

## Appendix 5. System Check

Prior to the assessment, the system was verified in the flat region of the phantom, 900 MHz, 1800 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, 1800 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  $\pm 5\%$  for the 900MHz, 1800MHz, 1900MHz, 2450 MHz and 5.0 GHz dipoles.

The applicable verification normalised to 1 Watt.

### System Check 900 Head

Date: 17/06/2013

Validation Dipole and Serial Number: D900V2; SN: 035

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Head     | 900             | 23.0 °C   | 21.6 °C     | $\epsilon_r$ | 41.50        | 40.95          | -1.33         | 5.00      |
|          |                 |           |             | $\sigma$     | 0.97         | 0.95           | -1.80         | 5.00      |
|          |                 |           |             | 1g SAR       | 10.50        | 10.16          | -3.24         | 5.00      |
|          |                 |           |             | 10g SAR      | 6.74         | 6.60           | -2.08         | 5.00      |

Date: 21/06/2013

Validation Dipole and Serial Number: D900V2; SN: 035

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Head     | 900             | 23.0 °C   | 21.8 °C     | $\epsilon_r$ | 41.50        | 41.20          | -0.72         | 5.00      |
|          |                 |           |             | $\sigma$     | 0.97         | 0.98           | 1.03          | 5.00      |
|          |                 |           |             | 1g SAR       | 10.50        | 10.72          | 2.10          | 5.00      |
|          |                 |           |             | 10g SAR      | 6.74         | 6.96           | 3.26          | 5.00      |

Date: 24/06/2013

Validation Dipole and Serial Number: D900V2; SN: 035

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Head     | 900             | 23.0 °C   | 22.5 °C     | $\epsilon_r$ | 41.50        | 40.40          | -2.65         | 5.00      |
|          |                 |           |             | $\sigma$     | 0.97         | 0.97           | -0.36         | 5.00      |
|          |                 |           |             | 1g SAR       | 10.50        | 10.80          | 2.86          | 5.00      |
|          |                 |           |             | 10g SAR      | 6.74         | 7.04           | 4.45          | 5.00      |

**System Check 900 Head (Continued):****Date: 25/06/2013****Validation Dipole and Serial Number: D900V2; SN: 035**

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters     | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|----------------|--------------|----------------|---------------|-----------|
| Head     | 900             | 23.0°C    | 22.5°C      | $\epsilon_r$   | 41.50        | 40.40          | -2.65         | 5.00      |
|          |                 |           |             | $\sigma$       | 0.97         | 0.97           | -0.36         | 5.00      |
|          |                 |           |             | <b>1g SAR</b>  | 10.50        | 10.52          | 0.19          | 5.00      |
|          |                 |           |             | <b>10g SAR</b> | 6.74         | 6.84           | -1.48         | 5.00      |

**System Check 900 Body**

**Date: 18/06/2013**

**Validation Dipole and Serial Number: D900V2; SN: 035**

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Body     | 900             | 23.0°C    | 21.5°C      | $\epsilon_r$ | 55.00        | 53.46          | -2.80         | 5.00      |
|          |                 |           |             | $\sigma$     | 1.05         | 1.04           | -1.33         | 5.00      |
|          |                 |           |             | 1g SAR       | 10.80        | 10.68          | -1.11         | 5.00      |
|          |                 |           |             | 10g SAR      | 6.96         | 7.04           | 1.15          | 5.00      |

**Date: 18/06/2013**

**Validation Dipole and Serial Number: D900V2; SN: 035**

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Body     | 900             | 23.0°C    | 21.7°C      | $\epsilon_r$ | 55.00        | 53.75          | -2.27         | 5.00      |
|          |                 |           |             | $\sigma$     | 1.05         | 1.04           | -1.43         | 5.00      |
|          |                 |           |             | 1g SAR       | 10.80        | 11.04          | 2.22          | 5.00      |
|          |                 |           |             | 10g SAR      | 6.96         | 7.20           | 3.45          | 5.00      |

**Date: 19/06/2013**

**Validation Dipole and Serial Number: D900V2; SN: 035**

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Body     | 900             | 23.0 °C   | 21.5 °C     | $\epsilon_r$ | 55.00        | 53.46          | -2.80         | 5.00      |
|          |                 |           |             | $\sigma$     | 1.05         | 1.04           | -1.33         | 5.00      |
|          |                 |           |             | 1g SAR       | 10.80        | 10.44          | -3.33         | 5.00      |
|          |                 |           |             | 10g SAR      | 6.96         | 6.84           | -1.72         | 5.00      |

**Date: 26/06/2013**

**Validation Dipole and Serial Number: D900V2; SN: 035**

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Body     | 900             | 24.0°C    | 22.0 °C     | $\epsilon_r$ | 55.00        | 53.80          | -2.18         | 5.00      |
|          |                 |           |             | $\sigma$     | 1.05         | 1.04           | -1.10         | 5.00      |
|          |                 |           |             | 1g SAR       | 10.80        | 10.68          | -1.11         | 5.00      |
|          |                 |           |             | 10g SAR      | 6.96         | 7.00           | 0.57          | 5.00      |

**System Check 1800 Head**

**Date: 19/06/2013**

**Validation Dipole and Serial Number: D1800V2; SN: 264**

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters     | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|----------------|--------------|----------------|---------------|-----------|
| Head     | 1800            | 23.0°C    | 22.2°C      | $\epsilon_r$   | 40.00        | 38.61          | -3.48         | 5.00      |
|          |                 |           |             | $\sigma$       | 1.40         | 1.41           | 0.57          | 5.00      |
|          |                 |           |             | <b>1g SAR</b>  | 37.20        | 35.52          | -4.52         | 5.00      |
|          |                 |           |             | <b>10g SAR</b> | 19.60        | 19.00          | -3.06         | 5.00      |

**Date: 20/06/2013**

**Validation Dipole and Serial Number: D1800V2; SN: 264**

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters     | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|----------------|--------------|----------------|---------------|-----------|
| Head     | 1800            | 23.0°C    | 22.2°C      | $\epsilon_r$   | 40.00        | 39.18          | -2.05         | 5.00      |
|          |                 |           |             | $\sigma$       | 1.40         | 1.44           | 2.79          | 5.00      |
|          |                 |           |             | <b>1g SAR</b>  | 37.20        | 37.60          | -1.08         | 5.00      |
|          |                 |           |             | <b>10g SAR</b> | 19.60        | 19.72          | 0.61          | 5.00      |

**System Check 1800 Body****Date: 17/06/2013****Validation Dipole and Serial Number: D1800V2; SN: 264**

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Body     | 1800            | 23.0 °C   | 22.2 °C     | $\epsilon_r$ | 53.30        | 51.84          | -2.74         | 5.00      |
|          |                 |           |             | $\sigma$     | 1.52         | 1.56           | 2.70          | 5.00      |
|          |                 |           |             | 1g SAR       | 37.80        | 37.32          | -1.27         | 5.00      |
|          |                 |           |             | 10g SAR      | 20.10        | 20.16          | 0.30          | 5.00      |

**Date: 18/06/2013****Validation Dipole and Serial Number: D1800V2; SN: 264**

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Body     | 1800            | 23.0 °C   | 22.2 °C     | $\epsilon_r$ | 53.30        | 51.84          | -2.74         | 5.00      |
|          |                 |           |             | $\sigma$     | 1.52         | 1.56           | 2.70          | 5.00      |
|          |                 |           |             | 1g SAR       | 37.80        | 37.04          | -2.01         | 5.00      |
|          |                 |           |             | 10g SAR      | 20.10        | 19.92          | -0.90         | 5.00      |

**Date: 19/06/2013****Validation Dipole and Serial Number: D1800V2; SN: 264**

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Body     | 1800            | 23.0 °C   | 23.7 °C     | $\epsilon_r$ | 53.30        | 52.61          | -1.29         | 5.00      |
|          |                 |           |             | $\sigma$     | 1.52         | 1.49           | -1.71         | 5.00      |
|          |                 |           |             | 1g SAR       | 37.80        | 37.96          | 0.42          | 5.00      |
|          |                 |           |             | 10g SAR      | 20.10        | 20.40          | 1.49          | 5.00      |

**System Check 1900 Head****Date: 20/06/2013****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°C    | 23.0°C      | $\epsilon_r$ | 40.00        | 38.50          | -3.75         | 5.00      |
|          |                 |           |             | $\sigma$     | 1.40         | 1.45           | 3.60          | 5.00      |
|          |                 |           |             | 1g SAR       | 39.40        | 39.72          | 0.81          | 5.00      |
|          |                 |           |             | 10g SAR      | 20.70        | 20.84          | 0.68          | 5.00      |

**Date: 20/06/2013****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°C    | 23.0°C      | $\epsilon_r$ | 40.00        | 39.36          | -1.60         | 5.00      |
|          |                 |           |             | $\sigma$     | 1.40         | 1.45           | 3.22          | 5.00      |
|          |                 |           |             | 1g SAR       | 39.40        | 40.80          | 3.55          | 5.00      |
|          |                 |           |             | 10g SAR      | 20.70        | 20.60          | -0.48         | 5.00      |

**Date: 21/06/2013****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°C    | 23.0°C      | $\epsilon_r$ | 40.00        | 38.50          | -3.75         | 5.00      |
|          |                 |           |             | $\sigma$     | 1.40         | 1.45           | 3.60          | 5.00      |
|          |                 |           |             | 1g SAR       | 39.40        | 39.56          | 0.41          | 5.00      |
|          |                 |           |             | 10g SAR      | 20.70        | 20.80          | 0.48          | 5.00      |

**Date: 24/06/2013****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 °C   | 23.0 °C     | $\epsilon_r$ | 40.00        | 38.82          | -2.95         | 5.00      |
|          |                 |           |             | $\sigma$     | 1.40         | 1.41           | 0.43          | 5.00      |
|          |                 |           |             | 1g SAR       | 39.40        | 38.80          | -1.52         | 5.00      |
|          |                 |           |             | 10g SAR      | 20.70        | 20.80          | 0.48          | 5.00      |

**System Check 1900 Body****Date: 20/06/2013****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 °C   | 22.5 °C     | $\epsilon_r$ | 53.30        | 54.13          | 1.56          | 5.00      |
|          |                 |           |             | $\sigma$     | 1.52         | 1.53           | 0.63          | 5.00      |
|          |                 |           |             | 1g SAR       | 40.50        | 39.28          | -3.01         | 5.00      |
|          |                 |           |             | 10g SAR      | 21.40        | 21.04          | -1.68         | 5.00      |

**Date: 21/06/2013****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 °C   | 22.5 °C     | $\epsilon_r$ | 53.30        | 54.13          | 1.56          | 5.00      |
|          |                 |           |             | $\sigma$     | 1.52         | 1.53           | 0.63          | 5.00      |
|          |                 |           |             | 1g SAR       | 40.50        | 39.40          | -2.72         | 5.00      |
|          |                 |           |             | 10g SAR      | 21.40        | 21.16          | -1.12         | 5.00      |

**Date: 21/06/2013****Validation Dipole and Serial Number: D1900V2; SN: 537**

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Body     | 1900            | 24.0 °C   | 23.5 °C     | $\epsilon_r$ | 53.30        | 52.17          | -2.12         | 5.00      |
|          |                 |           |             | $\sigma$     | 1.52         | 1.57           | 3.33          | 5.00      |
|          |                 |           |             | 1g SAR       | 40.50        | 40.00          | -1.23         | 5.00      |
|          |                 |           |             | 10g SAR      | 21.40        | 21.08          | -1.50         | 5.00      |

**Date: 22/06/2013****Validation Dipole and Serial Number: D1900V2; SN: 537**

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Body     | 1900            | 24.0 °C   | 23.5 °C     | $\epsilon_r$ | 53.30        | 52.17          | -2.12         | 5.00      |
|          |                 |           |             | $\sigma$     | 1.52         | 1.57           | 3.33          | 5.00      |
|          |                 |           |             | 1g SAR       | 40.50        | 40.00          | -1.23         | 5.00      |
|          |                 |           |             | 10g SAR      | 21.40        | 21.16          | -1.12         | 5.00      |

**System Check 1900 Body (Continued):****Date: 24/06/2013****Validation Dipole and Serial Number: D1900V2; SN: 537**

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Body     | 1900            | 24.0 °C   | 23.8 °C     | $\epsilon_r$ | 53.30        | 50.90          | -4.50         | 5.00      |
|          |                 |           |             | $\sigma$     | 1.52         | 1.57           | 3.33          | 5.00      |
|          |                 |           |             | 1g SAR       | 40.50        | 38.72          | -4.40         | 5.00      |
|          |                 |           |             | 10g SAR      | 21.40        | 20.56          | -3.93         | 5.00      |

**System Check 2450 Head****Date: 17/06/2013****Validation Dipole and Serial Number: D2440V2; SN: 701**

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Head     | 2450            | 24.0 °C   | 24.0 °C     | $\epsilon_r$ | 39.20        | 40.06          | 2.19          | 5.00      |
|          |                 |           |             | $\sigma$     | 1.80         | 1.85           | 2.54          | 5.00      |
|          |                 |           |             | 1g SAR       | 52.30        | 50.80          | -2.87         | 5.00      |
|          |                 |           |             | 10g SAR      | 24.20        | 23.88          | -1.32         | 5.00      |

**Date: 18/06/2013****Validation Dipole and Serial Number: D2440V2; SN: 701**

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Head     | 2450            | 24.0 °C   | 24.0 °C     | $\epsilon_r$ | 39.20        | 40.06          | 2.19          | 5.00      |
|          |                 |           |             | $\sigma$     | 1.80         | 1.85           | 2.54          | 5.00      |
|          |                 |           |             | 1g SAR       | 52.30        | 50.80          | -2.87         | 5.00      |
|          |                 |           |             | 10g SAR      | 24.20        | 23.72          | -1.98         | 5.00      |

**System Check 2450 Body****Date: 18/06/2013****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 °C   | 22.8 °C     | $\epsilon_r$ | 52.70        | 52.55          | -0.28         | 5.00      |
|          |                 |           |             | $\sigma$     | 1.95         | 2.00           | 2.61          | 5.00      |
|          |                 |           |             | 1g SAR       | 52.00        | 52.40          | 0.77          | 5.00      |
|          |                 |           |             | 10g SAR      | 24.10        | 24.00          | -0.41         | 5.00      |

**Date: 19/06/2013****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°C    | 22.8°C      | $\epsilon_r$ | 52.70        | 52.55          | -0.28         | 5.00      |
|          |                 |           |             | $\sigma$     | 1.95         | 2.00           | 2.61          | 5.00      |
|          |                 |           |             | 1g SAR       | 52.00        | 52.80          | 1.54          | 5.00      |
|          |                 |           |             | 10g SAR      | 24.10        | 24.12          | 0.08          | 5.00      |

### System Check 2600 Head

Date: 27/06/2013

Validation Dipole and Serial Number: D26000V2; SN: 1046

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Head     | 2600            | 24.0 °C   | 22.9 °C     | $\epsilon_r$ | 39.00        | 38.96          | -0.10         | 5.00      |
|          |                 |           |             | $\sigma$     | 1.96         | 2.04           | 4.06          | 5.00      |
|          |                 |           |             | 1g SAR       | 58.20        | 60.40          | 3.78          | 5.00      |
|          |                 |           |             | 10g SAR      | 26.20        | 26.48          | 1.07          | 5.00      |

### System Check 2600 Body

Date: 27/06/2013

Validation Dipole and Serial Number: D26000V2; SN: 1046

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Body     | 2600            | 24.0 °C   | 23.5 °C     | $\epsilon_r$ | 52.50        | 52.77          | 0.51          | 5.00      |
|          |                 |           |             | $\sigma$     | 2.16         | 2.18           | 0.71          | 5.00      |
|          |                 |           |             | 1g SAR       | 55.50        | 56.00          | 0.90          | 5.00      |
|          |                 |           |             | 10g SAR      | 25.00        | 24.36          | -2.56         | 5.00      |

### System Check 5200/5500/5800 Head

Date: 20/06/2013

Validation Dipole and Serial Number: D5GHzV2; SN: 1016

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Head     | 5200            | 24.0 °C   | 24.0 °C     | $\epsilon_r$ | 36.00        | 34.81          | -3.31         | 5.00      |
|          |                 |           |             | $\sigma$     | 4.66         | 4.65           | 2.10          | 5.00      |
|          |                 |           |             | 1g SAR       | 78.10        | 75.00          | -3.97         | 5.00      |
|          |                 |           |             | 10g SAR      | 23.00        | 21.90          | -1.79         | 5.00      |

Date: 21/06/2013

Validation Dipole and Serial Number: D5GHzV2; SN: 1016

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Head     | 5200            | 24.0 °C   | 24.0 °C     | $\epsilon_r$ | 36.00        | 34.81          | -3.31         | 5.00      |
|          |                 |           |             | $\sigma$     | 4.66         | 4.65           | 2.10          | 5.00      |
|          |                 |           |             | 1g SAR       | 78.10        | 80.30          | 2.82          | 5.00      |
|          |                 |           |             | 10g SAR      | 23.00        | 23.10          | 3.59          | 5.00      |

Date: 21/06/2013

Validation Dipole and Serial Number: D5GHzV2; SN: 1016

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Head     | 5500            | 24.0 °C   | 24.0 °C     | $\epsilon_r$ | 35.60        | 34.23          | -3.85         | 5.00      |
|          |                 |           |             | $\sigma$     | 4.96         | 5.06           | 2.02          | 5.00      |
|          |                 |           |             | 1g SAR       | 82.50        | 86.20          | 4.48          | 5.00      |
|          |                 |           |             | 10g SAR      | 23.50        | 24.20          | 2.98          | 5.00      |

Date: 21/06/2013

Validation Dipole and Serial Number: D5GHzV2; SN: 1016

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Head     | 5800            | 24.0 °C   | 24.0 °C     | $\epsilon_r$ | 35.30        | 33.77          | -4.33         | 5.00      |
|          |                 |           |             | $\sigma$     | 5.27         | 5.38           | 2.11          | 5.00      |
|          |                 |           |             | 1g SAR       | 77.00        | 80.40          | 4.42          | 5.00      |
|          |                 |           |             | 10g SAR      | 21.90        | 22.60          | 3.20          | 5.00      |

### System Check 5200/5500/5800 Body

Date: 24/06/2013

Validation Dipole and Serial Number: D5GHzV2; SN: 1016

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Body     | 5200            | 24.0 °C   | 24.0 °C     | $\epsilon_r$ | 49.00        | 47.89          | -2.27         | 5.00      |
|          |                 |           |             | $\sigma$     | 5.30         | 5.42           | 2.20          | 5.00      |
|          |                 |           |             | 1g SAR       | 75.10        | 78.00          | 3.86          | 5.00      |
|          |                 |           |             | 10g SAR      | 21.10        | 20.10          | -4.74         | 5.00      |

Date: 25/06/2013

Validation Dipole and Serial Number: D5GHzV2; SN: 1016

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Body     | 5200            | 24.0 °C   | 24.0 °C     | $\epsilon_r$ | 49.00        | 47.89          | -2.27         | 5.00      |
|          |                 |           |             | $\sigma$     | 5.30         | 5.42           | 2.20          | 5.00      |
|          |                 |           |             | 1g SAR       | 75.10        | 74.40          | -0.93         | 5.00      |
|          |                 |           |             | 10g SAR      | 21.10        | 20.50          | -2.84         | 5.00      |

Date: 25/06/2013

Validation Dipole and Serial Number: D5GHzV2; SN: 1016

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Body     | 5500            | 24.0 °C   | 24.0 °C     | $\epsilon_r$ | 48.60        | 47.36          | -2.55         | 5.00      |
|          |                 |           |             | $\sigma$     | 5.65         | 5.80           | 2.59          | 5.00      |
|          |                 |           |             | 1g SAR       | 79.00        | 82.90          | 4.94          | 5.00      |
|          |                 |           |             | 10g SAR      | 22.00        | 21.50          | -2.27         | 5.00      |

Date: 25/06/2013

Validation Dipole and Serial Number: D5GHzV2; SN: 1016

| Simulant | Frequency (MHz) | Room Temp | Liquid Temp | Parameters   | Target Value | Measured Value | Deviation (%) | Limit (%) |
|----------|-----------------|-----------|-------------|--------------|--------------|----------------|---------------|-----------|
| Body     | 5800            | 24.0 °C   | 24.0 °C     | $\epsilon_r$ | 48.20        | 46.86          | -2.78         | 5.00      |
|          |                 |           |             | $\sigma$     | 6.00         | 6.19           | 3.11          | 5.00      |
|          |                 |           |             | 1g SAR       | 74.40        | 72.10          | -3.09         | 5.00      |
|          |                 |           |             | 10g SAR      | 20.60        | 19.80          | -3.88         | 5.00      |

## Appendix 6. 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<br>(% 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<br>(% 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<br>(% by weight) | Frequency 2450/2600 MHz |       |
|-----------------------------|-------------------------|-------|
|                             | Head                    | Body  |
| De-Ionized Water            | 55.75 <sup>(1)</sup>    | 71.70 |
| Polysorbate 20              | 45.25 <sup>(1)</sup>    | 28.00 |
| Salt                        | 0.00                    | 0.30  |

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

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

### Note(s):

- 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 7. DASY4 System Details

### A.7.1. DASY4 SAR Measurement System

UL, SAR measurement facility utilises the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY4 system is comprised of the robot controller, computer, near-field probe, probe alignment sensor, and the SAM phantom containing brain or muscle equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF). A cell controller system contains the power supply, robot controller; teach pendant (Joystick), and remote control. This is used to drive the robot motors. The Staubli robot is connected to the cell controller to allow software manipulation of the robot. The data acquisition electronics (DAE) performs signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection etc. The DAE is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card. The DAE3 utilises 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. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe-mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

#### A.7.2. DASY4 SAR System Specifications

##### Robot System

|                       |                                            |
|-----------------------|--------------------------------------------|
| Positioner:           | Stäubli Unimation Corp. Robot Model: RX90L |
| Repeatability:        | 0.025 mm                                   |
| No. of Axis:          | 6                                          |
| Serial Number:        | F00/SD89A1/A/01                            |
| Reach:                | 1185 mm                                    |
| Payload:              | 3.5 kg                                     |
| Control Unit:         | CS7                                        |
| Programming Language: | V+                                         |

##### Robot System

|                       |                                            |
|-----------------------|--------------------------------------------|
| Positioner:           | Stäubli Unimation Corp. Robot Model: RX90L |
| Repeatability:        | 0.025 mm                                   |
| No. of Axis:          | 6                                          |
| Serial Number:        | F01/5J86A1/A/01                            |
| Reach:                | 1185 mm                                    |
| Payload:              | 3.5 kg                                     |
| Control Unit:         | CS7                                        |
| Programming Language: | V+                                         |

##### Robot System

|                       |                                            |
|-----------------------|--------------------------------------------|
| Positioner:           | Stäubli Unimation Corp. Robot Model: TX60L |
| Repeatability:        | ±0.030 mm                                  |
| No. of Axis:          | 6                                          |
| Serial Number:        | F12/5MZ7A1/A/01                            |
| Reach:                | 920 mm                                     |
| Payload:              | 2.0 kg                                     |
| Control Unit:         | CS8C                                       |
| Programming Language: | V+                                         |

##### Data Acquisition Electronic (DAE) System

|                |             |
|----------------|-------------|
| Serial Number: | DAE3 SN:417 |
| Serial Number: | DAE3 SN:431 |
| Serial Number: | DAE3 SN:450 |

**DASY4 SAR System Specifications (Continued)****PC Controller**

|                          |                          |
|--------------------------|--------------------------|
| <b>PC:</b>               | Dell Precision 340       |
| <b>Operating System:</b> | Windows 2000             |
| <b>Data Card:</b>        | DASY4 Measurement Server |
| <b>Serial Number:</b>    | 1080                     |

**Data Converter**

|                          |                                                                                      |
|--------------------------|--------------------------------------------------------------------------------------|
| <b>Features:</b>         | Signal Amplifier, multiplexer, A/D converted and control logic.                      |
| <b>Software:</b>         | DASY4 Software                                                                       |
| <b>Connecting Lines:</b> | Optical downlink for data and status info.<br>Optical uplink for commands and clock. |

**PC Interface Card**

|                  |                                                                                                                                                                          |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function:</b> | 24 bit (64 MHz) DSP for real time processing Link to DAE3 16 bit A/D converter for surface detection system serial link to robot direct emergency stop output for robot. |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**E-Field Probe**

|                              |                           |
|------------------------------|---------------------------|
| <b>Model:</b>                | EX3DV4                    |
| <b>Serial No:</b>            | 3814                      |
| <b>Construction:</b>         | Triangular core           |
| <b>Frequency:</b>            | 10 MHz to >6 GHz          |
| <b>Linearity:</b>            | ±0.2 dB (30 MHz to 6 GHz) |
| <b>Probe Length (mm):</b>    | 337                       |
| <b>Probe Diameter (mm):</b>  | 10                        |
| <b>Tip Length (mm):</b>      | 9                         |
| <b>Tip Diameter (mm):</b>    | 2.5                       |
| <b>Sensor X Offset (mm):</b> | 1                         |
| <b>Sensor Y Offset (mm):</b> | 1                         |
| <b>Sensor Z Offset (mm):</b> | 1                         |

**E-Field Probe**

|                              |                           |
|------------------------------|---------------------------|
| <b>Model:</b>                | ES3DV3                    |
| <b>Serial No:</b>            | 3304                      |
| <b>Construction:</b>         | Triangular core           |
| <b>Frequency:</b>            | 10 MHz to >4 GHz          |
| <b>Linearity:</b>            | ±0.2 dB (30 MHz to 4 GHz) |
| <b>Probe Length (mm):</b>    | 337                       |
| <b>Probe Diameter (mm):</b>  | 10                        |
| <b>Tip Length (mm):</b>      | 10                        |
| <b>Tip Diameter (mm):</b>    | 4                         |
| <b>Sensor X Offset (mm):</b> | 2                         |
| <b>Sensor Y Offset (mm):</b> | 2                         |
| <b>Sensor Z Offset (mm):</b> | 2                         |

**DASY4 SAR System Specifications (Continued)****E-Field Probe**

|                              |                             |
|------------------------------|-----------------------------|
| <b>Model:</b>                | ET3DV6                      |
| <b>Serial No:</b>            | 1528;1529                   |
| <b>Construction:</b>         | Triangular core             |
| <b>Frequency:</b>            | 10 MHz to 2.55GHz           |
| <b>Linearity:</b>            | ±0.2 dB (30 MHz to 2.55GHz) |
| <b>Probe Length (mm):</b>    | 337                         |
| <b>Probe Diameter (mm):</b>  | 10                          |
| <b>Tip Length (mm):</b>      | 10                          |
| <b>Tip Diameter (mm):</b>    | 6.8                         |
| <b>Sensor X Offset (mm):</b> | 2.7                         |
| <b>Sensor Y Offset (mm):</b> | 2.7                         |
| <b>Sensor Z Offset (mm):</b> | 2.7                         |

**Phantom**

|                        |                          |
|------------------------|--------------------------|
| <b>Phantom:</b>        | SAM Phantom, Eli Phantom |
| <b>Shell Material:</b> | Fibreglass               |
| <b>Thickness:</b>      | 2.0 ±0.1 mm              |

## 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.

| Call Setup Screen   |  |                                                                                                                |  |  |                                                                                                            |                    |  |                              |  |
|---------------------|--|----------------------------------------------------------------------------------------------------------------|--|--|------------------------------------------------------------------------------------------------------------|--------------------|--|------------------------------|--|
| Call Control        |  | Active Cell Operating Mode                                                                                     |  |  |                                                                                                            |                    |  | Call Parms                   |  |
| Operating Mode      |  | UE Information                                                                                                 |  |  |                                                                                                            |                    |  | Cell Power                   |  |
| Active Cell         |  | INSI:<br>INEI(SU): (---)<br>Power Class:                                                                       |  |  |                                                                                                            |                    |  | -35.00                       |  |
|                     |  |                                                                                                                |  |  |                                                                                                            |                    |  | dBm/3.84 MHz                 |  |
|                     |  | UE Expected Open Loop Transmit Power                                                                           |  |  |                                                                                                            |                    |  | Channel Type                 |  |
|                     |  | Initial PRACH TX Power: -60.00 dBm<br>Initial DPCCH TX Power: -11.55 dBm                                       |  |  |                                                                                                            |                    |  | 12.2k RMC                    |  |
| Originate Call      |  | Call Processing Status                                                                                         |  |  |                                                                                                            |                    |  | Paging Service               |  |
|                     |  | Current Service Type: None<br>RIM Status: None<br>GMM State: None<br>Current DPCCH Offset: 0 chips             |  |  |                                                                                                            |                    |  | RB Test Mode                 |  |
| Paging Parameters ▾ |  |                                                                                                                |  |  |                                                                                                            |                    |  | HSPA Parameters              |  |
|                     |  |                                                                                                                |  |  |                                                                                                            |                    |  |                              |  |
| Handovers           |  | HSUPA Information                                                                                              |  |  | HSDPA Information                                                                                          |                    |  | 34,121 Preset Call Configs ▾ |  |
|                     |  | Rep EDCH Cat/Ext: Unrep/Unrep<br>Last received E-TFCI: ----<br>Throughput: ---- kbps<br>Acks Transmitted: ---- |  |  | Cur UE HS-DSCH Cat: ----<br>Block Error Ratio: ---- %<br>Throughput: ---- kbps<br>Blocks Transmitted: ---- |                    |  |                              |  |
| Clear UE Info       |  |                                                                                                                |  |  |                                                                                                            |                    |  | Channel (UARFCN) Parms       |  |
|                     |  |                                                                                                                |  |  |                                                                                                            |                    |  |                              |  |
|                     |  | Active Cell                                                                                                    |  |  |                                                                                                            | Sys Type: UTRA FDD |  |                              |  |
|                     |  | Idle                                                                                                           |  |  |                                                                                                            |                    |  |                              |  |
| 1 of 5              |  | IntRef                                                                                                         |  |  |                                                                                                            |                    |  | 1 of 3                       |  |

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 (UARFCN) 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 Parm               |       |          |   |           |   |          |   |                            |   |                        |      |                       |   |                                                                                                      |  |  |
|                   | <div>UE Information</div> <div> <b>INSI:</b><br/> <b>IMEI(SV):</b> (---)<br/> <b>Power Class:</b> </div>                                                                                                                                                                                                                                                                                                                              |       |  |        |                    |  | HSDPA RB Test Node Setup |       |          |   |           |   |          |   |                            |   |                        |      |                       |   |                                                                                                      |  |  |
|                   | <div>UE Expected Open Loop Transmit Power</div> <div> <b>Initial PRACH TX Power:</b> -60.00 dBm<br/> <b>Initial DPCCH TX Power:</b> -11.55 dBm </div>                                                                                                                                                                                                                                                                                 |       |  |        |                    |  |                          |       |          |   |           |   |          |   |                            |   |                        |      |                       |   |                                                                                                      |  |  |
|                   | <div>HSDPA Uplink Parameters</div> <table border="1"> <thead> <tr> <th></th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>DeltaACK</td> <td>8</td> </tr> <tr> <td>DeltaNACK</td> <td>8</td> </tr> <tr> <td>DeltaCQI</td> <td>8</td> </tr> <tr> <td>Ack-Nack Repetition Factor</td> <td>1</td> </tr> <tr> <td>CQI Feedback Cycle (k)</td> <td>2 ms</td> </tr> <tr> <td>CQI Repetition Factor</td> <td>1</td> </tr> </tbody> </table> |       |  |        |                    |  |                          | Value | DeltaACK | 8 | DeltaNACK | 8 | DeltaCQI | 8 | Ack-Nack Repetition Factor | 1 | CQI Feedback Cycle (k) | 2 ms | CQI Repetition Factor | 1 | <div>UE Category Parameters</div> <div>MAC-(e)hs Parameters</div> <div>HSDPA Uplink Parameters</div> |  |  |
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                       | Value |  |        |                    |  |                          |       |          |   |           |   |          |   |                            |   |                        |      |                       |   |                                                                                                      |  |  |
|                   | DeltaACK                                                                                                                                                                                                                                                                                                                                                                                                                              | 8     |  |        |                    |  |                          |       |          |   |           |   |          |   |                            |   |                        |      |                       |   |                                                                                                      |  |  |
|                   | DeltaNACK                                                                                                                                                                                                                                                                                                                                                                                                                             | 8     |  |        |                    |  |                          |       |          |   |           |   |          |   |                            |   |                        |      |                       |   |                                                                                                      |  |  |
|                   | DeltaCQI                                                                                                                                                                                                                                                                                                                                                                                                                              | 8     |  |        |                    |  |                          |       |          |   |           |   |          |   |                            |   |                        |      |                       |   |                                                                                                      |  |  |
|                   | Ack-Nack Repetition Factor                                                                                                                                                                                                                                                                                                                                                                                                            | 1     |  |        |                    |  |                          |       |          |   |           |   |          |   |                            |   |                        |      |                       |   |                                                                                                      |  |  |
|                   | CQI Feedback Cycle (k)                                                                                                                                                                                                                                                                                                                                                                                                                | 2 ms  |  |        |                    |  |                          |       |          |   |           |   |          |   |                            |   |                        |      |                       |   |                                                                                                      |  |  |
|                   | CQI Repetition Factor                                                                                                                                                                                                                                                                                                                                                                                                                 | 1     |  |        |                    |  |                          |       |          |   |           |   |          |   |                            |   |                        |      |                       |   |                                                                                                      |  |  |
| Close Menu        |                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |  |        |                    |  | Return                   |       |          |   |           |   |          |   |                            |   |                        |      |                       |   |                                                                                                      |  |  |
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |  |        |                    |  |                          |       |          |   |           |   |          |   |                            |   |                        |      |                       |   |                                                                                                      |  |  |
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |  |        |                    |  |                          |       |          |   |           |   |          |   |                            |   |                        |      |                       |   |                                                                                                      |  |  |
|                   | <div>Active Cell</div> <div>Idle</div>                                                                                                                                                                                                                                                                                                                                                                                                |       |  |        | Sys Type: UTRA FDD |  |                          |       |          |   |           |   |          |   |                            |   |                        |      |                       |   |                                                                                                      |  |  |
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |  | IntRef |                    |  |                          |       | 1 of 2   |   |           |   |          |   |                            |   |                        |      |                       |   |                                                                                                      |  |  |

Figure 2: HSDPA Parameters

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 Parm        |  |        |
| Operating Mode    | <div>UE Information</div> <div> <b>INSI:</b><br/> <b>IMEI(SV):</b> (---)<br/> <b>Power Class:</b> </div>                                                                                   |  |  |        |                    |  | DL DTCH Data     |  |        |
| Active Cell       |                                                                                                                                                                                            |  |  |        |                    |  | All Ones         |  |        |
| Originate Call    | <div>UE Expected Open Loop Transmit Power</div> <div> <b>Initial PRACH TX Power:</b> -60.00 dBm<br/> <b>Initial DPCCH TX Power:</b> -11.55 dBm </div>                                      |  |  |        |                    |  | RLC Reestablish  |  |        |
|                   |                                                                                                                                                                                            |  |  |        |                    |  | Auto             |  |        |
| Paging Parameters | <div>Call Processing Status</div> <div> <b>Current Service Type:</b> None<br/> <b>MM Status:</b> None<br/> <b>GMN State:</b> None<br/> <b>Current DPCCH Offset:</b> 0 chips </div>         |  |  |        |                    |  | Call Limit State |  |        |
|                   |                                                                                                                                                                                            |  |  |        |                    |  | Off              |  |        |
| Handovers         | <div>HSUPA Information</div> <div> <b>Rep EDCH Cat/Ext:</b> Unrep/Unrep<br/> <b>Last received E-TFCI:</b> ----<br/> <b>Throughput:</b> ---- kbps<br/> <b>Acks Transmitted:</b> ---- </div> |  |  |        |                    |  | Call Drop Timer  |  |        |
|                   |                                                                                                                                                                                            |  |  |        |                    |  | On               |  |        |
| Clear UE Info     | <div>HSUPA Information</div> <div> <b>Cur UE HS-DSCH Cat:</b> ----<br/> <b>Block Error Ratio:</b> ---- %<br/> <b>Throughput:</b> ---- kbps<br/> <b>Blocks Transmitted:</b> ---- </div>     |  |  |        |                    |  | SRB Parameters   |  |        |
|                   |                                                                                                                                                                                            |  |  |        |                    |  |                  |  |        |
|                   | <div>Active Cell</div> <div>Idle</div>                                                                                                                                                     |  |  |        | Sys Type: UTRA FDD |  |                  |  |        |
| 1 of 5            |                                                                                                                                                                                            |  |  | IntRef |                    |  |                  |  | 2 of 3 |

Figure 3: DL DTCH Data Parm

| Call Setup Screen |                                                                                                                                                                     |                            |  |  |  |                    |                                              |             |  |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--|--|--|--------------------|----------------------------------------------|-------------|--|
| Call Control      |                                                                                                                                                                     | Active Cell Operating Mode |  |  |  |                    |                                              | Call Params |  |
|                   | <div>UE Information</div> <div>           IMSI:<br/>           IMEI(SV):<br/>           Power Class:         </div>                                                 |                            |  |  |  |                    | <div>UE Target Power</div> <div>-5 dBm</div> |             |  |
|                   | <div>UE Expected Open Loop Transmit Power</div> <div>           Initial PRACH TX Power: -60.00 dBm<br/>           Initial DPCCH TX Power: -11.55 dBm         </div> |                            |  |  |  |                    | <div>UL CL Power Ctrl Parameters</div>       |             |  |
|                   | <div>UL CL Power Ctrl Parameters</div> <div>Value</div>                                                                                                             |                            |  |  |  |                    |                                              |             |  |
|                   | <div>UL CL Power Ctrl Mode</div> <div>All Up bits</div>                                                                                                             |                            |  |  |  |                    | <div>Send Step Up TPC Bit Pattern</div>      |             |  |
|                   | <div>UL CL Power Ctrl Algorithm</div> <div>Two</div>                                                                                                                |                            |  |  |  |                    |                                              |             |  |
|                   | <div>UL CL Power Ctrl Stepsize</div> <div>1 dB</div>                                                                                                                |                            |  |  |  |                    | <div>Send Step Down TPC Bit Pattern</div>    |             |  |
|                   |                                                                                                                                                                     |                            |  |  |  |                    |                                              |             |  |
|                   |                                                                                                                                                                     |                            |  |  |  |                    |                                              |             |  |
|                   |                                                                                                                                                                     |                            |  |  |  |                    | <div>Receiver Control</div>                  |             |  |
|                   |                                                                                                                                                                     |                            |  |  |  |                    |                                              |             |  |
| Close Menu        |                                                                                                                                                                     |                            |  |  |  |                    |                                              |             |  |
|                   |                                                                                                                                                                     | 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 Params |  |
| Additional Screens | <div>UE Information</div> <div>           IMSI:<br/>           IMEI(SV):<br/>           Power Class:         </div> |                            |  |  |  |                    | <div>Cell Power</div> <div>-35.00</div>           |             |  |
|                    |                                                                                                                     |                            |  |  |  |                    | <div>dBm/3.84 MHz</div>                           |             |  |
|                    |                                                                                                                     |                            |  |  |  |                    | <div>Channel Type</div> <div>12.2k RMC</div>      |             |  |
|                    |                                                                                                                     |                            |  |  |  |                    |                                                   |             |  |
|                    |                                                                                                                     |                            |  |  |  |                    | <div>Paging Service</div> <div>RB Test Mode</div> |             |  |
|                    |                                                                                                                     |                            |  |  |  |                    |                                                   |             |  |
|                    |                                                                                                                     |                            |  |  |  |                    |                                                   |             |  |
|                    |                                                                                                                     |                            |  |  |  |                    |                                                   |             |  |
|                    |                                                                                                                     |                            |  |  |  |                    |                                                   |             |  |
|                    |                                                                                                                     |                            |  |  |  |                    |                                                   |             |  |
| Cell Parameters    | <div>Cell Parameters</div> <div>Value</div>                                                                         |                            |  |  |  |                    |                                                   |             |  |
| Generator Info     | <div>BCCH Update Page</div> <div>Inhibit</div>                                                                      |                            |  |  |  |                    | <div>HSPA Parameters</div>                        |             |  |
|                    | <div>PS Domain Information</div> <div>Absent</div>                                                                  |                            |  |  |  |                    |                                                   |             |  |
|                    | <div>MCC (Mobile Country Code)</div> <div>1</div>                                                                   |                            |  |  |  |                    |                                                   |             |  |
|                    | <div>MNC (Mobile Network Code)</div> <div>1</div>                                                                   |                            |  |  |  |                    | <div>34.121 Preset Call Configs</div>             |             |  |
|                    | <div>MNC (Mobile Network Code) Length</div> <div>Auto</div>                                                         |                            |  |  |  |                    |                                                   |             |  |
| Uplink Parameters  | <div>LAC (Local Area Code)</div> <div>1</div>                                                                       |                            |  |  |  |                    |                                                   |             |  |
|                    | <div>RAC (Routing Area Code)</div> <div>1</div>                                                                     |                            |  |  |  |                    |                                                   |             |  |
|                    | <div>Cell Identity</div> <div>1</div>                                                                               |                            |  |  |  |                    | <div>Channel (UARFCN) Params</div>                |             |  |
| UE Rep Meas        |                                                                                                                     |                            |  |  |  |                    |                                                   |             |  |
|                    |                                                                                                                     |                            |  |  |  |                    |                                                   |             |  |
|                    |                                                                                                                     |                            |  |  |  |                    |                                                   |             |  |
| Close Menu         |                                                                                                                     |                            |  |  |  |                    |                                                   |             |  |
|                    |                                                                                                                     |                            |  |  |  |                    |                                                   |             |  |
|                    |                                                                                                                     |                            |  |  |  |                    |                                                   |             |  |
|                    |                                                                                                                     | Active Cell                |  |  |  | Sys Type: UTRA FDD |                                                   |             |  |
|                    |                                                                                                                     | Idle                       |  |  |  |                    |                                                   |             |  |
|                    |                                                                                                                     | IntRef                     |  |  |  |                    |                                                   | 1 of 3      |  |
| 2 of 5             |                                                                                                                     |                            |  |  |  |                    |                                                   |             |  |

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.

| Call Setup Screen  |                                                                          |  |  |  |  |  |                            |  |  |
|--------------------|--------------------------------------------------------------------------|--|--|--|--|--|----------------------------|--|--|
| Call Control       | Active Cell Operating Mode                                               |  |  |  |  |  | Call Params                |  |  |
| Additional Screens | UE Information                                                           |  |  |  |  |  | Cell Power                 |  |  |
|                    | INSI:<br>INEI(SU): (--)<br>Power Class:                                  |  |  |  |  |  | -35.00                     |  |  |
| Cell Parameters    | UE Expected Open Loop Transmit Power                                     |  |  |  |  |  | dBm/3.84 MHz               |  |  |
|                    | Initial PRACH TX Power: -60.00 dBm<br>Initial DPCCH TX Power: -11.55 dBm |  |  |  |  |  | Channel Type               |  |  |
| Generator Info     | Uplink Parameters                                                        |  |  |  |  |  | 12.2k RNC                  |  |  |
|                    | Value                                                                    |  |  |  |  |  | Paging Service             |  |  |
| Uplink Parameters  | PRACH Preambles                                                          |  |  |  |  |  | RB Test Mode               |  |  |
|                    | 64                                                                       |  |  |  |  |  | HSPA Parameters            |  |  |
| UE Rep Meas        | PRACH Ramping Cycles(NMAX)                                               |  |  |  |  |  | 34.121 Preset Call Configs |  |  |
|                    | 2                                                                        |  |  |  |  |  | Channel (UARFCN) Params    |  |  |
| Close Menu         | Available Subchannels (Bit Mask)                                         |  |  |  |  |  | 000000000001               |  |  |
|                    | Uplink DPCH Scrambling Code                                              |  |  |  |  |  | 0                          |  |  |
| Close Menu         | Uplink DPCH Bc/Bd Control                                                |  |  |  |  |  | Auto                       |  |  |
|                    | Manual Uplink DPCH Bc                                                    |  |  |  |  |  | 8                          |  |  |
| Close Menu         | Manual Uplink DPCH Bd                                                    |  |  |  |  |  | 15                         |  |  |
|                    | Maximum Uplink Transmit Power Level                                      |  |  |  |  |  | 24 dBm                     |  |  |
| 2 of 5             | Active Cell                                                              |  |  |  |  |  | Sys Type: UTRA FDD         |  |  |
|                    | Idle                                                                     |  |  |  |  |  | 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 Params                |  |  |
|                   | UE Information                                                           |  |  |  |  |  | Cell Power                 |  |  |
|                   | INSI:<br>INEI(SU): (--)<br>Power Class:                                  |  |  |  |  |  | -35.00                     |  |  |
|                   | UE Expected Open Loop Transmit Power                                     |  |  |  |  |  | dBm/3.84 MHz               |  |  |
|                   | Initial PRACH TX Power: -60.00 dBm<br>Initial DPCCH TX Power: -11.55 dBm |  |  |  |  |  | Channel Type               |  |  |
|                   | RB Test Mode Settings                                                    |  |  |  |  |  | 12.2k RNC                  |  |  |
|                   | Value                                                                    |  |  |  |  |  | Paging Service             |  |  |
|                   | Uplink DTCH RNC CRC Presence                                             |  |  |  |  |  | RB Test Mode               |  |  |
|                   | Present                                                                  |  |  |  |  |  | HSPA Parameters            |  |  |
|                   | Uplink Dummy DCCH Data                                                   |  |  |  |  |  | 34.121 Preset Call Configs |  |  |
|                   | Off                                                                      |  |  |  |  |  | Channel (UARFCN) Params    |  |  |
|                   | UE Loopback Type                                                         |  |  |  |  |  | Type 1                     |  |  |
|                   | Asymmetric RNC Loopback Messaging                                        |  |  |  |  |  | Close/Open                 |  |  |
| Voice Call        | Asymmetric RNC CN Domain                                                 |  |  |  |  |  | CS Domain                  |  |  |
| Close Menu        |                                                                          |  |  |  |  |  |                            |  |  |
|                   |                                                                          |  |  |  |  |  |                            |  |  |
| 3 of 5            | Active Cell                                                              |  |  |  |  |  | Sys Type: UTRA FDD         |  |  |
|                   | Idle                                                                     |  |  |  |  |  | 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 | $\beta_c$            | $\beta_d$            | $B_d$<br>(SF) | $\beta_c/\beta_d$    | $\beta_{hs}^{(1)}$ | SM (dB) <sup>(2)</sup> |
|----------|----------------------|----------------------|---------------|----------------------|--------------------|------------------------|
| 1        | 2/15                 | 15/15                | 64            | 2/15                 | 4/15               | 0.0                    |
| 2        | 12/15 <sup>(3)</sup> | 15/15 <sup>(3)</sup> | 64            | 12/15 <sup>(3)</sup> | 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:  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$

Note 2: CM = 1 for  $\beta_c/\beta_d = 12/15$ ,  $B_{hs}/\beta_c = 24/15$

Note 3: For subtest 2 the  $\beta_c/\beta_d$  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  $\beta_c = 11/15$  and  $\beta_d = 15/15$

**Sub-test 5 Setup for Release 6 HSUPA**

| Sub-test | $\beta_c$            | $\beta_d$            | $B_d$<br>(SF) | $\beta_c/\beta_d$    | $\beta_{hs}^{(1)}$ | $B_{oc}$ | $B_{od}$                                       | $B_{od}$<br>(SF) | $B_{od}$<br>(codes) | CM <sup>(2)</sup><br>(dB) | MPR<br>(dB) | AG <sup>(4)</sup><br>Index | E-TFCI |
|----------|----------------------|----------------------|---------------|----------------------|--------------------|----------|------------------------------------------------|------------------|---------------------|---------------------------|-------------|----------------------------|--------|
| 1        | 11/15 <sup>(3)</sup> | 15/15 <sup>(3)</sup> | 64            | 11/15 <sup>(3)</sup> | 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    | $B_{alt1}$ :<br>47/15<br>$B_{alt2}$ :<br>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 <sup>(4)</sup> | 15/15 <sup>(4)</sup> | 64            | 15/15 <sup>(4)</sup> | 24/15              | 24/15    | 134/15                                         | 4                | 1                   | 1.0                       | 0.0         | 21                         | 81     |

Note 1:  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$

Note 2: CM = 1 for  $\beta_c/\beta_d = 12/15$ ,  $B_{hs}/\beta_c = 24/15$ . 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  $\beta_c/\beta_d$  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  $\beta_c = 10/15$  and  $\beta_d = 15/15$ .

Note 4: For subtest 5 the  $\beta_c/\beta_d$  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  $\beta_c = 14/15$  and  $\beta_d = 15/15$ .

Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 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    | <div> <div>UE Information</div> <div> INSI:<br/> IMEI(SV): (---)<br/> Power Class: </div> </div> <div> <div>UE Expected Open Loop Transmit Power</div> <div> Initial PRACH TX Power: -60.00 dBm<br/> Initial DPCCH TX Power: -11.55 dBm </div> </div> <div> <div>Call Processing Status</div> <div> Current Service Type: None<br/> MM Status: Abs Single Shot AG<br/> GMM State: Index 18: (95/15)^2<br/> Current DPCCH: Index 19: (106/15)^2<br/> Index 20: (119/15)^2<br/> Index 21: (134/15)^2<br/> Index 22: (150/15)^2<br/> Index 23: (168/15)^2 </div> </div> <div> <div>HSUPA Information</div> <div> Rep EDCH Cat: ----<br/> Last received: ----<br/> Throughput: ---- kbps<br/> Acks Transmitted: ---- </div> </div> |  |  |  |  |  |  | AG Mode                         |  |
| Active Cell       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |  |  |  |  |  | Single Shot                     |  |
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |  |  |  |  |  | Single Shot AG                  |  |
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |  |  |  |  |  | 21: (134/15)^2                  |  |
| Originate Call    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |  |  |  |  |  | Send Single Shot Absolute Grant |  |
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |  |  |  |  |  | RB Setup AG                     |  |
| Paging Parameters |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |  |  |  |  |  | 33: 4(134/15)^2                 |  |
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |  |  |  |  |  | AG Pattern Parameters           |  |
| Handovers         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |  |  |  |  |  | Return                          |  |
| Clear UE Info     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |  |  |  |  |  |                                 |  |
|                   | <div> <div>Active Cell</div> <div>Idle</div> </div> <div>Sys Type: UTRA FDD</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |  |  |  |                                 |  |
| 1 of 5            | IntRef                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |  |  |  |  |  | 1 of 2                          |  |

| Call Setup Screen  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |  |  |                            |  |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|----------------------------|--|
| Call Control       | Active Cell Operating Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |  |  |  |  | Call Parms                 |  |
| Additional Screens | <div> <div>UE Information</div> <div> INSI:<br/> IMEI(SV): (---)<br/> Power Class: </div> </div> <div> <div>UE Expected Open Loop Transmit Power</div> <div> Initial PRACH TX Power: -60.00 dBm<br/> Initial DPCCH TX Power: -22.58 dBm </div> </div> <div> <div>Uplink Parameters</div> <div> PRACH Preambles: 64<br/> PRACH Ramping Cycles(MAX): 2<br/> Available Subchannels (Bit Mask): 000000000001<br/> Uplink DPCCH Scrambling Code: 0<br/> Uplink DPCCH Bc/Bd Control: Manual<br/> Manual Uplink DPCCH Bc: 2<br/> Manual Uplink DPCCH Bd: 15<br/> Maximum Uplink Transmit Power Level: 24 dBm </div> </div> |  |  |  |  |  |  | Cell Power                 |  |
| Cell Parameters    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |  |  | -35.00                     |  |
|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |  |  | dBm/3.84 MHz               |  |
| Generator Info     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |  |  | Channel Type               |  |
|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |  |  | 12.2k + HSDPA              |  |
| Uplink Parameters  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |  |  | Paging Service             |  |
|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |  |  | RB Test Mode               |  |
| UE Rep Meas        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |  |  | HSPA Parameters            |  |
|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |  |  | 34.121 Preset Call Configs |  |
| Close Menu         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |  |  | Channel (UARFCN) Parms     |  |
|                    | <div> <div>Cell Off</div> <div>Sys Type: UTRA FDD</div> </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |  |  |  |  |  |                            |  |
| 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.

| Call Setup Screen |                                                                                                                                                                                                                |  |  |  |                                                                                                                                                                                                            |  |  |                                 |  |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|---------------------------------|--|
| Call Control      | Active Cell Operating Mode                                                                                                                                                                                     |  |  |  |                                                                                                                                                                                                            |  |  | Serving Grant                   |  |
| Operating Mode    | <div>UE Information</div> <div>           INSI:<br/>           INEI(SU):<br/>           Power Class:         </div> <div>(--)</div>                                                                            |  |  |  |                                                                                                                                                                                                            |  |  | AG Mode                         |  |
| Active Cell       |                                                                                                                                                                                                                |  |  |  |                                                                                                                                                                                                            |  |  | AG Mode                         |  |
|                   |                                                                                                                                                                                                                |  |  |  |                                                                                                                                                                                                            |  |  | Single Shot                     |  |
|                   |                                                                                                                                                                                                                |  |  |  |                                                                                                                                                                                                            |  |  | Single Shot AG                  |  |
|                   |                                                                                                                                                                                                                |  |  |  |                                                                                                                                                                                                            |  |  | 31: 6(168/15)^2                 |  |
|                   |                                                                                                                                                                                                                |  |  |  |                                                                                                                                                                                                            |  |  |                                 |  |
| Originate Call    | <div>UE Expected Open Loop Transmit Power</div> <div>           Initial PRACH TX Power: -60.00 dBm<br/>           Initial DPCH TX Power: -11.55 dBm         </div>                                             |  |  |  |                                                                                                                                                                                                            |  |  | Send Single Shot Absolute Grant |  |
|                   |                                                                                                                                                                                                                |  |  |  |                                                                                                                                                                                                            |  |  |                                 |  |
| Paging Parameters | <div>Call Processing Status</div> <div>           Current Service Type: None<br/>           MM Status: None<br/>           GMM State: None<br/>           Current DPCH Offset: 0 chips         </div>          |  |  |  |                                                                                                                                                                                                            |  |  | RB Setup AG                     |  |
|                   |                                                                                                                                                                                                                |  |  |  |                                                                                                                                                                                                            |  |  | 37: 6(168/15)^2                 |  |
|                   |                                                                                                                                                                                                                |  |  |  |                                                                                                                                                                                                            |  |  |                                 |  |
| Handovers         | <div>HSUPA Information</div> <div>           Rep EDCH Cat/Ext: Unrep/Unrep<br/>           Last received E-TFCI: ----<br/>           Throughput: ---- kbps<br/>           Acks Transmitted: ----         </div> |  |  |  | <div>HSDPA Information</div> <div>           Cur UE HS-DSCH Cat: ----<br/>           Block Error Ratio: ---- %<br/>           Throughput: ---- kbps<br/>           Blocks Transmitted: ----         </div> |  |  | AG Pattern Parameters           |  |
|                   |                                                                                                                                                                                                                |  |  |  |                                                                                                                                                                                                            |  |  |                                 |  |
| Clear UE Info     |                                                                                                                                                                                                                |  |  |  |                                                                                                                                                                                                            |  |  | Return                          |  |
|                   |                                                                                                                                                                                                                |  |  |  |                                                                                                                                                                                                            |  |  |                                 |  |
|                   |                                                                                                                                                                                                                |  |  |  |                                                                                                                                                                                                            |  |  |                                 |  |
| 1 of 5            |                                                                                                                                                                                                                |  |  |  |                                                                                                                                                                                                            |  |  | 1 of 2                          |  |

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.

| Call Setup Screen |  |                                      |  |                |                                |                     |  |                            |  |
|-------------------|--|--------------------------------------|--|----------------|--------------------------------|---------------------|--|----------------------------|--|
| Call Control      |  | Active Cell Operating Mode           |  |                |                                |                     |  | Call Params                |  |
| Operating Mode    |  | UE Information                       |  |                |                                |                     |  | Cell Power                 |  |
| Cell Off          |  | INSL:                                |  | Power Class:   |                                |                     |  | -75.00                     |  |
|                   |  | INEL(SU):                            |  | (--)           |                                | Detected PRACH Sig: |  | ----                       |  |
|                   |  | Called Party Number:                 |  |                |                                |                     |  | Channel Type               |  |
|                   |  |                                      |  |                |                                |                     |  | 12.2k RMC                  |  |
|                   |  | UE Expected Open Loop Transmit Power |  |                |                                |                     |  | Paging Service             |  |
|                   |  | Init PRACH TX Pou: -22.70 dBm        |  |                | Init DPCCCH TX Pou: -11.55 dBm |                     |  | RB Test Mode               |  |
| Originate Call    |  | Current Service Type                 |  |                |                                |                     |  |                            |  |
|                   |  | None                                 |  |                |                                |                     |  |                            |  |
| Paging Parameters |  | Call Processing Status               |  |                |                                |                     |  | HSPA Parameters            |  |
|                   |  | RRC State:                           |  | Operating Mode |                                | Power State: Off    |  |                            |  |
|                   |  | MM Status:                           |  | Active Cell    |                                | Mode State: Off     |  |                            |  |
|                   |  | GMM State:                           |  | FDD Test       |                                | Offset: 0 chips     |  |                            |  |
| Handovers         |  | HSUPA In CU                          |  |                |                                | Information         |  | 34.121 Preset Call Configs |  |
|                   |  | UE Rep E-DCH                         |  | Cell Off       |                                | DSCH Cat: 14        |  |                            |  |
|                   |  | Last Happy Bit                       |  |                |                                | Ratio: ---- %       |  |                            |  |
|                   |  | Throughput:                          |  |                |                                | ---- kbps           |  |                            |  |
| Clear UE Info     |  | ACKs Transmitt                       |  |                |                                | Transmitted: ----   |  | Channel (UARFCH) Params    |  |
|                   |  | Background                           |  | Cell Off       |                                | Sys Type: UTRA FDD  |  |                            |  |
|                   |  |                                      |  |                |                                | Logging: No Conn    |  |                            |  |
| 1 of 5            |  |                                      |  | IntRef Offset  |                                |                     |  | 1 of 3                     |  |

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         |                            |
| DL Code Channel Info Screen | Serving Cell Primary Scrambling Code: 0           |                           |         |        |           |                       |         |         | Cell Power         |                            |
|                             | Secondary Serving Cell Primary Scrambling Code: 2 |                           |         |        |           |                       |         |         | -75.00             |                            |
| Generated Power Info Screen | Channel                                           | Serving Cell DL Chan Info |         |        |           | Sec Cell DL Chan Info |         |         |                    | dBm/3.84 MHz               |
|                             | Level (dB)                                        | Current                   | Desired | QVSF   | Chan Code | Level (dB)            | Current | Desired | QVSF               | Chan Code                  |
| OCNS Info Screen            | CPICH:                                            | Off                       | -3.30   | 256    | 0         | Off                   | Off     | 256     | 0                  | Channel Type               |
|                             | P-CCPCH/SCH:                                      | Off                       | -5.30   | 256    | 1         | Off                   | Off     | 256     | 1                  | 12.2k + HSDPA              |
| DC-HSDPA DL Code Chan Info  | S-CCPCH:                                          | Off                       | -10.30  | 64     | 2         | Off                   | Off     | 256     | 2                  | Paging Service             |
|                             | PICH:                                             | Off                       | -8.30   | 256    | 2         | Off                   | Off     | 256     | 2                  | RB Test Mode               |
| Return                      | AICH:                                             | Off                       | -9.30   | 256    | 3         |                       |         |         |                    |                            |
|                             | (F-)DPCH:                                         | Off                       | Off     | 128    | 7         |                       |         |         |                    |                            |
|                             | E-AGCH:                                           | Off                       | Off     | 256    | 42        |                       |         |         |                    | HSPA Parameters            |
|                             | E-HICH:                                           | Off                       | Off     | 128    | 22        |                       |         |         |                    |                            |
|                             | E-RGCH:                                           | Off                       | Off     | 128    | 22        |                       |         |         |                    |                            |
|                             | HS-SCCH 1:                                        | Off                       | Off     | 128    | 2         | Off                   | Off     | 128     | 2                  | 34.121 Preset Call Configs |
|                             | HS-SCCH 2:                                        | Off                       | Off     | 128    | 3         | Off                   | Off     | 128     | 3                  |                            |
|                             | HS-SCCH 3:                                        |                           |         |        |           |                       |         |         |                    |                            |
|                             | HS-SCCH 4:                                        |                           |         |        |           |                       |         |         |                    |                            |
|                             | HS-PDSCHs:                                        | Off                       | Off     | 16     | 1-15      | Off                   | Off     | 16      | 1-15               | Channel (UARFCN) Parms     |
|                             | Comp OCNS:                                        | Off                       | Off     | 128    | WCDMA     | Off                   | Off     | 128     | HSDPA              |                            |
|                             | 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 data 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**

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 Parm 2 of 2** -> **Secondary Serv Cell Parm (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 Params                                               |  |
| Operating Mode      |  | <div>UE Information</div> <div> <div>IMSI: 001012345678901</div> <div>Power Class: 4</div> </div> <div> <div>IMEI(SV):352358040214948(--)</div> <div>Detected PRACH Sig: 0</div> </div> <div>Called Party Number:</div> <div>UE Expected Open Loop Transmit Power</div> <div> <div>Init PRACH TX Pou: -60.00 dBm</div> <div>Init DPCH TX Pou: -11.55 dBm</div> </div> <div>Current Service Type</div> <div>None</div> |  |  |  |  |  | Cell Power                                                |  |
| Active Cell         |  |                                                                                                                                                                                                                                                                                                                                                                                                                       |  |  |  |  |  | Paging Service                                            |  |
|                     |  |                                                                                                                                                                                                                                                                                                                                                                                                                       |  |  |  |  |  | RB Test Mode                                              |  |
|                     |  |                                                                                                                                                                                                                                                                                                                                                                                                                       |  |  |  |  |  |                                                           |  |
| Paging Parameters ▾ |  | <div>Call Processing Status</div> <div> <div>RRC State: Idle</div> <div>Soft Handover State: Off</div> </div> <div> <div>MM Status: None</div> <div>Compressed Mode State: Off</div> </div> <div> <div>GMM State: Attached</div> <div>Cur DPCH Offset: 0 chips</div> </div>                                                                                                                                           |  |  |  |  |  | HSPA Parameters                                           |  |
| Handovers           |  | <div>HSUPA Information</div> <div> <div>Rep EDCH Cat/Ext: 6/Unrep</div> <div>Cur UE HS-DSCH Cat: 24</div> </div> <div> <div>Last Happy Bit: None</div> <div>Block Error Ratio: ---- %</div> </div> <div> <div>Throughput: ---- kbps</div> <div>Throughput: ---- kbps</div> </div> <div> <div>ACKs Transmitted: ----</div> <div>Blocks Transmitted: ----</div> </div>                                                  |  |  |  |  |  | 34,121 Preset Call Configs ▾                              |  |
| Clear UE Info       |  |                                                                                                                                                                                                                                                                                                                                                                                                                       |  |  |  |  |  | Channel (UARFCN) Params                                   |  |
|                     |  | <div>Active Cell</div> <div>Idle</div>                                                                                                                                                                                                                                                                                                                                                                                |  |  |  |  |  | <div>Sys Type: UTRA FDD</div> <div>Logging: No Conn</div> |  |
| 1 of 6              |  | <div>DBUS-INT</div> <div>IntRef</div> <div>Offset</div>                                                                                                                                                                                                                                                                                                                                                               |  |  |  |  |  | 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 Params                                               |  |
| Operating Mode      |  | <div>UE Information</div> <div> <div>IMSI: 001012345678901</div> <div>Power Class: 4</div> </div> <div> <div>IMEI(SV):352358040214948(--)</div> <div>Detected PRACH Sig: 0</div> </div> <div>Called Party Number:</div> <div>UE Expected Open Loop Transmit Power</div> <div> <div>Init PRACH TX Pou: -60.00 dBm</div> <div>Init DPCH TX Pou: -11.55 dBm</div> </div> <div>Current Service Type</div> <div>RB Test Mode - HSDPA</div> |  |  |  |  |  | Cell Power                                                |  |
| Active Cell         |  |                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |  |  |  |  | Paging Service                                            |  |
|                     |  |                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |  |  |  |  | RB Test Mode                                              |  |
|                     |  |                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |  |  |  |  |                                                           |  |
| Paging Parameters ▾ |  | <div>Call Processing Status</div> <div> <div>RRC State: CELL_DCH</div> <div>Soft Handover State: Off</div> </div> <div> <div>MM Status: None</div> <div>Compressed Mode State: Off</div> </div> <div> <div>GMM State: Attached</div> <div>Cur DPCH Offset: 0 chips</div> </div>                                                                                                                                                       |  |  |  |  |  | HSPA Parameters                                           |  |
| Handovers           |  | <div>HSUPA Information</div> <div> <div>Rep EDCH Cat/Ext: 6/Unrep</div> <div>Cur UE HS-DSCH Cat: 24</div> </div> <div> <div>Last Happy Bit: None</div> <div>Block Error Ratio: 0 %</div> </div> <div> <div>Throughput: ---- kbps</div> <div>Throughput: 42101 kbps</div> </div> <div> <div>ACKs Transmitted: ----</div> <div>Blocks Transmitted: 115500</div> </div>                                                                  |  |  |  |  |  | 34,121 Preset Call Configs ▾                              |  |
| Clear UE Info       |  |                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |  |  |  |  | Channel (UARFCN) Params                                   |  |
|                     |  | <div>Active Cell</div> <div>Connected</div>                                                                                                                                                                                                                                                                                                                                                                                           |  |  |  |  |  | <div>Sys Type: UTRA FDD</div> <div>Logging: No Conn</div> |  |
| 1 of 6              |  | <div>DBUS-INT</div> <div>IntRef</div> <div>Offset</div>                                                                                                                                                                                                                                                                                                                                                                               |  |  |  |  |  | 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 |  |
| DL Code Channel Info Screen | Serving Cell Primary Scrambling Code: 0           |                           |        |        |                    |                       |        |      |       |                            | Cell Power |  |
|                             | Secondary Serving Cell Primary Scrambling Code: 2 |                           |        |        |                    |                       |        |      |       |                            | -25.00     |  |
|                             | Channel                                           | Serving Cell DL Chan Info |        |        |                    | Sec Cell DL Chan Info |        |      |       | dBm/3.84 MHz               |            |  |
| Generated Power Info Screen | Channel                                           | Level (dB)                |        | Chan   |                    | Level (dB)            |        | Chan |       | Channel Type               |            |  |
|                             | Current                                           | Desired                   | OVSF   | Code   | Current            | Desired               | OVSF   | Code |       | 12.2k + HSDPA              |            |  |
| OCNS Info Screen            | CPICH:                                            | -8.00                     | -8.00  | 256    | 0                  | -8.00                 | -8.00  | 256  | 0     | Paging Service             |            |  |
|                             | P-CCPCH/SCH:                                      | -20.00                    | -20.00 | 256    | 1                  | -20.00                | -20.00 | 256  | 1     | RB Test Mode               |            |  |
|                             | S-CCPCH:                                          | Off                       | Off    | 64     | 2                  |                       |        |      |       |                            |            |  |
|                             | PICH:                                             | Off                       | Off    | 256    | 2                  | Off                   | Off    | 256  | 2     |                            |            |  |
|                             | AICH:                                             |                           |        |        |                    |                       |        |      |       |                            |            |  |
|                             | (F-)DPCH:                                         | -30.00                    | -30.00 | 128    | 7                  |                       |        |      |       | HSPA Parameters            |            |  |
| DC-HSDPA DL Code Chan Info  | E-AGCH:                                           | Off                       | Off    | 256    | 42                 |                       |        |      |       |                            |            |  |
|                             | E-HICH:                                           | Off                       | Off    | 128    | 22                 |                       |        |      |       |                            |            |  |
|                             | E-RGCH:                                           | Off                       | Off    | 128    | 22                 |                       |        |      |       |                            |            |  |
|                             | HS-SCCH 1:                                        | -20.00                    | -20.00 | 128    | 2                  | -20.00                | -20.00 | 128  | 2     | 34.121 Preset Call Configs |            |  |
|                             | HS-SCCH 2:                                        | -20.00                    | -20.00 | 128    | 3                  | -20.00                | -20.00 | 128  | 3     |                            |            |  |
|                             | HS-SCCH 3:                                        |                           |        |        |                    |                       |        |      |       |                            |            |  |
|                             | HS-SCCH 4:                                        |                           |        |        |                    |                       |        |      |       |                            |            |  |
|                             | HS-PDSCHs:                                        | -1.00                     | -1.00  | 16     | 1-15               | -1.00                 | -1.00  | 16   | 1-15  | Channel (UARFCN) Parms     |            |  |
| Return                      | Comp OCNS:                                        | -17.91                    | -17.91 | 128    | HSDPA              | -17.65                | -17.65 | 128  | HSDPA |                            |            |  |
|                             |                                                   |                           |        |        |                    |                       |        |      |       |                            |            |  |
|                             | 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:

| Call Setup Screen   |  |                                      |  |                            |                              |        |  |                    |                            |  |
|---------------------|--|--------------------------------------|--|----------------------------|------------------------------|--------|--|--------------------|----------------------------|--|
| Call Control        |  | Active Cell Operating Mode           |  |                            |                              |        |  |                    | Call Parm                  |  |
| Operating Mode      |  | UE Information                       |  |                            |                              |        |  |                    | Cell Power                 |  |
| Active Cell         |  | INSI: 001012345678901                |  |                            | Power Class: 4               |        |  | -25.00             |                            |  |
|                     |  | IMEI(SV):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 Pou: -60.00 dBm        |  |                            | Init DPCH TX Pou: -11.55 dBm |        |  |                    |                            |  |
| End Call            |  | Current Service Type                 |  |                            |                              |        |  |                    | Paging Service             |  |
|                     |  | RB Test Mode - HSDPA                 |  |                            |                              |        |  |                    | RB Test Mode               |  |
|                     |  | Call Processing Status               |  |                            |                              |        |  |                    |                            |  |
| Paging Parameters ▾ |  | RRC State: CELL_DCH                  |  | Soft Handover State: Off   |                              |        |  |                    | HSPA Parameters            |  |
|                     |  | MM Status: None                      |  | Compressed Mode State: Off |                              |        |  |                    |                            |  |
|                     |  | GMM State: Attached                  |  | Cur DPCH Offset: 0 chips   |                              |        |  |                    |                            |  |
| Handovers           |  | HSUPA Information                    |  |                            | HSDPA Information            |        |  |                    | 34.121 Preset Call Configs |  |
|                     |  | Rep EDCH Cat/Ext: 6/Unrep            |  |                            | Cur UE HS-DSCH Cat: 24       |        |  |                    |                            |  |
|                     |  | Last Happy Bit: None                 |  |                            | Block Error Ratio: 0 %       |        |  |                    |                            |  |
|                     |  | Throughput: ---- kbps                |  |                            | Throughput: 21088 kbps       |        |  |                    |                            |  |
| Clear UE Info       |  | ACKs Transmitted: ----               |  |                            | Blocks Transmitted: 35000    |        |  |                    | Channel (UARFCN) Parm      |  |
|                     |  |                                      |  |                            | Active Cell Connected        |        |  | Sys Type: UTRA FDD |                            |  |
|                     |  |                                      |  |                            |                              |        |  | 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 Parm    |  |
| Channel (UARFCN) Info        | Secondary Serving Cell Status                              |          |              |        |                        |                    |                            | Cell Power   |  |
|                              | Current Secondary Serving Cell Status: Configured-Inactive |          |              |        |                        |                    |                            | -25.00       |  |
| HSPA Information             | DC-HSDPA Information                                       |          |              |        |                        |                    |                            | dBm/3.84 MHz |  |
|                              |                                                            | Summary  | Serving Cell |        | Secondary Serving Cell |                    | Channel Type               |              |  |
| E-TFCI Recording Information | Block Error Ratio:                                         | 0 %      | 0 %          |        | ----                   |                    | 12.2k + HSDPA              |              |  |
|                              | Throughput (kbps):                                         | 21082    | 21082        |        | 0                      |                    | Paging Service             |              |  |
|                              | Blocks Transmitted:                                        | 66000    | 66000        |        | 0                      |                    | RB Test Mode               |              |  |
|                              | ACKs Received:                                             | 65958    | 65958        |        | 0                      |                    |                            |              |  |
|                              | NACKs Received:                                            | 42       | 42           |        | 0                      |                    |                            |              |  |
| HSDPA Information            | statDTXs Received:                                         | 0        | 0            |        | 0                      |                    | HSPA Parameters            |              |  |
|                              | Count of Rep CQI Lim:                                      | ----     | ----         |        | ----                   |                    |                            |              |  |
|                              | Last Received CQI:                                         |          | 30           |        | 30                     |                    |                            |              |  |
|                              | Max Allowed CQI:                                           |          | ----         |        | ----                   |                    | 34.121 Preset Call Configs |              |  |
|                              | Test Mode User Def TBS:                                    |          | 42192        |        | 42192                  |                    |                            |              |  |
| Clear UE Info                | PS Data User Def TBS:                                      |          | 7298         |        | 7298                   |                    |                            |              |  |
|                              | Last Sig Meas Pur Offs (dB):                               |          | 6.0          |        | 6.0                    |                    | Channel (UARFCN) Parm      |              |  |
| Return                       |                                                            |          |              |        |                        |                    |                            |              |  |
|                              |                                                            |          | 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.

| Call Setup Screen            |                                                          |          |        |        |  |  |                            |  |  |
|------------------------------|----------------------------------------------------------|----------|--------|--------|--|--|----------------------------|--|--|
| Screen Ctrl                  | DC-HSDPA Information                                     |          |        |        |  |  | Call Parms                 |  |  |
| Channel (UARFCN) Info        | Secondary Serving Cell Status                            |          |        |        |  |  | Cell Power                 |  |  |
|                              | Current Secondary Serving Cell Status: Configured-Active |          |        |        |  |  | -25.00                     |  |  |
| HSPA Information             | DC-HSDPA Information                                     |          |        |        |  |  | dBm/3.84 MHz               |  |  |
|                              |                                                          |          |        |        |  |  | Channel Type               |  |  |
| E-TFCI Recording Information |                                                          |          |        |        |  |  | 12.2k + HSDPA              |  |  |
|                              |                                                          |          |        |        |  |  | Paging Service             |  |  |
| HSDPA Information            |                                                          |          |        |        |  |  | RB Test Mode               |  |  |
|                              |                                                          |          |        |        |  |  | HSPA Parameters            |  |  |
| Clear UE Info                |                                                          |          |        |        |  |  | 34.121 Preset Call Configs |  |  |
|                              |                                                          |          |        |        |  |  |                            |  |  |
| Return                       |                                                          |          |        |        |  |  | Channel (UARFCN) Parms     |  |  |
|                              |                                                          |          |        |        |  |  |                            |  |  |
| 1 of 2                       | Active Cell Connected                                    |          |        |        |  |  | Sys Type: UTRA FDD         |  |  |
|                              |                                                          |          |        |        |  |  | Logging: No Conn           |  |  |
|                              |                                                          | 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.