560	1.560	normal (k=1)	1.0000	0.6000	0.936	0.936	5
	Combined standard uncertainty			t-distribution			9.37	9.37	>500
	Expanded uncertainty			k = 1.96			18.36	18.36	>500

A.7.3. Uncertainty -PCS 1900 / UMTS FDD 2 Head Configuration 1g

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	$c_{i\,(1g)}$	Standard Uncertainty + u (%)	- u (%)	υ_i or υ_{eff}
B	Probe calibration	6.000	6.000	normal (k=1)	1.0000	1.0000	6.000	6.000	∞
B	Axial Isotropy	0.250	0.250	normal (k=1)	1.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	1.300	1.300	normal (k=1)	1.0000	1.0000	1.300	1.300	∞
B	Spatial Resolution	0.500	0.500	Rectangular	1.7321	1.0000	0.289	0.289	∞
B	Boundary Effect	0.769	0.769	Rectangular	1.7321	1.0000	0.444	0.444	∞
B	Linearity	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.160	0.160	normal (k=1)	1.0000	1.0000	0.160	0.160	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	1.730	1.730	Rectangular	1.7321	1.0000	0.999	0.999	∞
B	RF Ambient conditions	3.000	3.000	Rectangular	1.7321	1.0000	1.732	1.732	∞
B	Probe Positioner Mechanical Restrictions	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Probe Positioning with Regard to Phantom Shell	2.850	2.850	Rectangular	1.7321	1.0000	1.645	1.645	∞
B	Extrapolation and integration / Maximum SAR evaluation	5.080	5.080	Rectangular	1.7321	1.0000	2.933	2.933	∞
A	Test Sample Positioning	2.490	2.490	normal (k=1)	1.0000	1.0000	2.490	2.490	10
A	Device Holder uncertainty	0.154	0.154	normal (k=1)	1.0000	1.0000	0.154	0.154	10
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drift of output power	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞
B	Liquid Conductivity (target value)	5.000	5.000	Rectangular	1.7321	0.6400	1.848	1.848	∞
A	Liquid Conductivity (measured value)	3.560	3.560	normal (k=1)	1.0000	0.6400	2.278	2.278	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.6000	1.732	1.732	∞
A	Liquid Permittivity (measured value)	2.620	2.620	normal (k=1)	1.0000	0.6000	1.572	1.572	5
	Combined standard uncertainty			t-distribution			9.63	9.63	>500
	Expanded uncertainty			k = 1.96			18.88	18.88	>500

A.7.4. Uncertainty -PCS / GPRS / EDGE 1900 / UMTS FDD 2 Body Configuration 1g

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	$c_{i\,(1g)}$	Standard Uncertainty + u (%)	Standard Uncertainty - u (%)	υ_i or υ_{eff}
B	Probe calibration	6.000	6.000	normal (k=1)	1.0000	1.0000	6.000	6.000	∞
B	Axial Isotropy	0.250	0.250	normal (k=1)	1.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	1.300	1.300	normal (k=1)	1.0000	1.0000	1.300	1.300	∞
B	Spatial Resolution	0.500	0.500	Rectangular	1.7321	1.0000	0.289	0.289	∞
B	Boundary Effect	0.769	0.769	Rectangular	1.7321	1.0000	0.444	0.444	∞
B	Linearity	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.160	0.160	normal (k=1)	1.0000	1.0000	0.160	0.160	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	1.730	1.730	Rectangular	1.7321	1.0000	0.999	0.999	∞
B	RF Ambient conditions	3.000	3.000	Rectangular	1.7321	1.0000	1.732	1.732	∞
B	Probe Positioner Mechanical Restrictions	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Probe Positioning with regard to Phantom Shell	2.850	2.850	Rectangular	1.7321	1.0000	1.645	1.645	∞
B	Extrapolation and integration / Maximum SAR evaluation	5.080	5.080	Rectangular	1.7321	1.0000	2.933	2.933	∞
A	Test Sample Positioning	1.860	1.860	normal (k=1)	1.0000	1.0000	1.860	1.860	10
A	Device Holder uncertainty	0.154	0.154	normal (k=1)	1.0000	1.0000	0.154	0.154	10
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drift of output power	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞
B	Liquid Conductivity (target value)	5.000	5.000	Rectangular	1.7321	0.6400	1.848	1.848	∞
A	Liquid Conductivity (measured value)	2.610	2.610	normal (k=1)	1.0000	0.6400	1.670	1.670	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.6000	1.732	1.732	∞
A	Liquid Permittivity (measured value)	2.140	2.140	normal (k=1)	1.0000	0.6000	1.284	1.284	5
	Combined standard uncertainty			t-distribution			9.32	9.32	>500
	Expanded uncertainty			k = 1.96			18.26	18.26	>500

A.7.5. Uncertainty –LTE Band 7 / Wi-Fi 2450 MHz Head Configuration 1g

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	$c_{i\,(1g)}$	Standard Uncertainty		υ_i or υ_{eff}
							+ u (%)	- u (%)	
B	Probe calibration	6.000	6.000	normal (k=1)	1.0000	1.0000	6.000	6.000	∞
B	Axial Isotropy	0.250	0.250	normal (k=1)	1.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	1.300	1.300	normal (k=1)	1.0000	1.0000	1.300	1.300	∞
B	Spatial Resolution	0.500	0.500	Rectangular	1.7321	1.0000	0.289	0.289	∞
B	Boundary Effect	0.769	0.769	Rectangular	1.7321	1.0000	0.444	0.444	∞
B	Linearity	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.160	0.160	normal (k=1)	1.0000	1.0000	0.160	0.160	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	RF Ambient conditions	3.000	3.000	Rectangular	1.7321	1.0000	1.732	1.732	∞
B	Probe Positioner Mechanical Restrictions	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Probe Positioning with regard to Phantom Shell	2.850	2.850	Rectangular	1.7321	1.0000	1.645	1.645	∞
B	Extrapolation and integration / Maximum SAR evaluation	5.080	5.080	Rectangular	1.7321	1.0000	2.933	2.933	∞
A	Test Sample Positioning	2.180	2.180	normal (k=1)	1.0000	1.0000	2.180	2.180	10
A	Device Holder uncertainty	0.154	0.154	normal (k=1)	1.0000	1.0000	0.154	0.154	10
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drift of output power	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞
B	Liquid Conductivity (target value)	5.000	5.000	Rectangular	1.7321	0.6400	1.848	1.848	∞
A	Liquid Conductivity (measured value)	1.840	1.840	normal (k=1)	1.0000	0.6400	1.178	1.178	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.6000	1.732	1.732	∞
A	Liquid Permittivity (measured value)	2.030	2.030	normal (k=1)	1.0000	0.6000	1.218	1.218	5
	Combined standard uncertainty			t-distribution			9.25	9.25	>500
	Expanded uncertainty			k = 1.96			18.13	18.13	>500

UL Verification Services Ltd.   Report. No.: 1.0
This report shall not be reproduced except in full, without the written approval of UL Verification Services Ltd.

A.7.6. Uncertainty –LTE Band 7 / Wi-Fi 2450 MHz Body Configuration 1g

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	$c_{i\,(1g)}$	Standard Uncertainty + u (%)	Standard Uncertainty - u (%)	υ_i or υ_{eff}
B	Probe calibration	6.000	6.000	normal (k=1)	1.0000	1.0000	6.000	6.000	∞
B	Axial Isotropy	0.250	0.250	normal (k=1)	1.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	1.300	1.300	normal (k=1)	1.0000	1.0000	1.300	1.300	∞
B	Spatial Resolution	0.500	0.500	Rectangular	1.7321	1.0000	0.289	0.289	∞
B	Boundary Effect	0.769	0.769	Rectangular	1.7321	1.0000	0.444	0.444	∞
B	Linearity	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.160	0.160	normal (k=1)	1.0000	1.0000	0.160	0.160	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	RF Ambient conditions	3.000	3.000	Rectangular	1.7321	1.0000	1.732	1.732	∞
B	Probe Positioner Mechanical Restrictions	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Probe Positioning with regard to Phantom Shell	2.850	2.850	Rectangular	1.7321	1.0000	1.645	1.645	∞
B	Extrapolation and integration / Maximum SAR evaluation	5.080	5.080	Rectangular	1.7321	1.0000	2.933	2.933	∞
A	Test Sample Positioning	2.440	2.440	normal (k=1)	1.0000	1.0000	2.440	2.440	10
A	Device Holder uncertainty	0.154	0.154	normal (k=1)	1.0000	1.0000	0.154	0.154	10
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drift of output power	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞
B	Liquid Conductivity (target value)	5.000	5.000	Rectangular	1.7321	0.6400	1.848	1.848	∞
A	Liquid Conductivity (measured value)	2.260	2.260	normal (k=1)	1.0000	0.6400	1.446	1.446	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.6000	1.732	1.732	∞
A	Liquid Permittivity (measured value)	2.150	2.150	normal (k=1)	1.0000	0.6000	1.290	1.290	5
	Combined standard uncertainty			t-distribution			9.36	9.36	>500
	Expanded uncertainty			k = 1.96			18.35	18.35	>500

A.7.7. **Uncertainty -Wi-Fi 5GHz Head Configuration 1g**

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	$c_{i\,(1g)}$	Standard Uncertainty		υ_i or υ_{eff}
							+ u (%)	- u (%)	
B	Probe calibration	6.550	6.550	normal (k=1)	1.0000	1.0000	6.550	6.550	∞
B	Axial Isotropy	0.250	0.250	normal (k=1)	1.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	1.300	1.300	normal (k=1)	1.0000	1.0000	1.300	1.300	∞
B	Spatial Resolution	0.500	0.500	Rectangular	1.7321	1.0000	0.289	0.289	∞
B	Boundary Effect	0.769	0.769	Rectangular	1.7321	1.0000	0.444	0.444	∞
B	Linearity	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.160	0.160	normal (k=1)	1.0000	1.0000	0.160	0.160	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	RF Ambient conditions	3.000	3.000	Rectangular	1.7321	1.0000	1.732	1.732	∞
B	Probe Positioner Mechanical Restrictions	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Probe Positioning with regard to Phantom Shell	2.850	2.850	Rectangular	1.7321	1.0000	1.645	1.645	∞
B	Extrapolation and integration / Maximum SAR evaluation	5.080	5.080	Rectangular	1.7321	1.0000	2.933	2.933	∞
A	Test Sample Positioning	2.380	2.380	normal (k=1)	1.0000	1.0000	2.380	2.380	10
A	Device Holder uncertainty	0.154	0.154	normal (k=1)	1.0000	1.0000	0.154	0.154	10
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drift of output power	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞
B	Liquid Conductivity (target value)	5.000	5.000	Rectangular	1.7321	0.6400	1.848	1.848	∞
A	Liquid Conductivity (measured value)	6.220	6.220	normal (k=1)	1.0000	0.6400	3.981	3.981	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.6000	1.732	1.732	∞
A	Liquid Permittivity (measured value)	5.580	5.580	normal (k=1)	1.0000	0.6000	3.348	3.348	5
	Combined standard uncertainty			t-distribution			10.84	10.84	>150
	Expanded uncertainty			k = 1.96			21.25	21.25	>150

A.7.8. Uncertainty -Wi-Fi 5GHz Body Configuration 1g

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	$c_{i\,(1g)}$	Standard Uncertainty		υ_i or υ_{eff}
							+ u (%)	- u (%)	
B	Probe calibration	6.550	6.550	normal (k=1)	1.0000	1.0000	6.550	6.550	∞
B	Axial Isotropy	0.250	0.250	normal (k=1)	1.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	1.300	1.300	normal (k=1)	1.0000	1.0000	1.300	1.300	∞
B	Spatial Resolution	0.500	0.500	Rectangular	1.7321	1.0000	0.289	0.289	∞
B	Boundary Effect	0.769	0.769	Rectangular	1.7321	1.0000	0.444	0.444	∞
B	Linearity	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.160	0.160	normal (k=1)	1.0000	1.0000	0.160	0.160	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	RF Ambient conditions	3.000	3.000	Rectangular	1.7321	1.0000	1.732	1.732	∞
B	Probe Positioner Mechanical Restrictions	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Probe Positioning with regard to Phantom Shell	2.850	2.850	Rectangular	1.7321	1.0000	1.645	1.645	∞
B	Extrapolation and integration / Maximum SAR evaluation	5.080	5.080	Rectangular	1.7321	1.0000	2.933	2.933	∞
A	Test Sample Positioning	1.960	1.960	normal (k=1)	1.0000	1.0000	1.960	1.960	10
A	Device Holder uncertainty	0.154	0.154	normal (k=1)	1.0000	1.0000	0.154	0.154	10
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drift of output power	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞
B	Liquid Conductivity (target value)	5.000	5.000	Rectangular	1.7321	0.6400	1.848	1.848	∞
A	Liquid Conductivity (measured value)	4.370	4.370	normal (k=1)	1.0000	0.6400	2.797	2.797	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.6000	1.732	1.732	∞
A	Liquid Permittivity (measured value)	4.270	4.270	normal (k=1)	1.0000	0.6000	2.562	2.562	5
	Combined standard uncertainty			t-distribution			10.15	10.15	>450
	Expanded uncertainty			k = 1.96			19.90	19.90	>450

Appendix 8. 3G Test set-up
3G (12.K RMC / HSDPA / HSUPA) setup

To switch from 2G to 3G, on the system config screen choose Format Switch and select WCDMA. The Call Setup Screen as shown in figure 1 pops up.

Figure 1: 3G Call Setup Screen

For a 12.2k RMC call follow the steps below.

8.1. Steps for 12.2k RMC

1. Ensure that the Operating Mode of the cell is off before setting up the instrument.
2. On the Call Setup Screen, under Call Parameters, press the button against Cell Power. The Cell Power value is set to about -35dBm to account for all the losses and ensure sufficient signal strength to the EUT.
3. The Channel Type is selected to 12.2k RMC. Press button against Channel (VARFCN) Parms select the correct Downlink Channel for the required UMTS FDD Band.
4. On the Call Setup Screen, under Call Parameters, press the button against HSPA Parameters. Under HSDPA Parameters on page 1, press HSDPA Uplink parameters and set the Delta ACK, Delta NACK, Delta CQI values to 8. Under HSDPA Parms itself, press HSDPA RB Test Mode Setup button and then the HSDPA RB Test Mode Settings and change HS-DSCH Data Pattern to All Ones.

```
                          Call Setup Screen
 Call Control      │      Active Cell Operating Mode      │   HSDPA Parms
                   │                                       │
                   │      ┌─────── UE Information ───────┐ │
                   │      │ IMSI:                        │ │
                   │      │ IMEI(SV):              (--)   │ │
                   │      │ Power Class:                 │ │  HSDPA RB Test
                   │      └──────────────────────────────┘ │  Mode Setup
                   │                                       │
                   │  ┌── UE Expected Open Loop Transmit Power ──┐ │
                   │  │ Initial PRACH TX Power:   -60.00 dBm │ │  UE Category
                   │  │ Initial DPCCH TX Power:   -11.55 dBm │ │  Parameters ▽
                   │  └──────────────────────────────────────┘ │
                   │  ┌────────────────────────┬─────────┐ │
                   │  │ HSDPA Uplink Parameters │  Value  │ │
                   │  ├────────────────────────┼─────────┤ │  MAC-(e)hs
                   │  │ DeltaACK               │    8    │ │  Parameters ▽
                   │  │ DeltaNACK              │    8    │ │
                   │  │ DeltaCQI               │    8    │ │
                   │  │ Ack-Nack Repetition Factor │ 1   │ │  HSDPA Uplink
                   │  │ CQI Feedback Cycle (k) │  2 ms   │ │  Parameters ▽
                   │  │ CQI Repetition Factor  │    1    │ │
      Close        │  │                        │         │ │   Return
      Menu         │  └────────────────────────┴─────────┘ │
                   │  ┌──────┐ Active Cell  ┌─ Sys Type: UTRA FDD ─┐
                   │  │      │   Idle       │                       │
                   │  │      │ IntRef       │                       │   1 of 2
```

5. On the Call Setup Screen, under Call Parameters, on page 2, check if the DL DTCH Data is set to All Ones. On page 3, ensure that the Receiver is set to Manual. On page 3 itself, under UL CL Power Ctrl Parameters, UL CL Power Ctrl Mode is set to All Up Bits.

```
                          Call Setup Screen
 Call Control      │      Active Cell Operating Mode      │   Call Parms
 Operating Mode    │                                       │  DL DTCH Data
   Active Cell     │      ┌─────── UE Information ───────┐ │   All Ones
                   │      │ IMSI:                        │ │
                   │      │ IMEI(SV):              (--)   │ │
                   │      │ Power Class:                 │ │
                   │      └──────────────────────────────┘ │
                   │  ┌── UE Expected Open Loop Transmit Power ──┐ │
                   │  │ Initial PRACH TX Power:   -60.00 dBm │ │  RLC Reestablish
   Originate       │  │ Initial DPCCH TX Power:   -11.55 dBm │ │    Auto
     Call          │  └──────────────────────────────────────┘ │
                   │  ┌──────── Call Processing Status ───────┐ │
                   │  │ Current Service Type:    None         │ │  Call Limit State
   Paging          │  │ MM Status:               None         │ │    Off
  Parameters ▽     │  │ GMM State:               None         │ │
                   │  │ Current DPCH Offset:      0 chips     │ │
                   │  └───────────────────────────────────────┘ │  Call Drop Timer
   Handovers       │  ┌─ HSUPA Information ─┐┌─ HSDPA Information ─┐│    On
                   │  │ Rep EDCH Cat/Ext:Unrep/Unrep││Cur UE HS-DSCH Cat: ----│
                   │  │ Last received E-TFCI: ----  ││Block Error Ratio: ---- %│
   Clear           │  │ Throughput:    ---- kbps   ││Throughput:     ---- kbps│ SRB
   UE Info         │  │ Acks Transmitted:  ----    ││Blocks Transmitted: ----│ Parameters ▽
                   │  ┌──────┐ Active Cell  ┌─ Sys Type: UTRA FDD ─┐
    1 of 5         │  │      │   Idle       │                       │
                   │  │      │ IntRef       │                       │   2 of 3
```

```
                          Call Setup Screen
  Call Control      Active Cell Operating Mode           Call Parms
                                                      UE Target Power
                          UE Information                  -5 dBm
                 IMSI:
                 IMEI(SV):                    (--)
                 Power Class:                          UL CL Power
                                                      Ctrl Parameters▽

                   UE Expected Open Loop Transmit Power
                 Initial PRACH TX Power:      -60.00  dBm
                 Initial DPCCH TX Power:      -11.55  dBm

                  UL CL Power Ctrl Parameters      Value
                 UL CL Power Ctrl Mode           All Up bits
                 UL CL Power Ctrl Algorithm         Two          Send Step Up
                 UL CL Power Ctrl Stepsize          1 dB        TPC Bit Pattern


                                                               Send Step Down
                                                               TPC Bit Pattern

       Close                                                     Receiver
       Menu                                                      Control   ▽

                    │      │Active Cell      │Sys Type: UTRA FDD│
                    │      │ Idle            │                  │
                    │      │   │IntRef│      │                  │    3 of 3
```

Figure 4: UL CL Power Ctrl Parameters

6. On the Call Setup Screen, under Call Control, page 2, Cell Parameters, it is ensured that PS Domain information is kept as Absent for RMC.

```
                          Call Setup Screen
  Call Control        Active Cell Operating Mode          Call Parms
                                                       Cell Power
   Additional              UE Information                 -35.00
   Screens        IMSI:                                 dBm/3.84 MHz
                  IMEI(SV):                    (--)
                  Power Class:                         Channel Type
    Cell                                                12.2k RMC
  Parameters ▽
                    UE Expected Open Loop Transmit Power
                  Initial PRACH TX Power:     -60.00  dBm    Paging Service
   Generator      Initial DPCCH TX Power:     -11.55  dBm    RB Test Mode
   Info
                       Cell Parameters           Value
                  BCCH Update Page              Inhibit
   Uplink         PS Domain Information         Absent          HSPA
  Parameters ▽                                              Parameters
                  MCC (Mobile Country Code)       1
                  MNC (Mobile Network Code)       1
   UE Rep         MNC (Mobile Network Code) Length  Auto     34.121 Preset
   Meas                                                      Call Configs ▽
                  LAC (Local Area Code)           1
                  RAC (Routing Area Code)         1            Channel
   Close          Cell Identity                   1          (UARFCN) Parms
   Menu
                    │      │Active Cell      │Sys Type: UTRA FDD│
                    │      │ Idle            │                  │
    2 of 5          │      │   │IntRef│      │                  │    1 of 3
```

Figure 5: Cell Parameters

7.   On the same page under Uplink Parameters the maximum Uplink Transmit Power is made 24dBm. Uplink DPCH Bc/Bd Control Settings are kept at Auto for RMC. These vary according for HSDPA and HSUPA as per the values given in KDB 941225 D01 SAR test for 3G devices v02.

UL Verification Services Ltd.   Report. No.: 1.0
This report shall not be reproduced except in full, without the written approval of UL Verification Services Ltd.

```
                         Call Setup Screen
 Call Control          Active Cell Operating Mode              Call Parms
                                                             Cell Power
  Additional                  UE Information                    -35.00
   Screens         IMSI:
                   IMEI(SV):                        (--)      dBm/3.84 MHz
                   Power Class:                               Channel Type
    Cell                                                        12.2k RMC
 Parameters ▽
                      UE Expected Open Loop Transmit Power
                   Initial PRACH TX Power:    -60.00  dBm     Paging Service
  Generator        Initial DPCCH TX Power:    -11.55  dBm      RB Test Mode
    Info
                     Uplink Parameters          Value
                  PRACH Preambles                 64    ↑
   Uplink         PRACH Ramping Cycles(MMAX)       2          HSPA
 Parameters ▽     Available Subchannels (Bit Mask) 000000000001  Parameters
                  Uplink DPCH Scrambling Code       0
                  Uplink DPCH Bc/Bd Control        Auto        34.121 Preset
   UE Rep                                                      Call Configs ▽
   Meas           Manual Uplink DPCH Bc             8
                  Manual Uplink DPCH Bd            15
   Close          Maximum Uplink Transmit Power Level  24 dBm   Channel
   Menu                                                      (UARFCN) Parms
                        Active Cell
                          Idle                 Sys Type: UTRA FDD
   2 of 5               IntRef                                   1 of 3
```

Figure 6: Uplink Parameters

8. On page 3 under Call Control, for the RB Test Mode setup, Asymmetric RMC CN Domain is ensured to be in CS Domain for RMC call.

```
                         Call Setup Screen
 Call Control          Active Cell Operating Mode              Call Parms
                                                             Cell Power
                              UE Information                    -35.00
                   IMSI:
                   IMEI(SV):                        (--)      dBm/3.84 MHz
                   Power Class:                               Channel Type
                                                               12.2k RMC
                      UE Expected Open Loop Transmit Power
                   Initial PRACH TX Power:    -60.00  dBm     Paging Service
                   Initial DPCCH TX Power:    -11.55  dBm      RB Test Mode

                     RB Test Mode Settings       Value
                  Uplink DTCH RMC CRC Presence   Present
                  Uplink Dummy DCCH Data          Off         HSPA
                  UE Loopback Type               Type 1     Parameters
                  Asymmetric RMC Loopback Messaging Close/Open
   Voice          Asymmetric RMC CN Domain       CS Domain    34.121 Preset
   Call                                                       Call Configs ▽

   Close                                                        Channel
   Menu                                                      (UARFCN) Parms
                        Active Cell
                          Idle                 Sys Type: UTRA FDD
   3 of 5               IntRef                                   1 of 3
```

Figure 7: RB Test Mode Settings

9. After the test set has been set up, change the cell Operating Mode to Active Cell and originate a call.

8.2. Steps for 12.2k RMC + HSDPA/HSUPA

1. Most of the steps to be followed are as in the case of 12.2k RMC however, some of the settings need to be changed. The Channel Type is changed to 12.2k RMC+HSDPA or 12.2k RMC+HSUPA as required.
2. For HSDPA and HSUPA, the settings remain same as the case for RMC but the PS Domain is made Present for Cell Parameters (Figure 5) and RB Test Mode Setup (Figure 7).
3. The following tables taken from FCC 3G SAR procedures (KDB 941225 D01 SAR test for 3G devices v02) below were applied to the Agilent 8960 series 10 wireless communications test set which supports 3G / HSDPA release 5 / HSUPA release 6.

Sub-test 1 Setup for Release 5 HSDPA

Sub-test	β_c	β_d	B_d (SF)	β_c/β_d	β_{hs}[1]	SM (dB)[2]
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15[3]	15/15[3]	64	12/15[3]	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 $\Leftrightarrow$ A_{hs} = β_{hs}/β_c = 30/15 $\Leftrightarrow$ β_{hs} = 30/15 * β_c

Note 2: CM = 1 for β_c/β_d = 12/15, B_{hs}/β_c = 24/15

Note 3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15

Sub-test 5 Setup for Release 6 HSUPA

Sub-test	β_c	β_d	B_d (SF)	β_c/β_d	β_{hs}[1]	B_{oc}	B_{od}	B_{od} (SF)	B_{od} $(codes)$	CM[2] (dB)	MPR (dB)	AG[4] Index	E-TFCI
1	11/15[3]	15/15[3]	64	11/15[3]	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	31/15	B_{al1}: 47/15 B_{al2}: 47/15	4	1	2.0	1.0	15	92
4	2/15	15/15	64	2/15	2/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15[4]	15/15[4]	64	15/15[4]	24/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 $\Leftrightarrow$ A_{hs} = β_{hs}/β_c = 30/15 $\Leftrightarrow$ β_{hs} = 30/15 * β_c

Note 2: CM = 1 for β_c/β_d = 12/15, B_{hs}/β_c = 24/15. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH AND E-DPCCH for the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.

Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.

Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Tavle 5.1g.

Note 6: B_{od} can not be set directly; it is set by Absolute Grant Value.

Call Setup Screen

Call Control	Active Cell Operating Mode	Serving Grant
Operating Mode		**AG Mode**
Active Cell		**Single Shot**

UE Information

IMSI:
IMEI(SV):   (--)
Power Class:

Single Shot AG
21: (134/15)^2

UE Expected Open Loop Transmit Power

Initial PRACH TX Power: -60.00 dBm
Initial DPCCH TX Power: -11.55 dBm

Originate Call

Send Single Shot Absolute Grant

Call Processing Status

Current Service Type: None
MM Status:
GMM State:
Current DPCH

RB Setup AG
33: 4(134/15)^2

Paging Parameters ▽

Abs Single Shot AG

Index 18: (95/15)^2	↑
Index 19: (106/15)^2	
Index 20: (119/15)^2	
Index 21: (134/15)^2	
Index 22: (150/15)^2	
Index 23: (168/15)^2	↓

Handovers

HSUPA In... a Information
Rep EDCH Cat/B...   DSCH Cat: ----
Last received...   Ratio: ---- %
Throughput: ---- kbps
Acks Transmitt...   nsmitted: ----

AG Pattern Parameters ▽

Clear UE Info

Return

	Active Cell	Sys Type: UTRA FDD
	Idle	
1 of 5	IntRef	1 of 2

Call Setup Screen

Call Control	Active Cell Operating Mode	Call Parms
Additional Screens		**Cell Power**
		-35.00
		dBm/3.84 MHz

UE Information

IMSI:
IMEI(SV):   (--)
Power Class:

Channel Type
12.2k + HSDPA

Cell Parameters ▽

UE Expected Open Loop Transmit Power

Initial PRACH TX Power: -60.00 dBm
Initial DPCCH TX Power: -22.58 dBm

Paging Service

Generator Info

RB Test Mode

Uplink Parameters

Uplink Parameters	Value
PRACH Preambles	64
PRACH Ramping Cycles(MMAX)	2
Available Subchannels (Bit Mask)	000000000001
Uplink DPCH Scrambling Code	0
Uplink DPCH Bc/Bd Control	Manual
Manual Uplink DPCH Bc	2
Manual Uplink DPCH Bd	15
Maximum Uplink Transmit Power Level	24 dBm

Uplink Parameters ▽

HSPA Parameters

UE Rep Meas

34.121 Preset Call Configs ▽

Close Menu

Channel (UARFCN) Parms

| | Cell Off | Sys Type: UTRA FDD |
| 2 of 5 | IntRef | 1 of 3 |

4. For HSUPA the Serving Grant Parameter needs to be set. On the Call Setup Screen, under Call Parameters, press the button against HSPA Parameters. On the new screen that pops up, press HSUPA and Serving Grant. The Serving Grant is set according to the table for HSPA in the KDB (AG Index). The correct AG is chosen from the Single Shot AG. Consecutively, the RG Setup AG is set as per the ratio set on Single Shot AG.

Figure 8: Serving Grant Example

Appendix 9. CAT24 Test set-up

A.9.1. Establish a DC-HSDPA RB Test Mode Connection with DL 42Mbps

RB (radio bearer) test mode is a special, defined-channel configuration designed to simplify the testing environment. Since W-CDMA is an incredibly flexible system, defined radio bearers, called RMCs (reference measurement channels) simplify which configurations need to be tested for RF performance.

RB test mode provides the ability to set up a standalone channel configuration originating from the 8960 via call-processing. The direction of the call setup is always from the 8960 to the UE. This is the typical RF test that is used throughout the lifecycle of a device's design process. Using RB test mode is attractive to device manufacturers because it does not require extra software to control the UE. In this type of call connection, the radio bearer (within the 8960) essentially controls the UE during test.

A.9.1.1 Configure 8960

1. Press **Operating Mode** (**F1**), select **Cell Off** operating mode.

2. Set the **Channel type** to **12.2k + HSDPA**.

3. Set the downlink channel code. In order to achieve the 42 Mbps maximum downlink throughput, you have to set up 15 HS-PDSCHs which will possibly cause a code collision.

To easily configure the downlink 15 HS-PDSCH for a maximum throughput, use the code preset to configure the code channels for both the serving cell and the secondary serving cell.

Select **Call Control 2 of 6**-> **Generator Info (F3)** -> **Downlink Channel Configs (F4)** -> **DL Chan code Preset Configs (F5)**, choose **34.121 Tables E.6.2.3,4 (HSDPA 15 HS-PDSCHs).**

Set the **Conn S-CCPCH Cfg** to **Off** to avoid the code collision.

To see the channel code allocation for the serving cell and the secondary serving cell, select **Additional Gen Info Screens (F1) -> DC-HSDPA DL Code Chan Info (F4).**

```
                          Call Setup Screen
 Screen Ctrl  |    DC-HSDPA DL Code Channel Information    | Call Parms
              |                                            | Cell Power
 DL Code Channel |  Serving Cell Primary Scrambling Code:      0      |
 Info Screen     |  Secondary Serving Cell Primary Scrambling Code:  2 | -75.00
              | Channel | Serving Cell DL Chan Info | Sec Cell DL Chan Info | dBm/3.84 MHz
              |         |    Level (dB)      Chan |    Level (dB)      Chan |
 Generated Power | Channel | Current Desired OVSF Code | Current Desired OVSF Code | Channel Type
 Info Screen     | CPICH:    Off  -3.30 256    0 | Off    Off 256    0 | 12.2k + HSDPA
              | P-CCPCH/                          |                     |
              | SCH:      Off  -5.30 256    1 | Off    Off 256    1 | Paging Service
 OCNS         | S-CCPCH:  Off -10.30  64    2 |                     | RB Test Mode
 Info Screen  | PICH:     Off  -8.30 256    2 | Off    Off 256    2 |
              | AICH:     Off  -9.90 256    3 |                     |
              | (F-)DPCH: Off    Off 128    7 |                     |
 DC-HSDPA DL  | E-AGCH:   Off    Off 256   42 |                     | HSPA
 Code Chan Info | E-HICH:  Off    Off 128   22 |                     | Parameters
              | E-RGCH:   Off    Off 128   22 |                     |
              | HS-SCCH 1: Off   Off 128    2 | Off    Off 128    2 |
              | HS-SCCH 2: Off   Off 128    3 | Off    Off 128    3 | 34.121 Preset
              | HS-SCCH 3:                     |                     | Call Configs
              | HS-SCCH 4:                     |                     |
 Return       | HS-PDSCHs: Off   Off  16 1-15 | Off    Off  16 1-15 | Channel
              | Comp OCNS: Off    Off 128 WCDMA| Off   Off 128 HSDPA| (UARFCN) Parms
              |_____|
              |       | Cell Off            | Sys Type: UTRA FDD |
              |       |                     | Logging: No Conn   |
              | DBUS-INT |      IntRef Offset |                   | 1 of 3
```

4. Configure DC-HSDPA parameters to achieve the Maximum Downlink Data Rate:
First of all, you must know the maximum data rate of the device under test according to its category and the key factors to achieve the maximum date rate. In this lab, you use a category 24 device whose maximum data rate is 42 Mbps when DC-HSDPA is configured.
a) Set up the HSDPA RB Test Mode Parameters

*Path: Call Parms 1 of 3 -> HSPA Parameters (**F10**) -> HSDPA Parameters (**F10**) -> HSDPA RB Test Mode Setup (**F8**) -> HSDPA RB Test Mode Settings (**F8**).*

- **RB Test HS-DSCH Configuration Type** = **User Defined**

- **RB Test User Defined HS-DSCH MAC entity** = **MAC-ehs** (Note 1)

- **RB Test User Defined HARQ Processes** = **6** (Note 2)

- **RB Test User Defined UE IR Buffer Allocation** = **Implicit**

- **RB Test User Defined DC-HSDPA State** = **On**

- **RB Test Mode DC-HSDPA DPCH Loopback State** = **On**

Note 1: DC-HSDPA requires MAC-ehs. You must set the MAC entity to MAC-ehs before setting the DC-HSDPA state)
Note 2: To restrict the amount of soft memory that can be allocated to a single HARQ process (and thus limit the amount of data that has to be transferred across the UE"s internal data buses) the specifications require that when setting up a DC-HSDPA call with the implicit HARQ memory partitioning the network must configure 6, 7, or 8 HARQ processes per cell. For the explicit HARQ memory partitioning case, the number of HARQ processes can be 1 through 8, but the memory size for each HARQ process cannot be greater than the number of soft channel bits for an implicit memory partitioning with 6 processes per HS-DSCH channel.
b) Set up the Serving Cell Parameters

Path: **F10**
- **RB Test User Defined 64QAM State** =**On**

- **RB Test User Defined Active HS-PDSCHs** =**15**

- **RB Test User Def Transport Block Size Index** =**62**

- **RB Test User Defined Modulation Type** =**64QAM**

- **RB Test User Defined Inter-TTI Interval** =**1**

UL Verification Services Ltd.   Report. No.: 1.0
This report shall not be reproduced except in full, without the written approval of UL Verification Services Ltd.

c) Set up the Secondary Serving Cell Parameters
Path: **F11**

- **RB Test User Def Secondary Cell 64QAM State** =**On**

- **RBTM User Def Sec Cell Active HS-PDSCHs** = **15**

- **RBTM User Def Sec Cell TB Size Index** = **62**

- **RBTM User Def Sec Cell Modulation Type** =**64QAM**

- **RBTM User Def Sec Cell Inter-TTI Interval** = **1**

d) Set the **Secondary Serving Cell Power (dBm/3.84 MHz)** to **-25 dBm/3.84 MHz**

Path: Return (F12) -> HSDPA Parms 2 of 2 -> Secondary Serv Cell Parms (F10)
e) Set the **Cell power** to **-25 dBm/3.84 MHz**

Path: CALL SETUP -> F7
f) Set the HSDPA Conn DL Channel Levels

Path: CALL SETUP -> Call Control 2 of 6 -> Generator Info (F3) ->Downlink Channel Levels (F3) -> Connected DL Channel Levels (F3) -> F3

- **HSDPA Cell 1 Connected CPICH Level** = **-8**

- **HSDPA Cell 1 Connected P-CCPCH/SCH Level** = **-20**

- **HSDPA Cell 1 Connected PICH Level** = **off**

- **HSDPA Cell 1 Connected DPCH Level** = **-30**

- **HSDPA Cell 1 Connected HS-PDSCH Level (Sum)** = **-1 dBm**

- **HSDPA Cell 1 Connected HS-SCCH 1 to 4 Level** = **-20,-20,off,off**

- **Secondary Cell HSDPA Conn CPICH Level** = **-8**

- **Secondary Cell HSDPA Conn PCCPCH/SCH Level** = **-20**

- **Secondary Cell HSDPA Conn PICH Level** = **off**

- **Secondary Cell HSDPA Conn HS-PDSCHs Lvl (Sum)** = **-1 dBm**

- **Secondary Cell HSDPA Conn HS-SCCH 1 to 4 Level** = **-20,-20,off,off**

5. Set the **Operating Mode** (**F1**) to **Active Cell**.

A.9.1.2. Power on the UE and Set up the Connection

Power on the device, and then wait for it to camp on 8960. You should be able to see the following screen.

```
                         Call Setup Screen
Call Control │      Active Cell Operating Mode      │  Call Parms
Operating Mode│┌──────────── UE Information ────────┐│Cell Power
  Active Cell ││ IMSI:      001012345678901│Power Class:        4││   -25.00
             ││ IMEI(SU):352358040214948(--)│Detected PRACH Sig:  0││ dBm/3.84 MHz
             ││────── Called Party Number: ───────││Channel Type
             ││                                    ││ 12.2k + HSDPA
             ││── UE Expected Open Loop Transmit Power ──││
             ││ Init PRACH TX Pow: -60.00 dBm │ Init DPCCH TX Pow: -11.55 dBm ││Paging Service
  Originate  ││────── Current Service Type ───────││ RB Test Mode
    Call     ││              None                  ││
             ││───── Call Processing Status ──────││
  Paging     ││ RRC State:          Idle │ Soft Handover State:   Off ││   HSPA
 Parameters ▽││ MM Status:          None │ Compressed Mode State: Off ││ Parameters
             ││ GMM State:      Attached │ Cur DPCH Offset:   0 chips ││
 Handovers   ││┌── HSUPA Information ──┐┌── HSDPA Information ──┐││ 34.121 Preset
             ││ Rep EDCH Cat/Ext:  6/Unrep│Cur UE HS-DSCH Cat:    24 ││ Call Configs ▽
             ││ Last Happy Bit:    None │Block Error Ratio:  ---- % ││
   Clear     ││ Throughput:    ---- kbps│Throughput:     ---- kbps ││  Channel
  UE Info    ││ ACKs Transmitted:  ----│Blocks Transmitted:  ---- ││(UARFCN) Parms
             │┌────────┬Active Cell│Sys Type: UTRA FDD──┐│
             ││        │  Idle     │Logging: No Conn    ││
  1 of 6     ││ DBUS-INT││IntRef│Offset│         │    1 of 3
```

The UE reports HSDPA categories to 8960, which represents its maximum data rate capability. DC-HSDPA requires UE categories 21 to 24.

The GMM state must be **Attached**, otherwise you cannot establish a HSDPA connection.

2. Originate the Connection

a) Now, Originate an RB Test call with DC-HSDPA by pressing „**F3**" from the main Call Setup screen.

b) After a connection is set up, you will be able to see the throughput from the HSDPA Information window. Press the **Measurement Reset** key to reset the calculation.

```
                         Call Setup Screen
Call Control │      Active Cell Operating Mode      │  Call Parms
Operating Mode│┌──────────── UE Information ────────┐│Cell Power
  Active Cell ││ IMSI:      001012345678901│Power Class:        4││   -25.00
             ││ IMEI(SU):352358040214948(--)│Detected PRACH Sig:  0││ dBm/3.84 MHz
             ││────── Called Party Number: ───────││Channel Type
             ││── UE Expected Open Loop Transmit Power ──││ 12.2k + HSDPA
             ││ Init PRACH TX Pow: -60.00 dBm │ Init DPCCH TX Pow: -11.55 dBm ││
   End       ││────── Current Service Type ───────││Paging Service
   Call      ││        RB Test Mode - HSDPA        ││ RB Test Mode
             ││───── Call Processing Status ──────││
  Paging     ││ RRC State:      CELL_DCH │ Soft Handover State:   Off ││   HSPA
 Parameters ▽││ MM Status:          None │ Compressed Mode State: Off ││ Parameters
             ││ GMM State:      Attached │ Cur DPCH Offset:   0 chips ││
 Handovers   ││┌── HSUPA Information ──┐┌── HSDPA Information ──┐││ 34.121 Preset
             ││ Rep EDCH Cat/Ext:  6/Unrep│Cur UE HS-DSCH Cat:    24 ││ Call Configs ▽
             ││ Last Happy Bit:    None │Block Error Ratio:   0 % ││
   Clear     ││ Throughput:    ---- kbps│Throughput:    42101 kbps ││  Channel
  UE Info    ││ ACKs Transmitted:  ----│Blocks Transmitted:  115500 ││(UARFCN) Parms
             │┌────────┬Active Cell│Sys Type: UTRA FDD──┐│
             ││        │ Connected │Logging: No Conn    ││
  1 of 6     ││ DBUS-INT││IntRef│Offset│         │    1 of 3
```

Now you can also check the connected DC-HSDPA downlink channel levels.

*Path: CALL SETUP->Call Control 2 of 6 -> Generator Info (**F3**) -> Additional Gen Info Screens (**F1**) ->DC-HSDPA DL Code Chan Info (**F4**).*

```
                             Call Setup Screen
 Screen Ctrl    |    DC-HSDPA DL Code Channel Information    |  Call Parms
                                                                Cell Power
 DL Code Channel   Serving Cell Primary Scrambling Code:    0    -25.00
   Info Screen     Secondary Serving Cell Primary Scrambling Code:  2
                   Channel | Serving Cell DL Chan Info | Sec Cell DL Chan Info  dBm/3.84 MHz
                             Level (dB)         Chan    Level (dB)        Chan  Channel Type
 Generated Power   Channel  Current Desired OVSF Code  Current Desired OVSF Code  12.2k + HSDPA
   Info Screen     CPICH:    -8.00  -8.00  256     0    -8.00  -8.00 256    0
                   P-CCPCH/
                   SCH:     -20.00 -20.00  256     1   -20.00 -20.00 256    1  Paging Service
   OCNS            S-CCPCH:    Off    Off   64     2                            RB Test Mode
 Info Screen       PICH:       Off    Off  256     2      Off    Off 256    2
                   AICH:
                   (F-)DPCH: -30.00 -30.00  128     7
 DC-HSDPA DL       E-AGCH:     Off    Off  256    42                               HSPA
 Code Chan Info    E-HICH:     Off    Off  128    22                            Parameters
                   E-RGCH:     Off    Off  128    22
                   HS-SCCH 1:-20.00 -20.00 128     2   -20.00 -20.00 128    2   34.121 Preset
                   HS-SCCH 2:-20.00 -20.00 128     3   -20.00 -20.00 128    3   Call Configs ▽
                   HS-SCCH 3:
                   HS-SCCH 4:
   Return          HS-PDSCHs: -1.00  -1.00   16  1-15   -1.00  -1.00  16 1-15    Channel
                   Comp OCNS:-17.91 -17.91  128 HSDPA  -17.65 -17.65 128 HSDPA  (UARFCN) Parms

                    |Active Cell      |Sys Type: UTRA FDD
                    |Connected        |Logging: No Conn
                   DBUS-INT | IntRef|Offset|                      1 of 3
```

A.9.2. Activate/ Deactivate the Secondary Serving Cell

Once a DC-HSDPA connection is established, 8960 can control the UE to start or stop monitoring the secondary serving cell using HS-SCCH orders. The HS-SCCH orders can be sent on either the serving or secondary serving cell.

A.9.2.1 Deactivate the Secondary Serving Cell

1. Setup the Deactivate Secondary Cell Parameter

*Path: CALL SETUP->Call Control 6 of 6 -> HS-SCCH Order (**F3**) -> Deactivate Secondary Cell (**F2**)*
In this lab you set it to deactivate the secondary serving cell from the serving cell.
- **Deactivate Secondary Cell HS-SCCH Order From** = **Serving Cell**

Press **Send Deactivate Secondary Cell** (**F5**)
Press Measurement Reset key and see the throughput has dropped to 21 Mbps or so, like the figure below:

UL Verification Services Ltd.   Report. No.: 1.0
This report shall not be reproduced except in full, without the written approval of UL Verification Services Ltd.

```
                          Call Setup Screen
 Call Control │        Active Cell Operating Mode        │   Call Parms
 Operating Mode│              UE Information               │ Cell Power
  Active Cell  │ IMSI:        001012345678901│Power Class:      4│   -25.00
              │ IMEI(SV):352358040214948(--)│Detected PRACH Sig:  0│ dBm/3.84 MHz
              │         Called Party Number:             │ Channel Type
              │                                          │ 12.2k + HSDPA
              │      UE Expected Open Loop Transmit Power │
              │ Init PRACH TX Pow: -60.00 dBm│Init DPCCH TX Pow: -11.55 dBm│
     End      │           Current Service Type            │ Paging Service
    Call      │            RB Test Mode - HSDPA           │  RB Test Mode
              │           Call Processing Status          │
   Paging     │ RRC State:        CELL_DCH│Soft Handover State:    Off│    HSPA
 Parameters ▽ │ MM Status:           None│Compressed Mode State:  Off│ Parameters
              │ GMM State:       Attached│Cur DPCH Offset:   0 chips│
  Handovers   │  HSUPA Information  │  HSDPA Information  │ 34.121 Preset
              │ Rep EDCH Cat/Ext:  6/Unrep│Cur UE HS-DSCH Cat:  24│ Call Configs ▽
              │ Last Happy Bit:  None│Block Error Ratio:  0 %│
   Clear      │ Throughput:  ---- kbps│Throughput:  21088 kbps│  Channel
  UE Info     │ ACKs Transmitted:  ----│Blocks Transmitted: 35000│ (UARFCN) Parms
              │        │Active Cell │Sys Type: UTRA FDD│
              │        │ Connected  │Logging: No Conn │
   1 of 6     │ DBUS-INT │IntRef│Offset│              │   1 of 3
```

You can see more on the DC-HSDPA Information screen.
Path: *CALL SETUP->Call Control 2 of 6 -> Additional Screens (F1) -> HSDPA Information (F4) -> DC-HSDPA Information (F4).*

```
                          Call Setup Screen
 Screen Ctrl  │          DC-HSDPA Information             │   Call Parms
              │       Secondary Serving Cell Status       │ Cell Power
   Channel    │ Current Secondary Serving Cell Status:   Configured-Inactive│  -25.00
 (UARFCN) Info│                                          │ dBm/3.84 MHz
              │            DC-HSDPA Information            │ Channel Type
    HSPA      │                          Secondary        │ 12.2k + HSDPA
 Information   │        Summary  Serving Cell Serving Cell │
              │ Block Error Ratio:   0 %    0 %    ---- %  │ Paging Service
E-TFCI Recording│ Throughput (kbps):  21082  21082     0   │  RB Test Mode
 Information   │ Blocks Transmitted:  66000  66000     0   │
              │ ACKs Received:       65958  65958     0   │
    HSDPA     │ NACKs Received:        42     42      0   │    HSPA
 Information   │ statDTXs Received:      0      0      0   │ Parameters
              │ Count of Rep CQI Lim:  ----   ----   ---- │
    Clear     │ Last Received CQI:            30     30   │ 34.121 Preset
  UE Info     │ Max Allowed CQI:            ----   ----   │ Call Configs ▽
              │ Test Mode User Def TBS:    42192  42192   │
    Return    │ PS Data User Def TBS:       7298   7298   │  Channel
              │ Last Sig Meas Pwr Offs (dB):  6.0    6.0  │ (UARFCN) Parms
              │        │Active Cell │Sys Type: UTRA FDD│
              │        │ Connected  │Logging: No Conn │
   1 of 2     │ DBUS-INT │IntRef│Offset│              │   1 of 3
```

A.9.2.2 Re-activate the Secondary Serving Cell

Now you can activate the secondary serving cell by pressing back to the HS-SCCH Order menu.
Path: CALL SETUP->Call Control 6 of 6 -> HS-SCCH Order (F3)
Press **Send Activate Secondary Cell** (**F1**).
Press the Measurement Reset key and see the throughput has increased to 42 Mbps. When you look at the DC-HSDPA Information screen, you can see the secondary serving cell is set up again.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Ltd.

```
                              Call Setup Screen
 Screen Ctrl          DC-HSDPA Information                      Call Parms
                                                              Cell Power
    Channel          Secondary Serving Cell Status               -25.00
  (UARFCN) Info   Current Secondary Serving Cell Status:  Configured-Active
                                                              dBm/3.84 MHz

                                                              Channel Type
    HSPA              DC-HSDPA Information                     12.2k + HSDPA
  Information                                    Secondary
                                 Summary   Serving Cell Serving Cell
                  Block Error Ratio:       0 %      0 %        0 %     Paging Service
 E-TFCI Recording Throughput (kbps):     41996    21064      20941     RB Test Mode
  Information      Blocks Transmitted:    11000     6000       6000
                  ACKs Received:          10949     5991       5956
                  NACKs Received:            51        9         44
    HSDPA         statDTXs Received:          0        0          0     HSPA
  Information      Count of Rep CQI Lim:   ----     ----       ----    Parameters
                  Last Received CQI:                  30         30
    Clear         Max Allowed CQI:                  ----       ----   34.121 Preset
   UE Info        Test Mode User Def TBS:           42192      42192   Call Configs
                  PS Data User Def TBS:              7298       7298
                  Last Sig Meas Pwr Offs (dB):       6.0        6.0
    Return                                                             Channel
                                                                     (UARFCN) Parms

                   |        |Active Cell   |Sys Type: UTRA FDD|
                   |        | Connected    |Logging: No Conn  |
    1 of 2         | DBUS-INT| |IntRef||Offset|  |    |    |          1 of 3
```

When DC-HSDPA is active, the HBLER measurement can also be used to perform receiver testing. 3GPP TS 34.121-1 sections 6.3C and 6.3D are supported and can be set up and tested as described in an appendix in another document, DC-HSDPA User Guide.