



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
 Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
 E-mail: cttl@chinattl.com http://www.chinattl.cn

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	52.10.1.1476
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.2 ± 6 %	1.33 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	8.91 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	36.5 mW / g ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	4.81 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	19.5 mW / g ± 18.7 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.8 ± 6 %	1.48 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.17 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	37.0 mW / g ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	5.05 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	20.3 mW / g ± 18.7 % (k=2)



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
 Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
 E-mail: cttl@chinattl.com http://www.chinattl.cn

Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.3- 0.87 jΩ
Return Loss	- 40.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	44.8Ω- 2.59 jΩ
Return Loss	- 24.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.087 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
-----------------	-------



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Date: 07.30.2018

DASY5 Validation Report for Head TSL

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1137

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.332$ S/m; $\epsilon_r = 41.17$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7464; ConvF(8.7, 8.7, 8.7) @ 1750 MHz; Calibrated: 9/12/2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1524; Calibrated: 9/13/2017
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:

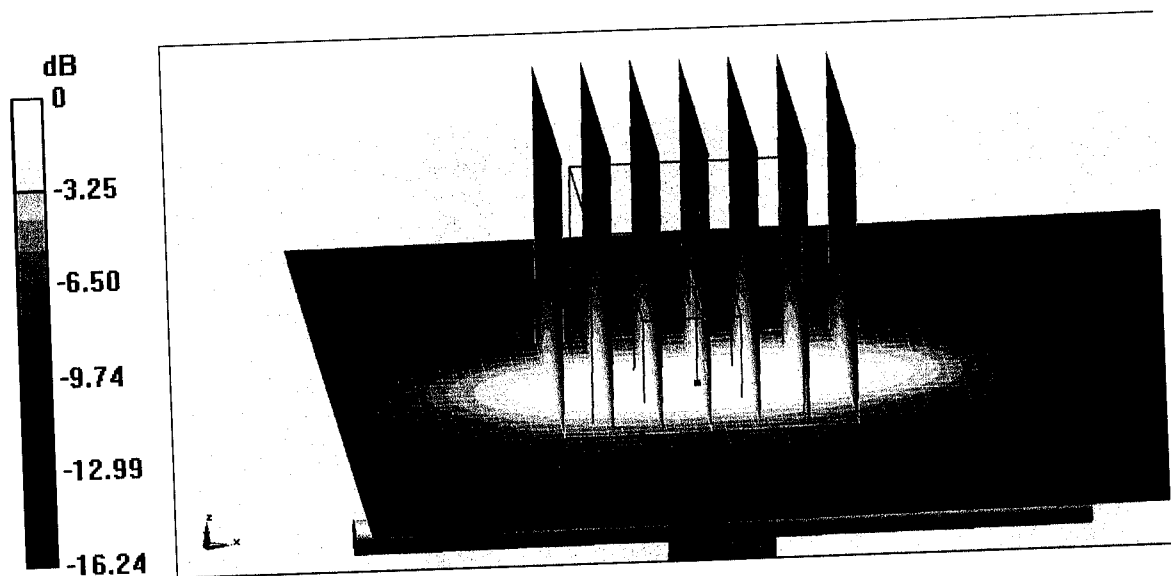
$dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 96.50 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 16.1 W/kg

SAR(1 g) = 8.91 W/kg; SAR(10 g) = 4.81 W/kg

Maximum value of SAR (measured) = 13.5 W/kg

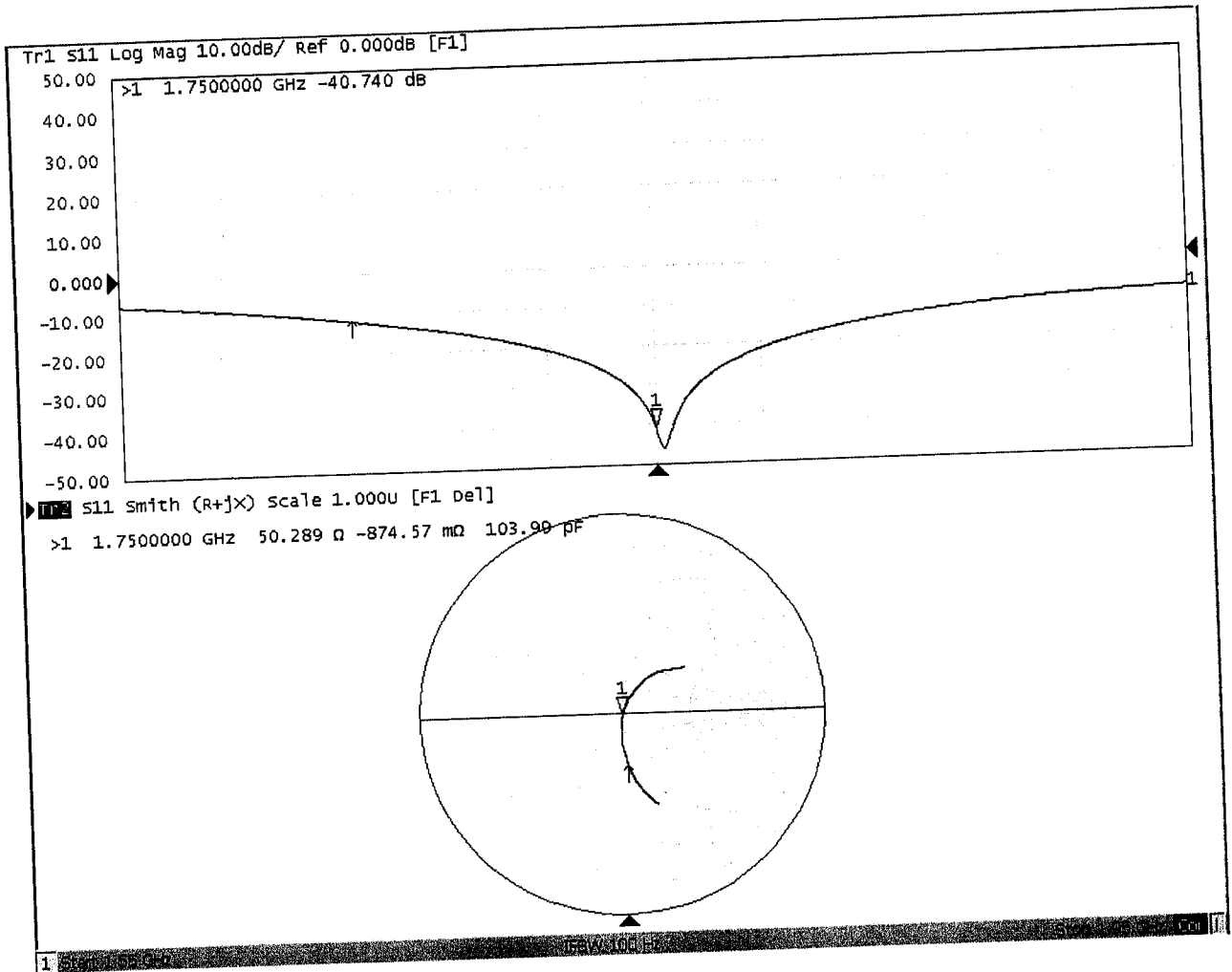


0 dB = 13.5 W/kg = 11.30 dBW/kg



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Head TSL





Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
 Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
 E-mail: cttl@chinattl.com http://www.chinattl.cn

Date: 07.30.2018

DASY5 Validation Report for Body TSL

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1137

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.477$ S/m; $\epsilon_r = 53.84$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7464; ConvF(8.6, 8.6, 8.6) @ 1750 MHz; Calibrated: 9/12/2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1524; Calibrated: 9/13/2017
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:

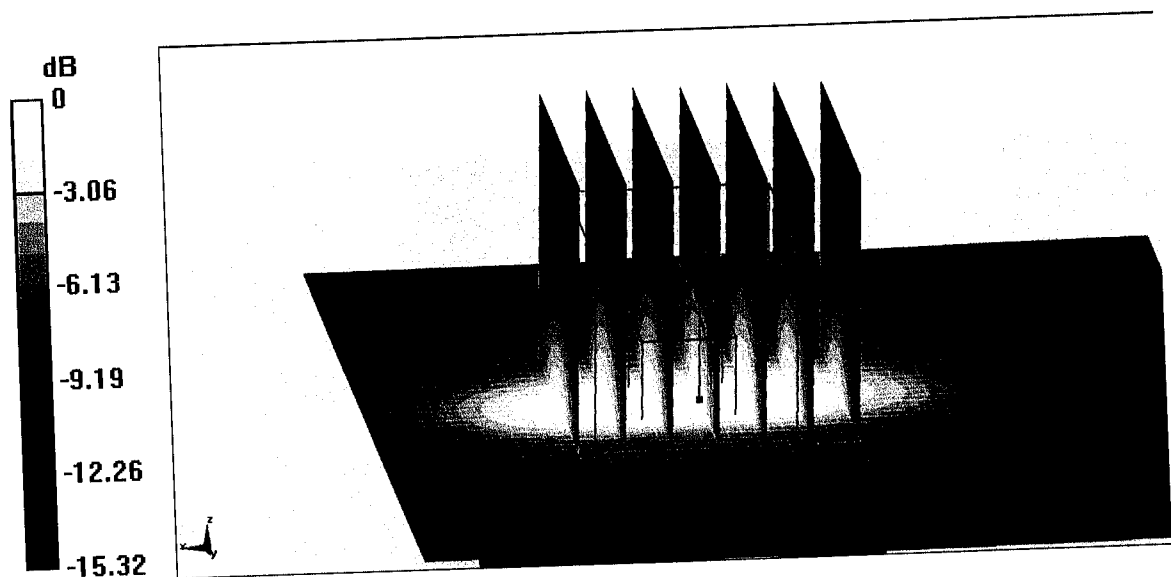
$dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 77.55 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 16.0 W/kg

SAR(1 g) = 9.17 W/kg; SAR(10 g) = 5.05 W/kg

Maximum value of SAR (measured) = 13.7 W/kg

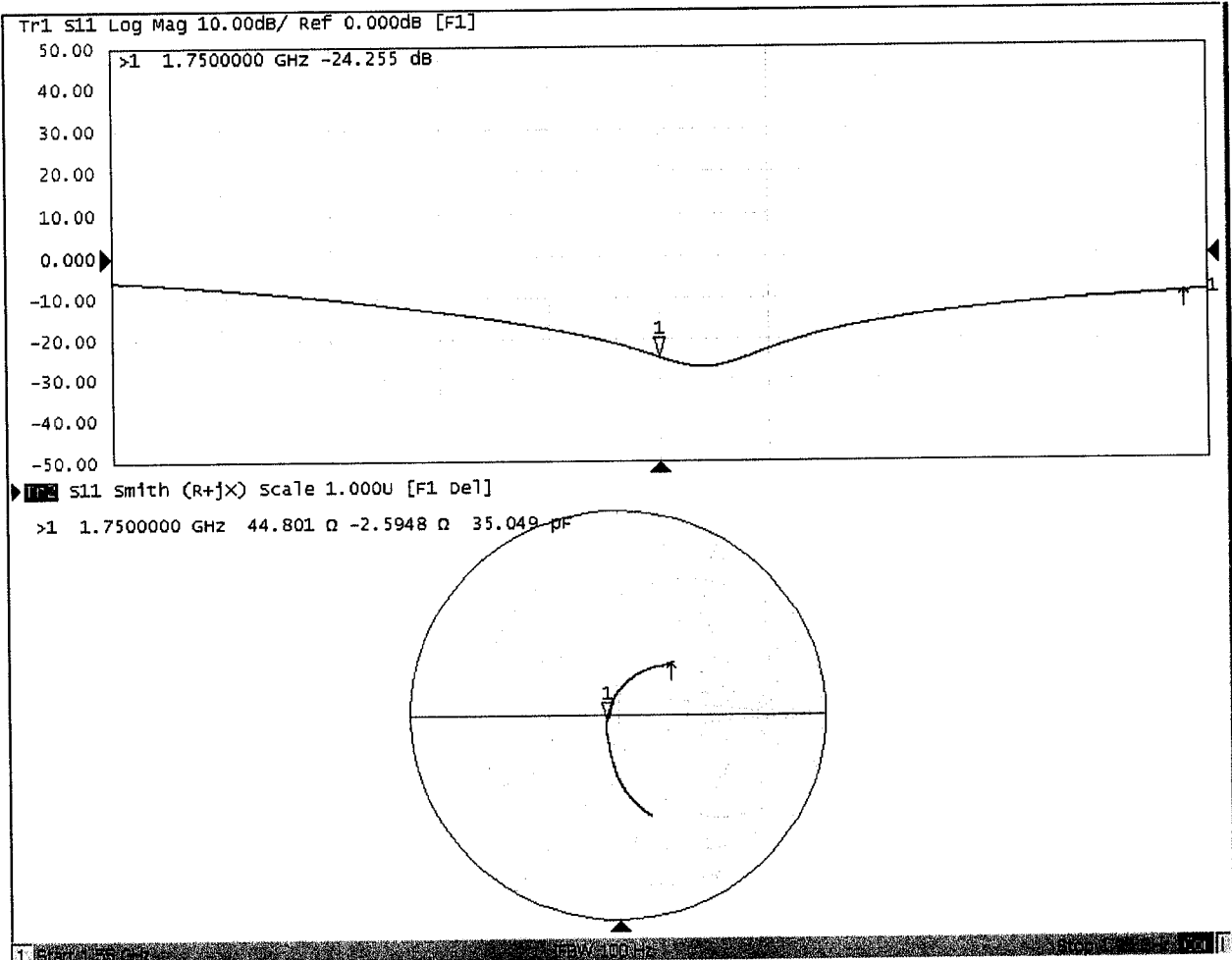


0 dB = 13.7 W/kg = 11.37 dBW/kg



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Body TSL





D1750V2, Serial No. 1137 Extended Dipole Calibrations

Referring to KDB 865664 D01 v01r02, if dipoles are verified in return loss ($< -20\text{dB}$, within 20% of prior calibration), and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

D1750V2 – serial no. 1137												
	1750 Head						1750 Body					
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
2018.07.30	-40.7		50.3		-0.87		-24.3		44.8		-2.59	
2019.10.23	-40.4	0.7	51	0.7	-0.15	0.72	-24.7	-1.6	46.1	1.3	-2.1	0.49

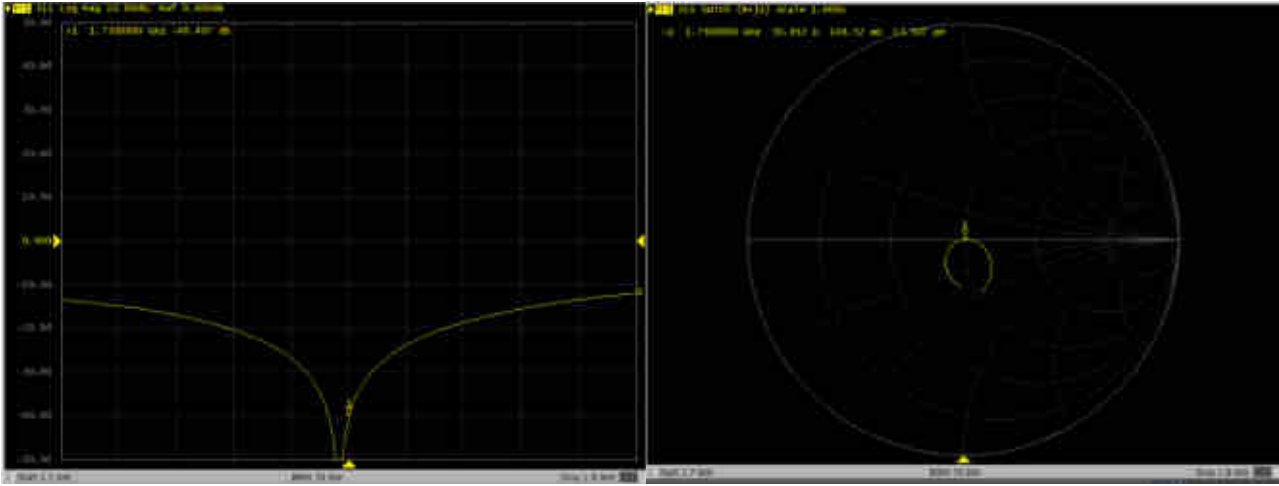
<Justification of the extended calibration>

The return loss is $< -20\text{dB}$, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

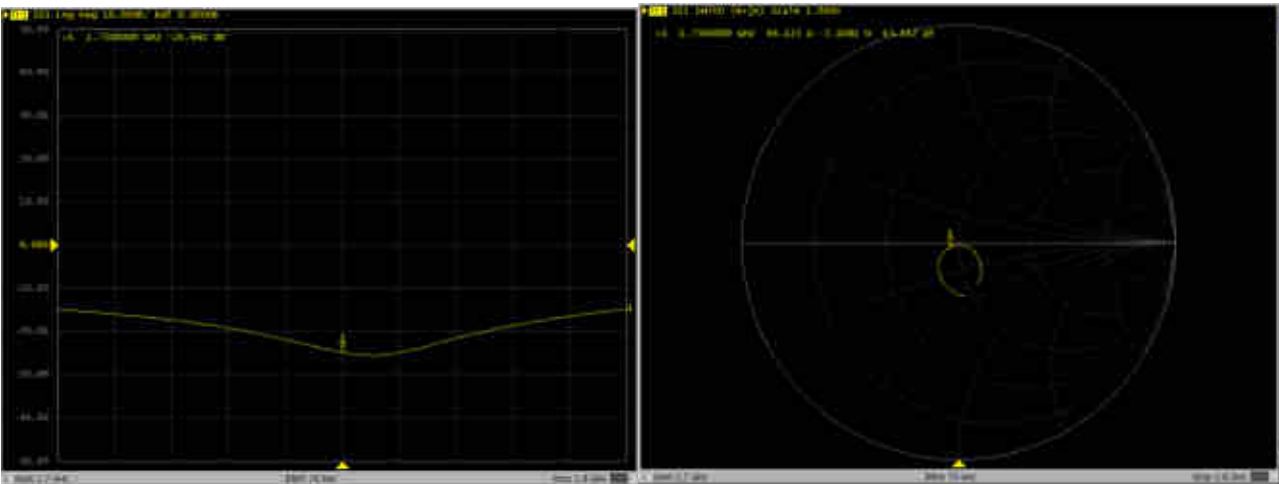


Dipole Verification Data> D1750V2, serial no. 1137

1750MHz - Head



1750MHz - Body





In Collaboration with
s p e a g
 CALIBRATION LABORATORY



中国认可
 国际互认
 校准
 CALIBRATION
 CNAS L0570

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
 Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
 E-mail: cttl@chinattl.com http://www.chinattl.cn

Certificate No: **Z18-60536**

Client **Sporton**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d182**

Calibration Procedure(s) **FF-Z11-003-01**
Calibration Procedures for dipole validation kits

Calibration date: **December 7, 2018**

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)°C and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRVD	102196	07-Mar-18 (CTTL, No.J18X01510)	Mar-19
Power sensor NRV-Z5	100596	07-Mar-18 (CTTL, No.J18X01510)	Mar-19
Reference Probe EX3DV4	SN 7514	27-Aug-18(SPEAG,No.EX3-7514_Aug18)	Aug-19
DAE4	SN 1555	20-Aug-18(SPEAG,No.DAE4-1555_Aug18)	Aug-19
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	23-Jan-18 (CTTL, No.J18X00560)	Jan-19
NetworkAnalyzer E5071C	MY46110673	24-Jan-18 (CTTL, No.J18X00561)	Jan-19

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: December 10, 2018

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

lossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM _{x,y,z}
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
- IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
- KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor $k=2$, which for a normal distribution Corresponds to a coverage probability of approximately 95%.



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	52.10.2.1495
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.6 ± 6 %	1.44 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.1 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	39.6 mW / g ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.25 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	20.7 mW / g ± 18.7 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.8 ± 6 %	1.56 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	39.9 mW / g ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	5.31 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	20.9 mW / g ± 18.7 % (k=2)



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
 Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
 E-mail: cttl@chinattl.com http://www.chinattl.cn

Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.1Ω+ 5.35jΩ
Return Loss	- 25.0dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.9Ω+ 6.19jΩ
Return Loss	- 24.0dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.067 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
-----------------	-------



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Date: 12.06.2018

DASY5 Validation Report for Head TSL

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d182

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.441$ S/m; $\epsilon_r = 39.59$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7514; ConvF(7.73, 7.73, 7.73) @ 1900 MHz; Calibrated: 8/27/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1555; Calibrated: 8/20/2018
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:

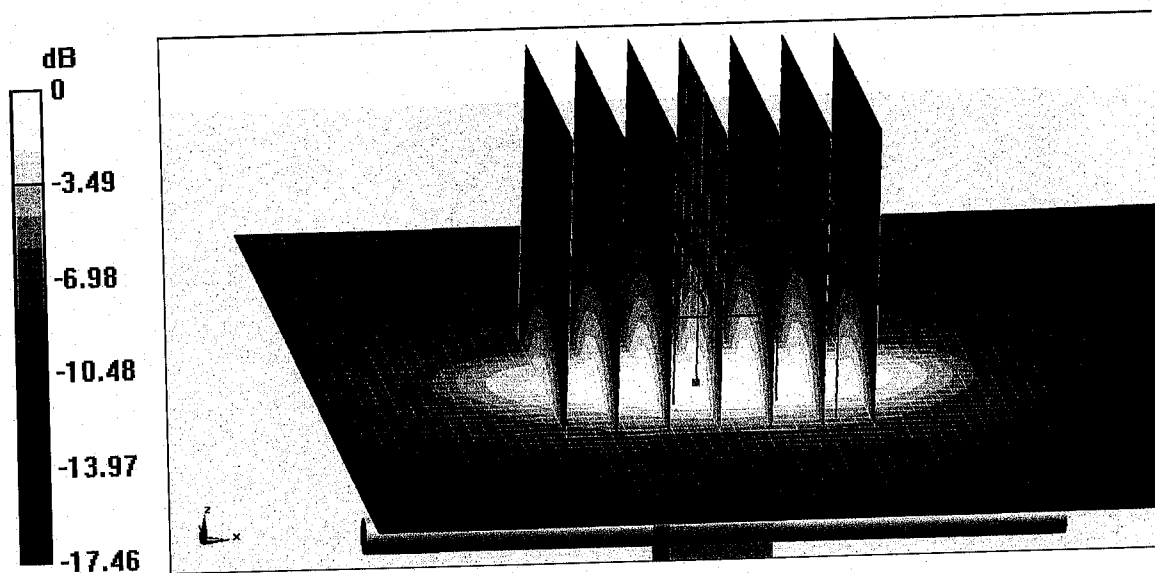
$dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 95.91 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 19.3 W/kg

SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.25 W/kg

Maximum value of SAR (measured) = 15.8 W/kg

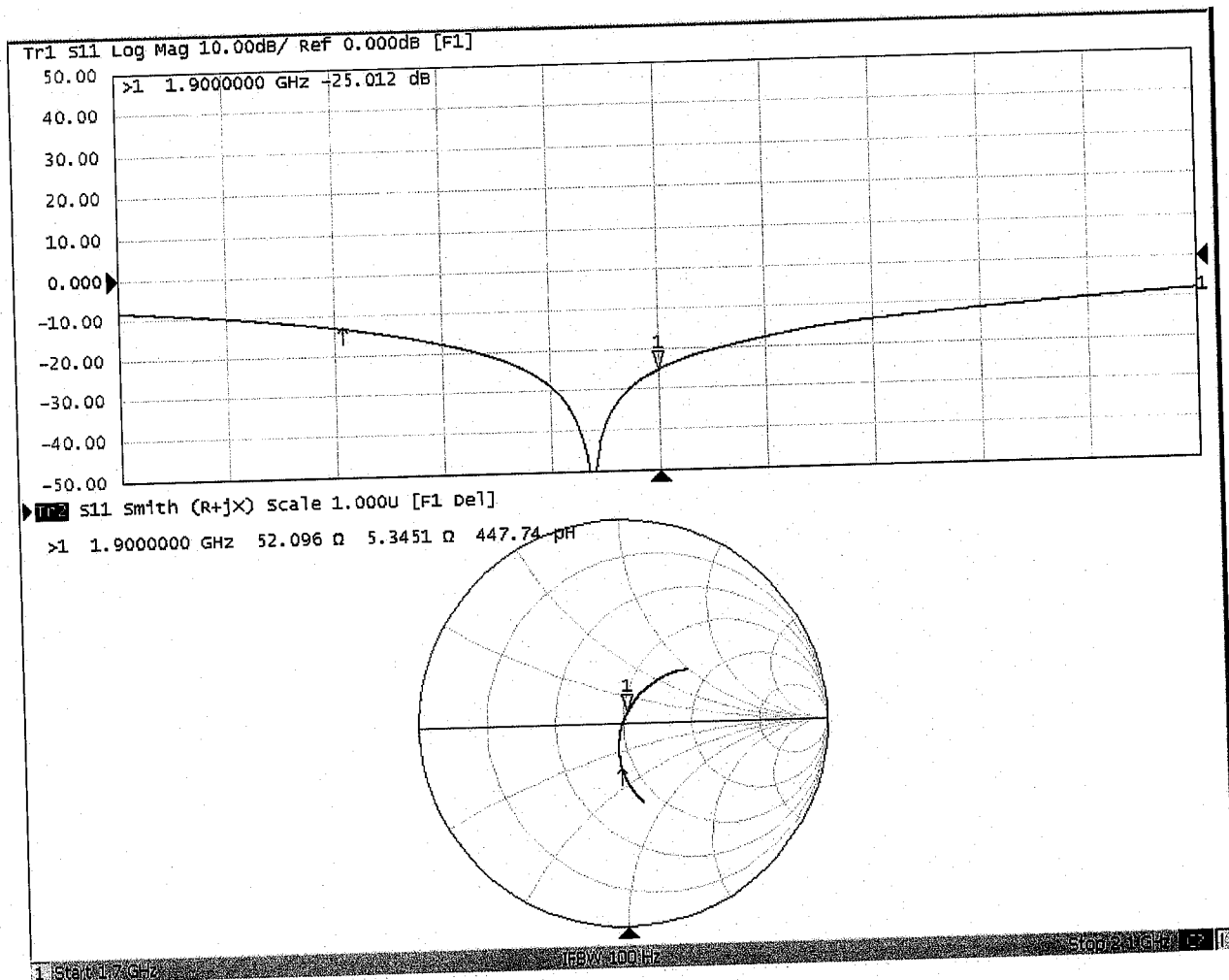


0 dB = 15.8 W/kg = 11.99 dBW/kg



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Head TSL





Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

DASY5 Validation Report for Body TSL

Date: 12.05.2018

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d182

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.564$ S/m; $\epsilon_r = 51.82$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7514; ConvF(7.53, 7.53, 7.53) @ 1900 MHz; Calibrated: 8/27/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1555; Calibrated: 8/20/2018
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:

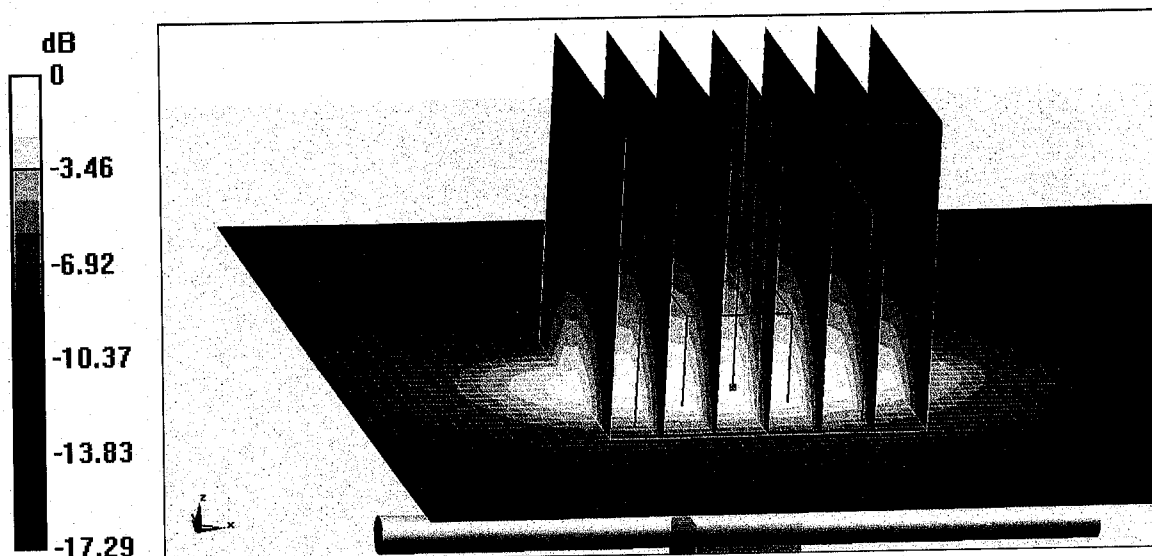
$dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 84.07 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 18.9 W/kg

SAR(1 g) = 10.2 W/kg; SAR(10 g) = 5.31 W/kg

Maximum value of SAR (measured) = 15.7 W/kg

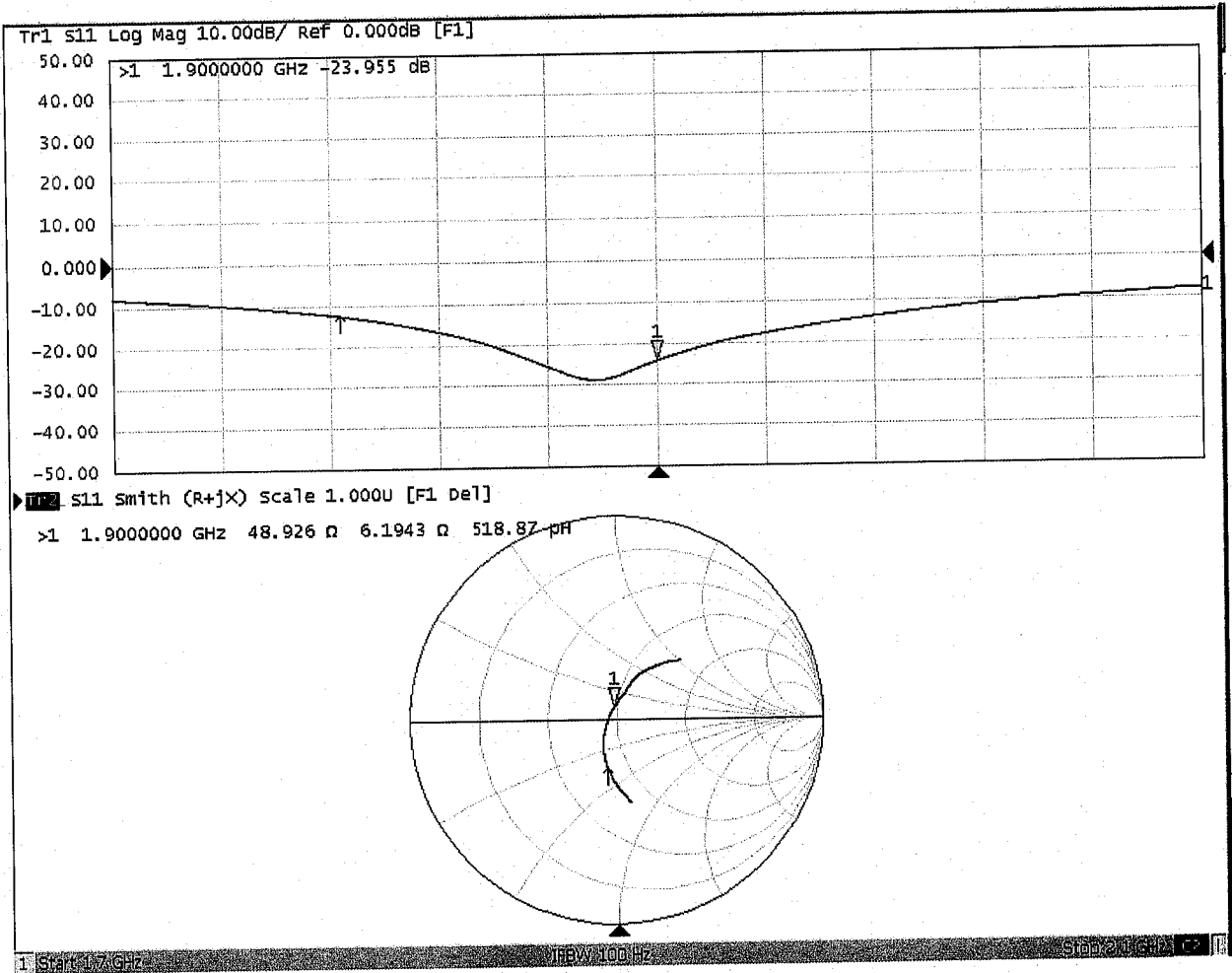


0 dB = 15.7 W/kg = 11.96 dBW/kg



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Body TSL





D1900V2, Serial No. 5d182 Extended Dipole Calibrations

Referring to KDB 865664 D01 v01r02, if dipoles are verified in return loss ($< -20\text{dB}$, within 20% of prior calibration), and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

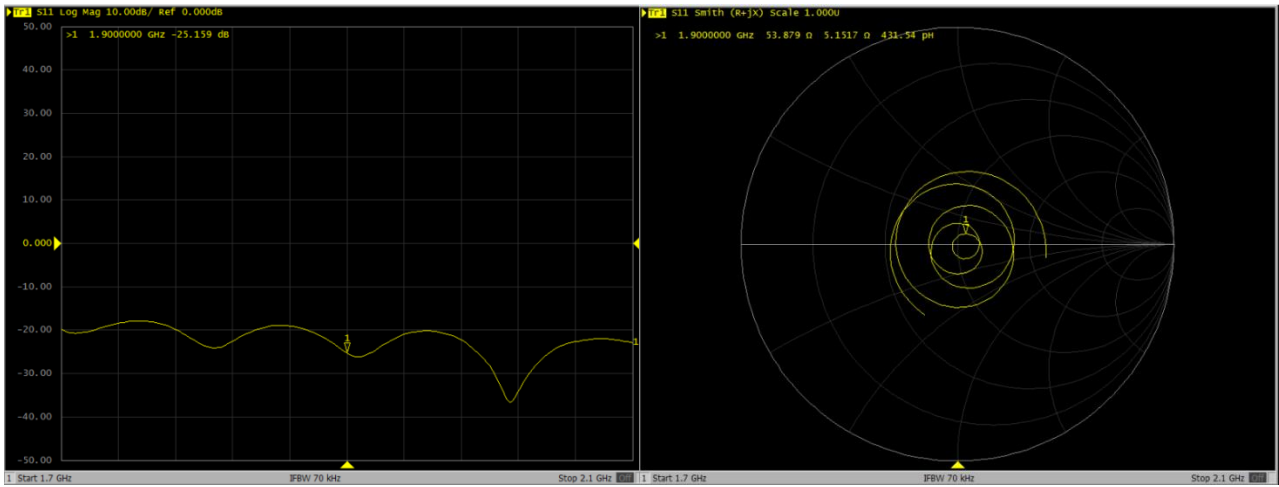
D1900V2 – serial no. 5d182												
	1900 Head						1900 Body					
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
2018.12.7	-25		52.1		5.35		-24		48.9		6.19	
2019.11.25	-25.2	-0.8	53.9	1.8	5.15	-0.2	-24.2	-0.8	48.7	-0.2	5.93	-0.26

<Justification of the extended calibration>

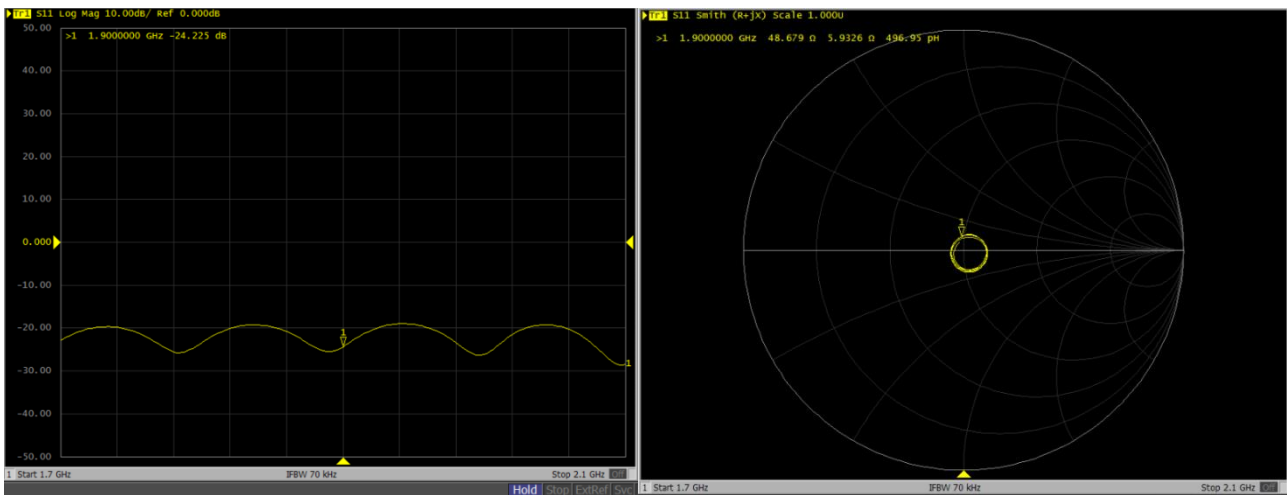
The return loss is $< -20\text{dB}$, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

Dipole Verification Data > D1900V2, serial no. 5d182

1900MHz - Head



1900MHz - Body





In Collaboration with
s p e a g
CALIBRATION LABORATORY



中国认可
国际互认
校准
CALIBRATION
CNAS L0570

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Client **Sporton**

Certificate No: **Z19-60134**

CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 924**

Calibration Procedure(s) **FF-Z11-003-01**
Calibration Procedures for dipole validation kits

Calibration date: **April 15, 2019**

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)°C and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	20-Aug-18 (CTTL, No.J18X06862)	Aug-19
Power sensor NRP8S	104291	20-Aug-18 (CTTL, No.J18X06862)	Aug-19
Reference Probe EX3DV4	SN 3617	31-Jan-19(SPEAG,No.EX3-3617_Jan19)	Jan-20
DAE4	SN 1331	06-Feb-19(SPEAG,No.DAE4-1331_Feb19)	Feb-20
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	23-Jan-19 (CTTL, No.J19X00336)	Jan-20
NetworkAnalyzer E5071C	MY46110673	24-Jan-19 (CTTL, No.J19X00547)	Jan-20

	Name	Function
Calibrated by:	Zhao Jing	SAR Test Engineer
Reviewed by:	Lin Hao	SAR Test Engineer
Approved by:	Qi Dianyuan	SAR Project Leader

Signature

Issued: April 20, 2019

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



In Collaboration with

s p e a g
CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM _{x,y,z}
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
- IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
- KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor $k=2$, which for a normal distribution Corresponds to a coverage probability of approximately 95%.



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
 Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
 E-mail: cttl@chinattl.com http://www.chinattl.cn

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	52.10.2.1495
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.4 ± 6 %	1.85 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.1 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	52.1 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.99 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.9 W/kg ± 18.7 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.3 ± 6 %	2.01 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.6 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	50.1 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	5.83 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	23.3 W/kg ± 18.7 % (k=2)



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.9Ω+ 2.68 jΩ
Return Loss	- 29.9dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.8Ω+ 4.17 jΩ
Return Loss	- 27.2dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.019 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
-----------------	-------



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
 Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
 E-mail: cttl@chinattl.com http://www.chinattl.cn

DASY5 Validation Report for Head TSL

Date: 04.15.2019

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 924

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.85$ S/m; $\epsilon_r = 40.35$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(7.62, 7.62, 7.62) @ 2450 MHz; Calibrated: 1/31/2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 2/6/2019
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

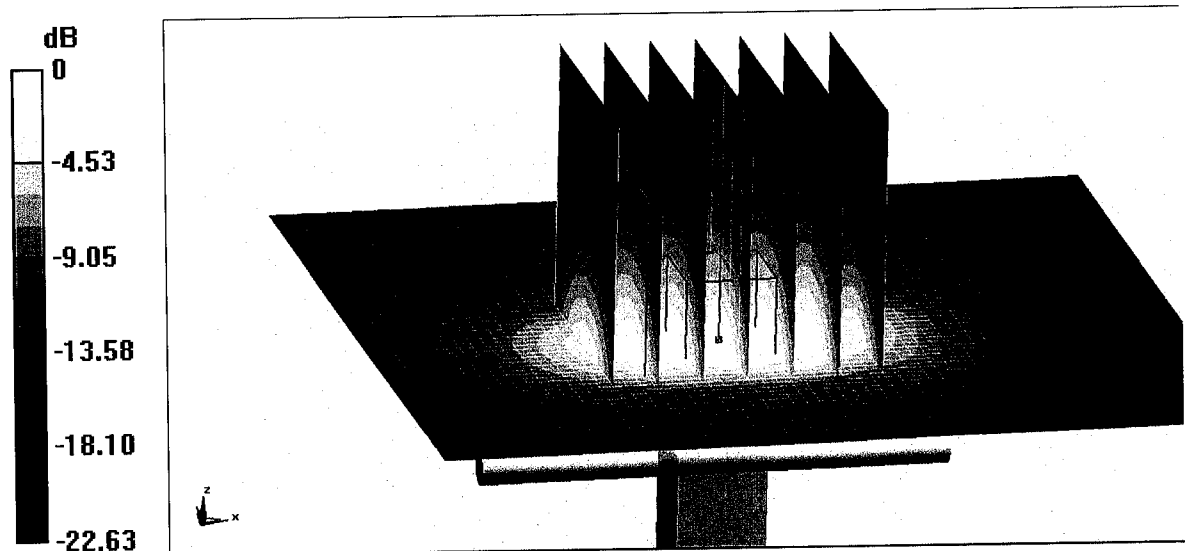
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 86.73 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 28.0 W/kg

SAR(1 g) = 13.1 W/kg; SAR(10 g) = 5.99 W/kg

Maximum value of SAR (measured) = 22.2 W/kg

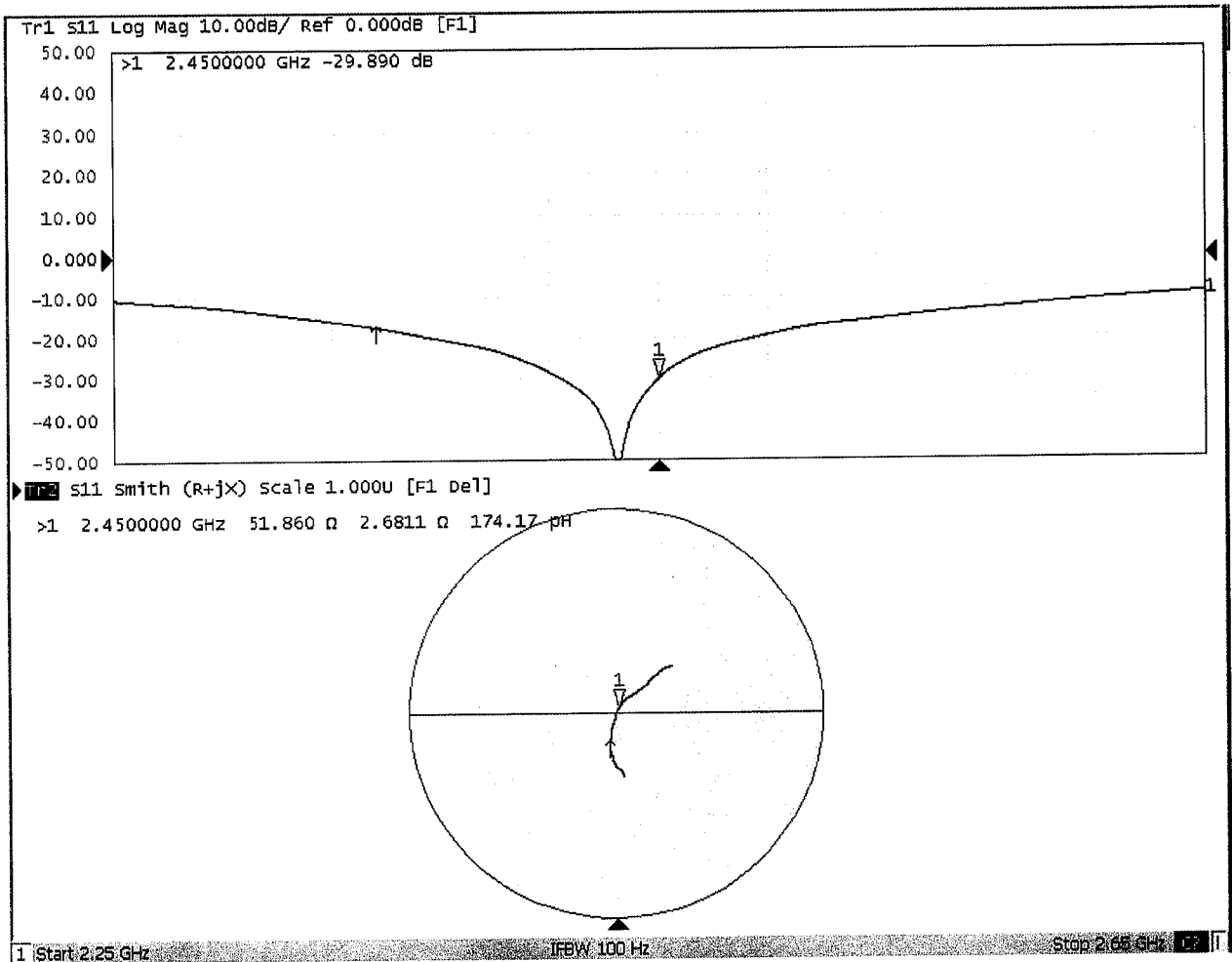


0 dB = 22.2 W/kg = 13.46 dBW/kg



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Head TSL





Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

DASY5 Validation Report for Body TSL

Date: 04.15.2019

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 924

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2450$ MHz; $\sigma = 2.005$ S/m; $\epsilon_r = 54.25$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(7.79, 7.79, 7.79) @ 2450 MHz; Calibrated: 1/31/2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 2/6/2019
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

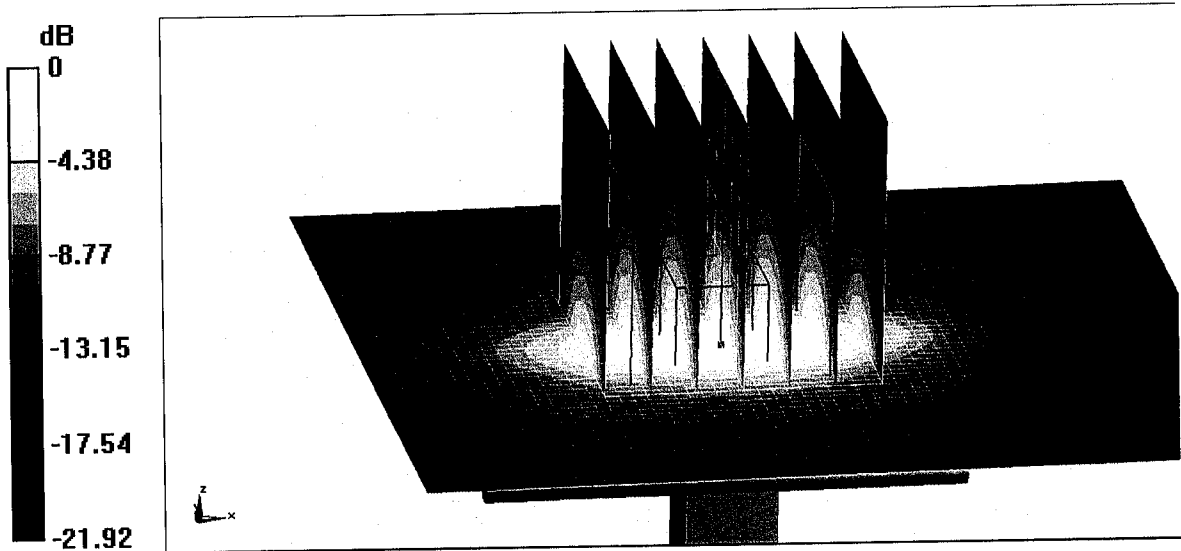
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.46 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 26.3 W/kg

SAR(1 g) = 12.6 W/kg; SAR(10 g) = 5.83 W/kg

Maximum value of SAR (measured) = 20.9 W/kg

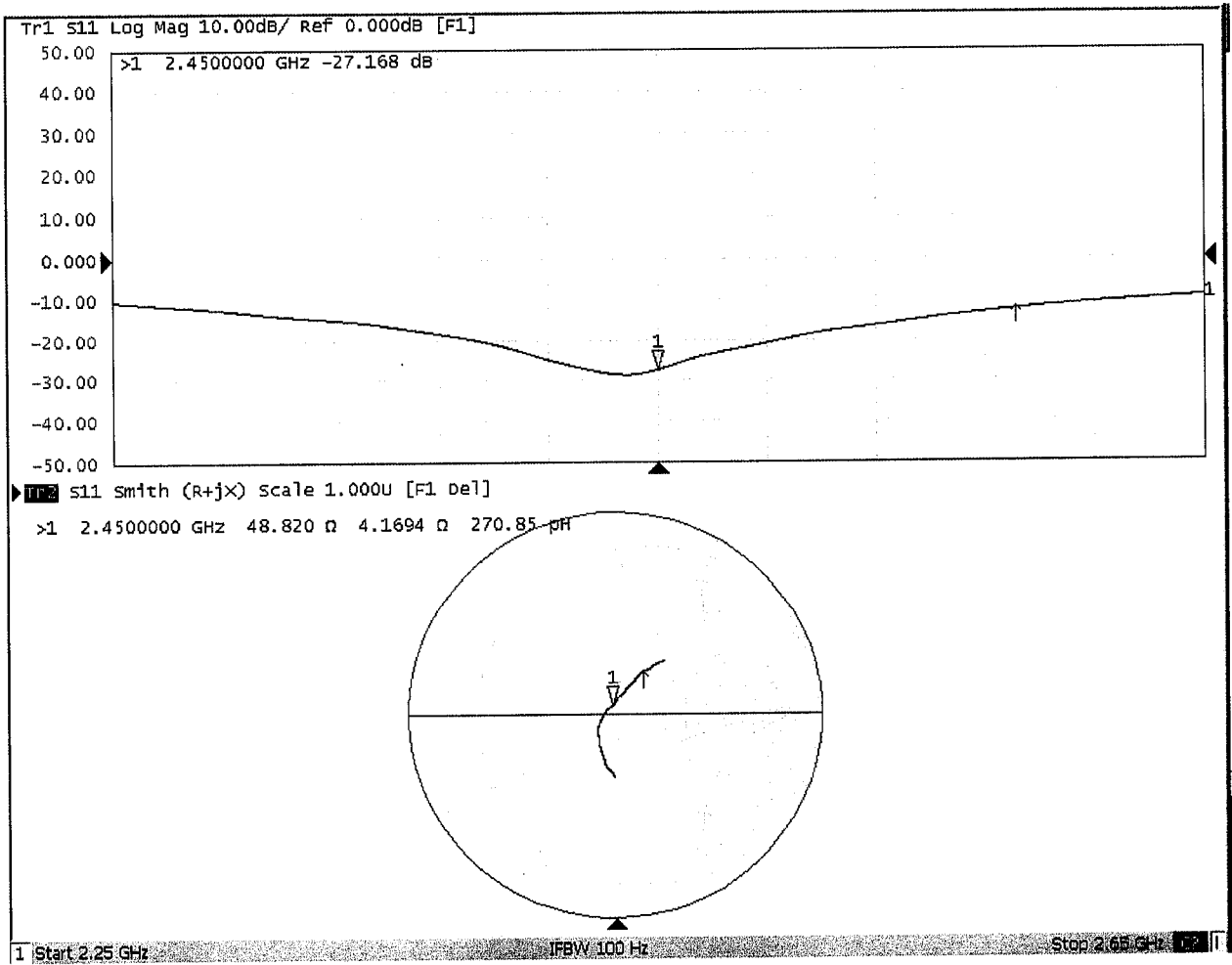


0 dB = 20.9 W/kg = 13.20 dBW/kg



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Body TSL





D2450V2, Serial No. 924 Extended Dipole Calibrations

Referring to KDB 865664 D01 v01r02, if dipoles are verified in return loss ($< -20\text{dB}$, within 20% of prior calibration), and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

D2450V2 – serial no. 924												
	2450 Head						2450 Body					
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
2019.04.15	-29.9		51.90		2.68		-27.2		48.80		4.17	
2020.04.11	-29.8	0.3	51.97	0.07	2.64	-0.04	-26.5	2.6	48.80	0	4.52	0.35

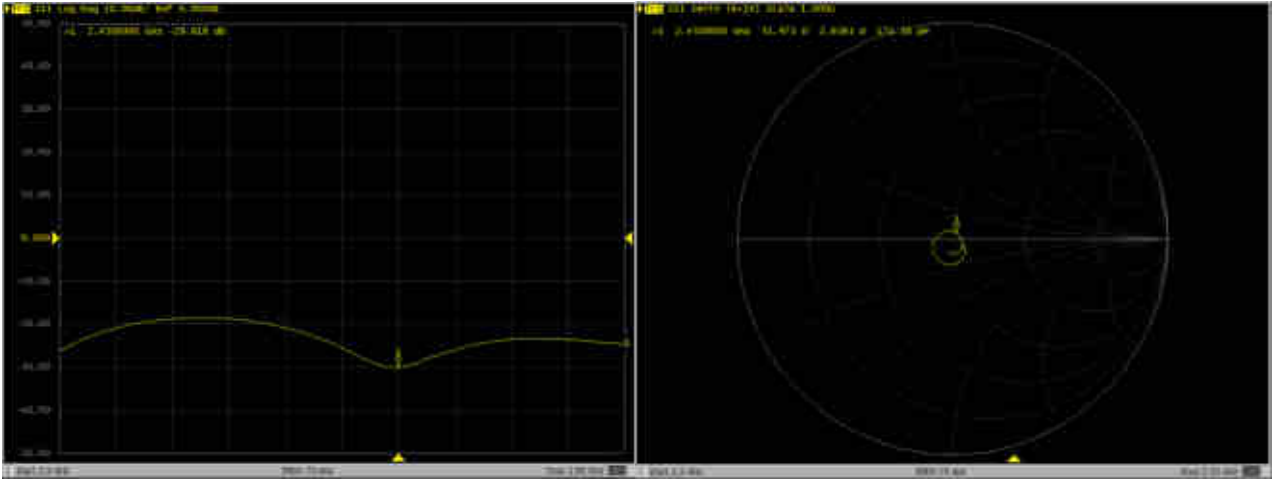
<Justification of the extended calibration>

The return loss is $< -20\text{dB}$, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

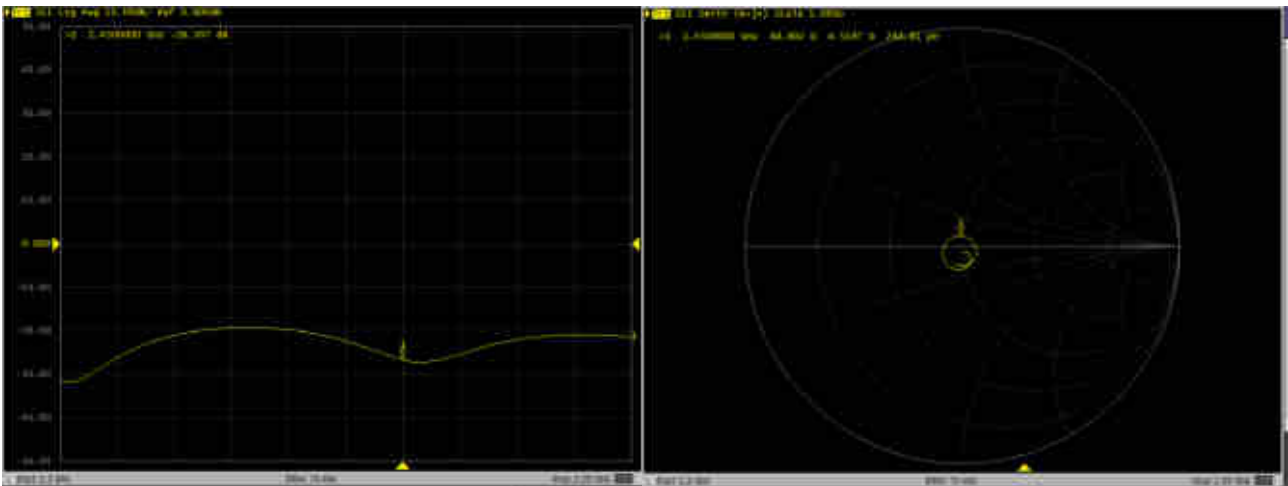


Dipole Verification Data> D2450V2, serial no. 924

2450MHz - Head



2450MHz - Body





Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Client **Sporton**

Certificate No: **Z18-60537**

CALIBRATION CERTIFICATE

Object **D2600V2 - SN: 1070**

Calibration Procedure(s) **FF-Z11-003-01**
Calibration Procedures for dipole validation kits

Calibration date: **December 7, 2018**

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)°C and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRVD	102196	07-Mar-18 (CTTL, No.J18X01510)	Mar-19
Power sensor NRV-Z5	100596	07-Mar-18 (CTTL, No.J18X01510)	Mar-19
Reference Probe EX3DV4	SN 7514	27-Aug-18(SPEAG,No.EX3-7514_Aug18)	Aug-19
DAE4	SN 1555	20-Aug-18(SPEAG,No.DAE4-1555_Aug18)	Aug-19
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	23-Jan-18 (CTTL, No.J18X00560)	Jan-19
Network Analyzer E5071C	MY46110673	24-Jan-18 (CTTL, No.J18X00561)	Jan-19

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: December 10, 2018

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



In Collaboration with

s p e a g

CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China

Tel: +86-10-62304633-2079

Fax: +86-10-62304633-2504

E-mail: cttl@chinattl.com

http://www.chinattl.cn

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM _{x,y,z}
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
- IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
- KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor $k=2$, which for a normal distribution Corresponds to a coverage probability of approximately 95%.



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
 Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
 E-mail: cttl@chinattl.com http://www.chinattl.cn

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	52.10.2.1495
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.1 ± 6 %	1.93 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.4 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	58.1 mW / g ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	6.50 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	26.1 mW / g ± 18.7 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.0 ± 6 %	2.18 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.8 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	54.6 mW / g ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	6.18 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	24.6 mW / g ± 18.7 % (k=2)



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Appendix(Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.6Ω- 6.33jΩ
Return Loss	- 23.7dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	44.8Ω- 5.36jΩ
Return Loss	- 22.1dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.015 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
-----------------	-------



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

DASY5 Validation Report for Head TSL

Date: 12.06.2018

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1070

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2600$ MHz; $\sigma = 1.926$ S/m; $\epsilon_r = 39.1$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7514; ConvF(6.92, 6.92, 6.92) @ 2600 MHz; Calibrated: 8/27/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1555; Calibrated: 8/20/2018
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

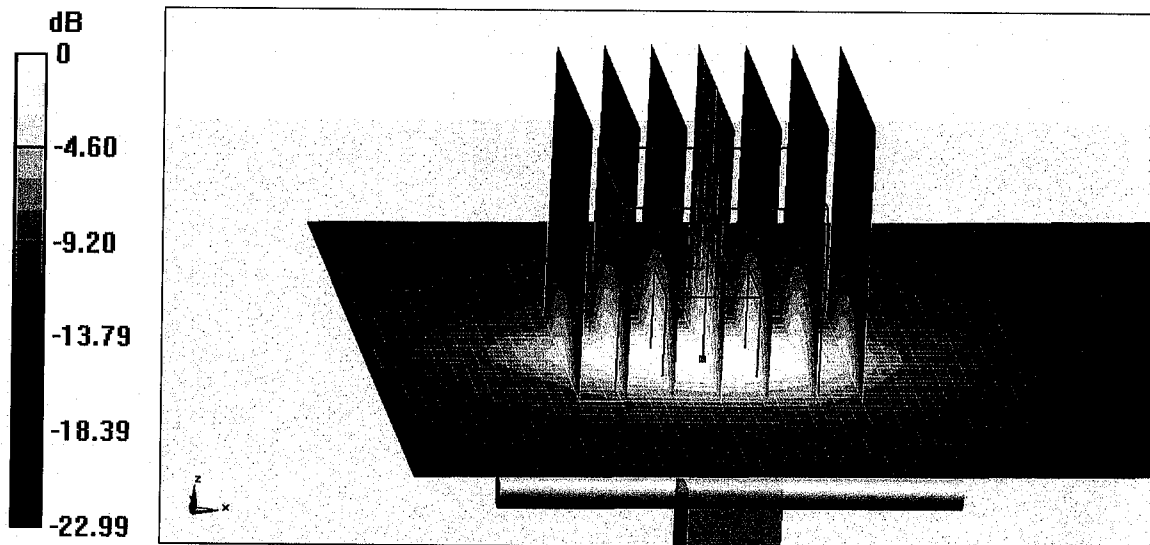
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 99.07 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 31.1 W/kg

SAR(1 g) = 14.4 W/kg; SAR(10 g) = 6.5 W/kg

Maximum value of SAR (measured) = 24.7 W/kg

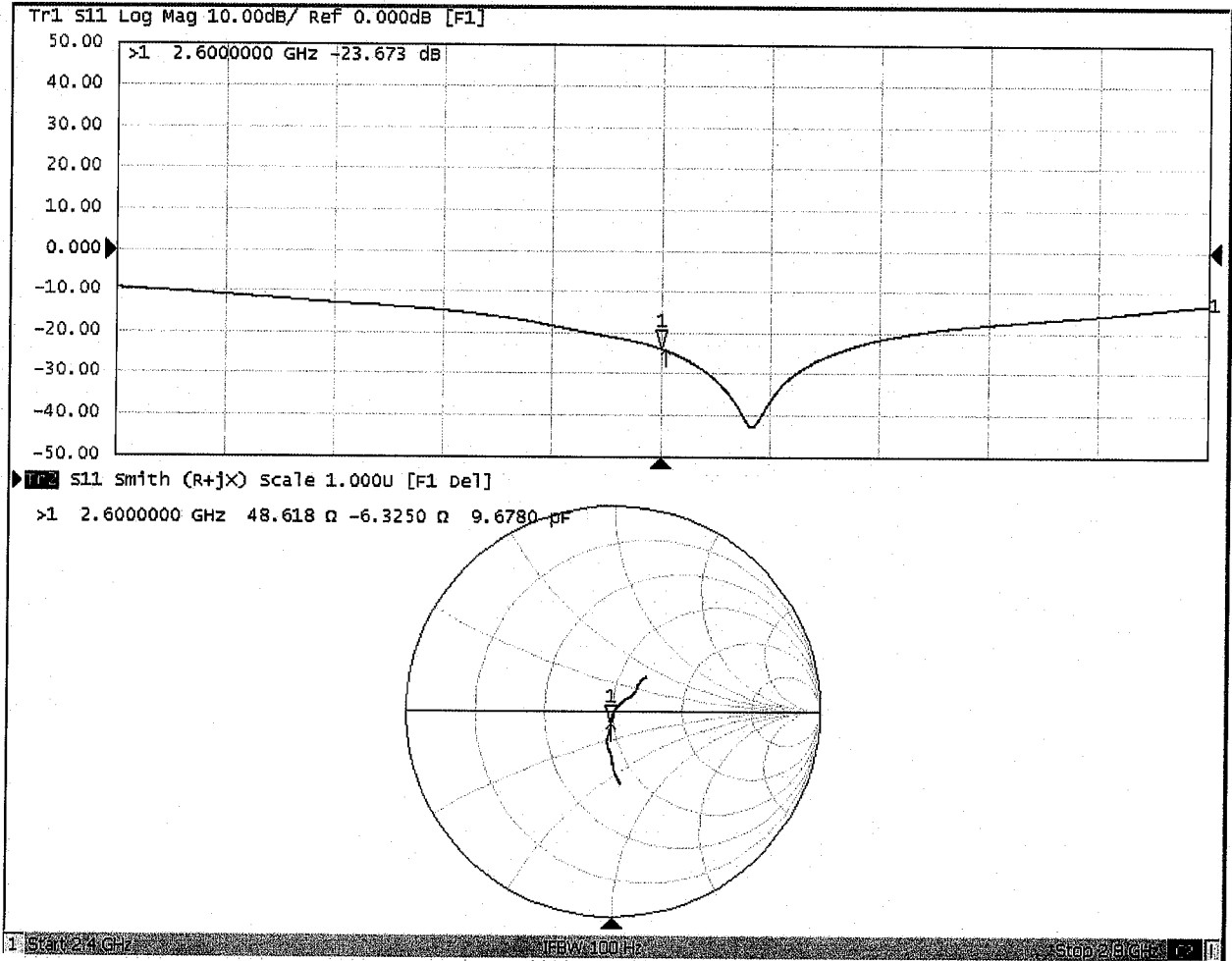


0 dB = 24.7 W/kg = 13.93 dBW/kg



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Head TSL





Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

DASY5 Validation Report for Body TSL

Date: 12.06.2018

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1070

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2600$ MHz; $\sigma = 2.181$ S/m; $\epsilon_r = 51.03$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7514; ConvF(7.06, 7.06, 7.06) @ 2600 MHz; Calibrated: 8/27/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1555; Calibrated: 8/20/2018
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

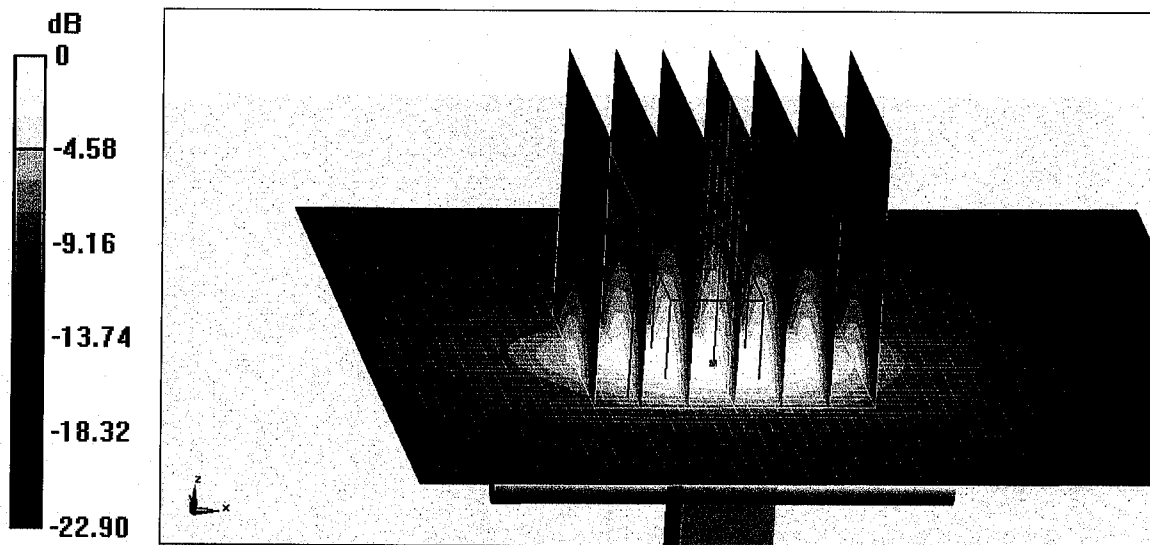
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 87.90 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 29.5 W/kg

SAR(1 g) = 13.8 W/kg; SAR(10 g) = 6.18 W/kg

Maximum value of SAR (measured) = 23.6 W/kg

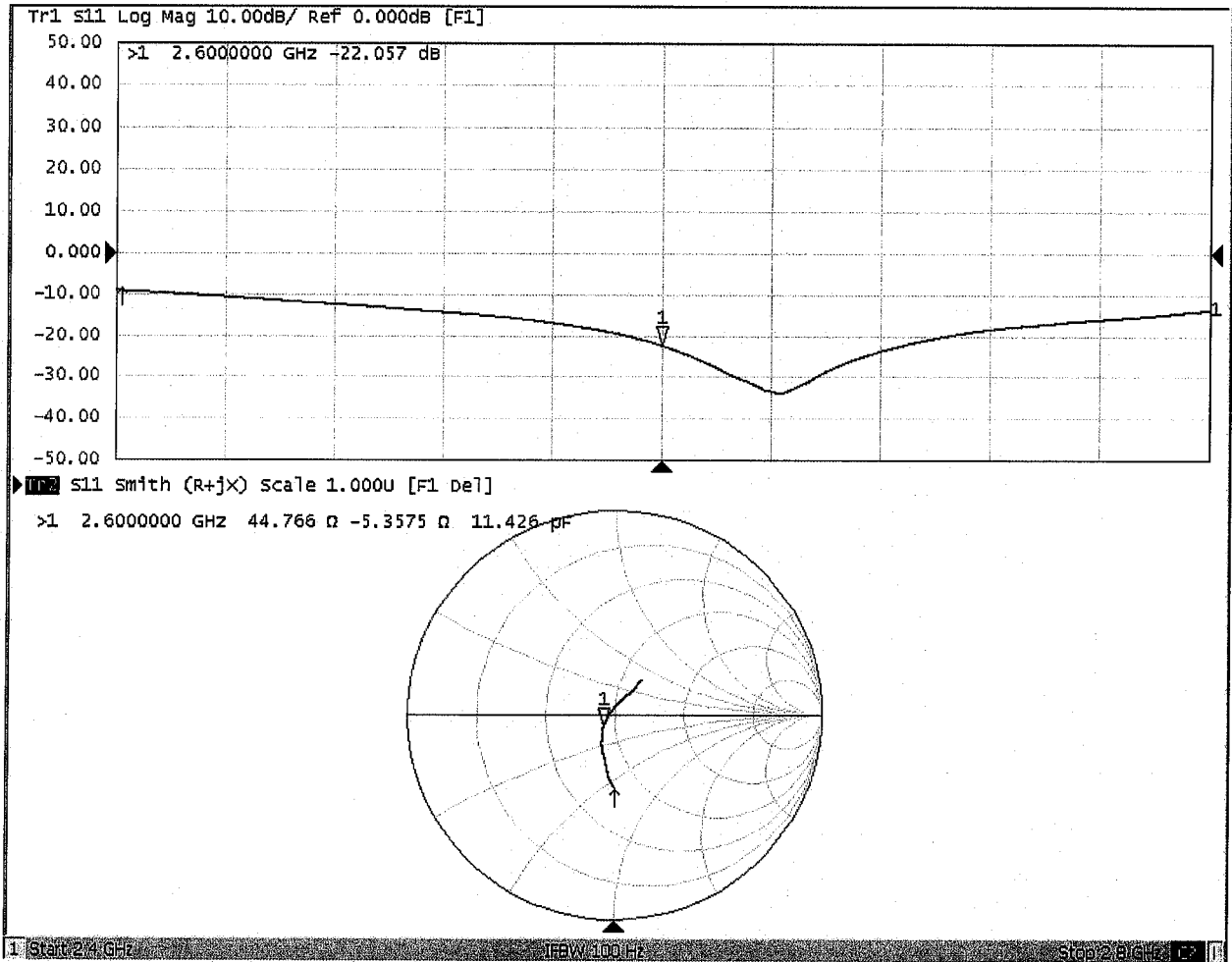


0 dB = 23.6 W/kg = 13.73 dBW/kg



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Body TSL





D2600V2, Serial No. 1070 Extended Dipole Calibrations

Referring to KDB 865664 D01 v01r02, if dipoles are verified in return loss ($< -20\text{dB}$, within 20% of prior calibration), and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

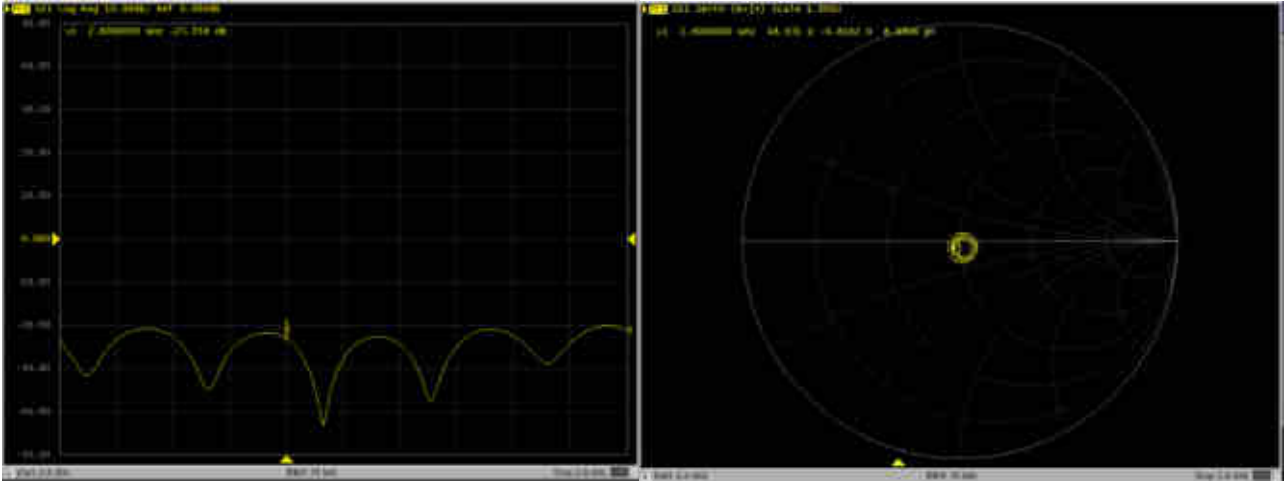
D2600V2 – serial no. 1070												
	2600 Head						2600 Body					
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
2018.12.7	-23.7		48.6		-6.33		-22.1		44.8		-5.36	
2019.11.25	-23.1	2.5	48.6	0	-6.82	-0.49	-22.0	0.5	45.3	0.5	-4.65	0.71

<Justification of the extended calibration>

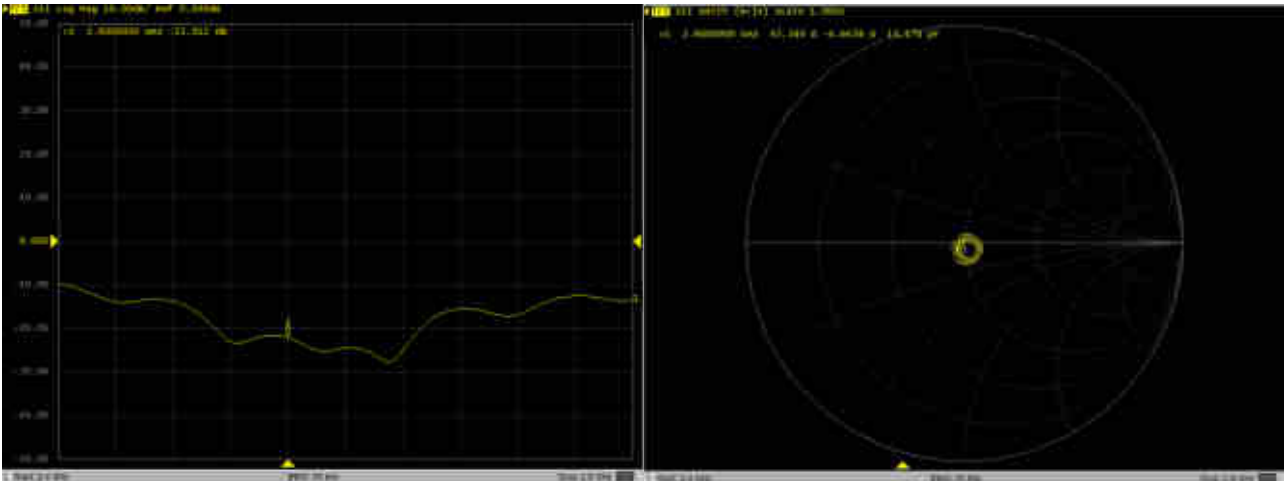
The return loss is $< -20\text{dB}$, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

Dipole Verification Data> D2600V2, serial no. 1070

2600MHz - Head



2600MHz - Body





In Collaboration with
s p e a g
 CALIBRATION LABORATORY



中国认可
 国际互认
 校准
 CALIBRATION
 CNAS L0570

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
 Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
 E-mail: cttl@chinattl.com http://www.chinattl.cn

Client **Sporton**

Certificate No: **Z18-60259**

CALIBRATION CERTIFICATE

Object **D5GHzV2 - SN: 1167**

Calibration Procedure(s) **FF-Z11-003-01**
Calibration Procedures for dipole validation kits

Calibration date: **August 03, 2018**

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)°C and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	102083	01-Nov-17 (CTTL, No.J17X08756)	Oct-18
Power sensor NRP-Z91	100542	01-Nov-17 (CTTL, No.J17X08756)	Oct-18
ReferenceProbe EX3DV4	SN 7464	12-Sep-17(SPEAG,No.EX3-7464_Sep17)	Sep-18
DAE4	SN 1524	13-Sep-17(SPEAG,No.DAE4-1524_Sep17)	Sep-18
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	23-Jan-18 (CTTL, No.J18X00560)	Jan-19
NetworkAnalyzerE5071C	MY46110673	24-Jan-18 (CTTL, No.J18X00561)	Jan-19

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: August 6, 2018

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM _{x,y,z}
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
- IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
- KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor $k=2$, which for a normal distribution Corresponds to a coverage probability of approximately 95%.



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	52.10.1.1476
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz	

Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.9 ± 6 %	4.82 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.69 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	77.0 mW / g ± 24.4 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.20 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	22.0 mW / g ± 24.2 % (k=2)



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
 Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
 E-mail: cttl@chinattl.com http://www.chinattl.cn

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.1 ± 6 %	5.18 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.09 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	80.8 mW / g ± 24.4 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.32 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	23.2 mW / g ± 24.2 % (k=2)

Head TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.9 ± 6 %	5.37 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL at 5750 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.70 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	76.9 mW / g ± 24.4 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.17 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	21.6 mW / g ± 24.2 % (k=2)



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Body TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.36 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.4 ± 6 %	5.32 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL at 5250 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.46 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	74.4 mW / g ± 24.4 % (k=2)
SAR averaged over 10 cm³ (10 g) of Body TSL	Condition	
SAR measured	100 mW input power	2.10 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	20.9 mW / g ± 24.2 % (k=2)

Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.7 ± 6 %	5.79 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.73 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	77.1 mW / g ± 24.4 % (k=2)
SAR averaged over 10 cm³ (10 g) of Body TSL	Condition	
SAR measured	100 mW input power	2.16 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	21.5 mW / g ± 24.2 % (k=2)



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
 Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
 E-mail: cttl@chinattl.com http://www.chinattl.cn

Body TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.3	5.94 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.5 ± 6 %	5.93 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL at 5750 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.43 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	74.3 mW /g ± 24.4 % (k=2)
SAR averaged over 10 cm³ (10 g) of Body TSL	Condition	
SAR measured	100 mW input power	2.08 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	20.8 mW /g ± 24.2 % (k=2)



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	50.3Ω - 9.42jΩ
Return Loss	- 20.6dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	58.1Ω - 7.15jΩ
Return Loss	- 20.0dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	53.5Ω - 7.66jΩ
Return Loss	- 21.8dB

Antenna Parameters with Body TSL at 5250 MHz

Impedance, transformed to feed point	49.5Ω - 7.40jΩ
Return Loss	- 22.6dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	58.0Ω - 6.37jΩ
Return Loss	- 20.5dB

Antenna Parameters with Body TSL at 5750 MHz

Impedance, transformed to feed point	54.5Ω - 7.07jΩ
Return Loss	- 21.9dB



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

General Antenna Parameters and Design

Electrical Delay (one direction)	1.065 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
-----------------	-------



In Collaboration with

s p e a g
CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

DASY5 Validation Report for Head TSL

Date: 07.27.2018

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1167

Communication System: CW; Frequency: 5250 MHz, Frequency: 5600 MHz,
Frequency: 5750 MHz,

Medium parameters used: $f = 5250$ MHz; $\sigma = 4.822$ S/m; $\epsilon_r = 35.92$; $\rho = 1000$ kg/m³,
Medium parameters used: $f = 5600$ MHz; $\sigma = 5.184$ S/m; $\epsilon_r = 35.14$; $\rho = 1000$ kg/m³,
Medium parameters used: $f = 5750$ MHz; $\sigma = 5.365$ S/m; $\epsilon_r = 34.88$; $\rho = 1000$ kg/m³,

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7464; ConvF(5.68, 5.68, 5.68) @ 5250 MHz; Calibrated: 9/12/2017, ConvF(4.98, 4.98, 4.98) @ 5600 MHz; Calibrated: 9/12/2017, ConvF(5.04, 5.04, 5.04) @ 5750 MHz; Calibrated: 9/12/2017,
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1524; Calibrated: 9/13/2017
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

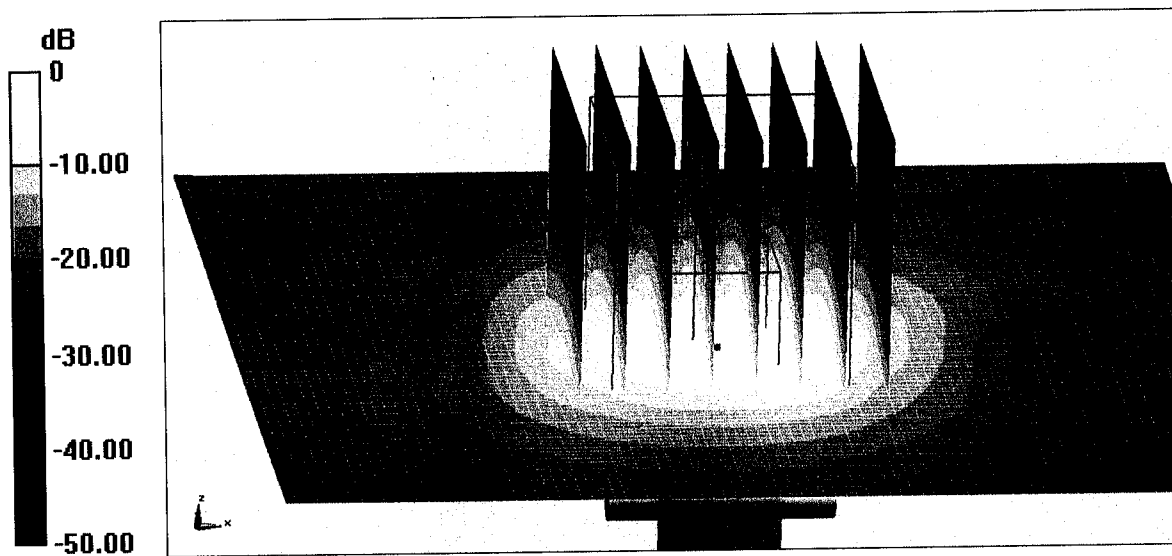
Dipole Calibration /Pin=100mW, d=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 65.09 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 32.4 W/kg
SAR(1 g) = 7.69 W/kg; SAR(10 g) = 2.2 W/kg
Maximum value of SAR (measured) = 18.0 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.53 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 36.2 W/kg
SAR(1 g) = 8.09 W/kg; SAR(10 g) = 2.32 W/kg
Maximum value of SAR (measured) = 19.7 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.79 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 36.2 W/kg
SAR(1 g) = 7.7 W/kg; SAR(10 g) = 2.17 W/kg
Maximum value of SAR (measured) = 19.0 W/kg



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

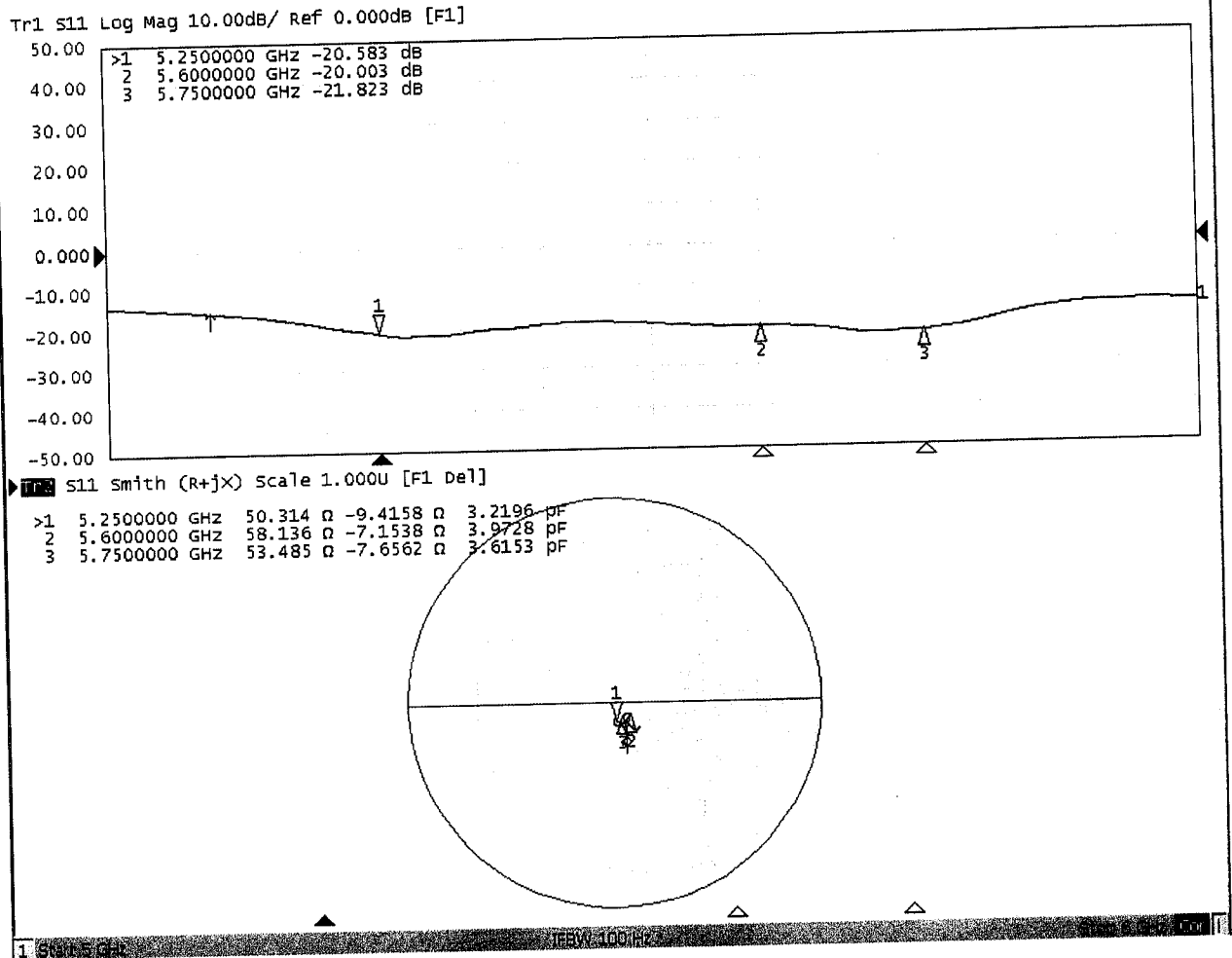


0 dB = 19.0 W/kg = 12.79 dBW/kg



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Head TSL





Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

DASY5 Validation Report for Body TSL

Date: 08.02.2018

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1167

Communication System: CW; Frequency: 5250 MHz, Frequency: 5600 MHz,
Frequency: 5750 MHz,

Medium parameters used: $f = 5250$ MHz; $\sigma = 5.316$ S/m; $\epsilon_r = 48.42$; $\rho = 1000$ kg/m³,
Medium parameters used: $f = 5600$ MHz; $\sigma = 5.789$ S/m; $\epsilon_r = 47.7$; $\rho = 1000$ kg/m³,
Medium parameters used: $f = 5750$ MHz; $\sigma = 5.926$ S/m; $\epsilon_r = 48.45$; $\rho = 1000$ kg/m³,

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7464; ConvF(5.29, 5.29, 5.29) @ 5250 MHz; Calibrated: 9/12/2017, ConvF(4.5, 4.5, 4.5) @ 5600 MHz; Calibrated: 9/12/2017, ConvF(4.59, 4.59, 4.59) @ 5750 MHz; Calibrated: 9/12/2017,
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1524; Calibrated: 9/13/2017
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

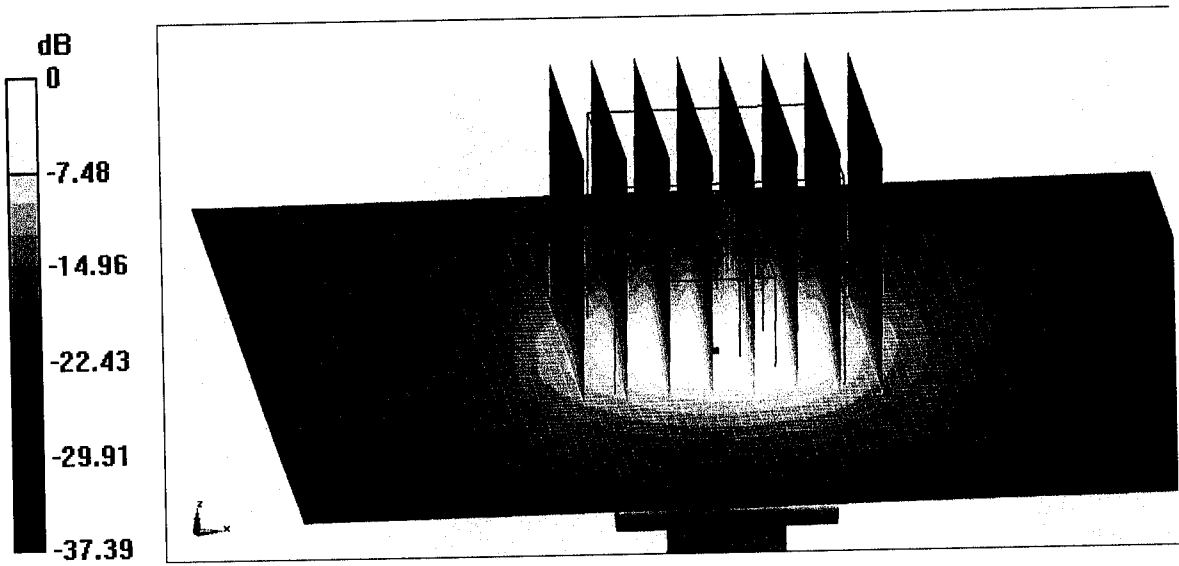
Dipole Calibration /Pin=100mW, d=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.14 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 31.9 W/kg
SAR(1 g) = 7.46 W/kg; SAR(10 g) = 2.1 W/kg
Maximum value of SAR (measured) = 17.6 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 62.32 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 36.3 W/kg
SAR(1 g) = 7.73 W/kg; SAR(10 g) = 2.16 W/kg
Maximum value of SAR (measured) = 19.1 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.99 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 35.2 W/kg
SAR(1 g) = 7.43 W/kg; SAR(10 g) = 2.08 W/kg
Maximum value of SAR (measured) = 18.0 W/kg



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn



0 dB = 18.0 W/kg = 12.55 dBW/kg

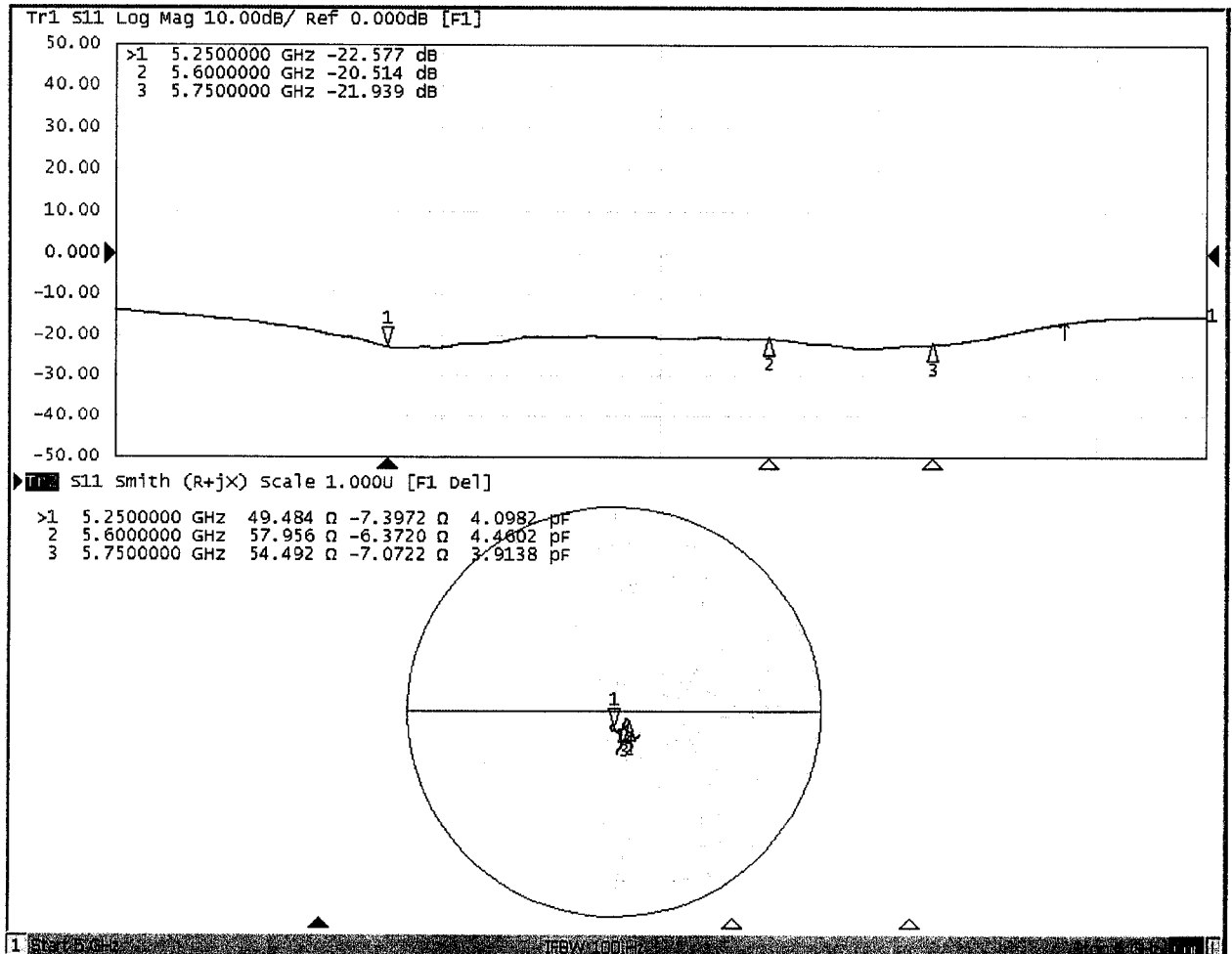


In Collaboration with

s p e a g
CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Body TSL

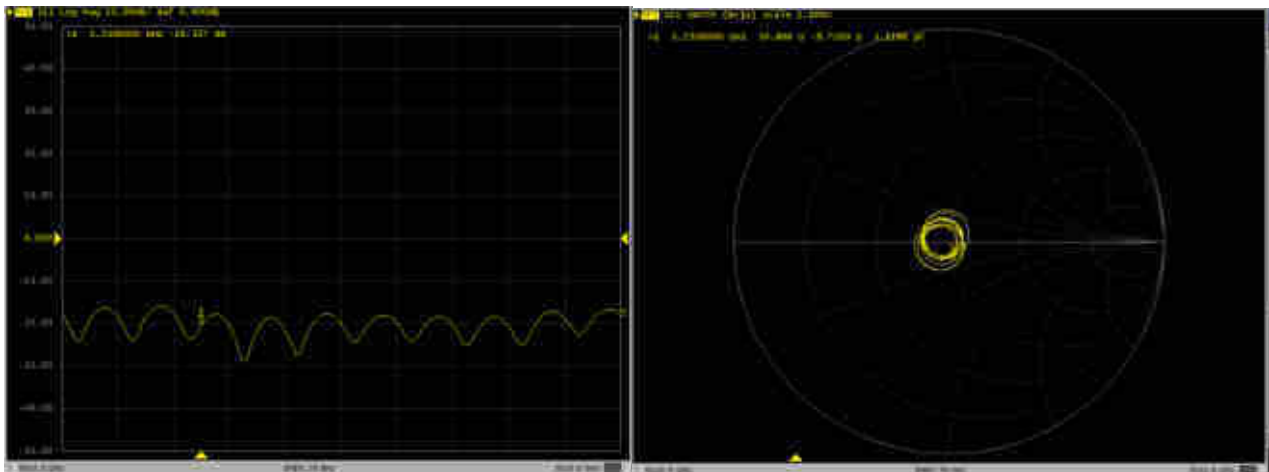


<Justification of the extended calibration>

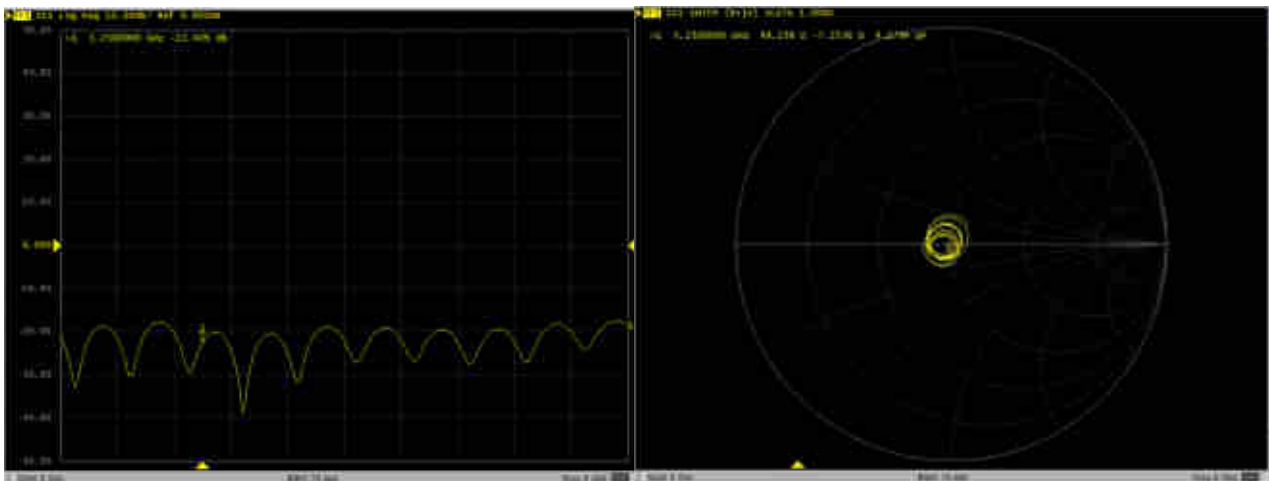
The return loss is $< -20\text{dB}$, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

Dipole Verification Data> D5GHzV3, serial no. 1167

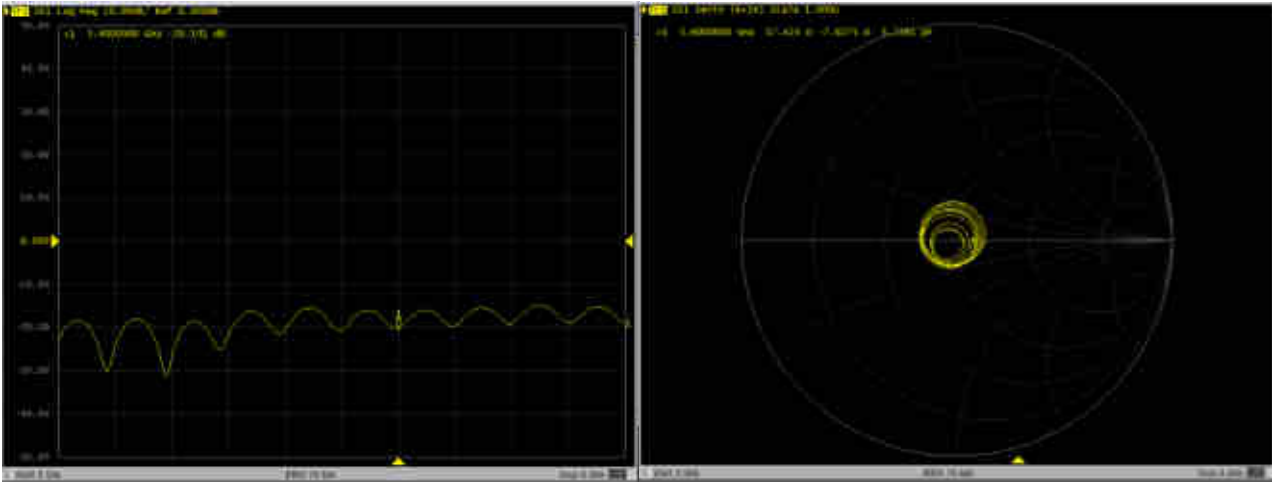
5250MHz - Head



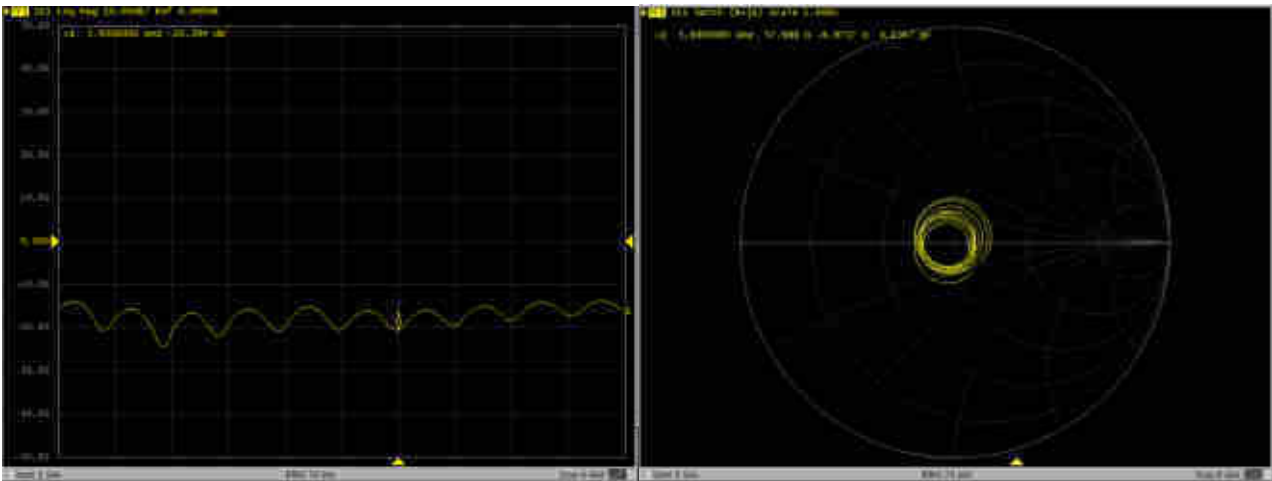
5250MHz - Body



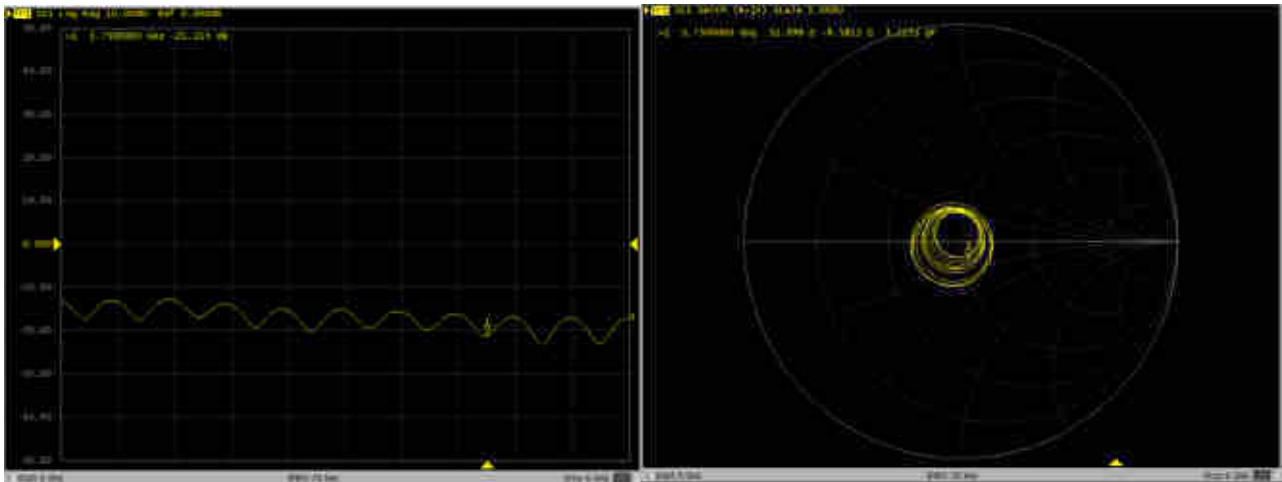
5600MHz – Head



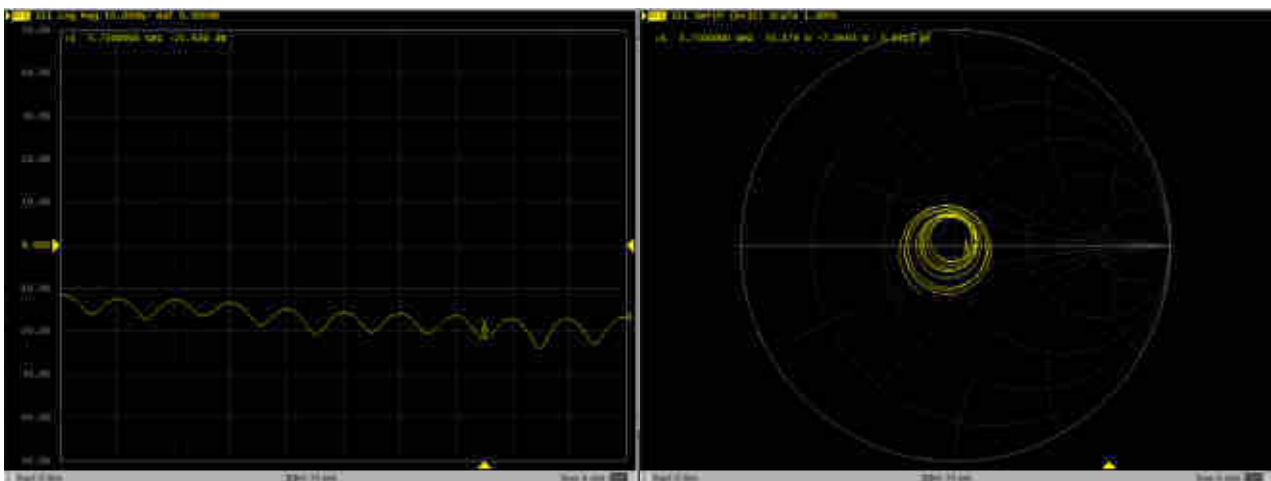
5600MHz – Body



5750MHz – Head



5750MHz – Body





Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **Auden**

Certificate No: **DAE3-528_Mar20**

CALIBRATION CERTIFICATE

Object **DAE3 - SD 000 D03 AA - SN: 528**

Calibration procedure(s) **QA CAL-06.v30
Calibration procedure for the data acquisition electronics (DAE)**

Calibration date: **March 16, 2020**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	03-Sep-19 (No:25949)	Sep-20
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Auto DAE Calibration Unit	SE UWS 053 AA 1001	09-Jan-20 (in house check)	In house check: Jan-21
Calibrator Box V2.1	SE UMS 006 AA 1002	09-Jan-20 (in house check)	In house check: Jan-21

Calibrated by:	Name Eric Hainfeld	Function Laboratory Technician	Signature
Approved by:	Name Sven Kühn	Function Deputy Manager	Signature

Issued: March 16, 2020

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Glossary

DAE data acquisition electronics
Connector angle information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- **DC Voltage Measurement:** Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- **Connector angle:** The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
 - **DC Voltage Measurement Linearity:** Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
 - **Common mode sensitivity:** Influence of a positive or negative common mode voltage on the differential measurement.
 - **Channel separation:** Influence of a voltage on the neighbor channels not subject to an input voltage.
 - **AD Converter Values with inputs shorted:** Values on the internal AD converter corresponding to zero input voltage
 - **Input Offset Measurement:** Output voltage and statistical results over a large number of zero voltage measurements.
 - **Input Offset Current:** Typical value for information; Maximum channel input offset current, not considering the input resistance.
 - **Input resistance:** Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
 - **Low Battery Alarm Voltage:** Typical value for information. Below this voltage, a battery alarm signal is generated.
 - **Power consumption:** Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1 μ V, full range = -100...+300 mV

Low Range: 1LSB = 61nV, full range = -1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.513 \pm 0.02% (k=2)	404.615 \pm 0.02% (k=2)	404.537 \pm 0.02% (k=2)
Low Range	3.97109 \pm 1.50% (k=2)	3.95930 \pm 1.50% (k=2)	3.96568 \pm 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	50.0 $^{\circ}$ \pm 1 $^{\circ}$
---	------------------------------------

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range	Reading (μV)	Difference (μV)	Error (%)
Channel X + Input	200037.58	3.28	0.00
Channel X + Input	20009.65	3.92	0.02
Channel X - Input	-20001.89	3.62	-0.02
Channel Y + Input	200037.90	3.50	0.00
Channel Y + Input	20005.83	0.31	0.00
Channel Y - Input	-20005.73	-0.03	0.00
Channel Z + Input	200033.51	-0.62	-0.00
Channel Z + Input	20006.48	0.89	0.00
Channel Z - Input	-20006.01	-0.27	0.00

Low Range	Reading (μV)	Difference (μV)	Error (%)
Channel X + Input	2001.68	0.24	0.01
Channel X + Input	201.09	-0.22	-0.11
Channel X - Input	-198.93	-0.12	0.06
Channel Y + Input	2001.70	0.49	0.02
Channel Y + Input	200.70	-0.24	-0.12
Channel Y - Input	-199.76	-0.76	0.38
Channel Z + Input	2001.03	-0.04	-0.00
Channel Z + Input	201.25	0.40	0.20
Channel Z - Input	-199.29	-0.32	0.16

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	9.59	7.82
	- 200	-7.34	-8.76
Channel Y	200	14.74	14.93
	- 200	-16.81	-17.15
Channel Z	200	-3.39	-3.82
	- 200	3.03	3.16

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	3.19	-1.66
Channel Y	200	6.79	-	4.73
Channel Z	200	7.16	5.28	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15972	16183
Channel Y	15900	16376
Channel Z	16167	15841

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Input 10M Ω

	Average (μ V)	min. Offset (μ V)	max. Offset (μ V)	Std. Deviation (μ V)
Channel X	1.19	0.18	2.38	0.46
Channel Y	0.15	-1.39	1.24	0.47
Channel Z	0.36	-1.22	1.42	0.42

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	-0.01	-8	-9



Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **Sporton**

Certificate No: **EX3-7576_Jan20**

CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:7576**

Calibration procedure(s) **QA CAL-01.v9, QA CAL-14.v5, QA CAL-23.v5, QA CAL-25.v7
Calibration procedure for dosimetric E-field probes**

Calibration date: **January 22, 2020**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-19 (No. 217-02894)	Apr-20
DAE4	SN: 660	27-Dec-19 (No. DAE4-660_Dec19)	Dec-20
Reference Probe ES3DV2	SN: 3013	31-Dec-19 (No. ES3-3013_Dec19)	Dec-20
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-16)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-16)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-16)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-18)	In house check: Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-19)	In house check: Oct-20

Calibrated by:	Name Jeton Kasrati	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Function Technical Manager	Signature
			Issued: January 25, 2020
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: SCS 0108

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z} = NORM_{x,y,z} * frequency_response** (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; D_{x,y,z}; VR_{x,y,z}; A, B, C, D** are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle**: The angle is assessed using the information gained by determining the NORM_x (no uncertainty required).

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7576

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.48	0.63	0.63	$\pm 10.1\%$
DCP (mV) ^B	103.8	99.8	103.6	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB/ μV	C	D dB	VR mV	Max dev.	Unc (k=2) ^E
0	CW	X	0.0	0.0	1.0	0.00	164.4	$\pm 2.7\%$	$\pm 4.7\%$
		Y	0.0	0.0	1.0		161.8		
		Z	0.0	0.0	1.0		164.7		

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

^A The uncertainties of Norm X,Y,Z do not affect the E²-field uncertainty inside TSL (see Page 5).

^B Numerical linearization parameter: uncertainty not required.

^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7576**Other Probe Parameters**

Sensor Arrangement	Triangular
Connector Angle (°)	112.2
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7576

Calibration Parameter Determined in Head Tissue Simulating Media

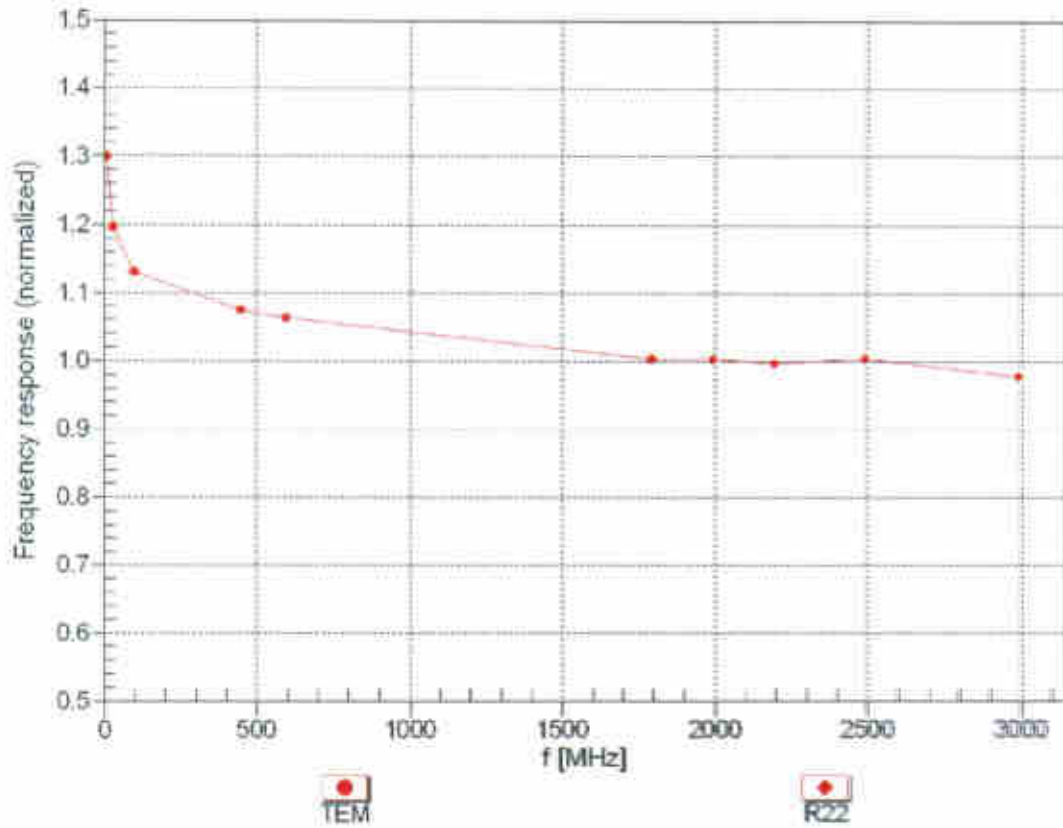
f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth (mm) ^G	Unc (k=2)
750	41.9	0.89	10.71	10.71	10.71	0.62	0.80	± 12.0 %
835	41.5	0.90	10.45	10.45	10.45	0.46	0.94	± 12.0 %
900	41.5	0.97	10.16	10.16	10.16	0.33	1.09	± 12.0 %
1750	40.1	1.37	8.88	8.88	8.88	0.42	0.86	± 12.0 %
1900	40.0	1.40	8.58	8.58	8.58	0.38	0.86	± 12.0 %
2000	40.0	1.40	8.48	8.48	8.48	0.39	0.86	± 12.0 %
2300	39.5	1.67	8.03	8.03	8.03	0.41	0.90	± 12.0 %
2450	39.2	1.80	7.76	7.76	7.76	0.44	0.90	± 12.0 %
2600	39.0	1.96	7.47	7.47	7.47	0.41	0.96	± 12.0 %
3300	38.2	2.71	7.08	7.08	7.08	0.30	1.35	± 14.0 %
3500	37.9	2.91	6.77	6.77	6.77	0.30	1.35	± 14.0 %
3700	37.7	3.12	6.74	6.74	6.74	0.30	1.35	± 14.0 %
3900	37.5	3.32	6.56	6.56	6.56	0.40	1.40	± 14.0 %
4100	37.2	3.53	6.26	6.26	6.26	0.40	1.40	± 14.0 %
4400	36.9	3.84	6.19	6.19	6.19	0.40	1.60	± 14.0 %
4600	36.7	4.04	6.06	6.06	6.06	0.40	1.60	± 14.0 %
4800	36.4	4.25	5.89	5.89	5.89	0.40	1.80	± 14.0 %
4950	36.3	4.40	5.59	5.59	5.59	0.40	1.80	± 14.0 %
5250	35.9	4.71	5.20	5.20	5.20	0.40	1.80	± 14.0 %
5600	35.5	5.07	4.62	4.62	4.62	0.40	1.80	± 14.0 %
5750	35.4	5.22	4.83	4.83	4.83	0.40	1.80	± 14.0 %

^C Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.

^F At frequencies up to 6 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

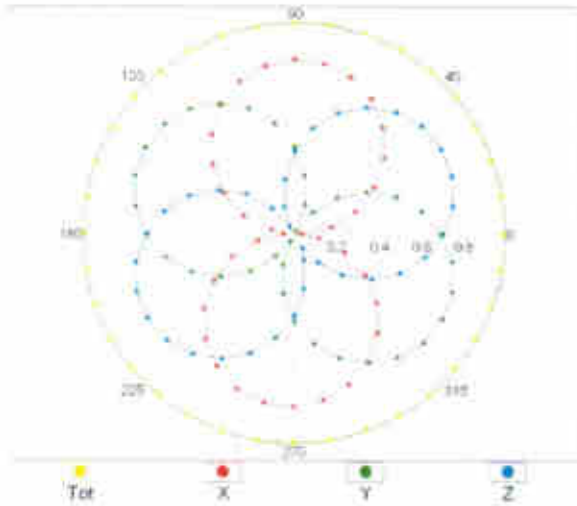
Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)



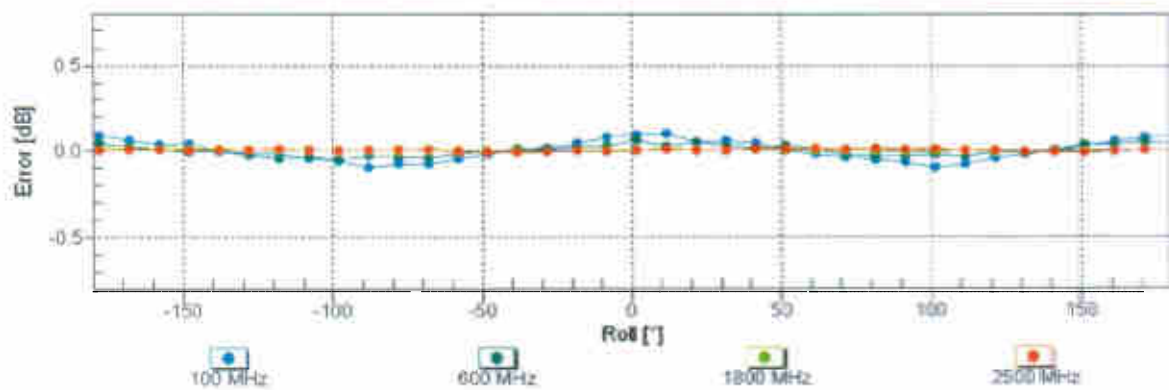
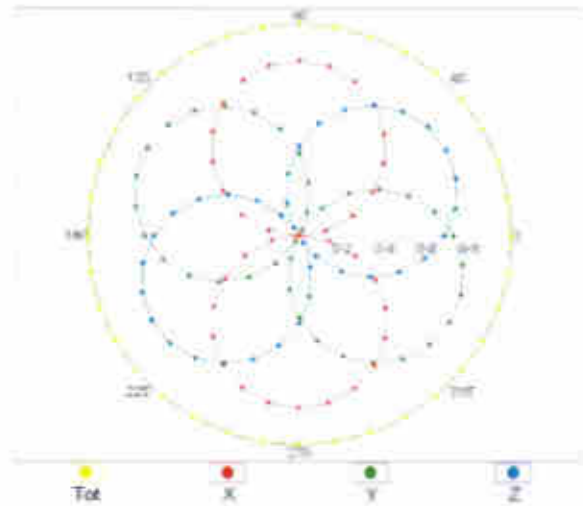
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

Receiving Pattern (ϕ), $\theta = 0^\circ$

f=600 MHz,TEM

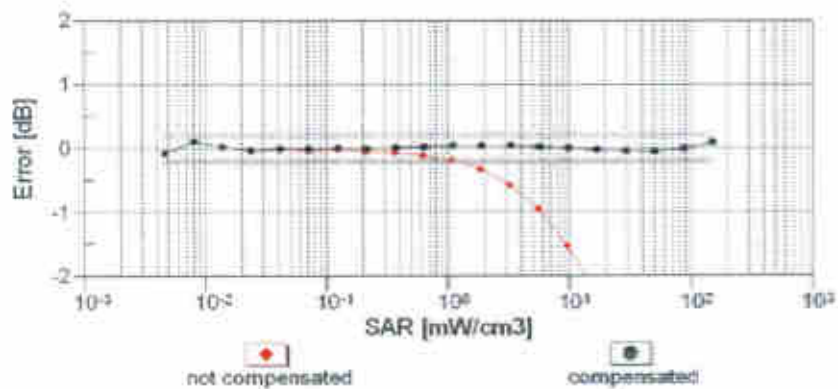
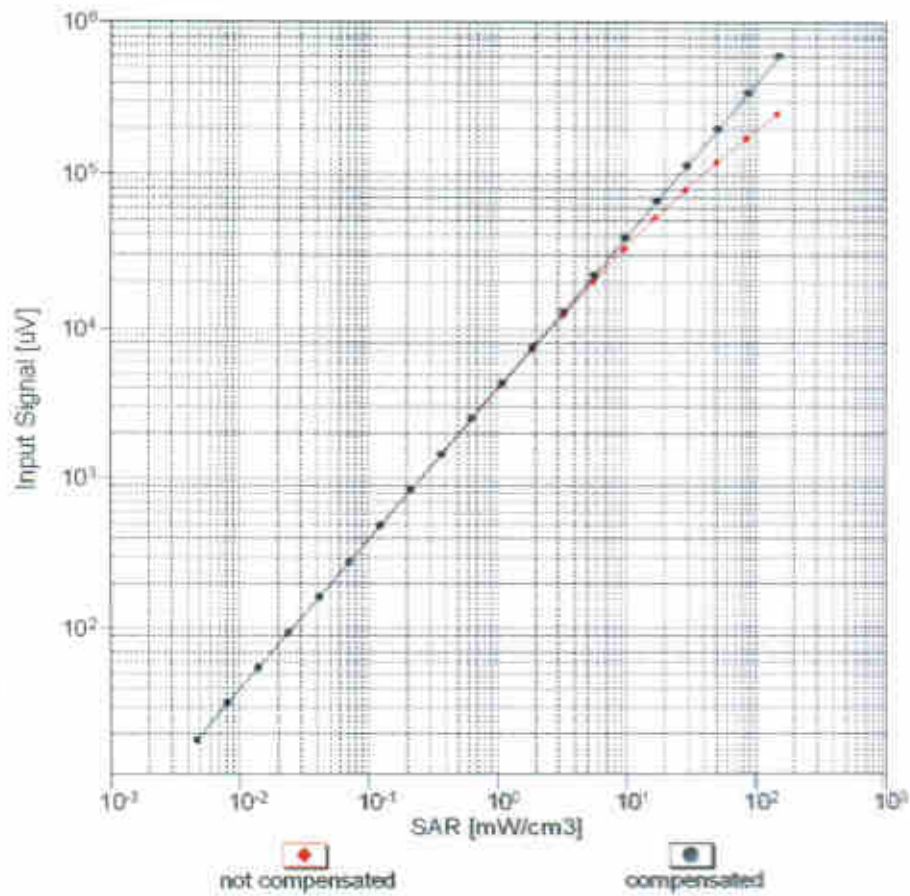


f=1800 MHz,R22



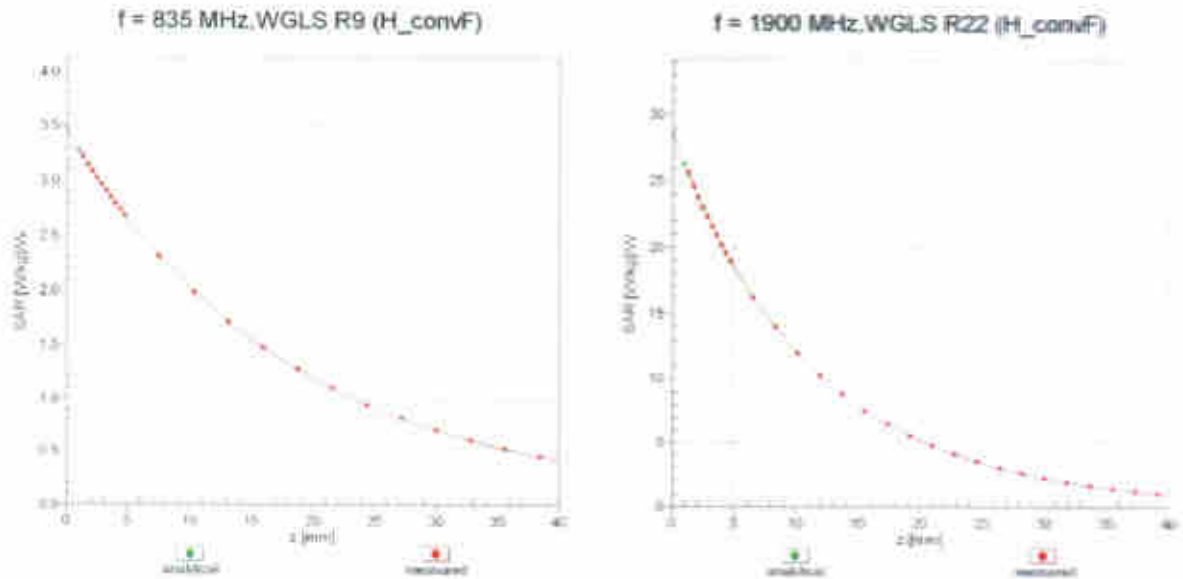
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Dynamic Range $f(\text{SAR}_{\text{head}})$ (TEM cell, $f_{\text{eval}} = 1900 \text{ MHz}$)



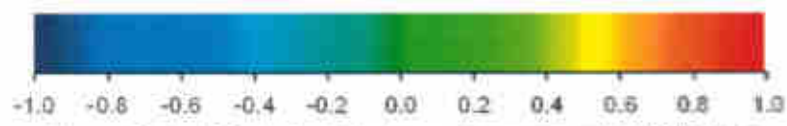
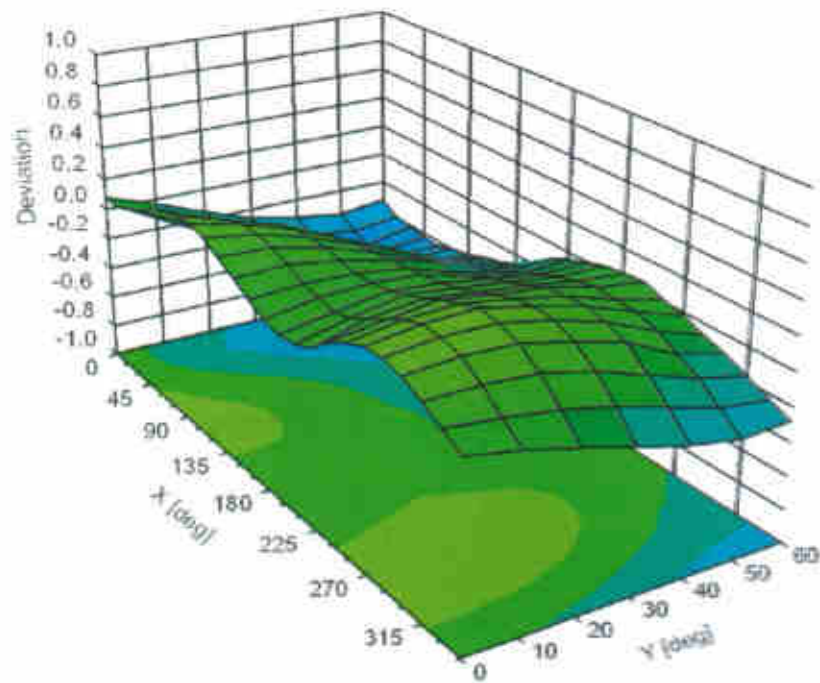
Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, θ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: $\pm 2.6\%$ (k=2)



Appendix E. Conducted RF Output Power Table

The detailed power tables are shown as follows.



Full Power Mode - UAT/LAT

GSM850	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	178	169	251		178	169	251	
TX Channel	824.2	838.4	848.8		824.2	838.4	848.8	
Frequency (MHz)	32.06	32.50	32.23	33.30	23.06	23.50	23.23	24.30
GSM 1 Tx slot	32.06	32.50	32.23	33.30	23.06	23.50	23.23	24.30
GPRS 1 Tx slot	32.04	32.46	32.20	33.30	23.04	23.46	23.20	24.30
GPRS 2 Tx slots	29.80	30.22	30.02	31.30	23.80	24.22	24.02	25.30
GPRS 3 Tx slots	28.23	28.63	28.45	29.80	23.97	24.37	24.19	25.54
GPRS 4 Tx slots	27.33	27.64	27.56	29.30	24.33	24.64	24.56	26.30
EDGE 1 Tx slot	26.65	26.52	26.77	28.30	17.65	17.52	17.77	19.30
EDGE 2 Tx slots	25.45	25.26	25.66	25.80	19.45	19.26	19.66	19.80
EDGE 3 Tx slots	23.25	23.15	23.59	24.30	16.99	16.89	17.33	20.04
EDGE 4 Tx slots	22.20	22.10	22.33	23.80	16.20	16.10	16.33	20.80

GSM1900	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
TX Channel	1850.2	1880	1909.8		1850.2	1880	1909.8	
Frequency (MHz)	29.15	29.28	29.26	30.30	20.15	20.28	20.26	21.30
GSM 1 Tx slot	29.15	29.28	29.26	30.30	20.15	20.28	20.26	21.30
GPRS 1 Tx slot	29.13	29.26	29.23	30.30	20.13	20.26	20.23	21.30
GPRS 2 Tx slots	26.00	26.22	26.19	27.80	20.00	20.22	20.19	21.80
GPRS 3 Tx slots	25.22	25.41	25.39	26.80	20.96	21.15	21.13	22.54
GPRS 4 Tx slots	23.37	23.54	23.53	25.30	20.37	20.54	20.53	22.30
EDGE 1 Tx slot	25.84	25.90	25.72	27.30	16.84	16.90	16.72	18.30
EDGE 2 Tx slots	23.92	24.00	23.89	24.80	17.92	18.00	17.89	18.80
EDGE 3 Tx slots	22.44	22.57	22.32	23.80	18.18	18.31	18.06	19.54
EDGE 4 Tx slots	21.24	21.28	21.12	22.80	18.24	18.28	18.12	19.80

Band	TX Channel	WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
		9262	9400	9538		1312	1413	1513		4132	4182	4233	
	Rx Channel	9662	9800	9938		1537	1638	1738		4357	4407	4458	
	Frequency (MHz)	1852.4	1880	1907.6		1712.4	1732.6	1752.6		826.4	838.4	846.6	
3GPP Rel 99	AMR 12.2Kbps	23.76	23.69	23.75	24.30	23.52	23.60	23.57	24.30	24.09	24.10	24.14	24.80
3GPP Rel 99	RMC 12.2Kbps	23.79	23.72	23.78	24.30	23.55	23.62	23.60	24.30	24.12	24.14	24.16	24.80
3GPP Rel 6	HSDPA Subtest-1	22.75	22.74	22.77	23.30	22.54	22.62	22.63	23.30	23.17	23.17	23.18	23.80
3GPP Rel 6	HSDPA Subtest-2	22.74	22.72	22.75	23.30	22.51	22.59	22.60	23.30	23.14	23.13	23.21	23.80
3GPP Rel 6	HSDPA Subtest-3	22.26	22.26	22.27	22.80	22.05	22.16	22.12	22.80	22.71	22.67	22.69	23.30
3GPP Rel 6	HSDPA Subtest-4	22.23	22.19	22.24	22.80	22.01	22.10	22.13	22.80	22.71	22.69	22.64	23.30
3GPP Rel 8	DC-HSDPA Subtest-1	22.64	22.68	22.75	23.30	22.49	22.53	22.43	23.30	23.01	23.08	23.10	23.80
3GPP Rel 8	DC-HSDPA Subtest-2	22.61	22.64	22.71	23.30	22.42	22.46	22.38	23.30	23.03	23.01	23.11	23.80
3GPP Rel 8	DC-HSDPA Subtest-3	22.17	22.22	22.31	22.80	21.96	22.02	22.04	22.80	22.63	22.54	22.52	23.30
3GPP Rel 8	DC-HSDPA Subtest-4	22.11	22.21	22.21	22.80	21.93	21.94	21.92	22.80	22.51	22.46	22.55	23.30
3GPP Rel 6	HSUPA Subtest-1	21.20	21.19	21.24	21.80	20.99	21.11	21.13	21.80	21.55	21.60	21.59	22.30
3GPP Rel 6	HSUPA Subtest-2	20.86	20.84	20.75	21.30	20.69	20.75	20.78	21.30	21.06	21.10	21.07	21.80
3GPP Rel 6	HSUPA Subtest-3	21.75	21.71	21.78	22.30	21.56	21.63	21.61	22.30	22.12	22.12	22.11	22.80
3GPP Rel 6	HSUPA Subtest-4	20.22	20.17	20.23	20.80	19.99	20.09	20.06	20.80	20.59	20.59	20.60	21.30
3GPP Rel 6	HSUPA Subtest-5	22.70	22.70	22.80	23.30	22.50	22.60	22.60	23.30	23.10	23.10	23.10	23.80
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	19.79	19.83	19.92	20.30	19.50	19.63	19.71	20.30	19.97	19.92	19.99	20.80



Band 2 (1900MHz Band)										
Part 24E										
BW (MHz)	Modulation	RB Size	RB Offset	Power Low Ch. Freq. (MHz)	Power High Ch. Freq. (MHz)	Power High Ch. Freq. (MHz)	Turn-up time (dBm)	MPR (dB)		
20	QPSK	1	0	22.90	22.98	22.88		24.3	0	
20	QPSK	1	49	23.00	23.08	22.98		24.3	0	
20	QPSK	1	99	23.10	23.18	23.08		24.3	0	
20	QPSK	50	0	23.20	23.28	23.18		24.3	1	
20	QPSK	50	24	23.30	23.38	23.28		24.3	1	
20	QPSK	50	50	23.40	23.48	23.38		24.3	1	
20	QPSK	100	0	23.50	23.58	23.48		24.3	1	
20	QPSK	100	24	23.60	23.68	23.58		24.3	1	
20	QPSK	100	49	23.70	23.78	23.68		24.3	1	
20	QPSK	100	99	23.80	23.88	23.78		24.3	1	
20	QPSK	50	0	23.90	23.98	23.88		24.3	1	
20	QPSK	50	24	24.00	24.08	23.98		24.3	1	
20	QPSK	50	50	24.10	24.18	24.08		24.3	1	
20	QPSK	100	0	24.20	24.28	24.18		24.3	1	
20	QPSK	100	24	24.30	24.38	24.28		24.3	1	
20	QPSK	100	49	24.40	24.48	24.38		24.3	1	
20	QPSK	100	99	24.50	24.58	24.48		24.3	1	
20	QPSK	50	0	24.60	24.68	24.58		24.3	1	
20	QPSK	50	24	24.70	24.78	24.68		24.3	1	
20	QPSK	50	50	24.80	24.88	24.78		24.3	1	
20	QPSK	100	0	24.90	24.98	24.88		24.3	1	
20	QPSK	100	24	25.00	25.08	24.98		24.3	1	
20	QPSK	100	49	25.10	25.18	25.08		24.3	1	
20	QPSK	100	99	25.20	25.28	25.18		24.3	1	
20	QPSK	50	0	25.30	25.38	25.28		24.3	1	
20	QPSK	50	24	25.40	25.48	25.38		24.3	1	
20	QPSK	50	50	25.50	25.58	25.48		24.3	1	
20	QPSK	100	0	25.60	25.68	25.58		24.3	1	
20	QPSK	100	24	25.70	25.78	25.68		24.3	1	
20	QPSK	100	49	25.80	25.88	25.78		24.3	1	
20	QPSK	100	99	25.90	25.98	25.88		24.3	1	
20	QPSK	50	0	26.00	26.08	25.98		24.3	1	
20	QPSK	50	24	26.10	26.18	26.08		24.3	1	
20	QPSK	50	50	26.20	26.28	26.18		24.3	1	
20	QPSK	100	0	26.30	26.38	26.28		24.3	1	
20	QPSK	100	24	26.40	26.48	26.38		24.3	1	
20	QPSK	100	49	26.50	26.58	26.48		24.3	1	
20	QPSK	100	99	26.60	26.68	26.58		24.3	1	
20	QPSK	50	0	26.70	26.78	26.68		24.3	1	
20	QPSK	50	24	26.80	26.88	26.78		24.3	1	
20	QPSK	50	50	26.90	26.98	26.88		24.3	1	
20	QPSK	100	0	27.00	27.08	26.98		24.3	1	
20	QPSK	100	24	27.10	27.18	27.08		24.3	1	
20	QPSK	100	49	27.20	27.28	27.18		24.3	1	
20	QPSK	100	99	27.30	27.38	27.28		24.3	1	
20	QPSK	50	0	27.40	27.48	27.38		24.3	1	
20	QPSK	50	24	27.50	27.58	27.48		24.3	1	
20	QPSK	50	50	27.60	27.68	27.58		24.3	1	
20	QPSK	100	0	27.70	27.78	27.68		24.3	1	
20	QPSK	100	24	27.80	27.88	27.78		24.3	1	
20	QPSK	100	49	27.90	27.98	27.88		24.3	1	
20	QPSK	100	99	28.00	28.08	27.98		24.3	1	
20	QPSK	50	0	28.10	28.18	28.08		24.3	1	
20	QPSK	50	24	28.20	28.28	28.18		24.3	1	
20	QPSK	50	50	28.30	28.38	28.28		24.3	1	
20	QPSK	100	0	28.40	28.48	28.38		24.3	1	
20	QPSK	100	24	28.50	28.58	28.48		24.3	1	
20	QPSK	100	49	28.60	28.68	28.58		24.3	1	
20	QPSK	100	99	28.70	28.78	28.68		24.3	1	
20	QPSK	50	0	28.80	28.88	28.78		24.3	1	
20	QPSK	50	24	28.90	28.98	28.88		24.3	1	
20	QPSK	50	50	29.00	29.08	28.98		24.3	1	
20	QPSK	100	0	29.10	29.18	29.08		24.3	1	
20	QPSK	100	24	29.20	29.28	29.18		24.3	1	
20	QPSK	100	49	29.30	29.38	29.28		24.3	1	
20	QPSK	100	99	29.40	29.48	29.38		24.3	1	
20	QPSK	50	0	29.50	29.58	29.48		24.3	1	
20	QPSK	50	24	29.60	29.68	29.58		24.3	1	
20	QPSK	50	50	29.70	29.78	29.68		24.3	1	
20	QPSK	100	0	29.80	29.88	29.78		24.3	1	
20	QPSK	100	24	29.90	29.98	29.88		24.3	1	
20	QPSK	100	49	30.00	30.08	29.98		24.3	1	
20	QPSK	100	99	30.10	30.18	30.08		24.3	1	
20	QPSK	50	0	30.20	30.28	30.18		24.3	1	
20	QPSK	50	24	30.30	30.38	30.28		24.3	1	
20	QPSK	50	50	30.40	30.48	30.38		24.3	1	
20	QPSK	100	0	30.50	30.58	30.48		24.3	1	
20	QPSK	100	24	30.60	30.68	30.58		24.3	1	
20	QPSK	100	49	30.70	30.78	30.68		24.3	1	
20	QPSK	100	99	30.80	30.88	30.78		24.3	1	
20	QPSK	50	0	30.90	30.98	30.88		24.3	1	
20	QPSK	50	24	31.00	31.08	30.98		24.3	1	
20	QPSK	50	50	31.10	31.18	31.08		24.3	1	
20	QPSK	100	0	31.20	31.28	31.18		24.3	1	
20	QPSK	100	24	31.30	31.38	31.28		24.3	1	
20	QPSK	100	49	31.40	31.48	31.38		24.3	1	
20	QPSK	100	99	31.50	31.58	31.48		24.3	1	
20	QPSK	50	0	31.60	31.68	31.58		24.3	1	
20	QPSK	50	24	31.70	31.78	31.68		24.3	1	
20	QPSK	50	50	31.80	31.88	31.78		24.3	1	
20	QPSK	100	0	31.90	31.98	31.88		24.3	1	
20	QPSK	100	24	32.00	32.08	31.98		24.3	1	
20	QPSK	100	49	32.10	32.18	32.08		24.3	1	
20	QPSK	100	99	32.20	32.28	32.18		24.3	1	
20	QPSK	50	0	32.30	32.38	32.28		24.3	1	
20	QPSK	50	24	32.40	32.48	32.38		24.3	1	
20	QPSK	50	50	32.50	32.58	32.48		24.3	1	
20	QPSK	100	0	32.60	32.68	32.58		24.3	1	
20	QPSK	100	24	32.70	32.78	32.68		24.3	1	
20	QPSK	100	49	32.80	32.88	32.78		24.3	1	
20	QPSK	100	99	32.90	32.98	32.88		24.3	1	
20	QPSK	50	0	33.00	33.08	32.98		24.3	1	
20	QPSK	50	24	33.10	33.18	33.08		24.3	1	
20	QPSK	50	50	33.20	33.28	33.18		24.3	1	
20	QPSK	100	0	33.30	33.38	33.28		24.3	1	
20	QPSK	100	24	33.40	33.48	33.38		24.3	1	
20	QPSK	100	49	33.50	33.58	33.48		24.3	1	
20	QPSK	100	99	33.60	33.68	33.58		24.3	1	
20	QPSK	50	0	33.70	33.78	33.68		24.3	1	
20	QPSK	50	24	33.80	33.88	33.78		24.3	1	
20	QPSK	50	50	33.90	33.98	33.88		24.3	1	
20	QPSK	100	0	34.00	34.08	33.98		24.3	1	
20	QPSK	100	24	34.10	34.18	34.08		24.3	1	
20	QPSK	100	49	34.20	34.28	34.18		24.3	1	
20	QPSK	100	99	34.30	34.38	34.28		24.3	1	
20	QPSK	50	0	34.40	34.48	34.38		24.3	1	
20	QPSK	50	24	34.50	34.58	34.48		24.3	1	
20	QPSK	50	50	34.60	34.68	34.58		24.3	1	
20	QPSK	100	0	34.70	34.78	34.68		24.3	1	
20	QPSK	100	24	34.80	34.88	34.78		24.3	1	
20	QPSK	100	49	34.90	34.98	34.88		24.3	1	
20										

Band 38 (only on channel required)									
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)	
Channel				37850	38000	38150			
Frequency (MHz)				2580	2595	2610			
20	QPSK	1	0	23.23	23.23	23.30	24.3	0	
20	QPSK	1	49	23.49	23.44	23.46			
20	QPSK	1	99	23.39	23.34	23.40			
20	QPSK	50	0	22.07	22.05	22.11	23.3	1	
20	QPSK	50	24	22.17	22.10	22.16			
20	QPSK	50	50	22.11	22.08	22.10			
20	QPSK	100	0	22.10	22.07	22.09	23.3	1	
20	16QAM	1	0	22.16	22.10	22.22			
20	16QAM	1	49	22.37	22.44	22.45			
20	16QAM	1	99	22.25	22.27	22.35	22.3	2	
20	16QAM	50	0	21.45	21.49	21.50			
20	16QAM	50	24	21.46	21.49	21.52			
20	16QAM	50	50	21.48	21.51	21.52	22.3	2	
20	16QAM	100	0	21.45	21.44	21.50			
20	64QAM	1	0	21.25	21.34	21.40			
20	64QAM	1	49	21.47	21.53	21.58	21.3	3	
20	64QAM	1	99	21.41	21.45	21.52			
20	64QAM	50	0	20.33	20.38	20.48			
20	64QAM	50	24	20.45	20.49	20.45	21.3	3	
20	64QAM	50	50	20.46	20.45	20.49			
20	64QAM	100	0	20.37	20.39	20.45			
Channel				37825	38000	38175	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				2577.5	2595	2612.5			
15	QPSK	1	0	23.22	23.24	23.32	24.3	0	
15	QPSK	1	37	23.34	23.44	23.47			
15	QPSK	1	74	23.40	23.37	23.41			
15	QPSK	36	0	22.09	22.07	22.18	23.3	1	
15	QPSK	36	20	22.12	22.16	22.23			
15	QPSK	36	39	22.13	22.10	22.21			
15	QPSK	75	0	22.15	22.17	22.24	23.3	1	
15	16QAM	1	0	22.19	22.18	22.20			
15	16QAM	1	37	22.32	22.35	22.35			
15	16QAM	1	74	22.33	22.28	22.35	22.3	2	
15	16QAM	36	0	21.38	21.41	21.47			
15	16QAM	36	20	21.40	21.42	21.49			
15	16QAM	36	39	21.44	21.47	21.44	22.3	2	
15	16QAM	75	0	21.40	21.47	21.54			
15	64QAM	1	0	21.36	21.32	21.49			
15	64QAM	1	37	21.45	21.53	21.52	21.3	3	
15	64QAM	1	74	21.54	21.47	21.55			
15	64QAM	36	0	20.37	20.46	20.57			
15	64QAM	36	20	20.45	20.47	20.50	21.3	3	
15	64QAM	36	39	20.39	20.49	20.45			
15	64QAM	75	0	20.39	20.42	20.41			
Channel				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				2575	2595	2615			
10	QPSK	1	0	23.31	23.42	23.35	24.3	0	
10	QPSK	1	25	23.38	23.48	23.43			
10	QPSK	1	49	23.45	23.44	23.49			
10	QPSK	25	0	22.03	22.19	22.18	23.3	1	
10	QPSK	25	12	22.17	22.19	22.24			
10	QPSK	25	25	22.14	22.09	22.24			
10	QPSK	50	0	22.12	22.12	22.17	23.3	1	
10	16QAM	1	0	22.20	22.27	22.28			
10	16QAM	1	25	22.33	22.35	22.41			
10	16QAM	1	49	22.29	22.39	22.40	22.3	2	
10	16QAM	25	0	21.44	21.55	21.55			
10	16QAM	25	12	21.44	21.52	21.59			
10	16QAM	25	25	21.49	21.52	21.60	22.3	2	
10	16QAM	50	0	21.46	21.45	21.59			
10	64QAM	1	0	21.39	21.46	21.47			
10	64QAM	1	25	21.45	21.47	21.60	21.3	3	
10	64QAM	1	49	21.47	21.53	21.56			
10	64QAM	25	0	20.48	20.53	20.53			
10	64QAM	25	12	20.51	20.51	20.66	21.3	3	
10	64QAM	25	25	20.54	20.46	20.63			
10	64QAM	50	0	20.40	20.47	20.54			
Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				2572.5	2595	2617.5			
5	QPSK	1	0	23.31	23.40	23.48	24.3	0	
5	QPSK	1	12	23.34	23.39	23.47			
5	QPSK	1	24	23.40	23.46	23.47			
5	QPSK	12	0	22.11	22.21	22.26	23.3	1	
5	QPSK	12	7	22.12	22.20	22.22			
5	QPSK	12	13	22.11	22.15	22.27			
5	QPSK	25	0	22.19	22.16	22.25	23.3	1	
5	16QAM	1	0	22.26	22.32	22.36			
5	16QAM	1	12	22.29	22.39	22.36			
5	16QAM	1	24	22.24	22.37	22.39	22.3	2	
5	16QAM	12	0	21.38	21.47	21.54			
5	16QAM	12	7	21.37	21.46	21.62			
5	16QAM	12	13	21.42	21.45	21.56	22.3	2	
5	16QAM	25	0	21.43	21.57	21.59			
5	64QAM	1	0	21.44	21.52	21.56			
5	64QAM	1	12	21.46	21.53	21.59	21.3	3	
5	64QAM	1	24	21.49	21.52	21.58			
5	64QAM	12	0	20.38	20.53	20.50			
5	64QAM	12	7	20.41	20.48	20.50	21.3	3	
5	64QAM	12	13	20.46	20.45	20.50			
5	64QAM	25	0	20.47	20.50	20.61			

Band 41 (2.6G Band)										
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				39750	40185	40620	41055	41490		
Frequency (MHz)				2506	2549.5	2593	2636.5	2680		
20	QPSK	1	0	23.40	23.34	23.47	23.49	23.52	24.3	0
20	QPSK	1	49	23.58	23.56	23.67	23.65	23.65		
20	QPSK	1	99	23.45	23.41	23.60	23.60	23.51		
20	QPSK	50	0	22.12	22.04	22.23	22.25	22.25	23.3	1
20	QPSK	50	24	22.21	22.19	22.31	22.29	22.27		
20	QPSK	50	50	22.13	22.15	22.27	22.30	22.26		
20	QPSK	100	0	22.11	22.12	22.28	22.27	22.25	23.3	1
20	16QAM	1	0	22.04	22.10	22.19	22.01	22.04		
20	16QAM	1	49	22.09	22.26	22.30	22.13	22.12		
20	16QAM	1	99	22.19	22.10	22.12	22.06	22.00	22.3	2
20	16QAM	50	0	21.26	21.43	21.58	21.39	21.38		
20	16QAM	50	24	21.38	21.46	21.59	21.44	21.41		
20	16QAM	50	50	21.37	21.51	21.56	21.44	21.36	22.3	2
20	16QAM	100	0	21.29	21.46	21.53	21.41	21.37		
20	64QAM	1	0	21.01	21.09	21.19	21.03	21.00		
20	64QAM	1	49	21.08	21.25	21.28	21.12	21.15	21.3	3
20	64QAM	1	99	21.00	21.09	21.14	21.08	21.04		
20	64QAM	50	0	20.21	20.37	20.52	20.33	20.33		
20	64QAM	50	24	20.34	20.41	20.52	20.43	20.36	21.3	3
20	64QAM	50	50	20.33	20.45	20.51	20.39	20.31		
20	64QAM	100	0	20.26	20.42	20.52	20.38	20.31		
Channel				39725	40173	40620	41088	41515	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5		
15	QPSK	1	0	23.35	23.56	23.51	23.54	23.56	24.3	0
15	QPSK	1	37	23.47	23.57	23.57	23.55	23.55		
15	QPSK	1	74	23.41	23.59	23.52	23.54	23.51		
15	QPSK	36	0	22.15	22.35	22.27	22.36	22.48	23.3	1
15	QPSK	36	20	22.16	22.39	22.28	22.41	22.49		
15	QPSK	36	39	22.14	22.44	22.32	22.42	22.47		
15	QPSK	75	0	22.17	22.43	22.35	22.42	22.51	23.3	1
15	16QAM	1	0	22.13	22.42	22.31	22.37	22.47		
15	16QAM	1	37	22.22	22.50	22.37	22.44	22.53		
15	16QAM	1	74	22.24	22.44	22.33	22.43	22.44	22.3	2
15	16QAM	36	0	21.43	21.64	21.58	21.63	21.75		
15	16QAM	36	20	21.45	21.68	21.59	21.67	21.76		
15	16QAM	36	39	21.47	21.69	21.59	21.73	21.77	22.3	2
15	16QAM	75	0	21.48	21.75	21.66	21.70	21.84		
15	64QAM	1	0	21.17	21.42	21.33	21.40	21.52		
15	64QAM	1	37	21.30	21.52	21.43	21.47	21.56	21.3	3
15	64QAM	1	74	21.27	21.45	21.37	21.45	21.45		
15	64QAM	36	0	20.43	20.63	20.61	20.65	20.77		
15	64QAM	36	20	20.47	20.70	20.56	20.69	20.76	21.3	3
15	64QAM	36	39	20.4						



Reduced Power Level 1 for Head -UAT

GSM850 TX Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	128	189	251		128	189	251	
Frequency (MHz)	824.2	836.4	848.8	824.2	836.4	848.8	824.2	836.4
GSM 1 Tx slot	27.24	27.39	27.29	27.80	18.24	18.39	18.29	18.80
GPRS 1 Tx slot	27.22	27.38	27.27	27.80	18.22	18.38	18.27	18.80
GPRS 2 Tx slots	24.63	24.79	24.66	25.80	18.63	18.79	18.66	19.80
GPRS 3 Tx slots	23.17	23.30	23.18	24.30	18.17	18.04	18.92	20.04
GPRS 4 Tx slots	22.13	22.30	22.23	23.80	19.13	19.30	19.23	20.80
EDGE 1 Tx slot	21.33	21.37	21.42	22.80	12.33	12.37	12.42	13.80
EDGE 2 Tx slots	20.04	19.98	20.08	20.30	14.04	13.98	14.08	14.30
EDGE 3 Tx slots	17.95	18.03	17.99	18.80	13.69	13.77	13.73	14.54
EDGE 4 Tx slots	16.97	16.96	16.96	18.30	13.97	13.96	13.96	15.30

GSM1900 TX Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8	1850.2	1880
GSM 1 Tx slot	23.40	23.45	23.46	24.30	14.40	14.45	14.46	15.30
GPRS 1 Tx slot	23.38	23.43	23.43	24.30	14.38	14.43	14.43	15.30
GPRS 2 Tx slots	19.76	19.88	19.83	21.30	13.76	13.88	13.83	15.30
GPRS 3 Tx slots	19.07	19.20	19.18	20.30	14.81	14.94	14.92	16.04
GPRS 4 Tx slots	17.28	17.39	17.33	18.80	14.28	14.39	14.33	15.80
EDGE 1 Tx slot	19.28	19.36	19.31	20.80	10.28	10.36	10.31	11.80
EDGE 2 Tx slots	17.36	17.44	17.40	18.30	11.36	11.44	11.40	12.30
EDGE 3 Tx slots	15.73	15.83	15.78	17.30	11.47	11.57	11.52	13.04
EDGE 4 Tx slots	14.56	14.66	14.62	16.30	11.56	11.66	11.62	13.30

Band TX Channel	WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
	9282	9400	9538		1312	1413	1513		4132	4182	4233	
Rx Channel	9682	9800	9938	1537	1638	1738	4357	4407	4458	4357	4407	4458
Frequency (MHz)	1852.4	1880	1907.6	1712.4	1732.6	1752.6	626.4	636.4	646.6	626.4	636.4	646.6
3GPP Rel 99 AMR 12.2Kbps	14.85	14.84	14.65	15.30	13.64	13.66	13.63	14.30	19.10	19.08	19.13	19.80
3GPP Rel 99 RMCS 12.2Kbps	14.97	14.86	14.68	15.30	13.67	13.68	13.66	14.30	19.13	19.11	19.15	19.80
3GPP Rel 6 HSDPA Subtest-1	13.79	13.82	13.71	14.30	12.60	12.61	12.65	13.30	18.08	18.08	18.03	18.80
3GPP Rel 6 HSDPA Subtest-2	13.77	13.78	13.75	14.30	12.60	12.63	12.64	13.30	18.09	18.07	17.70	18.80
3GPP Rel 6 HSDPA Subtest-3	13.34	13.35	13.28	13.80	12.14	12.13	12.20	12.80	17.80	17.75	17.75	18.30
3GPP Rel 6 HSDPA Subtest-4	13.33	13.27	13.26	13.80	12.10	12.13	12.16	12.80	17.80	17.71	17.70	18.30
3GPP Rel 8 DC-HSDPA Subtest-1	13.65	13.61	13.54	14.30	12.30	12.39	12.46	13.30	17.99	17.92	18.01	18.80
3GPP Rel 8 DC-HSDPA Subtest-2	13.66	13.64	13.72	14.30	12.44	12.47	12.38	13.30	17.79	17.79	17.39	18.80
3GPP Rel 8 DC-HSDPA Subtest-3	13.13	13.10	13.10	13.80	12.13	11.92	11.92	12.80	17.56	17.56	17.52	18.30
3GPP Rel 8 DC-HSDPA Subtest-4	13.31	13.15	13.14	13.80	12.08	11.95	11.85	12.80	17.49	17.40	17.65	18.30
3GPP Rel 8 HSUPA Subtest-1	12.22	12.31	12.16	12.80	10.70	10.79	11.00	11.80	16.51	16.67	16.64	17.30
3GPP Rel 8 HSUPA Subtest-2	11.58	11.61	11.66	12.30	10.52	10.67	10.62	11.30	16.17	16.27	16.34	16.80
3GPP Rel 6 HSUPA Subtest-3	12.82	12.70	12.71	13.30	11.43	11.35	11.54	12.30	17.32	17.30	17.23	17.80
3GPP Rel 6 HSUPA Subtest-4	11.16	11.22	11.16	11.80	9.90	9.83	9.77	10.80	15.59	15.69	15.72	16.30
3GPP Rel 6 HSUPA Subtest-5	13.70	13.60	13.70	14.30	12.30	12.30	12.50	13.30	18.20	18.20	18.30	18.80
3GPP Rel 7 HSPA+ (16QAM) Subtest-1	10.90	10.84	10.85	11.30	9.52	9.45	9.64	10.30	14.98	15.09	15.03	15.80



Band 2 (1900MHz Band)									
Part 24E									
BW (MHz)	Modulation	RB Size	RB Offset	Low Ch. Freq.	High Ch. Freq.	Power Ch. Freq.	Power Ch. Freq.	Take-up limit (dBm)	MPR (dB)
20	QPSK	1	0	14.15	14.13	14.07	14.15		
20	QPSK	1	49	14.18	14.25	14.38	14.18	15.3	0
20	QPSK	1	99	14.07	14.01	13.99	14.07		
20	QPSK	50	0	14.02	14.00	14.03	14.02		
20	QPSK	50	24	14.19	14.23	14.17	14.19	15.3	0
20	QPSK	50	50	14.09	14.05	14.07	14.09		
20	QPSK	100	0	14.02	14.00	14.03	14.02		
20	QPSK	1	1	14.18	14.19	13.89	14.18		
20	16QAM	1	49	14.15	14.16	14.01	14.15	15.3	0
20	16QAM	1	99	14.11	14.14	13.98	14.11		
20	16QAM	50	0	14.02	14.03	14.03	14.02		
20	16QAM	50	24	14.03	14.02	14.08	14.03	15.3	0
20	16QAM	50	50	14.01	13.97	14.15	14.01		
20	16QAM	100	0	14.07	14.02	14.09	14.07		
20	16QAM	1	1	14.17	14.14	14.14	14.17		
20	64QAM	1	49	14.08	14.10	14.07	14.08	15.3	0
20	64QAM	1	99	14.10	14.08	14.14	14.10		
20	64QAM	50	0	14.02	14.03	14.03	14.02		
20	64QAM	50	24	14.02	14.03	14.12	14.02	15.3	0
20	64QAM	50	50	14.02	14.03	14.20	14.02		
20	64QAM	100	0	14.02	13.96	14.20	14.02		
Channel									
Frequency (MHz)	Channel	Low Ch. Freq.	High Ch. Freq.	Power Ch. Freq.	Power Ch. Freq.	Take-up limit (dBm)	MPR (dB)		
15	QPSK	1	0	13.95	13.97	13.91	13.95	15.3	0
15	QPSK	1	37	14.02	14.01	13.93	14.02		
15	QPSK	36	0	13.98	13.97	14.08	13.98		
15	QPSK	36	20	13.97	13.98	13.97	13.97	15.3	0
15	QPSK	36	50	13.98	13.92	14.09	13.98		
15	QPSK	36	100	13.98	13.92	14.09	13.98		
15	16QAM	1	0	14.20	14.14	14.19	14.20		
15	16QAM	1	37	14.14	14.16	14.15	14.14	15.3	0
15	16QAM	36	0	14.02	14.02	14.13	14.02		
15	16QAM	36	20	13.99	13.99	14.07	13.99		
15	16QAM	36	50	13.99	13.99	13.99	13.99	15.3	0
15	16QAM	36	100	13.99	13.98	14.14	13.99		
15	64QAM	1	0	14.08	14.12	14.09	14.08		
15	64QAM	1	37	14.16	14.17	14.16	14.16	15.3	0
15	64QAM	36	0	13.93	13.93	14.04	13.93		
15	64QAM	36	20	13.99	13.99	14.11	13.99		
15	64QAM	36	50	13.99	14.01	14.00	13.99	15.3	0
15	64QAM	36	100	13.99	13.99	14.16	13.99		
15	64QAM	75	0	13.92	13.92	14.17	13.92		
Channel									
Frequency (MHz)	Channel	Low Ch. Freq.	High Ch. Freq.	Power Ch. Freq.	Power Ch. Freq.	Take-up limit (dBm)	MPR (dB)		
10	QPSK	1	0	13.98	14.08	14.01	13.98	15.3	0
10	QPSK	1	49	13.95	14.05	13.95	13.95		
10	QPSK	1	99	13.91	13.94	13.89	13.91		
10	QPSK	25	0	14.00	13.98	13.97	14.00	15.3	0
10	QPSK	25	12	13.99	14.00	13.92	13.99		
10	QPSK	25	37	13.96	14.02	14.11	13.96		
10	QPSK	50	0	14.01	14.00	14.06	14.01		
10	16QAM	1	0	14.15	14.23	14.22	14.15	15.3	0
10	16QAM	1	49	14.18	14.21	14.13	14.18		
10	16QAM	1	99	14.20	14.01	13.98	14.20		
10	16QAM	25	0	14.02	14.03	14.03	14.02	15.3	0
10	16QAM	25	12	13.99	14.06	14.03	13.99		
10	16QAM	25	37	13.96	14.00	14.03	13.96		
10	16QAM	50	0	14.00	14.01	14.09	14.00		
10	16QAM	50	24	14.02	14.23	14.17	14.02	15.3	0
10	16QAM	50	50	14.02	14.03	14.13	14.02		
10	64QAM	1	0	14.14	14.10	14.04	14.14		
10	64QAM	1	49	14.14	14.10	14.09	14.14	15.3	0
10	64QAM	25	0	14.03	13.99	13.99	14.03		
10	64QAM	25	12	14.02	14.08	14.04	14.02		
10	64QAM	25	37	14.01	14.07	14.17	14.01	15.3	0
10	64QAM	50	0	14.02	14.05	14.09	14.02		
Channel									
Frequency (MHz)	Channel	Low Ch. Freq.	High Ch. Freq.	Power Ch. Freq.	Power Ch. Freq.	Take-up limit (dBm)	MPR (dB)		
5	QPSK	1	0	13.99	14.00	13.98	13.99	15.3	0
5	QPSK	1	12	14.00	14.07	13.95	14.00		
5	QPSK	1	24	13.97	14.04	13.98	13.97		
5	QPSK	12	0	14.01	14.00	13.99	14.01	15.3	0
5	QPSK	12	7	14.00	14.04	14.05	14.00		
5	QPSK	12	13	13.97	14.07	14.03	13.97		
5	QPSK	25	0	14.01	14.07	13.99	14.01	15.3	0
5	16QAM	1	0	14.19	14.23	14.15	14.19		
5	16QAM	1	12	14.14	14.20	14.13	14.14	15.3	0
5	16QAM	1	24	14.20	14.23	14.15	14.20		
5	16QAM	12	0	13.99	14.06	14.03	13.99	15.3	0
5	16QAM	12	7	13.99	14.06	14.03	13.99		
5	16QAM	12	13	13.97	14.06	14.02	13.97		
5	16QAM	25	0	14.01	14.10	14.00	14.01	15.3	0
5	16QAM	25	12	14.02	14.23	14.17	14.02		
5	16QAM	25	24	14.02	14.23	14.17	14.02		
5	64QAM	1	0	14.17	14.24	14.21	14.17	15.3	0
5	64QAM	1	14	14.18	14.23	14.21	14.18		
5	64QAM	1	28	14.05	14.00	14.03	14.05		
5	64QAM	1	42	14.02	14.08	14.02	14.02	15.3	0
5	64QAM	1	56	14.02	14.10	14.07	14.02		
5	64QAM	15	0	13.99	14.05	13.97	13.99		
Channel									
Frequency (MHz)	Channel	Low Ch. Freq.	High Ch. Freq.	Power Ch. Freq.	Power Ch. Freq.	Take-up limit (dBm)	MPR (dB)		
1.4	QPSK	1	0	13.97	14.01	13.92	13.97	15.3	0
1.4	QPSK	1	3	14.00	14.03	13.95	14.00		
1.4	QPSK	1	5	13.96	14.02	13.93	13.96		
1.4	QPSK	3	0	13.98	14.03	13.96	13.98	15.3	0
1.4	QPSK	3	1	14.00	14.01	13.92	14.00		
1.4	QPSK	3	14.00	14.01	13.95	14.00			
1.4	QPSK	6	0	13.99	14.04	13.99	13.99	15.3	0
1.4	16QAM	1	0	14.21	14.24	14.23	14.21		
1.4	16QAM	1	3	14.20	14.23	14.24	14.20	15.3	0
1.4	16QAM	1	5	14.18	14.23	14.21	14.18		
1.4	16QAM	3	0	14.01	14.03	14.01	14.01	15.3	0
1.4	16QAM	3	1	13.98	14.03	13.98	13.98		
1.4	16QAM	3	14.00	14.08	14.04	14.00			
1.4	64QAM	1	0	14.08	14.12	14.05	14.08		
1.4	64QAM	1	3	14.09	14.15	14.07	14.09	15.3	0
1.4	64QAM	1	5	14.12	14.13	14.08	14.12		
1.4	64QAM	3	0	14.05	14.09	14.07	14.05		
1.4	64QAM	3	1	14.07	14.14	14.04	14.07	15.3	0
1.4	64QAM	3	14.00	14.18	14.05	14.00			
1.4	64QAM	6	0	14.01	14.02	13.95	14.01		

Band 4 (AWS Band)									
Part 27L (Only on Channel required)									
BW (MHz)	Modulation	RB Size	RB Offset	Low Ch. Freq.	High Ch. Freq.	Power Ch. Freq.	Power Ch. Freq.	Take-up limit (dBm)	MPR (dB)
20	QPSK	1	0	13.71	13.66	13.64	13.71		
20	QPSK	1	49	13.73	13.77	13.72	13.73	14.3	0
20	QPSK	1	99	13.69	13.65	13.58	13.69		
20	QPSK	50	0	13.58	13.57	13.58	13.58		
20	QPSK	50	24	13.68	13.70	13.72	13.68	14.3	0
20	QPSK	50	50	13.60	13.72	13.71	13.60		
20	QPSK	100	0	13.58	13.70	13.61	13.58		
20	16QAM	1	0	13.71	13.76	13.72	13.71	14.3	0
20	16QAM	1	49	13.75	13.75	13.76	13.75		
20	16QAM	1	99	13.68	13.70	13.71	13.68		
20	16QAM	50	0	13.59	13.62	13.68	13.59		
20	16QAM	50	24	13.75	13.72	13.74	13.75	14.3	0
20	16QAM	50	50	13.64	13.76	13.78	13.64		
20	16QAM	100	0	13.58	13.70	13.61	13.58		
20	64QAM	1	49	13.66	13.65	13.66	13.66	14.3	0
20	64QAM	1	99	13.53	13.57	13.68	13.53		
20	64QAM	50							



Band 12 (700MHz Low Band) Part 27F (only on channel required)										
BW (MHz)	Modulation	RB Size	RB Offset	Low Ch. Freq. (MHz)	High Ch. Freq. (MHz)	Power High Ch. Freq. (dBm)	Power Low Ch. Freq. (dBm)	Take-up time (dBm)	MPR (dB)	
Channel										
Frequency (MHz)										
10	QPSK	1	0	22.61	22.55	22.60				
10	QPSK	1	26	22.64	22.58	22.65			23.3	0
10	QPSK	1	49	22.63	22.57	22.60				
10	QPSK	25	0	22.50	22.50	22.57				
10	QPSK	25	12	22.63	22.57	22.62			23.3	0
10	QPSK	25	25	22.61	22.54	22.58				
10	QPSK	50	0	22.50	22.50	22.54				
10	QPSK	50	1	22.59	22.53	22.57				
10	HDQAM	1	26	22.45	22.41	22.43			23.3	0
10	HDQAM	1	49	22.49	22.47	22.53				
10	HDQAM	25	0	21.50	21.50	21.46				
10	HDQAM	25	12	21.53	21.50	21.51			23.3	1
10	HDQAM	25	25	21.52	21.51	21.49				
10	HDQAM	50	0	21.49	21.50	21.46				
10	HDQAM	50	1	21.47	21.49	21.48				
10	HDQAM	1	26	21.56	21.57	21.57			23.3	1
10	HDQAM	1	49	21.61	21.57	21.60				
10	HDQAM	25	0	20.40	20.38	20.35				
10	HDQAM	25	12	20.43	20.40	20.40			21.3	2
10	HDQAM	25	25	20.43	20.42	20.36				
10	HDQAM	50	0	20.40	20.37	20.36				
Channel										
Frequency (MHz)										
5	QPSK	1	0	22.28	22.26	22.27			23.3	0
5	QPSK	1	12	22.35	22.41	22.29				
5	QPSK	1	24	22.36	22.39	22.37				
5	QPSK	12	0	21.98	22.02	21.98				
5	QPSK	12	7	21.97	22.03	21.99			23.3	0
5	QPSK	12	13	21.98	22.00	21.97				
5	QPSK	25	0	21.97	22.00	21.96				
5	HDQAM	1	0	22.24	22.21	22.21				
5	HDQAM	1	12	22.29	22.33	22.24			23.3	0
5	HDQAM	12	0	22.33	22.30	22.30				
5	HDQAM	12	7	21.27	21.34	21.29				
5	HDQAM	12	13	21.25	21.31	21.27			23.3	1
5	HDQAM	25	0	21.31	21.33	21.27				
5	HDQAM	1	0	21.40	21.40	21.42				
5	HDQAM	1	12	21.46	21.49	21.43			23.3	1
5	HDQAM	12	0	20.35	20.35	20.34				
5	HDQAM	12	7	20.32	20.32	20.29			21.3	2
5	HDQAM	12	13	20.29	20.33	20.25				
5	HDQAM	25	0	20.25	20.26	20.24				
Channel										
Frequency (MHz)										
3	QPSK	1	0	22.47	22.45	22.38			23.3	0
3	QPSK	1	14	22.66	22.58	22.48				
3	QPSK	8	0	22.47	22.40	22.35				
3	QPSK	8	7	22.65	22.64	22.40			23.3	0
3	QPSK	16	0	22.51	22.66	22.38				
3	HDQAM	1	0	22.40	22.23	22.37			23.3	0
3	HDQAM	1	14	22.50	22.30	22.53				
3	HDQAM	8	0	21.54	21.41	21.42				
3	HDQAM	8	4	21.50	21.46	21.43			23.3	1
3	HDQAM	16	0	21.35	21.58	21.33				
3	HDQAM	16	0	21.51	21.41	21.37				
3	HDQAM	1	0	21.46	21.33	21.29			23.3	1
3	HDQAM	8	0	20.17	20.19	20.24				
3	HDQAM	8	7	20.29	20.42	20.27			21.3	2
3	HDQAM	16	0	20.20	20.18	20.13				
Channel										
Frequency (MHz)										
1.4	QPSK	1	0	22.41	22.40	22.56				
1.4	QPSK	1	3	22.60	22.44	22.58				
1.4	QPSK	1	5	22.38	22.57	22.61			23.3	0
1.4	QPSK	3	0	22.43	22.57	22.42				
1.4	QPSK	3	1	22.62	22.42	22.40				
1.4	QPSK	3	3	22.39	22.41	22.63			23.3	0
1.4	HDQAM	1	0	22.34	22.20	22.31				
1.4	HDQAM	1	3	22.38	22.39	22.44				
1.4	HDQAM	1	5	22.38	22.40	22.37			23.3	0
1.4	HDQAM	3	0	21.37	21.43	21.51				
1.4	HDQAM	3	1	21.55	21.34	21.26				
1.4	HDQAM	3	3	21.31	21.30	21.26				
1.4	HDQAM	3	0	21.46	21.57	21.49			23.3	1
1.4	HDQAM	1	0	21.46	21.41	21.36				
1.4	HDQAM	1	3	21.34	21.38	21.56				
1.4	HDQAM	1	5	21.43	21.61	21.45			23.3	1
1.4	HDQAM	3	0	20.37	20.33	20.12				
1.4	HDQAM	3	1	20.32	20.41	20.40				
1.4	HDQAM	3	3	20.31	20.30	20.21				
1.4	HDQAM	6	0	20.25	20.40	20.40			21.3	2

Band 17 (700MHz Band) Part 27H (only on channel required)										
BW (MHz)	Modulation	RB Size	RB Offset	Low Ch. Freq. (MHz)	High Ch. Freq. (MHz)	Power High Ch. Freq. (dBm)	Power Low Ch. Freq. (dBm)	Take-up time (dBm)	MPR (dB)	
Channel										
Frequency (MHz)										
10	QPSK	1	0	22.42	22.50	22.45				
10	QPSK	1	26	22.43	22.51	22.50			23.3	0
10	QPSK	1	49	22.40	22.40	22.54				
10	QPSK	25	0	22.36	22.49	22.44				
10	QPSK	25	12	22.42	22.50	22.50			23.3	0
10	QPSK	25	25	22.33	22.52	22.54				
10	QPSK	50	0	22.40	22.40	22.54				
10	QPSK	50	1	22.22	22.50	22.49				
10	HDQAM	1	26	22.34	22.54	22.50			23.3	0
10	HDQAM	1	49	22.29	22.49	22.38				
10	HDQAM	25	0	21.62	21.49	21.43				
10	HDQAM	25	12	21.48	21.49	21.51			23.3	1
10	HDQAM	25	25	21.56	21.53	21.40				
10	HDQAM	50	0	21.44	21.42	21.36				
10	HDQAM	50	1	21.22	21.24	21.23				
10	HDQAM	1	26	21.30	21.27	21.29			23.3	1
10	HDQAM	1	49	21.30	21.26	21.34				
10	HDQAM	25	0	20.43	20.43	20.36				
10	HDQAM	25	12	20.47	20.51	20.48			21.3	2
10	HDQAM	25	25	20.50	20.47	20.38				
10	HDQAM	50	0	20.43	20.46	20.43				
Channel										
Frequency (MHz)										
5	QPSK	1	0	22.29	22.32	22.36			23.3	0
5	QPSK	1	12	22.38	22.40	22.39				
5	QPSK	1	24	22.35	22.39	22.36				
5	QPSK	12	0	22.00	21.93	22.02				
5	QPSK	12	7	22.02	22.02	21.98			23.3	0
5	QPSK	12	13	21.98	22.00	21.97				
5	QPSK	25	0	21.99	21.99	21.97				
5	HDQAM	1	0	22.26	22.30	22.21				
5	HDQAM	1	12	22.37	22.29	22.32			23.3	0
5	HDQAM	12	0	22.31	22.28	22.33				
5	HDQAM	12	7	21.34	21.24	21.27				
5	HDQAM	12	13	21.34	21.30	21.26			23.3	1
5	HDQAM	25	0	21.30	21.32	21.27				
5	HDQAM	1	0	21.38	21.45	21.41				
5	HDQAM	1	12	21.48	21.51	21.47			23.3	1
5	HDQAM	12	0	20.32	20.32	20.34				
5	HDQAM	12	7	20.33	20.30	20.28			21.3	2
5	HDQAM	12	13	20.30	20.30	20.21				
5	HDQAM	25	0	20.20	20.20	20.24				
Channel										
Frequency (MHz)										
3	QPSK	1	0	22.29	22.32	22.36			23.3	0
3	QPSK	1	14	22.66	22.58	22.48				
3	QPSK	8	0	22.47	22.40	22.35				
3	QPSK	8	7	22.65	22.64	22.40			23.3	0
3	QPSK	16	0	22.51	22.66	22.38				
3	HDQAM	1	0	22.40	22.23	22.37			23.3	0
3	HDQAM	1	14	22.50	22.30	22.53				
3	HDQAM	8	0	21.54	21.41	21.42				
3	HDQAM	8	4	21.50	21.46	21.43			23.3	1
3	HDQAM	16								



Band 38(only on channel required)										
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)		
Channel				37850	38000	38150				
Frequency (MHz)				2580	2595	2610				
20	QPSK	1	0	17.33	17.33	17.40	18.3	0		
20	QPSK	1	49	17.63	17.60	17.55				
20	QPSK	1	99	17.50	17.55	17.53				
20	QPSK	50	0	17.49	17.58	17.52	18.3	0		
20	QPSK	50	24	17.81	17.60	17.53				
20	QPSK	50	50	17.57	17.59	17.50				
20	QPSK	100	0	17.58	17.57	17.51	18.3	0		
20	16QAM	1	0	17.42	17.44	17.46				
20	16QAM	1	49	17.56	17.56	17.50				
20	16QAM	1	99	17.52	17.53	17.55	18.3	0		
20	16QAM	50	0	17.45	17.57	17.57				
20	16QAM	50	24	17.58	17.56	17.61				
20	16QAM	50	50	17.49	17.56	17.62	18.3	0		
20	16QAM	100	0	17.56	17.48	17.59				
20	64QAM	1	0	17.35	17.37	17.44				
20	64QAM	1	49	17.60	17.58	17.55	18.3	0		
20	64QAM	1	99	17.55	17.56	17.60				
20	64QAM	50	0	17.49	17.48	17.49				
20	64QAM	50	24	17.45	17.49	17.56	18.3	0		
20	64QAM	50	50	17.46	17.46	17.57				
20	64QAM	100	0	17.51	17.53	17.55				
Channel				37825	38000	38175	Tune-up limit (dBm)	MPR (dB)		
Frequency (MHz)				257.5	2595	2612.5				
15	QPSK	1	0	17.27	17.32	17.23	18.3	0		
15	QPSK	1	37	17.62	17.45	17.53				
15	QPSK	1	74	17.52	17.46	17.44				
15	QPSK	36	0	17.29	17.61	17.39	18.3	0		
15	QPSK	36	20	17.41	17.50	17.42				
15	QPSK	36	39	17.41	17.35	17.58				
15	QPSK	75	0	17.47	17.39	17.35	18.3	0		
15	16QAM	1	0	17.43	17.32	17.46				
15	16QAM	1	37	17.44	17.50	17.51				
15	16QAM	1	74	17.44	17.29	17.35	18.3	0		
15	16QAM	36	0	17.31	17.53	17.50				
15	16QAM	36	20	17.35	17.41	17.55				
15	16QAM	36	39	17.42	17.40	17.47	18.3	0		
15	16QAM	75	0	17.44	17.44	17.51				
15	64QAM	1	0	17.37	17.32	17.32				
15	64QAM	1	37	17.41	17.56	17.41	18.3	0		
15	64QAM	1	74	17.54	17.36	17.48				
15	64QAM	36	0	17.40	17.37	17.27				
15	64QAM	36	20	17.44	17.42	17.36	18.3	0		
15	64QAM	36	39	17.24	17.40	17.38				
15	64QAM	75	0	17.42	17.34	17.31				
Channel				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)		
Frequency (MHz)				2575	2595	2615				
10	QPSK	1	0	17.34	17.37	17.23	18.3	0		
10	QPSK	1	25	17.60	17.52	17.30				
10	QPSK	1	49	17.30	17.43	17.36				
10	QPSK	25	0	17.37	17.53	17.32	18.3	0		
10	QPSK	25	12	17.51	17.44	17.34				
10	QPSK	25	25	17.44	17.34	17.29				
10	QPSK	50	0	17.55	17.45	17.37	18.3	0		
10	16QAM	1	0	17.24	17.36	17.45				
10	16QAM	1	25	17.59	17.33	17.27				
10	16QAM	1	49	17.54	17.33	17.53	18.3	0		
10	16QAM	25	0	17.22	17.52	17.61				
10	16QAM	25	12	17.38	17.32	17.38				
10	16QAM	25	25	17.24	17.51	17.41	18.3	0		
10	16QAM	50	0	17.58	17.51	17.60				
10	64QAM	1	0	17.14	17.18	17.39				
10	64QAM	1	25	17.53	17.34	17.42	18.3	0		
10	64QAM	1	49	17.57	17.46	17.45				
10	64QAM	25	0	17.53	17.36	17.49				
10	64QAM	25	12	17.35	17.33	17.42	18.3	0		
10	64QAM	25	25	17.34	17.50	17.37				
10	64QAM	50	0	17.35	17.45	17.41				
Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)		
Frequency (MHz)				2572.5	2595	2617.5				
5	QPSK	1	0	17.38	17.23	17.40	18.3	0		
5	QPSK	1	12	17.62	17.52	17.35				
5	QPSK	1	24	17.33	17.46	17.48				
5	QPSK	12	0	17.47	17.33	17.43	18.3	0		
5	QPSK	12	7	17.39	17.43	17.53				
5	QPSK	12	13	17.48	17.58	17.41				
5	QPSK	25	0	17.43	17.38	17.37	18.3	0		
5	16QAM	1	0	17.30	17.32	17.35				
5	16QAM	1	12	17.39	17.37	17.51				
5	16QAM	1	24	17.32	17.36	17.38	18.3	0		
5	16QAM	12	0	17.48	17.52	17.51				
5	16QAM	12	7	17.60	17.47	17.54				
5	16QAM	12	13	17.51	17.54	17.40	18.3	0		
5	16QAM	25	0	17.57	17.30	17.60				
5	64QAM	1	0	17.17	17.20	17.31				
5	64QAM	1	12	17.54	17.34	17.45	18.3	0		
5	64QAM	1	24	17.39	17.61	17.40				
5	64QAM	12	0	17.45	17.49	17.27				
5	64QAM	12	7	17.37	17.44	17.33	18.3	0		
5	64QAM	12	13	17.43	17.50	17.60				
5	64QAM	25	0	17.40	17.41	17.39				

Band 41 (2.6G Band)												
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)		
Channel				39750	40185	40620	41055	41490				
Frequency (MHz)				2506	2549.5	2593	2636.5	2680				
20	QPSK	1	0	17.54	17.49	17.60	17.68	17.58	18.3	0		
20	QPSK	1	49	17.67	17.66	17.79	17.76	17.72				
20	QPSK	1	99	17.60	17.61	17.68	17.75	17.69				
20	QPSK	50	0	17.65	17.64	17.64	17.62	17.62	18.3	0		
20	QPSK	50	24	17.65	17.65	17.77	17.75	17.70				
20	QPSK	50	50	17.51	17.63	17.73	17.71	17.72				
20	QPSK	100	0	17.63	17.65	17.75	17.73	17.68	18.3	0		
20	16QAM	1	0	17.65	17.64	17.65	17.70	17.71				
20	16QAM	1	49	17.77	17.70	17.70	17.72	17.71				
20	16QAM	1	99	17.64	17.69	17.77	17.74	17.78	18.3	0		
20	16QAM	50	0	17.53	17.45	17.60	17.78	17.66				
20	16QAM	50	24	17.55	17.55	17.70	17.78	17.67				
20	16QAM	50	50	17.45	17.57	17.65	17.77	17.62	18.3	0		
20	16QAM	100	0	17.51	17.56	17.64	17.75	17.53				
20	64QAM	1	0	17.63	17.56	17.62	17.70	17.67				
20	64QAM	1	49	17.72	17.72	17.74	17.71	17.72	18.3	0		
20	64QAM	1	99	17.60	17.62	17.70	17.72	17.67				
20	64QAM	50	0	17.58	17.56	17.71	17.75	17.72				
20	64QAM	50	24	17.64	17.68	17.79	17.79	17.66	18.3	0		
20	64QAM	50	50	17.60	17.66	17.74	17.76	17.79				
20	64QAM	100	0	17.69	17.62	17.69	17.74	17.73				
Channel				39725	40173	40620	41068	41515	Tune-up limit (dBm)	MPR (dB)		
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5				
15	QPSK	1	0	17.54	17.39	17.46	17.61	17.48	18.3	0		
15	QPSK	1	37	17.49	17.54	17.60	17.77	17.72				
15	QPSK	1	74	17.54	17.55	17.60	17.76	17.53				
15	QPSK	36	0	17.61	17.37	17.51	17.62	17.57	18.3	0		
15	QPSK	36	20	17.48	17.70	17.66	17.64	17.53				
15	QPSK	36	39	17.27	17.54	17.58	17.53	17.71				
15	QPSK	75	0	17.62	17.50	17.57	17.63	17.62	18.3	0		
15	16QAM	1	0	17.53	17.59	17.68	17.62	17.66				
15	16QAM	1	37	17.72	17.52	17.48	17.47	17.64				
15	16QAM	1	74	17.66	17.55	17.72	17.66	17.61	18.3	0		
15	16QAM	36	0	17.52	17.34	17.38	17.55	17.64				
15	16QAM	36	20	17.54	17.51	17.63	17.75	17.56				
15	16QAM	36	39	17.38	17.47							



Reduced Power Level 2 for Head -UAT

GSM850	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	128	169	251		128	169	251	
TX Channel	128	169	251	128	169	251	128	169
Frequency (MHz)	924.2	938.4	948.8	924.2	938.4	948.8	924.2	938.4
GSM 1 Tx slot	25.22	25.35	25.30	25.80	16.22	16.35	16.30	16.80
GPRS 1 Tx slot	25.19	25.33	25.27	25.80	16.19	16.33	16.27	16.80
GPRS 2 Tx slots	22.61	22.76	22.66	23.80	16.61	16.76	16.66	17.80
GPRS 3 Tx slots	21.13	21.29	21.21	22.30	16.87	17.03	16.95	18.04
GPRS 4 Tx slots	20.17	20.33	20.24	21.80	17.17	17.33	17.24	18.80
EDGE 1 Tx slot	19.28	19.25	19.21	20.80	10.28	10.25	10.21	11.80
EDGE 2 Tx slots	18.00	17.82	17.99	18.30	12.00	11.92	11.99	12.30
EDGE 3 Tx slots	15.79	15.84	15.96	16.80	11.53	11.58	11.70	12.54
EDGE 4 Tx slots	14.76	14.73	14.84	16.30	11.76	11.73	11.94	13.30

GSM1900	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
TX Channel	512	661	810	512	661	810	512	661
Frequency (MHz)	1850.2	1880	1909.6	1850.2	1880	1909.6	1850.2	1880
GSM 1 Tx slot	21.36	21.50	21.42	22.30	12.36	12.50	12.42	13.30
GPRS 1 Tx slot	21.34	21.48	21.40	22.30	12.34	12.48	12.40	13.30
GPRS 2 Tx slots	17.78	17.91	17.82	18.30	11.78	11.91	11.82	13.30
GPRS 3 Tx slots	17.04	17.18	17.09	18.30	12.78	12.92	12.83	14.04
GPRS 4 Tx slots	15.22	15.42	15.33	16.80	12.22	12.42	12.33	13.80
EDGE 1 Tx slot	17.19	17.30	17.35	18.80	8.19	8.30	8.35	9.80
EDGE 2 Tx slots	15.27	15.45	15.34	16.30	9.27	9.45	9.34	10.30
EDGE 3 Tx slots	13.74	13.81	13.70	15.30	9.48	9.55	9.44	11.04
EDGE 4 Tx slots	12.60	12.59	12.53	14.30	9.60	9.59	9.53	11.30

Band	WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)	
	9262	9490	9538		1312	1413	1513		4132	4182	4233		
TX Channel	9262	9490	9538	1312	1413	1513	4132	4182	4233	4132	4182	4233	
Rx Channel	9662	9900	9938	1537	1638	1738	4357	4407	4458	4357	4407	4458	
Frequency (MHz)	1852.4	1880	1907.6	1712.4	1732.6	1752.6	826.4	836.4	846.6	826.4	836.4	846.6	
3GPP Rel 99	AMR 12.2kbps	12.95	12.94	12.85	13.30	11.68	11.60	11.66	12.30	17.54	17.55	17.45	18.30
3GPP Rel 99	RMC 12.2kbps	12.97	12.96	12.88	13.30	11.71	11.72	11.69	12.30	17.56	17.48	17.58	18.30
3GPP Rel 6	HSDPA Subtest-1	11.90	11.87	11.78	12.30	10.61	10.63	10.67	11.30	16.22	16.20	16.17	17.30
3GPP Rel 6	HSDPA Subtest-2	11.85	11.89	11.90	12.30	10.61	10.61	10.63	11.30	16.24	16.17	16.13	17.30
3GPP Rel 6	HSUPA Subtest-3	11.39	11.47	11.35	11.80	10.12	10.14	10.16	10.80	15.80	15.72	15.67	16.80
3GPP Rel 6	HSUPA Subtest-4	11.35	11.38	11.31	11.80	10.09	10.11	10.13	10.80	15.74	15.69	15.63	16.80
3GPP Rel 8	DC-HSDPA Subtest-1	11.67	11.66	11.77	12.30	10.34	10.54	10.52	11.30	15.88	15.80	15.95	17.30
3GPP Rel 8	DC-HSDPA Subtest-2	11.73	11.87	11.56	12.30	10.45	10.31	10.32	11.30	15.98	15.88	15.78	17.30
3GPP Rel 8	DC-HSDPA Subtest-3	11.10	11.18	11.26	11.80	9.79	9.84	9.83	10.80	15.75	15.46	15.33	16.80
3GPP Rel 8	DC-HSDPA Subtest-4	11.06	11.24	11.30	11.80	9.77	9.80	10.04	10.80	15.63	15.41	15.60	16.80
3GPP Rel 6	HSUPA Subtest-1	10.14	10.07	10.29	10.80	9.09	9.03	8.95	9.80	15.13	15.22	15.33	15.80
3GPP Rel 6	HSUPA Subtest-2	9.68	9.43	9.75	10.30	8.49	8.66	8.73	9.30	14.78	14.77	14.65	15.30
3GPP Rel 6	HSUPA Subtest-3	10.74	10.46	10.57	11.30	9.64	9.53	9.71	10.30	15.81	15.60	15.56	16.30
3GPP Rel 6	HSUPA Subtest-4	9.30	9.04	9.28	9.80	7.76	8.13	7.81	8.80	14.04	14.20	14.19	14.80
3GPP Rel 6	HSUPA Subtest-5	11.80	11.80	11.80	12.30	10.50	10.60	10.50	11.30	16.90	16.70	16.70	17.30
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	8.84	8.88	8.80	9.30	7.41	7.60	7.43	8.30	13.70	13.67	13.72	14.30



Band 12 (700MHz Low Band) Part 27F (only on channel required)										
BV (MHz)	Modulation	RB Size	RB Offset	Power Ch. 1/Freq.	Power Ch. 2/Freq.	Power Ch. 3/Freq.	Time-up limit (min)	MPR (dB)		
Channel										
Frequency (MHz)										
10	QPSK	1	0	20.82	20.82	20.86				
10	QPSK	1	20	20.87	20.87	20.91				
10	QPSK	1	40	20.97	20.97	21.03	21.3	0		
10	QPSK	25	0	20.83	20.83	20.98				
10	QPSK	25	20	20.91	20.91	21.06				
10	QPSK	25	25	20.90	20.75	20.95	21.3	0		
10	QPSK	50	0	20.84	20.74	20.79				
10	QPSK	50	20	20.92	20.82	20.87				
10	TGSM	1	20	21.01	21.04	21.11	21.3	0		
10	TGSM	1	40	20.92	20.84	20.88				
10	TGSM	25	10	20.88	20.88	20.95				
10	TGSM	25	25	20.84	20.86	20.89				
10	TGSM	50	0	20.82	20.83	20.92				
10	TGSM	50	20	20.92	20.91	20.97				
10	TGSM	50	40	20.98	20.94	20.94	21.3	0		
10	TGSM	50	60	20.94	20.91	20.94				
10	TGSM	50	80	20.91	20.85	20.88				
10	TGSM	50	100	20.86	20.82	20.86				
10	TGSM	50	120	20.82	20.78	20.82				
10	TGSM	50	140	20.78	20.74	20.78				
10	TGSM	50	160	20.74	20.70	20.74				
10	TGSM	50	180	20.70	20.66	20.70				
10	TGSM	50	200	20.66	20.62	20.66				
10	TGSM	50	220	20.62	20.58	20.62				
10	TGSM	50	240	20.58	20.54	20.58				
10	TGSM	50	260	20.54	20.50	20.54				
10	TGSM	50	280	20.50	20.46	20.50				
10	TGSM	50	300	20.46	20.42	20.46				
10	TGSM	50	320	20.42	20.38	20.42				
10	TGSM	50	340	20.38	20.34	20.38				
10	TGSM	50	360	20.34	20.30	20.34				
10	TGSM	50	380	20.30	20.26	20.30				
10	TGSM	50	400	20.26	20.22	20.26				
10	TGSM	50	420	20.22	20.18	20.22				
10	TGSM	50	440	20.18	20.14	20.18				
10	TGSM	50	460	20.14	20.10	20.14				
10	TGSM	50	480	20.10	20.06	20.10				
10	TGSM	50	500	20.06	20.02	20.06				
10	TGSM	50	520	20.02	19.98	20.02				
10	TGSM	50	540	19.98	19.94	19.98				
10	TGSM	50	560	19.94	19.90	19.94				
10	TGSM	50	580	19.90	19.86	19.90				
10	TGSM	50	600	19.86	19.82	19.86				
10	TGSM	50	620	19.82	19.78	19.82				
10	TGSM	50	640	19.78	19.74	19.78				
10	TGSM	50	660	19.74	19.70	19.74				
10	TGSM	50	680	19.70	19.66	19.70				
10	TGSM	50	700	19.66	19.62	19.66				
10	TGSM	50	720	19.62	19.58	19.62				
10	TGSM	50	740	19.58	19.54	19.58				
10	TGSM	50	760	19.54	19.50	19.54				
10	TGSM	50	780	19.50	19.46	19.50				
10	TGSM	50	800	19.46	19.42	19.46				
10	TGSM	50	820	19.42	19.38	19.42				
10	TGSM	50	840	19.38	19.34	19.38				
10	TGSM	50	860	19.34	19.30	19.34				
10	TGSM	50	880	19.30	19.26	19.30				
10	TGSM	50	900	19.26	19.22	19.26				
10	TGSM	50	920	19.22	19.18	19.22				
10	TGSM	50	940	19.18	19.14	19.18				
10	TGSM	50	960	19.14	19.10	19.14				
10	TGSM	50	980	19.10	19.06	19.10				
10	TGSM	50	1000	19.06	19.02	19.06				
10	TGSM	50	1020	19.02	18.98	19.02				
10	TGSM	50	1040	18.98	18.94	18.98				
10	TGSM	50	1060	18.94	18.90	18.94				
10	TGSM	50	1080	18.90	18.86	18.90				
10	TGSM	50	1100	18.86	18.82	18.86				
10	TGSM	50	1120	18.82	18.78	18.82				
10	TGSM	50	1140	18.78	18.74	18.78				
10	TGSM	50	1160	18.74	18.70	18.74				
10	TGSM	50	1180	18.70	18.66	18.70				
10	TGSM	50	1200	18.66	18.62	18.66				
10	TGSM	50	1220	18.62	18.58	18.62				
10	TGSM	50	1240	18.58	18.54	18.58				
10	TGSM	50	1260	18.54	18.50	18.54				
10	TGSM	50	1280	18.50	18.46	18.50				
10	TGSM	50	1300	18.46	18.42	18.46				
10	TGSM	50	1320	18.42	18.38	18.42				
10	TGSM	50	1340	18.38	18.34	18.38				
10	TGSM	50	1360	18.34	18.30	18.34				
10	TGSM	50	1380	18.30	18.26	18.30				
10	TGSM	50	1400	18.26	18.22	18.26				
10	TGSM	50	1420	18.22	18.18	18.22				
10	TGSM	50	1440	18.18	18.14	18.18				
10	TGSM	50	1460	18.14	18.10	18.14				
10	TGSM	50	1480	18.10	18.06	18.10				
10	TGSM	50	1500	18.06	18.02	18.06				
10	TGSM	50	1520	18.02	17.98	18.02				
10	TGSM	50	1540	17.98	17.94	17.98				
10	TGSM	50	1560	17.94	17.90	17.94				
10	TGSM	50	1580	17.90	17.86	17.90				
10	TGSM	50	1600	17.86	17.82	17.86				
10	TGSM	50	1620	17.82	17.78	17.82				
10	TGSM	50	1640	17.78	17.74	17.78				
10	TGSM	50	1660	17.74	17.70	17.74				
10	TGSM	50	1680	17.70	17.66	17.70				
10	TGSM	50	1700	17.66	17.62	17.66				
10	TGSM	50	1720	17.62	17.58	17.62				
10	TGSM	50	1740	17.58	17.54	17.58				
10	TGSM	50	1760	17.54	17.50	17.54				
10	TGSM	50	1780	17.50	17.46	17.50				
10	TGSM	50	1800	17.46	17.42	17.46				
10	TGSM	50	1820	17.42	17.38	17.42				
10	TGSM	50	1840	17.38	17.34	17.38				
10	TGSM	50	1860	17.34	17.30	17.34				
10	TGSM	50	1880	17.30	17.26	17.30				
10	TGSM	50	1900	17.26	17.22	17.26				
10	TGSM	50	1920	17.22	17.18	17.22				
10	TGSM	50	1940	17.18	17.14	17.18				
10	TGSM	50	1960	17.14	17.10	17.14				
10	TGSM	50	1980	17.10	17.06	17.10				
10	TGSM	50	2000	17.06	17.02	17.06				
10	TGSM	50	2020	17.02	16.98	17.02				
10	TGSM	50	2040	16.98	16.94	16.98				
10	TGSM	50	2060	16.94	16.90	16.94				
10	TGSM	50	2080	16.90	16.86	16.90				
10	TGSM	50	2100	16.86	16.82	16.86				
10	TGSM	50	2120	16.82	16.78	16.82				
10	TGSM	50	2140	16.78	16.74	16.78				
10	TGSM	50	2160	16.74	16.70	16.74				
10	TGSM	50	2180	16.70	16.66	16.70				
10	TGSM	50	2200	16.66	16.62	16.66				
10	TGSM	50	2220	16.62	16.58	16.62				
10	TGSM	50	2240	16.58	16.54	16.58				
10	TGSM	50	2260	16.54	16.50	16.54				
10	TGSM	50	2280	16.50	16.46	16.50				
10	TGSM	50	2300	16.46	16.42	16.46				
10	TGSM	50	2320	16.42	16.38	16.42				
10	TGSM	50	23							



Band 38(only on channel required)

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				37850	38000	38150		
Frequency (MHz)				2580	2595	2610		
20	QPSK	1	0	15.90	15.91	15.90	16.8	0
20	QPSK	1	49	16.07	16.03	16.05		
20	QPSK	1	99	15.99	16.00	16.02		
20	QPSK	50	0	15.98	15.96	16.00	16.8	0
20	QPSK	50	24	16.05	16.01	16.04		
20	QPSK	50	50	16.02	16.00	16.03		
20	QPSK	100	0	16.03	16.00	16.02	16.8	0
20	16QAM	1	0	15.94	15.92	15.93		
20	16QAM	1	49	15.97	16.02	16.01		
20	16QAM	1	99	15.98	16.01	16.01	16.8	0
20	16QAM	50	0	15.88	15.90	15.97		
20	16QAM	50	24	15.88	15.94	16.01		
20	16QAM	50	50	15.96	15.97	15.96	16.8	0
20	16QAM	100	0	15.82	15.95	15.93		
20	64QAM	1	0	15.80	15.94	15.89		
20	64QAM	1	49	16.00	16.01	15.93	16.8	0
20	64QAM	1	99	16.00	16.01	16.00		
20	64QAM	50	0	15.89	15.95	15.99		
20	64QAM	50	24	15.92	15.92	15.98	16.8	0
20	64QAM	50	50	15.94	15.92	15.93		
20	64QAM	100	0	15.82	15.89	15.95		
Channel				37825	38000	38175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2577.5	2595	2612.5		
15	QPSK	1	0	15.66	15.90	15.87	16.8	0
15	QPSK	1	37	15.95	16.05	15.85		
15	QPSK	1	74	15.86	15.90	15.95		
15	QPSK	36	0	15.98	15.81	15.92	16.8	0
15	QPSK	36	20	16.02	16.06	15.92		
15	QPSK	36	39	15.82	16.02	15.89		
15	QPSK	75	0	15.88	15.86	15.77	16.8	0
15	16QAM	1	0	15.95	15.83	15.77		
15	16QAM	1	37	15.92	15.78	15.78		
15	16QAM	1	74	15.82	15.98	15.86	16.8	0
15	16QAM	36	0	15.86	15.77	15.78		
15	16QAM	36	20	15.65	15.97	16.05		
15	16QAM	36	39	15.98	15.82	15.76	16.8	0
15	16QAM	75	0	15.82	15.70	15.76		
15	64QAM	1	0	15.67	15.86	15.90		
15	64QAM	1	37	15.97	15.91	15.79	16.8	0
15	64QAM	1	74	15.85	15.76	15.87		
15	64QAM	36	0	15.94	15.81	15.93		
15	64QAM	36	20	15.69	15.86	16.01	16.8	0
15	64QAM	36	39	15.99	15.89	15.88		
15	64QAM	75	0	15.62	15.67	15.86		
Channel				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2575	2595	2615		
10	QPSK	1	0	15.68	15.90	15.87	16.8	0
10	QPSK	1	25	15.89	16.05	15.93		
10	QPSK	1	49	15.90	15.94	16.06		
10	QPSK	25	0	15.84	15.86	15.82	16.8	0
10	QPSK	25	12	15.97	15.93	15.85		
10	QPSK	25	25	15.90	16.01	16.06		
10	QPSK	50	0	15.78	16.01	16.05	16.8	0
10	16QAM	1	0	15.86	15.95	15.85		
10	16QAM	1	25	15.99	15.82	15.84		
10	16QAM	1	49	15.73	15.89	16.02	16.8	0
10	16QAM	25	0	15.75	15.91	15.81		
10	16QAM	25	12	15.68	15.96	15.83		
10	16QAM	25	25	15.87	15.81	16.01	16.8	0
10	16QAM	50	0	15.83	15.77	15.94		
10	64QAM	1	0	15.72	15.79	15.86		
10	64QAM	1	25	16.04	15.92	15.84	16.8	0
10	64QAM	1	49	15.79	15.89	15.87		
10	64QAM	25	0	15.66	15.93	15.80		
10	64QAM	25	12	15.78	15.92	15.96	16.8	0
10	64QAM	25	25	15.75	15.71	15.79		
10	64QAM	50	0	15.86	15.66	15.81		
Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2572.5	2595	2617.5		
5	QPSK	1	0	15.72	15.91	15.78	16.8	0
5	QPSK	1	12	16.03	15.78	16.02		
5	QPSK	1	24	15.91	16.01	15.96		
5	QPSK	12	0	15.96	15.78	15.95	16.8	0
5	QPSK	12	7	15.86	15.86	16.03		
5	QPSK	12	13	15.95	15.87	15.82		
5	QPSK	25	0	15.80	15.87	15.79	16.8	0
5	16QAM	1	0	15.75	15.87	15.86		
5	16QAM	1	12	15.98	15.96	15.80		
5	16QAM	1	24	15.92	15.84	16.01	16.8	0
5	16QAM	12	0	15.92	15.92	15.95		
5	16QAM	12	7	15.93	15.80	15.90		
5	16QAM	12	13	15.94	15.76	15.81	16.8	0
5	16QAM	25	0	15.65	15.89	15.93		
5	64QAM	1	0	15.80	15.79	15.73		
5	64QAM	1	12	15.92	15.91	15.74	16.8	0
5	64QAM	1	24	15.92	15.84	15.81		
5	64QAM	12	0	15.80	15.81	15.81		
5	64QAM	12	7	15.95	15.69	15.76	16.8	0
5	64QAM	12	13	15.71	15.87	15.73		
5	64QAM	25	0	15.80	15.91	15.91		

Band 41 (2.6G Band)

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				39750	40185	40620	41055	41490		
Frequency (MHz)				2506	2549.5	2593	2636.5	2680		
20	QPSK	1	0	15.96	15.87	15.93	16.11	15.97	16.8	0
20	QPSK	1	49	16.12	16.10	16.20	16.17	16.17		
20	QPSK	1	99	15.99	16.05	16.11	16.13	16.10		
20	QPSK	50	0	15.91	15.88	16.10	16.15	15.97	16.8	0
20	QPSK	50	24	16.10	16.08	16.19	16.16	16.15		
20	QPSK	50	50	16.01	16.05	16.06	16.13	16.01		
20	QPSK	100	0	16.08	16.07	16.17	16.14	16.13	16.8	0
20	16QAM	1	0	16.01	15.94	16.02	16.06	15.97		
20	16QAM	1	49	16.10	16.10	16.12	16.03	16.10		
20	16QAM	1	99	16.01	16.04	16.12	16.01	16.10	16.8	0
20	16QAM	50	0	15.82	15.76	15.99	16.09	15.89		
20	16QAM	50	24	15.88	15.82	16.02	16.12	15.96		
20	16QAM	50	50	15.85	15.93	15.94	16.09	15.91	16.8	0
20	16QAM	100	0	15.86	15.82	15.98	16.08	15.87		
20	64QAM	1	0	15.82	15.73	15.90	15.96	15.84		
20	64QAM	1	49	16.00	15.89	16.09	16.05	15.98	16.8	0
20	64QAM	1	99	15.78	15.84	15.93	15.93	15.91		
20	64QAM	50	0	15.76	15.77	15.90	15.99	15.89		
20	64QAM	50	24	15.84	15.82	15.95	16.03	15.93	16.8	0
20	64QAM	50	50	15.82	15.84	15.95	16.06	15.90		
20	64QAM	100	0	15.90	15.82	15.90	16.09	15.84		
Channel				39725	40173	40620	41088	41515	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5		
15	QPSK	1	0	15.79	15.67	15.86	15.90	15.84	16.8	0
15	QPSK	1	37	15.84	15.88	15.96	16.02	15.95		
15	QPSK	1	74	15.74	15.79	15.88	15.98	15.89		
15	QPSK	36	0	15.75	15.72	15.91	15.99	15.98	16.8	0
15	QPSK	36	20	15.84	15.80	15.90	15.99	15.86		
15	QPSK	36	39	15.79	15.78	15.89	16.03	15.97		
15	QPSK	75	0	15.74	15.76	15.97	16.04	15.91	16.8	0
15	16QAM	1	0	16.03	15.94	16.11	16.16	16.00		
15	16QAM	1	37	16.14	16.04	16.14	16.06	16.17		
15	16QAM	1	74	15.96	16.04	16.16	16.12	16.08	16.8	0
15	16QAM	36	0	15.77	15.75	15.89	16.00	15.87		
15	16QAM	36	20	15.86	15.78	15.83	16.00	15.93		
15	16QAM	36	39	15.77	15.86	15.88	15.98	15.91	16.8	0
15	16QAM	75	0	15.89	15.79	15.90	16.02	15.90		
15	64QAM	1	0	15.89	15.82	15.93	16.05	15.88		
15	64QAM	1	37	15.93	15.91	16.03	16.08	16.01	16.8	0
15	64QAM	1	74	15.85	15.86	15.98	16.02	15.94		
15	64QAM	36	0	15.78	15.77	15.86	15.96	15.87		
15	64QAM	36	20	15.83	15.80	15.94	15.98	15.86	16.8	0
15	64QAM	36	39	15.87	15.77	15.92	16.02	15.95		
15	64QAM	75	0	15.87	15.70	15.86	16.01	15.95		
Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2501	2547	2593	2639	2685		
10	QPSK	1	0	15.74	15.69	15.79	15.87	15.82	16.8	0
10	QPSK	1	25	15.74	15.72	15.89	15.93	15.78		
10	QPSK	1	49	15.80	15.70	15.84	15.86	15.91		
10	QPSK	25	0	15.82	15.79	15.94	15.98	15.97	16.8	0
10	QPSK	25	12	15.84	15.86	15.94	16.00	15.98		
10	QPSK	25	25	15.89	15.80	16.00	16.05	16.00		
10	QPSK	50	0	15.81	15.78	15.96	16.11	15.94	16.8	0
10	16QAM	1	0	16.05	15.97	16.13	16.11	16.13		
10	16QAM	1	25	16.09	16.07	16.14	16.08	16.11		
10	16QAM	1	49	16.12	16.02	16.09	16.14	16.18	16.8	0
10	16QAM	25	0	15.91	15.73	16.00	16.02	15.98		
10	16QAM	25	12	15.86	15.89	16.01	16.04	16.00		
10	16QAM	25	25	15.94	15.83	15.95	16.06	15.99	16.8	0
10	16QAM	50	0	15.97	15.80	15.99	16.07	15.96		
10	64QAM	1	0	15.94	15.80	15.93	16.05	15.98		
10	64QAM	1	25	15.94	15.88	16.05	16.13	16.05	16.8	0
10	64QAM									



Power Level for Hotspot -UAT

GSM850 TX Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	128	189	251		128	189	251	
Frequency (MHz)	824.2	836.4	848.8		824.2	836.4	848.8	
GSM 1 Tx slot	32.06	32.50	32.23	33.30	23.06	23.50	23.23	24.30
GPRS 1 Tx slot	32.04	32.46	32.20	33.30	23.04	23.46	23.20	24.30
GPRS 2 Tx slots	29.80	30.22	30.02	31.30	23.80	24.22	24.02	25.30
GPRS 3 Tx slots	28.23	28.63	28.45	29.80	23.97	24.37	24.19	25.54
GPRS 4 Tx slots	27.33	27.64	27.56	29.30	24.33	24.64	24.56	26.30
EDGE 1 Tx slot	26.65	26.52	26.77	28.30	17.65	17.52	17.77	19.30
EDGE 2 Tx slots	25.45	25.26	25.66	26.80	19.45	19.26	19.66	19.80
EDGE 3 Tx slots	23.25	23.15	23.59	24.50	18.90	18.89	19.33	20.04
EDGE 4 Tx slots	22.20	22.10	22.33	23.60	19.20	19.10	19.33	20.80

GSM1900 TX Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1860	1909.8		1850.2	1860	1909.8	
GSM 1 Tx slot	25.45	25.53	25.69	26.30	16.45	16.53	16.69	17.30
GPRS 1 Tx slot	25.43	25.50	25.67	26.30	16.43	16.50	16.67	17.30
GPRS 2 Tx slots	21.79	21.91	21.84	23.30	15.79	15.91	15.84	17.30
GPRS 3 Tx slots	21.04	21.16	21.09	22.30	16.78	16.90	16.83	18.04
GPRS 4 Tx slots	19.26	19.38	19.31	20.80	16.26	16.38	16.31	17.80
EDGE 1 Tx slot	21.26	21.57	21.08	22.80	12.26	12.57	12.08	13.80
EDGE 2 Tx slots	19.40	19.65	19.43	20.30	13.40	13.65	13.43	14.30
EDGE 3 Tx slots	17.81	18.15	17.91	19.30	13.55	13.89	13.65	15.04
EDGE 4 Tx slots	16.63	16.69	16.53	18.30	13.63	13.69	13.53	15.30

Band	WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)	
	9262	9400	9538		1312	1413	1513		4132	4182	4233		
TX Channel	9682	9800	9938		1537	1638	1738		4357	4407	4458		
Rx Channel	1852.4	1880	1907.6		1712.4	1732.6	1752.6		826.4	836.4	846.6		
Frequency (MHz)													
3GPP Rel 99	AMR 12.2kbps	17.79	17.75	17.73	18.30	17.66	17.68	17.60	18.30	24.09	24.10	24.14	24.80
3GPP Rel 99	RMC 12.2kbps	17.81	17.78	17.76	18.30	17.69	17.70	17.63	18.30	24.12	24.14	24.16	24.80
3GPP Rel 6	HSDPA Subtest-1	16.64	16.65	16.60	17.30	16.39	16.48	16.47	17.30	23.17	23.17	23.18	23.80
3GPP Rel 6	HSDPA Subtest-2	16.63	16.65	16.62	17.30	16.41	16.47	16.49	17.30	23.14	23.13	23.21	23.80
3GPP Rel 6	HSDPA Subtest-3	16.16	16.19	16.19	16.80	15.93	16.01	15.97	16.80	22.71	22.67	22.69	23.30
3GPP Rel 6	HSDPA Subtest-4	16.09	16.13	16.13	16.80	15.91	15.98	15.93	16.80	22.71	22.69	22.64	23.30
3GPP Rel 8	DC-HSDPA Subtest-1	16.55	16.43	16.60	17.30	16.20	16.27	16.31	17.30	23.01	23.08	23.10	23.80
3GPP Rel 8	DC-HSDPA Subtest-2	16.31	16.43	16.37	17.30	16.34	16.38	16.14	17.30	23.03	23.01	23.11	23.80
3GPP Rel 8	DC-HSDPA Subtest-3	15.83	16.18	16.13	16.80	15.89	15.75	15.73	16.80	22.63	22.54	22.52	23.30
3GPP Rel 8	DC-HSDPA Subtest-4	15.86	16.06	15.86	16.80	15.70	15.87	15.90	16.80	22.51	22.46	22.55	23.30
3GPP Rel 6	HSUPA Subtest-1	14.88	14.93	14.90	15.80	15.19	15.23	15.17	15.80	21.55	21.60	21.59	22.30
3GPP Rel 6	HSUPA Subtest-2	14.47	14.56	14.52	15.30	14.69	14.76	14.67	15.30	21.06	21.10	21.07	21.80
3GPP Rel 6	HSUPA Subtest-3	15.42	15.49	15.49	16.30	15.68	15.68	15.64	16.30	22.12	22.12	22.11	22.80
3GPP Rel 6	HSUPA Subtest-4	14.00	13.94	13.94	14.80	14.12	14.11	14.14	14.80	20.59	20.59	20.60	21.30
3GPP Rel 6	HSUPA Subtest-5	16.40	16.50	16.40	17.30	16.80	16.70	16.70	17.30	23.10	23.10	23.10	23.80
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	13.52	13.45	13.40	14.30	13.59	13.62	13.68	14.30	19.97	19.92	19.99	20.80



Band 2 (1900MHz Band)									
SV (MHz)	Modulation	RB Size	RB Offset	Power Ch./Freq.	Power Ch./Freq.	Power Ch./Freq.	Power Ch./Freq.	Turn-up time (min)	MPR (dB)
Channel									
Frequency (MHz)									
20	QPSK	1	0	17.15	17.14	17.08	17.79	18.3	0
20	QPSK	1	48	17.15	17.14	17.08	17.79	18.3	0
20	QPSK	1	96	17.15	17.14	17.08	17.79	18.3	0
20	QPSK	50	0	17.25	17.25	17.22	17.81	18.3	0
20	QPSK	50	24	17.25	17.25	17.22	17.81	18.3	0
20	QPSK	50	48	17.25	17.25	17.22	17.81	18.3	0
20	QPSK	100	0	17.25	17.24	17.20	17.81	18.3	0
20	HQAM	1	0	17.14	17.06	17.04	17.74	18.3	0
20	HQAM	1	48	17.13	17.21	17.20	17.81	18.3	0
20	HQAM	1	96	17.13	17.21	17.20	17.81	18.3	0
20	HQAM	50	0	17.11	17.16	17.10	17.74	18.3	0
20	HQAM	50	24	17.16	17.14	17.10	17.74	18.3	0
20	HQAM	50	48	17.16	17.14	17.10	17.74	18.3	0
20	HQAM	100	0	17.20	17.20	17.18	17.79	18.3	0
20	HQAM	100	48	17.20	17.15	17.18	17.79	18.3	0
20	HQAM	100	96	17.20	17.15	17.18	17.79	18.3	0
20	HQAM	50	0	17.12	17.06	17.17	17.74	18.3	0
20	HQAM	50	24	17.13	17.13	17.10	17.74	18.3	0
20	HQAM	50	48	17.13	17.02	17.10	17.74	18.3	0
20	HQAM	100	0	17.13	17.03	17.10	17.74	18.3	0
Channel									
Frequency (MHz)									
15	QPSK	1	0	17.04	17.02	16.98	17.61	18.3	0
15	QPSK	1	37	17.25	17.26	17.30	17.81	18.3	0
15	QPSK	1	74	17.04	17.02	16.98	17.61	18.3	0
15	QPSK	36	0	17.21	17.03	17.00	17.61	18.3	0
15	QPSK	36	20	17.22	17.25	17.26	17.81	18.3	0
15	QPSK	36	39	17.23	17.27	17.28	17.81	18.3	0
15	QPSK	72	0	17.05	17.19	17.19	17.61	18.3	0
15	HQAM	1	0	17.19	16.91	16.85	17.51	18.3	0
15	HQAM	1	37	17.08	17.14	17.08	17.61	18.3	0
15	HQAM	1	74	17.08	17.09	16.88	17.61	18.3	0
15	HQAM	36	0	17.11	17.09	16.91	17.61	18.3	0
15	HQAM	36	20	17.09	17.04	17.21	17.61	18.3	0
15	HQAM	36	39	17.17	17.05	16.95	17.61	18.3	0
15	HQAM	72	0	16.96	16.98	17.01	17.61	18.3	0
15	HQAM	72	37	16.96	17.07	16.96	17.61	18.3	0
15	HQAM	72	74	17.04	16.79	17.14	17.61	18.3	0
15	HQAM	36	0	16.97	17.05	16.95	17.61	18.3	0
15	HQAM	36	20	17.11	16.96	17.10	17.61	18.3	0
15	HQAM	36	39	16.98	16.83	16.91	17.61	18.3	0
15	HQAM	72	0	17.05	16.82	16.92	17.61	18.3	0
Channel									
Frequency (MHz)									
10	QPSK	1	0	17.15	17.10	17.07	17.61	18.3	0
10	QPSK	1	24	17.17	17.25	17.18	17.61	18.3	0
10	QPSK	1	48	17.01	17.19	17.24	17.61	18.3	0
10	QPSK	25	0	17.21	17.13	17.24	17.61	18.3	0
10	QPSK	25	12	17.03	17.25	17.21	17.61	18.3	0
10	QPSK	25	25	17.23	17.20	16.95	17.61	18.3	0
10	QPSK	50	0	17.04	17.06	17.21	17.61	18.3	0
10	HQAM	1	0	17.03	17.20	16.95	17.61	18.3	0
10	HQAM	1	25	16.95	17.23	17.11	17.61	18.3	0
10	HQAM	1	48	17.08	17.16	17.25	17.61	18.3	0
10	HQAM	25	0	17.02	17.16	17.25	17.61	18.3	0
10	HQAM	25	12	17.04	17.10	17.25	17.61	18.3	0
10	HQAM	25	25	17.09	17.05	17.25	17.61	18.3	0
10	HQAM	50	0	16.93	17.02	17.25	17.61	18.3	0
10	HQAM	50	24	16.98	17.07	16.97	17.61	18.3	0
10	HQAM	50	48	16.97	16.92	17.01	17.61	18.3	0
10	HQAM	25	0	16.99	16.97	16.97	17.61	18.3	0
10	HQAM	25	12	17.14	17.11	17.17	17.61	18.3	0
10	HQAM	25	25	17.03	16.84	17.14	17.61	18.3	0
10	HQAM	50	0	17.03	16.84	17.14	17.61	18.3	0
Channel									
Frequency (MHz)									
5	QPSK	1	0	17.04	17.09	16.92	17.51	18.3	0
5	QPSK	1	12	17.11	17.04	17.21	17.51	18.3	0
5	QPSK	1	24	17.08	17.06	17.08	17.51	18.3	0
5	QPSK	12	0	17.08	17.02	17.15	17.51	18.3	0
5	QPSK	12	7	17.16	17.11	17.08	17.51	18.3	0
5	QPSK	12	13	17.07	16.97	17.11	17.51	18.3	0
5	QPSK	25	0	17.22	17.25	17.22	17.81	18.3	0
5	HQAM	1	0	17.13	17.15	17.10	17.51	18.3	0
5	HQAM	1	24	16.93	16.98	17.05	17.51	18.3	0
5	HQAM	1	48	16.98	16.94	17.03	17.51	18.3	0
5	HQAM	12	7	17.12	16.96	17.16	17.51	18.3	0
5	HQAM	12	13	17.15	16.93	17.07	17.51	18.3	0
5	HQAM	25	0	17.13	16.93	17.07	17.51	18.3	0
5	HQAM	25	12	17.13	16.93	17.07	17.51	18.3	0
5	HQAM	25	13	17.12	16.96	17.16	17.51	18.3	0
5	HQAM	50	0	16.93	16.98	17.07	17.51	18.3	0
5	HQAM	50	24	16.91	16.94	17.03	17.51	18.3	0
5	HQAM	50	48	16.97	16.92	17.01	17.51	18.3	0
5	HQAM	12	0	16.97	16.97	16.99	17.51	18.3	0
5	HQAM	12	7	17.05	16.95	17.06	17.51	18.3	0
5	HQAM	12	13	17.02	16.92	17.03	17.51	18.3	0
5	HQAM	25	0	17.14	16.93	16.98	17.51	18.3	0
Channel									
Frequency (MHz)									
3	QPSK	1	0	16.97	16.96	17.07	17.51	18.3	0
3	QPSK	1	9	17.02	17.19	17.04	17.51	18.3	0
3	QPSK	8	0	17.23	16.95	17.03	17.51	18.3	0
3	QPSK	8	4	17.19	17.23	17.25	17.51	18.3	0
3	QPSK	8	7	17.13	17.04	16.99	17.51	18.3	0
3	QPSK	16	0	17.05	17.06	17.08	17.51	18.3	0
3	HQAM	1	0	16.90	17.15	16.90	17.51	18.3	0
3	HQAM	1	14	16.96	17.07	17.03	17.51	18.3	0
3	HQAM	8	0	16.88	16.97	16.93	17.51	18.3	0
3	HQAM	8	7	17.05	17.18	17.08	17.51	18.3	0
3	HQAM	8	7	16.95	16.98	17.03	17.51	18.3	0
3	HQAM	16	0	17.02	17.05	16.98	17.51	18.3	0
3	HQAM	16	4	16.94	17.08	16.96	17.51	18.3	0
3	HQAM	16	4	16.94	17.08	16.96	17.51	18.3	0
3	HQAM	8	0	16.97	17.06	16.98	17.51	18.3	0
3	HQAM	8	7	17.07	16.92	16.98	17.51	18.3	0
3	HQAM	8	7	17.13	16.96	17.08	17.51	18.3	0
3	HQAM	8	0	16.97	17.06	16.98	17.51	18.3	0
3	HQAM	8	7	17.07	16.92	16.98	17.51	18.3	0
3	HQAM	8	7	17.13	16.96	17.08	17.51	18.3	0
3	HQAM	16	0	16.99	17.17	17.06	17.51	18.3	0
3	HQAM	16	4	16.93	16.86	17.08	17.51	18.3	0
3	HQAM	16	4	16.93	17.02	17.13	17.51	18.3	0
Channel									
Frequency (MHz)									
1.4	QPSK	1	0	17.15	16.99	17.08	17.51	18.3	0
1.4	QPSK	1	3	17.17	17.07	17.21	17.51	18.3	0
1.4	QPSK	1	6	17.15	17.15	17.04	17.51	18.3	0
1.4	QPSK	3	0	17.01	17.18	17.25	17.51	18.3	0
1.4	QPSK	3	3	17.12	17.16	17.12	17.51	18.3	0
1.4	QPSK	3	6	17.08	17.21	17.01	17.51	18.3	0
1.4	HQAM	1	0	17.03	17.20	17.15	17.51	18.3	0
1.4	HQAM	1	3	17.11	16.92	16.91	17.51	18.3	0
1.4	HQAM	1	6	16.98	17.08	16.91	17.51	18.3	0
1.4	HQAM	3	0	17.02	17.16	17.24	17.51	18.3	0
1.4	HQAM	3	3	17.15	16.95	16.99	17.51	18.3	0
1.4	HQAM	3	6	16.93	17.05	17.03	17.51	18.3	0
1.4	HQAM	6	0	16.94	16.99	16.97	17.51	18.3	0
1.4	HQAM	6	3	16.94	16.99	16.97	17.51	18.3	0
1.4	HQAM	6	6	17.06	17.08	17.07	17.51	18.3	0
1.4	HQAM	3	0	17.05	17.06				



Band 12 (700MHz Low Band)										
Part 27E (only one channel required)										
BW (MHz)	Modulation	RB Size	RB Offset	Power Floor Ch./Freq.	Power Floor Ch./Freq.	Power Floor Ch./Freq.	Time-up limit (dBm)	MPR (dB)		
Channel										
Frequency (MHz)										
10	QPSK	1	0	23.70	23.86	23.86		24.3	0	
10	QPSK	1	26	23.72	23.72	23.72				
10	QPSK	1	46	23.72	23.72	23.71				
10	QPSK	25	0	22.36	22.34	22.28				
10	QPSK	25	12	22.36	22.36	22.34				
10	QPSK	25	26	22.37	22.35	22.29		23.3	1	
10	QPSK	50	0	22.41	22.29	22.33				
10	HQAM	1	0	22.02	22.02	22.02				
10	HQAM	1	26	22.51	22.67	22.66		23.3	1	
10	HQAM	1	46	22.68	22.68	22.69				
10	HQAM	25	0	21.84	21.89	21.84		23.3	2	
10	HQAM	25	12	21.83	21.88	21.84				
10	HQAM	25	26	21.84	21.89	21.83				
10	HQAM	50	0	21.86	21.87	21.81				
10	HQAM	1	0	21.77	21.71	21.77				
10	HQAM	1	26	21.72	21.80	21.79		22.3	2	
10	HQAM	1	46	21.79	21.79	21.83				
10	HQAM	25	0	20.87	20.57	20.58				
10	HQAM	25	12	20.89	20.66	20.62		21.3	3	
10	HQAM	25	26	20.89	20.69	20.59				
10	HQAM	50	0	20.45	20.44	20.59				
Channel										
Frequency (MHz)										
5	QPSK	1	0	23.88	23.62	23.94		24.3	0	
5	QPSK	1	12	23.88	23.69	23.70				
5	QPSK	1	26	23.88	23.65	23.70				
5	QPSK	12	0	22.37	22.38	22.38				
5	QPSK	12	7	22.36	22.37	22.33		23.3	1	
5	QPSK	25	0	22.04	22.07	22.06				
5	QPSK	25	0	22.40	22.37	22.30				
5	HQAM	1	0	22.59	22.61	22.57		23.3	1	
5	HQAM	1	26	22.67	22.68	22.71				
5	HQAM	12	0	21.86	21.86	21.96				
5	HQAM	12	7	21.83	21.87	21.82		23.3	2	
5	HQAM	12	13	21.84	21.87	21.82				
5	HQAM	25	0	21.71	21.83	21.81				
5	HQAM	1	0	21.79	21.79	21.79		23.3	2	
5	HQAM	1	12	21.85	21.80	21.83				
5	HQAM	1	26	21.82	21.81	21.83				
5	HQAM	12	0	20.86	20.66	20.68				
5	HQAM	12	7	20.86	20.60	20.64		21.3	3	
5	HQAM	12	13	20.86	20.61	20.52				
5	HQAM	25	0	20.63	20.64	20.56				
Channel										
Frequency (MHz)										
3	QPSK	1	0	23.84	23.67	23.62		24.3	0	
3	QPSK	1	6	23.85	23.63	23.63				
3	QPSK	1	14	23.85	23.66	23.65				
3	QPSK	8	0	22.29	22.29	22.33				
3	QPSK	8	4	22.28	22.34	22.29		23.3	1	
3	QPSK	8	7	22.27	22.31	22.28				
3	HQAM	1	0	22.61	22.64	22.65		23.3	1	
3	HQAM	1	6	22.60	22.63	22.60				
3	HQAM	1	14	22.59	22.66	22.59				
3	HQAM	8	0	21.69	21.71	21.71		23.3	2	
3	HQAM	8	4	21.69	21.67	21.71				
3	HQAM	8	7	21.67	21.67	21.71				
3	HQAM	15	0	21.61	21.66	21.63				
3	HQAM	1	0	21.73	21.80	21.79		23.3	2	
3	HQAM	1	6	21.73	21.80	21.81				
3	HQAM	1	14	21.77	21.77	21.79				
3	HQAM	8	0	20.82	20.67	20.69				
3	HQAM	8	4	20.83	20.65	20.65		21.3	3	
3	HQAM	8	7	20.59	20.59	20.52				
3	HQAM	15	0	20.57	20.57	20.49				
Channel										
Frequency (MHz)										
1.4	QPSK	1	0	23.84	23.62	23.64		24.3	0	
1.4	QPSK	1	6	23.87	23.67	23.63				
1.4	QPSK	1	8	23.85	23.65	23.67				
1.4	QPSK	3	0	22.63	22.66	22.60				
1.4	QPSK	3	1	22.63	22.67	22.66				
1.4	QPSK	3	3	22.66	22.64	22.66		23.3	1	
1.4	HQAM	1	0	22.31	22.29	22.31				
1.4	HQAM	1	6	22.64	22.64	22.65				
1.4	HQAM	1	8	22.62	22.63	22.61		23.3	1	
1.4	HQAM	3	0	22.33	22.33	22.30				
1.4	HQAM	3	1	22.33	22.30	22.33		23.3	2	
1.4	HQAM	3	3	22.33	22.30	22.33				
1.4	HQAM	1	0	21.78	21.79	21.79				
1.4	HQAM	1	6	21.76	21.80	21.79		23.3	2	
1.4	HQAM	1	8	21.75	21.82	21.79				
1.4	HQAM	3	0	21.75	21.78	21.71				
1.4	HQAM	3	1	21.75	21.79	21.76				
1.4	HQAM	3	3	21.72	21.67	21.74				
1.4	HQAM	8	0	20.53	20.57	20.56		21.3	3	

Band 17 (700MHz Band)										
Part 27E (only one channel required)										
BW (MHz)	Modulation	RB Size	RB Offset	Power Floor Ch./Freq.	Power Floor Ch./Freq.	Power Floor Ch./Freq.	Time-up limit (dBm)	MPR (dB)		
Channel										
Frequency (MHz)										
15	QPSK	1	0	23.81	23.82	23.85		24.3	0	
15	QPSK	1	36	23.78	23.71	23.68				
15	QPSK	1	43	23.70	23.70	23.67				
15	QPSK	25	0	22.26	22.26	22.23				
15	QPSK	25	12	22.25	22.23	22.21		23.3	1	
15	QPSK	25	26	22.25	22.20	22.25				
15	QPSK	50	0	22.32	22.33	22.31				
15	HQAM	1	0	22.03	22.07	22.03				
15	HQAM	1	25	22.01	22.02	22.02		23.3	1	
15	HQAM	1	49	22.02	22.05	22.05				
15	HQAM	25	0	21.59	21.59	21.59		23.3	2	
15	HQAM	25	12	21.60	21.57	21.58				
15	HQAM	25	26	21.62	21.62	21.54				
15	HQAM	50	0	21.59	21.56	21.55				
15	HQAM	1	0	21.61	21.71	21.62		23.3	2	
15	HQAM	1	25	21.74	21.69	21.70				
15	HQAM	1	49	21.62	21.73	21.61				
15	HQAM	25	0	20.59	20.52	20.51		21.3	3	
15	HQAM	25	12	20.62	20.59	20.58				
15	HQAM	25	26	20.61	20.61	20.55				
15	HQAM	50	0	20.59	20.57	20.57				
Channel										
Frequency (MHz)										
5	QPSK	1	0	23.62	23.63	23.54		24.3	0	
5	QPSK	1	12	23.59	23.63	23.63				
5	QPSK	1	24	23.68	23.62	23.63				
5	QPSK	12	0	22.31	22.22	22.28				
5	QPSK	12	7	22.25	22.24	22.24		23.3	1	
5	QPSK	25	0	22.07	22.05	22.01				
5	QPSK	25	4	22.07	22.28	22.28				
5	HQAM	1	0	22.61	22.62	22.64		23.3	1	
5	HQAM	1	12	22.64	22.65	22.65				
5	HQAM	1	24	22.64	22.66	22.65				
5	HQAM	12	0	21.58	21.53	21.54		23.3	2	
5	HQAM	12	7	21.53	21.54	21.56				
5	HQAM	12	13	21.61	21.56	21.49				
5	HQAM	25	0	21.46	21.58	21.54		23.3	2	
5	HQAM	25	4	21.54	21.57	21.54				
5	HQAM	1	0	21.78	21.79	21.80		23.3	2	
5	HQAM	1	12	21.83	21.83	21.83				
5	HQAM	12	7	20.53	20.54	20.59		21.3	3	
5	HQAM	12	13	20.56	20.56	20.51				
5	HQAM	25	0	20.54	20.52	20.53				
Channel										
Frequency (MHz)										
3	QPSK	1	0	23.42	23.41	23.42		24.3	0	
3	QPSK	1	12	23.46	23.47	23.41				
3	QPSK	1	24	23.47	23.46	23.46				
3	QPSK	8	0	22.13	22.13	22.13				
3	QPSK	8	4	22.13	22.12					



Band 38(only on channel required)										
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)		
Channel				37850	38000	38150				
Frequency (MHz)				2580	2595	2610				
20	QPSK	1	0	20.35	20.38	20.40	21.3	0		
20	QPSK	1	49	20.47	20.44	20.41				
20	QPSK	1	99	20.25	20.32	20.38				
20	QPSK	50	0	20.43	20.38	20.32	21.3	0		
20	QPSK	50	24	20.45	20.43	20.40				
20	QPSK	50	50	20.33	20.40	20.35				
20	QPSK	100	0	20.43	20.42	20.38	21.3	0		
20	16QAM	1	0	20.38	20.39	20.35				
20	16QAM	1	49	20.36	20.35	20.39				
20	16QAM	1	99	20.39	20.39	20.38	21.3	0		
20	16QAM	50	0	20.46	20.45	20.43				
20	16QAM	50	24	20.46	20.40	20.43				
20	16QAM	50	50	20.30	20.34	20.44	21.3	0		
20	16QAM	100	0	20.41	20.41	20.41				
20	16QAM	100	0	20.41	20.41	20.41				
20	64QAM	1	0	20.35	20.41	20.45	21.3	0		
20	64QAM	1	49	20.31	20.30	20.44				
20	64QAM	1	99	20.21	20.26	20.21				
20	64QAM	50	0	20.41	20.40	20.38	21.3	0		
20	64QAM	50	24	20.37	20.41	20.44				
20	64QAM	50	50	20.33	20.37	20.42				
20	64QAM	100	0	20.35	20.39	20.44				
Channel				21.12	21.17	21.28	Tune-up limit (dBm)	MPR (dB)		
Frequency (MHz)				21.12	21.11	21.23				
15	QPSK	1	0	20.39	20.17	20.44	21.3	0		
15	QPSK	1	37	20.30	20.28	20.29				
15	QPSK	1	74	20.16	20.15	20.23				
15	QPSK	36	0	20.36	20.38	20.08	21.3	0		
15	QPSK	36	20	20.43	20.24	20.43				
15	QPSK	36	39	20.32	20.42	20.23				
15	QPSK	75	0	20.26	20.40	20.34	21.3	0		
15	16QAM	1	0	20.40	20.43	20.22				
15	16QAM	1	37	20.20	20.15	20.20				
15	16QAM	1	74	20.37	20.24	20.43	21.3	0		
15	16QAM	36	0	20.21	20.41	20.18				
15	16QAM	36	20	20.41	20.15	20.43				
15	16QAM	36	39	20.32	20.37	20.23	21.3	0		
15	16QAM	75	0	20.29	20.42	20.34				
15	64QAM	1	0	20.19	20.24	20.47				
15	64QAM	1	37	20.22	20.16	20.25	21.3	0		
15	64QAM	1	74	20.15	20.02	19.97				
15	64QAM	36	0	20.30	20.28	20.16				
15	64QAM	36	20	20.26	20.31	20.23	21.3	0		
15	64QAM	36	39	20.10	20.17	20.45				
15	64QAM	75	0	20.11	20.38	20.19				
Channel				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)		
Frequency (MHz)				2575	2595	2615				
10	QPSK	1	0	20.21	20.30	20.28	21.3	0		
10	QPSK	1	25	20.23	20.40	20.34				
10	QPSK	1	49	20.18	20.16	20.38				
10	QPSK	25	0	20.36	20.29	20.16	21.3	0		
10	QPSK	25	12	20.21	20.39	20.25				
10	QPSK	25	25	20.18	20.21	20.10				
10	QPSK	50	0	20.21	20.35	20.41	21.3	0		
10	16QAM	1	0	20.16	20.26	20.19				
10	16QAM	1	25	20.28	20.12	20.29				
10	16QAM	1	49	20.44	20.37	20.29	21.3	0		
10	16QAM	25	0	20.43	20.39	20.18				
10	16QAM	25	12	20.28	20.37	20.36				
10	16QAM	25	25	20.12	20.25	20.47	21.3	0		
10	16QAM	50	0	20.39	20.16	20.18				
10	64QAM	1	0	20.24	20.24	20.47				
10	64QAM	1	25	20.31	20.20	20.46	21.3	0		
10	64QAM	1	49	20.09	20.21	20.24				
10	64QAM	25	0	20.33	20.42	20.22				
10	64QAM	25	12	20.26	20.43	20.26	21.3	0		
10	64QAM	25	25	20.22	20.15	20.42				
10	64QAM	50	0	20.32	20.14	20.22				
Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)		
Frequency (MHz)				2572.5	2595	2617.5				
5	QPSK	1	0	20.20	20.35	20.20	21.3	0		
5	QPSK	1	12	20.31	20.37	20.35				
5	QPSK	1	24	20.13	20.20	20.40				
5	QPSK	12	0	20.44	20.16	20.26	21.3	0		
5	QPSK	12	7	20.40	20.42	20.25				
5	QPSK	12	13	20.28	20.35	20.17				
5	QPSK	25	0	20.45	20.18	20.29	21.3	0		
5	16QAM	1	0	20.17	20.37	20.25				
5	16QAM	1	12	20.21	20.39	20.23				
5	16QAM	1	24	20.42	20.35	20.24	21.3	0		
5	16QAM	12	0	20.22	20.20	20.43				
5	16QAM	12	7	20.40	20.36	20.19				
5	16QAM	12	13	20.05	20.27	20.38	21.3	0		
5	16QAM	25	0	20.38	20.44	20.40				
5	64QAM	1	0	20.29	20.19	20.39				
5	64QAM	1	12	20.27	20.22	20.34	21.3	0		
5	64QAM	1	24	20.01	20.06	20.03				
5	64QAM	12	0	20.28	20.35	20.25				
5	64QAM	12	7	20.25	20.23	20.35	21.3	0		
5	64QAM	12	13	20.30	20.40	20.43				
5	64QAM	25	0	20.24	20.37	20.21				

Band 41 (2.6G Band)												
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)		
Channel				39750	40185	40620	41055	41490				
Frequency (MHz)				2506	2549.5	2593	2636.5	2680				
20	QPSK	1	0	20.55	20.47	20.57	20.64	20.58	21.3	0		
20	QPSK	1	49	20.68	20.63	20.78	20.76	20.73				
20	QPSK	1	99	20.56	20.61	20.72	20.74	20.65				
20	QPSK	50	0	20.59	20.52	20.74	20.68	20.70	21.3	0		
20	QPSK	50	24	20.65	20.63	20.76	20.74	20.72				
20	QPSK	50	50	20.54	20.60	20.73	20.72	20.67				
20	QPSK	100	0	20.63	20.61	20.74	20.72	20.71	21.3	0		
20	16QAM	1	0	20.63	20.61	20.66	20.70	20.67				
20	16QAM	1	49	20.71	20.73	20.71	20.76	20.73				
20	16QAM	1	99	20.67	20.71	20.78	20.73	20.72	21.3	0		
20	16QAM	50	0	20.53	20.48	20.69	20.73	20.61				
20	16QAM	50	24	20.53	20.52	20.66	20.77	20.65				
20	16QAM	50	50	20.52	20.61	20.68	20.73	20.65	21.3	0		
20	16QAM	100	0	20.49	20.49	20.67	20.71	20.63				
20	64QAM	1	0	20.48	20.41	20.51	20.62	20.43				
20	64QAM	1	49	20.60	20.56	20.73	20.72	20.56	21.3	0		
20	64QAM	1	99	20.42	20.55	20.55	20.63	20.47				
20	64QAM	50	0	20.49	20.40	20.59	20.71	20.59				
20	64QAM	50	24	20.58	20.49	20.62	20.74	20.64	21.3	0		
20	64QAM	50	50	20.43	20.53	20.63	20.72	20.64				
20	64QAM	100	0	20.55	20.54	20.58	20.71	20.61				
Channel				39725	40173	40620	41068	41515	Tune-up limit (dBm)	MPR (dB)		
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5				
15	QPSK	1	0	20.53	20.43	20.34	20.46	20.39	21.3	0		
15	QPSK	1	37	20.48	20.54	20.75	20.72	20.60				
15	QPSK	1	74	20.42	20.58	20.76	20.59	20.49				
15	QPSK	36	0	20.44	20.53	20.63	20.52	20.45	21.3	0		
15	QPSK	36	20	20.54	20.43	20.65	20.51	20.47				
15	QPSK	36	39	20.37	20.70	20.75	20.75	20.61				
15	QPSK	75	0	20.56	20.37	20.57	20.68	20.50	21.3	0		
15	16QAM	1	0	20.66	20.42	20.58	20.69	20.61				
15	16QAM	1	37	20.51	20.59	20.76	20.69	20.71				
15	16QAM	1	74	20.71	20.67	20.70	20.69	20.51	21.3	0		
15	16QAM	36	0	20.30	20.24	20.57	20.71	20.43				
15	16QAM	36	20	20.58	20.28	20.63	2					



Power Level for Body-worn -UAT

GSM850	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	128	169	251		128	169	251	
Tx Channel	128	169	251	128	169	251	128	169
Frequency (MHz)	924.2	935.4	945.8	924.2	935.4	945.8	924.2	935.4
GSM 1 Tx slot	32.06	32.50	32.23	33.30	23.06	23.50	23.23	24.30
GPRS 1 Tx slot	32.04	32.46	32.20	33.30	23.04	23.46	23.20	24.30
GPRS 2 Tx slots	29.80	30.22	30.02	31.30	23.80	24.22	24.02	25.30
GPRS 3 Tx slots	28.23	28.63	28.45	29.80	23.97	24.37	24.19	25.54
GPRS 4 Tx slots	27.33	27.64	27.56	29.30	24.33	24.64	24.56	26.30
EDGE 1 Tx slot	26.65	26.52	26.77	28.30	17.65	17.52	17.77	19.30
EDGE 2 Tx slots	25.45	25.26	25.66	25.80	19.45	19.26	19.66	19.80
EDGE 3 Tx slots	23.25	23.15	23.59	24.30	18.99	18.89	19.33	20.04
EDGE 4 Tx slots	22.20	22.10	22.33	23.80	19.20	19.10	19.33	20.80

GSM1900	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
Tx Channel	512 <td>661 <td>810 <td>512 <td>661 <td>810 <td>512 <td>661 </td></td></td></td></td></td></td>	661 <td>810 <td>512 <td>661 <td>810 <td>512 <td>661 </td></td></td></td></td></td>	810 <td>512 <td>661 <td>810 <td>512 <td>661 </td></td></td></td></td>	512 <td>661 <td>810 <td>512 <td>661 </td></td></td></td>	661 <td>810 <td>512 <td>661 </td></td></td>	810 <td>512 <td>661 </td></td>	512 <td>661 </td>	661
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8	1850.2	1880
GSM 1 Tx slot	27.00	27.08	27.03	27.80	18.00	18.08	18.03	18.80
GPRS 1 Tx slot	26.97	27.06	27.00	27.80	17.97	18.06	18.00	18.80
GPRS 2 Tx slots	23.36	23.43	23.39	24.80	17.36	17.43	17.39	18.80
GPRS 3 Tx slots	22.80	22.71	22.67	23.80	18.34	18.45	18.41	19.54
GPRS 4 Tx slots	20.82	20.96	20.88	22.30	17.82	17.96	17.88	19.30
EDGE 1 Tx slot	22.56	22.80	22.72	24.30	13.56	13.80	13.72	15.30
EDGE 2 Tx slots	20.60	20.87	20.80	21.80	14.60	14.87	14.80	15.80
EDGE 3 Tx slots	19.21	19.55	19.08	20.80	14.95	15.29	14.82	16.54
EDGE 4 Tx slots	18.08	18.05	17.86	19.80	15.08	15.05	14.86	16.80

Band	WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)	
	9262	9400	9538		1312	1413	1513		4132	4182	4233		
Tx Channel	9262	9400	9538	1312	1413	1513	4132	4182	4233	4132	4182	4233	
Rx Channel	9662	9800	9938	1537	1638	1738	4357	4407	4458	4357	4407	4458	
Frequency (MHz)	1933.4	1950	1997.6	1912.4	1931.5	1952.3	2353.4	2353.4	2353.4	2353.4	2353.4	2353.4	
3GPP Rel 99	AMR 12.2Kbps	19.37	19.33	19.25	19.80	19.11	19.15	19.13	19.80	24.09	24.10	24.14	24.80
3GPP Rel 99	AMR 12.2Kbps	19.38	19.36	19.27	19.80	19.13	19.18	19.14	19.80	24.12	24.14	24.16	24.80
3GPP Rel 6	HSDPA Subtest-1	18.30	18.31	18.24	18.80	18.05	18.13	18.12	18.80	23.17	23.17	23.18	23.80
3GPP Rel 6	HSDPA Subtest-2	18.27	18.31	18.25	18.80	17.99	18.12	18.06	18.80	23.14	23.13	23.21	23.80
3GPP Rel 6	HSDPA Subtest-3	17.83	17.84	17.75	18.30	17.54	17.63	17.62	18.30	22.71	22.67	22.69	23.30
3GPP Rel 6	HSDPA Subtest-4	17.77	17.81	17.73	18.30	17.53	17.61	17.58	18.30	22.71	22.69	22.64	23.30
3GPP Rel 8	DCHSDPA Subtest-1	18.30	18.11	18.07	18.80	17.80	18.04	17.82	18.80	23.01	23.08	23.10	23.80
3GPP Rel 8	DCHSDPA Subtest-2	18.15	17.98	18.16	18.80	17.99	17.97	17.77	18.80	23.03	23.01	23.11	23.80
3GPP Rel 8	DCHSDPA Subtest-3	17.61	17.63	17.67	18.30	17.26	17.59	17.32	18.30	22.63	22.54	22.52	23.30
3GPP Rel 8	DCHSDPA Subtest-4	17.77	17.55	17.46	18.30	17.42	17.34	17.41	18.30	22.51	22.46	22.55	23.30
3GPP Rel 6	HSUPA Subtest-1	16.83	16.80	16.73	17.30	16.54	16.60	16.61	17.30	21.55	21.60	21.59	22.30
3GPP Rel 6	HSUPA Subtest-2	16.26	16.29	16.23	16.80	16.01	16.12	16.13	16.80	21.08	21.10	21.07	21.80
3GPP Rel 6	HSUPA Subtest-3	17.33	17.32	17.26	17.80	17.13	17.14	17.15	17.80	22.12	22.12	22.11	22.80
3GPP Rel 6	HSUPA Subtest-4	15.82	15.80	15.73	16.30	15.51	15.63	15.64	16.30	20.59	20.59	20.60	21.30
3GPP Rel 6	HSUPA Subtest-5	18.33	18.33	18.23	18.80	18.00	18.10	18.10	18.80	23.10	23.10	23.10	23.80
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	15.28	15.35	15.26	15.80	15.00	15.14	15.16	15.80	19.97	19.92	19.99	20.80



Band 12 (DSM/Low Band)									
Part 27 (Power and channel request)									
BW (MHz)	Modulation	RB Size	RB Offset	Power Ch. Freq.	Power Ch. Freq.	Power Ch. Freq.	Time-up limit (min)	MFR (dB)	
10	QPSK	1	0	23.70	23.68	23.66			
10	QPSK	1	24	23.70	23.71	23.71	24.3	0	
10	QPSK	1	48	23.72	23.72	23.71			
10	QPSK	25	0	24.36	24.34	24.32			
10	QPSK	25	12	24.36	24.35	24.34			
10	QPSK	25	24	24.37	24.36	24.35	23.3	1	
10	QPSK	50	0	24.41	24.38	24.35			
10	QPSK	50	12	24.41	24.40	24.39			
10	QPSK	50	24	24.42	24.41	24.40	23.3	1	
10	TDMA	1	24	22.51	22.51	22.56	23.3	1	
10	TDMA	1	48	22.58	22.58	22.59			
10	TDMA	25	0	21.83	21.83	21.84	23.3	2	
10	TDMA	25	12	21.83	21.86	21.84			
10	TDMA	25	24	21.84	21.85	21.85	23.3	2	
10	TDMA	50	0	21.84	21.83	21.86			
10	TDMA	50	12	21.87	21.87	21.82	23.3	1	
10	TDMA	50	24	21.87	21.87	21.82			
10	TDMA	100	0	21.77	21.71	21.77	22.3	2	
10	TDMA	100	12	21.77	21.78	21.78			
10	TDMA	100	24	21.78	21.78	21.78	21.3	3	
10	TDMA	200	0	20.85	20.85	20.86			
10	TDMA	200	12	20.85	20.84	20.89	21.3	3	
10	TDMA	200	24	20.85	20.84	20.89			
10	TDMA	400	0	20.85	20.84	20.89	21.3	3	
10	TDMA	400	12	20.85	20.84	20.89			
10	TDMA	400	24	20.87	20.88	20.71	23.3	1	
10	TDMA	12	0	21.86	21.83	21.83	22.3	2	
10	TDMA	12	12	21.84	21.81	21.82			
10	TDMA	12	24	21.84	21.81	21.83	23.3	2	
10	TDMA	25	0	21.71	21.71	21.71	22.3	2	
10	TDMA	25	12	21.71	21.71	21.71			
10	TDMA	25	24	21.71	21.71	21.71	21.3	3	
10	TDMA	50	0	21.71	21.71	21.71			
10	TDMA	50	12	21.71	21.71	21.71	21.3	3	
10	TDMA	50	24	21.71	21.71	21.71			
10	TDMA	100	0	21.71	21.71	21.71	21.3	3	
10	TDMA	100	12	21.71	21.71	21.71			
10	TDMA	100	24	21.71	21.71	21.71	21.3	3	
10	TDMA	200	0	20.85	20.84	20.89	21.3	3	
10	TDMA	200	12	20.85	20.84	20.89			
10	TDMA	200	24	20.85	20.84	20.89	21.3	3	
10	TDMA	400	0	20.85	20.84	20.89			
10	TDMA	400	12	20.85	20.84	20.89	21.3	3	
10	TDMA	400	24	20.85	20.84	20.89			
10	TDMA	800	0	20.85	20.84	20.89	21.3	3	
10	TDMA	800	12	20.85	20.84	20.89			
10	TDMA	800	24	20.85	20.84	20.89	21.3	3	
10	TDMA	1600	0	20.85	20.84	20.89			
10	TDMA	1600	12	20.85	20.84	20.89	21.3	3	
10	TDMA	1600	24	20.85	20.84	20.89			
10	TDMA	3200	0	20.85	20.84	20.89	21.3	3	
10	TDMA	3200	12	20.85	20.84	20.89			
10	TDMA	3200	24	20.85	20.84	20.89	21.3	3	
10	TDMA	6400	0	20.85	20.84	20.89			
10	TDMA	6400	12	20.85	20.84	20.89	21.3	3	
10	TDMA	6400	24	20.85	20.84	20.89			
10	TDMA	12800	0	20.85	20.84	20.89	21.3	3	
10	TDMA	12800	12	20.85	20.84	20.89			
10	TDMA	12800	24	20.85	20.84	20.89	21.3	3	
10	TDMA	25600	0	20.85	20.84	20.89			
10	TDMA	25600	12	20.85	20.84	20.89	21.3	3	
10	TDMA	25600	24	20.85	20.84	20.89			
10	TDMA	51200	0	20.85	20.84	20.89	21.3	3	
10	TDMA	51200	12	20.85	20.84	20.89			
10	TDMA	51200	24	20.85	20.84	20.89	21.3	3	
10	TDMA	102400	0	20.85	20.84	20.89			
10	TDMA	102400	12	20.85	20.84	20.89	21.3	3	
10	TDMA	102400	24	20.85	20.84	20.89			
10	TDMA	204800	0	20.85	20.84	20.89	21.3	3	
10	TDMA	204800	12	20.85	20.84	20.89			
10	TDMA	204800	24	20.85	20.84	20.89	21.3	3	
10	TDMA	409600	0	20.85	20.84	20.89			
10	TDMA	409600	12	20.85	20.84	20.89	21.3	3	
10	TDMA	409600	24	20.85	20.84	20.89			
10	TDMA	819200	0	20.85	20.84	20.89	21.3	3	
10	TDMA	819200	12	20.85	20.84	20.89			
10	TDMA	819200	24	20.85	20.84	20.89	21.3	3	
10	TDMA	1638400	0	20.85	20.84	20.89			
10	TDMA	1638400	12	20.85	20.84	20.89	21.3	3	
10	TDMA	1638400	24	20.85	20.84	20.89			
10	TDMA	3276800	0	20.85	20.84	20.89	21.3	3	
10	TDMA	3276800	12	20.85	20.84	20.89			
10	TDMA	3276800	24	20.85	20.84	20.89	21.3	3	
10	TDMA	6553600	0	20.85	20.84	20.89			
10	TDMA	6553600	12	20.85	20.84	20.89	21.3	3	
10	TDMA	6553600	24	20.85	20.84	20.89			
10	TDMA	13107200	0	20.85	20.84	20.89	21.3	3	
10	TDMA	13107200	12	20.85	20.84	20.89			
10	TDMA	13107200	24	20.85	20.84	20.89	21.3	3	
10	TDMA	26214400	0	20.85	20.84	20.89			
10	TDMA	26214400	12	20.85	20.84	20.89	21.3	3	
10	TDMA	26214400	24	20.85	20.84	20.89			
10	TDMA	52428800	0	20.85	20.84	20.89	21.3	3	
10	TDMA	52428800	12	20.85	20.84	20.89			
10	TDMA	52428800	24	20.85	20.84	20.89	21.3	3	
10	TDMA	104857600	0	20.85	20.84	20.89			
10	TDMA	104857600	12	20.85	20.84	20.89	21.3	3	
10	TDMA	104857600	24	20.85	20.84	20.89			
10	TDMA	209715200	0	20.85	20.84	20.89	21.3	3	
10	TDMA	209715200	12	20.85	20.84	20.89			
10	TDMA	209715200	24	20.85	20.84	20.89	21.3	3	
10	TDMA	419430400	0	20.85	20.84	20.89			
10	TDMA	419430400	12	20.85	20.84	20.89	21.3	3	
10	TDMA	419430400	24	20.85	20.84	20.89			
10	TDMA	838860800	0	20.85	20.84	20.89	21.3	3	
10	TDMA	838860800	12	20.85	20.84	20.89			
10	TDMA	838860800	24	20.85	20.84	20.89	21.3	3	
10	TDMA	1677721600	0	20.85	20.84	20.89			
10	TDMA	1677721600	12	20.85	20.84	20.89	21.3	3	
10	TDMA	1677721600	24	20.85	20.84	20.89			
10	TDMA	3355443200	0	20.85	20.84	20.89	21.3	3	
10	TDMA	3355443200	12	20.85	20.84	20.89			
10	TDMA	3355443200	24	20.85	20.84	20.89	21.3	3	
10	TDMA	6710886400	0	20.85	20.84	20.89			
10	TDMA	6710886400	12	20.85	20.84	20.89	21.3	3	
10	TDMA	6710886400	24	20.85	20.84	20.89			
10	TDMA	13421772800	0	20.85	20.84	20.89	21.3	3	
10	TDMA	13421772800	12	20.85	20.84	20.89			
10	TDMA	13421772800	24	20.85	20.84	20.89	21.3	3	
10	TDMA	26843545600	0	20.85	20.84	20.89			
10	TDMA	26843545600	12	20.85	20.84	20.89	21.3	3	
10	TDMA	26843545600	24	20.85	20.84	20.89			
10	TDMA	53687091200	0	20.85	20.84	20.89	21.3	3	
10	TDMA	53687091200	12	20.85	20.84	20.89			
10	TDMA	53687091200	24	20.85	20.84	20.89	21.3	3	
10	TDMA	107374182400	0	20.85	20.84	20.89			
10	TDMA	107374182400	12	20.85	20.84	20.89	21.3	3	
10	TDMA	107374182400	24	20.85	20.84	20.89			
10	TDMA	214748364800	0	20.85	20.84	20.89	21.3	3	
10	TDMA	2147							



Band 38(only on channel required)												
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)				
Channel				37850	38000	38150						
Frequency (MHz)				2580	2595	2610						
20	QPSK	1	0	21.75	21.79	21.82	22.8	0				
20	QPSK	1	49	22.06	21.97	22.00						
20	QPSK	1	99	22.00	21.96	21.95						
20	QPSK	50	0	22.00	21.91	21.95						
20	QPSK	50	24	22.04	21.95	21.98	22.8	0				
20	QPSK	50	50	22.01	21.93	21.91						
20	QPSK	100	0	22.00	21.94	21.96						
20	16QAM	1	0	22.05	22.00	22.02						
20	16QAM	1	49	22.01	22.05	22.00	22.8	0				
20	16QAM	1	99	22.00	22.05	22.00						
20	16QAM	50	0	21.57	21.56	21.61						
20	16QAM	50	24	21.55	21.60	21.71						
20	16QAM	50	50	21.64	21.56	21.67	22.3	0.5				
20	16QAM	100	0	21.55	21.69	21.61						
20	64QAM	1	0	21.39	21.42	21.44						
20	64QAM	1	49	21.57	21.58	21.63						
20	64QAM	1	99	21.57	21.61	21.56	22.3	0.5				
20	64QAM	50	0	20.46	20.58	20.62						
20	64QAM	50	24	20.57	20.60	20.61						
20	64QAM	50	50	20.53	20.55	20.68						
20	64QAM	100	0	20.51	20.57	20.60	21.3	1.5				
Channel				37825	38000	38175						
Frequency (MHz)				2577.5	2595	2612.5						
15	QPSK	1	0	21.70	21.62	21.71			22.8	0		
15	QPSK	1	37	22.03	22.01	21.75						
15	QPSK	1	74	21.80	22.00	21.72						
15	QPSK	36	0	22.00	21.76	21.82						
15	QPSK	36	20	22.01	21.88	21.86	22.8	0				
15	QPSK	36	39	22.00	21.90	21.69						
15	QPSK	75	0	21.96	21.72	21.93						
15	16QAM	1	0	21.83	21.80	21.78						
15	16QAM	1	37	21.94	22.05	22.02	22.8	0				
15	16QAM	1	74	21.98	22.02	21.95						
15	16QAM	36	0	21.38	21.54	21.56						
15	16QAM	36	20	21.43	21.57	21.48						
15	16QAM	36	39	21.51	21.39	21.67	22.3	0.5				
15	16QAM	75	0	21.39	21.68	21.38						
15	64QAM	1	0	21.41	21.24	21.29						
15	64QAM	1	37	21.40	21.38	21.64						
15	64QAM	1	74	21.50	21.39	21.41	22.3	0.5				
15	64QAM	36	0	20.48	20.60	20.49						
15	64QAM	36	20	20.62	20.37	20.42						
15	64QAM	36	39	20.44	20.56	20.51						
15	64QAM	75	0	20.54	20.44	20.45	21.3	1.5				
Channel				37800	38000	38200						
Frequency (MHz)				2575	2595	2615						
10	QPSK	1	0	21.72	21.60	21.66			22.8	0		
10	QPSK	1	25	22.05	21.90	22.04						
10	QPSK	1	49	21.79	21.85	21.80						
10	QPSK	25	0	21.89	21.82	21.98						
10	QPSK	25	12	21.87	21.95	21.76	22.8	0				
10	QPSK	25	25	21.95	21.85	21.91						
10	QPSK	50	0	21.96	21.85	21.98						
10	16QAM	1	0	21.89	21.94	21.88						
10	16QAM	1	25	21.97	22.00	21.99	22.8	0				
10	16QAM	1	49	22.01	22.04	21.99						
10	16QAM	25	0	21.37	21.54	21.58						
10	16QAM	25	12	21.51	21.56	21.72						
10	16QAM	25	25	21.43	21.41	21.60	22.3	0.5				
10	16QAM	50	0	21.31	21.44	21.59						
10	64QAM	1	0	21.27	21.27	21.48						
10	64QAM	1	25	21.43	21.42	21.41						
10	64QAM	1	49	21.38	21.40	21.47	22.3	0.5				
10	64QAM	25	0	20.35	20.41	20.44						
10	64QAM	25	12	20.41	20.43	20.59						
10	64QAM	25	25	20.29	20.52	20.70						
10	64QAM	50	0	20.48	20.48	20.62	21.3	1.5				
Channel				37775	38000	38225						
Frequency (MHz)				2572.5	2595	2617.5						
5	QPSK	1	0	21.64	21.72	21.75			22.8	0		
5	QPSK	1	12	21.98	21.89	21.86						
5	QPSK	1	24	21.78	22.01	21.90						
5	QPSK	12	0	21.99	21.66	21.80						
5	QPSK	12	7	22.03	21.90	21.95	22.8	0				
5	QPSK	12	13	21.96	21.80	21.88						
5	QPSK	25	0	21.92	21.72	21.75						
5	16QAM	1	0	21.99	21.83	21.79						
5	16QAM	1	12	22.03	21.94	21.87	22.8	0				
5	16QAM	1	24	21.80	21.87	22.04						
5	16QAM	12	0	21.33	21.60	21.41						
5	16QAM	12	7	21.39	21.54	21.58						
5	16QAM	12	13	21.57	21.61	21.45	22.3	0.5				
5	16QAM	25	0	21.44	21.52	21.60						
5	64QAM	1	0	21.41	21.19	21.30						
5	64QAM	1	12	21.54	21.58	21.44						
5	64QAM	1	24	21.48	21.53	21.42	22.3	0.5				
5	64QAM	12	0	20.27	20.49	20.50						
5	64QAM	12	7	20.53	20.58	20.45						
5	64QAM	12	13	20.44	20.36	20.67						
5	64QAM	25	0	20.27	20.45	20.51	21.3	1.5				

Band 41 (2.6G Band)												
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)		
Channel				39750	40185	40620	41055	41490				
Frequency (MHz)				2506	2549.5	2593	2636.5	2680				
20	QPSK	1	0	21.96	21.87	21.99	22.06	21.97	22.8	0		
20	QPSK	1	49	22.00	22.03	22.18	22.15	22.13				
20	QPSK	1	99	21.88	22.02	22.08	22.11	22.03				
20	QPSK	50	0	21.92	21.94	22.10	22.13	22.08				
20	QPSK	50	24	21.97	22.00	22.15	22.14	22.11	22.8	0		
20	QPSK	50	50	21.95	21.98	22.08	22.12	22.10				
20	QPSK	100	0	21.95	21.97	22.13	22.12	22.09				
20	16QAM	1	0	21.83	21.85	21.90	22.02	21.97				
20	16QAM	1	49	22.05	22.06	22.10	22.06	22.07	22.8	0		
20	16QAM	1	99	21.93	21.95	22.02	22.10	21.99				
20	16QAM	50	0	21.49	21.44	21.64	21.74	21.81				
20	16QAM	50	24	21.61	21.49	21.68	21.77	21.89				
20	16QAM	50	50	21.51	21.59	21.68	21.74	21.83	22.3	0.5		
20	16QAM	100	0	21.48	21.46	21.49	21.71	21.81				
20	64QAM	1	0	21.43	21.47	21.42	21.57	21.49				
20	64QAM	1	49	21.60	21.56	21.69	21.73	21.80				
20	64QAM	1	99	21.44	21.47	21.57	21.62	21.50	22.3	0.5		
20	64QAM	50	0	20.45	20.44	20.60	20.71	20.59				
20	64QAM	50	24	20.55	20.50	20.66	20.67	20.62				
20	64QAM	50	50	20.46	20.55	20.64	20.73	20.63				
20	64QAM	100	0	20.53	20.49	20.62	20.64	20.60	21.3	1.5		
Channel				39725	40173	40620	41068	41515				
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5				
15	QPSK	1	0	21.82	21.77	21.94	22.05	21.85			22.8	0
15	QPSK	1	37	21.89	22.07	22.08	22.14	21.96				
15	QPSK	1	74	21.83	21.98	21.99	22.13	21.83				
15	QPSK	36	0	21.79	21.81	21.91	21.98	22.03				
15	QPSK	36	20	21.86	21.99	22.03	21.90	21.95	22.8	0		
15	QPSK	36	39	21.72	21.90	22.02	21.91	21.93				
15	QPSK	75	0	21.72	21.88	21.93	22.13	22.09				
15	16QAM	1	0	21.67	21.86	21.71	22.06	21.85				
15	16QAM	1	37	21.97	21.94	22.04	21.81	21.88	22.8	0		
15	16QAM	1	74	21.90	21.83	21.83	21.86	21.84				
15	16QAM	36	0	21.31	21.37	21.67	21.59	21.65				
15	16QAM	36	20	21.60	21.43	21.51	21.71	21.50				
15	16QAM	36	39	21.35	21.63	21.64	21.67	21.64	22.3	0.5		
15	16QAM	75	0	21.39	21.43	21.40	21.76					



Power Level for Head -LAT

GSM850	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	128	169	251		128	169	251	
TX Channel	128	169	251	128	169	251	128	169
Frequency (MHz)	924.2	935.4	945.8	924.2	935.4	945.8	924.2	935.4
GSM 1 Tx slot	32.06	32.50	32.23	33.30	23.06	23.50	23.23	24.30
GPRS 1 Tx slot	32.04	32.46	32.20	33.30	23.04	23.46	23.20	24.30
GPRS 2 Tx slots	29.80	30.22	30.02	31.30	23.80	24.22	24.02	25.30
GPRS 3 Tx slots	28.23	28.63	28.45	29.80	23.97	24.37	24.19	25.54
GPRS 4 Tx slots	27.33	27.64	27.56	29.30	24.33	24.64	24.56	26.30
EDGE 1 Tx slot	26.65	26.52	26.77	28.30	17.65	17.52	17.77	19.30
EDGE 2 Tx slots	25.45	25.26	25.66	25.80	19.45	19.26	19.66	19.80
EDGE 3 Tx slots	23.25	23.15	23.59	24.30	18.99	18.89	19.33	20.04
EDGE 4 Tx slots	22.20	22.10	22.33	23.80	19.20	19.10	19.33	20.80

GSM1900	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
TX Channel	512	661	810	512	661	810	512	661
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8	1850.2	1880
GSM 1 Tx slot	29.15	29.28	29.26	30.30	20.15	20.28	20.26	21.30
GPRS 1 Tx slot	29.13	29.26	29.23	30.30	20.13	20.26	20.23	21.30
GPRS 2 Tx slots	26.00	26.22	26.19	27.80	20.00	20.22	20.19	21.80
GPRS 3 Tx slots	25.22	25.41	25.39	26.80	20.96	21.15	21.13	22.54
GPRS 4 Tx slots	23.37	23.54	23.53	25.30	20.37	20.54	20.53	22.30
EDGE 1 Tx slot	25.84	25.90	25.72	27.30	16.84	16.90	16.72	18.30
EDGE 2 Tx slots	23.92	24.00	23.89	24.80	17.92	18.00	17.89	18.80
EDGE 3 Tx slots	22.44	22.57	22.32	23.80	18.18	18.31	18.06	19.54
EDGE 4 Tx slots	21.24	21.28	21.12	22.80	18.24	18.28	18.12	19.80

Band	WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)	
	9262	9400	9538		1312	1413	1513		4132	4182	4233		
TX Channel	9262	9400	9538	1312	1413	1513	4132	4182	4233	4132	4182	4233	
Rx Channel	9662	9800	9938	1537	1638	1738	4357	4407	4458	4357	4407	4458	
Frequency (MHz)	1933.4	1950	1997.6	1712.4	1731.5	1752.3	4253.4	4333.1	4413.6	4253.4	4333.1	4413.6	
3GPP Rel 99	AMR 12.2Kbps	23.78	23.69	23.75	24.30	23.52	23.60	23.57	24.30	24.09	24.10	24.14	24.80
3GPP Rel 99	AMR 12.2Kbps	23.79	23.72	23.78	24.30	23.55	23.62	23.60	24.30	24.12	24.14	24.16	24.80
3GPP Rel 6	HSDPA Subtest-1	22.75	22.74	22.77	23.30	22.54	22.62	22.63	23.30	23.17	23.17	23.18	23.80
3GPP Rel 6	HSDPA Subtest-2	22.74	22.72	22.75	23.30	22.51	22.59	22.60	23.30	23.14	23.13	23.21	23.80
3GPP Rel 6	HSDPA Subtest-3	22.26	22.26	22.27	22.80	22.05	22.16	22.12	22.80	22.71	22.67	22.69	23.30
3GPP Rel 6	HSDPA Subtest-4	22.23	22.19	22.24	22.80	22.01	22.10	22.13	22.80	22.71	22.69	22.64	23.30
3GPP Rel 8	DC-HSDPA Subtest-1	22.64	22.68	22.75	23.30	22.49	22.53	22.43	23.30	23.01	23.08	23.10	23.80
3GPP Rel 8	DC-HSDPA Subtest-2	22.61	22.64	22.71	23.30	22.42	22.46	22.38	23.30	23.03	23.01	23.11	23.80
3GPP Rel 8	DC-HSDPA Subtest-3	22.17	22.22	22.31	22.80	21.96	22.02	22.04	22.80	22.63	22.54	22.52	23.30
3GPP Rel 8	DC-HSDPA Subtest-4	22.11	22.21	22.21	22.80	21.93	21.94	21.92	22.80	22.51	22.46	22.55	23.30
3GPP Rel 6	HSUPA Subtest-1	21.20	21.19	21.24	21.80	20.90	21.11	21.13	21.80	21.55	21.60	21.59	22.30
3GPP Rel 6	HSUPA Subtest-2	20.86	20.84	20.75	21.30	20.69	20.75	20.78	21.30	21.08	21.10	21.07	21.80
3GPP Rel 6	HSUPA Subtest-3	21.75	21.71	21.78	22.30	21.56	21.63	21.61	22.30	22.12	22.12	22.11	22.80
3GPP Rel 6	HSUPA Subtest-4	20.22	20.17	20.23	20.80	19.99	20.09	20.06	20.80	20.59	20.59	20.60	21.30
3GPP Rel 6	HSUPA Subtest-5	22.70	22.70	22.80	23.30	22.50	22.60	22.60	23.30	23.10	23.10	23.10	23.80
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	19.79	19.83	19.92	20.30	19.50	19.63	19.71	20.30	19.97	19.92	19.99	20.80



Band 38(only on channel required)										
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)		
Channel				37850	38000	38150				
Frequency (MHz)				2580	2595	2610				
20	QPSK	1	0	23.23	23.23	23.30	24.3	0		
20	QPSK	1	49	23.49	23.44	23.46				
20	QPSK	1	99	23.39	23.34	23.40				
20	QPSK	50	0	22.07	22.05	22.11	23.3	1		
20	QPSK	50	24	22.17	22.10	22.16				
20	QPSK	50	50	22.11	22.08	22.10				
20	QPSK	100	0	22.10	22.07	22.09	23.3	1		
20	16QAM	1	0	22.16	22.10	22.22				
20	16QAM	1	49	22.37	22.44	22.45				
20	16QAM	1	99	22.25	22.27	22.35	22.3	2		
20	16QAM	50	0	21.45	21.49	21.50				
20	16QAM	50	24	21.46	21.49	21.52				
20	16QAM	50	50	21.48	21.51	21.52	22.3	2		
20	16QAM	100	0	21.45	21.44	21.50				
20	64QAM	1	0	21.25	21.34	21.40				
20	64QAM	1	49	21.47	21.53	21.58	21.3	3		
20	64QAM	1	99	21.41	21.45	21.52				
20	64QAM	50	0	20.33	20.38	20.48				
20	64QAM	50	24	20.45	20.49	20.45	21.3	3		
20	64QAM	50	50	20.46	20.45	20.49				
20	64QAM	100	0	20.37	20.39	20.45				
Channel				37825	38000	38175	Tune-up limit (dBm)	MPR (dB)		
Frequency (MHz)				2577.5	2595	2612.5				
15	QPSK	1	0	23.22	23.24	23.32	24.3	0		
15	QPSK	1	37	23.34	23.44	23.47				
15	QPSK	1	74	23.40	23.37	23.41				
15	QPSK	36	0	22.09	22.07	22.18	23.3	1		
15	QPSK	36	20	22.12	22.16	22.23				
15	QPSK	36	39	22.13	22.10	22.21				
15	QPSK	75	0	22.15	22.17	22.24	23.3	1		
15	16QAM	1	0	22.19	22.18	22.20				
15	16QAM	1	37	22.32	22.35	22.35				
15	16QAM	1	74	22.33	22.28	22.35	22.3	2		
15	16QAM	36	0	21.38	21.41	21.47				
15	16QAM	36	20	21.40	21.42	21.49				
15	16QAM	36	39	21.44	21.47	21.44	22.3	2		
15	16QAM	75	0	21.40	21.47	21.54				
15	64QAM	1	0	21.36	21.32	21.49				
15	64QAM	1	37	21.45	21.53	21.52	22.3	2		
15	64QAM	1	74	21.54	21.47	21.55				
15	64QAM	36	0	20.37	20.46	20.57				
15	64QAM	36	20	20.45	20.47	20.50	21.3	3		
15	64QAM	36	39	20.39	20.49	20.45				
15	64QAM	75	0	20.39	20.42	20.41				
Channel				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)		
Frequency (MHz)				2575	2595	2615				
10	QPSK	1	0	23.31	23.42	23.35	24.3	0		
10	QPSK	1	25	23.38	23.48	23.43				
10	QPSK	1	49	23.45	23.44	23.49				
10	QPSK	25	0	22.03	22.19	22.18	23.3	1		
10	QPSK	25	12	22.17	22.19	22.24				
10	QPSK	25	25	22.14	22.09	22.24				
10	QPSK	50	0	22.12	22.12	22.17	23.3	1		
10	16QAM	1	0	22.20	22.27	22.28				
10	16QAM	1	25	22.33	22.35	22.41				
10	16QAM	1	49	22.29	22.39	22.40	22.3	2		
10	16QAM	25	0	21.44	21.55	21.55				
10	16QAM	25	12	21.44	21.52	21.59				
10	16QAM	25	25	21.49	21.52	21.60	22.3	2		
10	16QAM	50	0	21.46	21.45	21.59				
10	64QAM	1	0	21.39	21.46	21.47				
10	64QAM	1	25	21.45	21.47	21.60	21.3	3		
10	64QAM	1	49	21.47	21.53	21.56				
10	64QAM	25	0	20.48	20.53	20.53				
10	64QAM	25	12	20.51	20.51	20.66	21.3	3		
10	64QAM	25	25	20.54	20.46	20.63				
10	64QAM	50	0	20.40	20.47	20.54				
Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)		
Frequency (MHz)				2572.5	2595	2617.5				
5	QPSK	1	0	23.31	23.40	23.48	24.3	0		
5	QPSK	1	12	23.34	23.39	23.47				
5	QPSK	1	24	23.40	23.46	23.47				
5	QPSK	12	0	22.11	22.21	22.26	23.3	1		
5	QPSK	12	7	22.12	22.20	22.22				
5	QPSK	12	13	22.11	22.15	22.27				
5	QPSK	25	0	22.19	22.16	22.25	23.3	1		
5	16QAM	1	0	22.26	22.32	22.36				
5	16QAM	1	12	22.29	22.39	22.36				
5	16QAM	1	24	22.24	22.37	22.39	22.3	2		
5	16QAM	12	0	21.38	21.47	21.54				
5	16QAM	12	7	21.37	21.46	21.62				
5	16QAM	12	13	21.42	21.45	21.56	22.3	2		
5	16QAM	25	0	21.43	21.57	21.59				
5	64QAM	1	0	21.44	21.52	21.56				
5	64QAM	1	12	21.46	21.53	21.59	22.3	2		
5	64QAM	1	24	21.49	21.52	21.58				
5	64QAM	12	0	20.38	20.53	20.50				
5	64QAM	12	7	20.41	20.48	20.50	21.3	3		
5	64QAM	12	13	20.46	20.45	20.50				
5	64QAM	25	0	20.47	20.50	20.61				

Band 41 (2.6G Band)												
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)		
Channel				39750	40185	40620	41055	41490				
Frequency (MHz)				2506	2549.5	2593	2636.5	2680				
20	QPSK	1	0	23.40	23.34	23.47	23.49	23.52	24.3	0		
20	QPSK	1	49	23.58	23.56	23.67	23.65	23.65				
20	QPSK	1	99	23.45	23.41	23.80	23.60	23.51				
20	QPSK	50	0	22.12	22.04	22.23	22.25	22.25	23.3	1		
20	QPSK	50	24	22.21	22.19	22.31	22.29	22.27				
20	QPSK	50	50	22.13	22.15	22.27	22.30	22.26				
20	QPSK	100	0	22.11	22.12	22.28	22.27	22.25	23.3	1		
20	16QAM	1	0	22.04	22.10	22.19	22.01	22.04				
20	16QAM	1	49	22.09	22.26	22.30	22.13	22.12				
20	16QAM	1	99	22.19	22.10	22.12	22.06	22.00	22.3	2		
20	16QAM	50	0	21.26	21.43	21.58	21.39	21.38				
20	16QAM	50	24	21.38	21.46	21.59	21.44	21.41				
20	16QAM	50	50	21.37	21.51	21.56	21.44	21.36	22.3	2		
20	16QAM	100	0	21.29	21.46	21.53	21.41	21.37				
20	64QAM	1	0	21.01	21.09	21.19	21.03	21.00				
20	64QAM	1	49	21.08	21.25	21.28	21.12	21.15	22.3	2		
20	64QAM	1	99	21.00	21.09	21.14	21.08	21.04				
20	64QAM	50	0	20.21	20.37	20.52	20.33	20.33				
20	64QAM	50	24	20.34	20.41	20.52	20.43	20.36	21.3	3		
20	64QAM	50	50	20.33	20.45	20.51	20.39	20.31				
20	64QAM	100	0	20.26	20.42	20.52	20.38	20.31				
Channel				39725	40173	40620	41088	41515	Tune-up limit (dBm)	MPR (dB)		
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5				
15	QPSK	1	0	23.35	23.56	23.51	23.54	23.56	24.3	0		
15	QPSK	1	37	23.47	23.57	23.57	23.55	23.55				
15	QPSK	1	74	23.41	23.59	23.52	23.54	23.51				
15	QPSK	36	0	22.15	22.35	22.27	22.36	22.48	23.3	1		
15	QPSK	36	20	22.16	22.39	22.28	22.41	22.49				
15	QPSK	36	39	22.14	22.44	22.32	22.42	22.47				
15	QPSK	75	0	22.17	22.43	22.35	22.42	22.51	23.3	1		
15	16QAM	1	0	22.13	22.42	22.31	22.37	22.47				
15	16QAM	1	37	22.22	22.50	22.37	22.44	22.53				
15	16QAM	1	74	22.24	22.44	22.33	22.43	22.44	22.3	2		
15	16QAM	36	0	21.43	21.64	21.58	21.63	21.75				
15	16QAM	36	20	21.45	21.68	21.59	21.67	21.76				
15	16QAM	36	39	21.47	21.69							



Power Level for Hotspot -LAT

GSM850 TX Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	128	189	251		128	189	251	
Frequency (MHz)	824.2	836.4	848.8		824.2	836.4	848.8	
GSM 1 Tx slot	32.06	32.50	32.23	33.30	23.06	23.50	23.23	24.30
GPRS 1 Tx slot	32.04	32.46	32.20	33.30	23.04	23.46	23.20	24.30
GPRS 2 Tx slots	29.80	30.22	30.02	31.30	23.80	24.22	24.02	25.30
GPRS 3 Tx slots	28.23	28.63	28.45	29.80	23.97	24.37	24.19	25.54
GPRS 4 Tx slots	27.33	27.64	27.56	29.30	24.33	24.64	24.56	26.30
EDGE 1 Tx slot	26.65	26.52	26.77	28.30	17.65	17.52	17.77	19.30
EDGE 2 Tx slots	25.45	25.26	25.66	25.80	16.45	16.26	16.66	19.80
EDGE 3 Tx slots	23.25	23.15	23.59	24.30	18.99	18.89	19.33	20.04
EDGE 4 Tx slots	22.20	22.10	22.33	23.80	19.20	19.10	19.33	20.80

GSM1900 TX Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1860	1909.8		1850.2	1860	1909.8	
GSM 1 Tx slot	29.15	29.28	29.26	30.30	20.15	20.28	20.26	21.30
GPRS 1 Tx slot	29.13	29.26	29.23	30.30	20.13	20.26	20.23	21.30
GPRS 2 Tx slots	26.00	26.22	26.19	27.80	20.00	20.22	20.19	21.80
GPRS 3 Tx slots	25.22	25.41	25.39	26.80	20.96	21.15	21.13	22.54
GPRS 4 Tx slots	23.37	23.54	23.53	25.30	20.37	20.54	20.53	22.30
EDGE 1 Tx slot	25.84	25.90	25.72	27.30	16.84	16.90	16.72	18.30
EDGE 2 Tx slots	23.92	24.00	23.89	24.80	17.92	18.00	17.89	18.80
EDGE 3 Tx slots	22.44	22.57	22.32	23.80	18.18	18.31	18.06	19.54
EDGE 4 Tx slots	21.24	21.28	21.12	22.80	18.24	18.28	18.12	19.80

Band	TX Channel	WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
		9262	9400	9538		1312	1413	1513		4132	4162	4233	
	Rx Channel	9662	9900	9938		1537	1638	1738		4357	4407	4458	
	Frequency (MHz)	1852.4	1860	1907.6		1712.4	1732.6	1752.6		826.4	836.4	846.6	
3GPP Rel 99	AMR 12.2Kbps	21.32	21.30	21.32	21.80	19.11	19.15	19.13	19.80	24.09	24.10	24.14	24.80
3GPP Rel 99	RMC 12.2Kbps	21.35	21.33	21.34	21.80	19.13	19.18	19.14	19.80	24.12	24.14	24.16	24.80
3GPP Rel 6	HSDPA Subtest-1	20.51	20.52	20.55	20.80	18.05	18.13	18.12	18.80	23.17	23.17	23.18	23.80
3GPP Rel 6	HSDPA Subtest-2	20.49	20.51	20.55	20.80	17.99	18.12	18.06	18.80	23.14	23.13	23.21	23.80
3GPP Rel 6	HSDPA Subtest-3	20.03	20.02	20.06	20.30	17.54	17.63	17.62	18.30	22.71	22.67	22.69	23.30
3GPP Rel 6	HSDPA Subtest-4	20.01	19.99	20.00	20.30	17.53	17.61	17.58	18.30	22.71	22.69	22.64	23.30
3GPP Rel 8	DC-HSDPA Subtest-1	20.26	20.31	20.37	20.80	17.80	18.04	17.82	18.80	23.01	23.08	23.10	23.80
3GPP Rel 8	DC-HSDPA Subtest-2	20.30	20.47	20.36	20.80	17.99	17.97	17.77	18.80	23.03	23.01	23.11	23.80
3GPP Rel 8	DC-HSDPA Subtest-3	19.89	19.76	19.82	20.30	17.26	17.59	17.32	18.30	22.63	22.54	22.52	23.30
3GPP Rel 8	DC-HSDPA Subtest-4	19.74	19.92	19.81	20.30	17.42	17.34	17.41	18.30	22.51	22.46	22.55	23.30
3GPP Rel 6	HSUPA Subtest-1	18.97	18.98	18.98	19.30	16.54	16.60	16.61	17.30	21.55	21.60	21.59	22.30
3GPP Rel 6	HSUPA Subtest-2	18.49	18.47	18.49	18.80	16.01	16.12	16.13	16.80	21.06	21.10	21.07	21.80
3GPP Rel 6	HSUPA Subtest-3	19.50	19.51	19.49	19.80	17.13	17.14	17.15	17.80	22.12	22.12	22.11	22.80
3GPP Rel 6	HSUPA Subtest-4	17.98	17.99	17.98	18.30	15.51	15.63	15.64	16.30	20.59	20.59	20.60	21.30
3GPP Rel 6	HSUPA Subtest-5	20.60	20.50	20.50	20.80	18.00	18.10	18.10	18.80	23.10	23.10	23.10	23.80
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	17.42	17.46	17.52	17.80	15.00	15.14	15.16	15.80	19.97	19.92	19.99	20.80



Band 2 (1900MHz Band) Part 2 (only on channels required)										
BW (MHz)	Modulation	RB Size	RB Offset	Power Ch. 1 Ch. 2	Power Ch. 3 Ch. 4	Power Ch. 5 Ch. 6	Power Ch. 7 Ch. 8	Time-up limit (min)	MPR (dB)	
50	QPSK	1	0	20.48	20.59	20.52				0
Channel Frequency (MHz)										
50	QPSK	1	0	20.48	20.59	20.52		21.8	0	
50	QPSK	1	0	20.48	20.42	20.52				
50	QPSK	50	0	20.57	20.60	20.57				
50	QPSK	50	0	20.58	20.55	20.54		21.8	0	
50	QPSK	100	0	20.62	20.64	20.64				
50	HQAM	1	40	20.68	20.66	20.36		21.8	0	
50	HQAM	1	50	20.61	20.49	20.51				
50	HQAM	50	0	20.45	20.36	20.68		21.8	0	
50	HQAM	50	0	20.51	20.42	20.38				
50	HQAM	1	0	20.62	20.62	20.37				
50	HQAM	1	40	20.55	20.57	20.55		21.8	0	
50	HQAM	1	50	20.61	20.51	20.26				
50	HQAM	50	0	20.12	20.03	20.13				
50	HQAM	50	0	20.22	20.03	20.15		21.3	0.5	
50	HQAM	50	0	20.20	19.97	20.10				
50	HQAM	100	0	19.98	19.96	20.11				
Channel Frequency (MHz)										
15	QPSK	1	0	20.50	20.44	20.44				
15	QPSK	1	37	20.47	20.55	20.51		21.8	0	
15	QPSK	1	74	20.38	20.51	20.38				
15	QPSK	38	0	20.54	20.47	20.83				
15	QPSK	38	0	20.51	20.54	20.82		21.8	0	
15	QPSK	76	0	20.51	20.51	20.82				
15	QPSK	76	0	20.57	20.55	20.83				
15	HQAM	1	0	20.59	20.64	20.81		21.8	0	
15	HQAM	1	37	20.61	20.54	20.68				
15	HQAM	1	74	20.31	20.80	20.80				
15	HQAM	38	0	20.56	20.60	20.80		21.8	0	
15	HQAM	38	0	20.53	20.57	20.80				
15	HQAM	38	0	20.51	20.57	20.80				
15	HQAM	76	0	20.57	20.55	20.83				
15	HQAM	76	0	20.51	20.57	20.80				
15	HQAM	1	37	20.40	20.46	20.55		21.8	0	
15	HQAM	1	74	20.20	20.70	20.34				
15	HQAM	38	0	20.43	20.54	20.87				
15	HQAM	38	0	20.13	20.10	20.12		21.3	0.5	
15	HQAM	38	0	20.11	20.00	20.16				
15	HQAM	76	0	20.20	20.05	20.20				
Channel Frequency (MHz)										
10	QPSK	1	0	20.34	20.57	20.30				
10	QPSK	1	25	20.52	20.56	20.87		21.8	0	
10	QPSK	1	49	20.48	20.53	20.55				
10	QPSK	1	74	20.38	20.44	20.55				
10	QPSK	25	12	20.58	20.55	20.89		21.8	0	
10	QPSK	25	12	20.54	20.58	20.70				
10	QPSK	50	0	20.61	20.51	20.87				
10	HQAM	1	0	20.60	20.66	20.71		21.8	0	
10	HQAM	1	25	20.57	20.57	20.68				
10	HQAM	1	49	20.58	20.68	20.68				
10	HQAM	25	0	20.58	20.50	20.63		21.8	0	
10	HQAM	25	12	20.57	20.63	20.70				
10	HQAM	50	0	20.64	20.54	20.68				
10	HQAM	50	0	20.61	20.58	20.68		21.8	0	
10	HQAM	1	0	20.53	20.56	20.55				
10	HQAM	1	25	20.54	20.56	20.85				
10	HQAM	25	0	20.47	19.98	20.13		21.3	0.5	
10	HQAM	25	12	19.97	20.00	20.09				
10	HQAM	25	12	20.00	20.03	20.15				
10	HQAM	50	0	20.24	20.04	20.15				
10	HQAM	50	0	20.22	20.05	20.16				
Channel Frequency (MHz)										
5	QPSK	1	0	20.54	20.61	20.64				
5	QPSK	1	12	20.63	20.68	20.68		21.8	0	
5	QPSK	1	24	20.58	20.80	20.86				
5	QPSK	12	0	20.56	20.57	20.80		21.8	0	
5	QPSK	12	13	20.57	20.57	20.80				
5	QPSK	12	13	20.50	20.53	20.50				
5	QPSK	25	0	20.54	20.58	20.85		21.8	0	
5	QPSK	25	12	20.62	20.62	20.84				
5	HQAM	1	0	20.60	20.69	20.80		21.8	0	
5	HQAM	1	12	20.63	20.69	20.84				
5	HQAM	1	24	20.51	20.80	20.84				
5	HQAM	12	0	20.61	20.64	20.81		21.8	0	
5	HQAM	12	13	20.57	20.55	20.60				
5	HQAM	25	0	20.54	20.58	20.85		21.8	0	
5	HQAM	25	12	20.62	20.62	20.84				
5	HQAM	25	12	20.50	20.50	20.50				
5	HQAM	1	0	20.50	20.65	20.38		21.8	0	
5	HQAM	1	12	20.56	20.64	20.86				
5	HQAM	1	24	20.53	20.59	20.59				
5	HQAM	12	0	20.52	20.00	20.35		21.3	0.5	
5	HQAM	12	13	20.00	20.03	20.15				
5	HQAM	25	0	20.24	20.04	20.15				
5	HQAM	25	0	20.22	20.13	20.12				
Channel Frequency (MHz)										
3	QPSK	1	0	20.53	20.49	20.43				
3	QPSK	1	8	20.44	20.38	20.53		21.8	0	
3	QPSK	1	14	20.41	20.43	20.60				
3	QPSK	8	0	20.50	20.55	20.61				
3	QPSK	8	0	20.53	20.56	20.64		21.8	0	
3	QPSK	8	0	20.50	20.50	20.60				
3	QPSK	16	0	20.50	20.54	20.63				
3	HQAM	1	0	20.51	20.46	20.44		21.8	0	
3	HQAM	1	8	20.41	20.44	20.40				
3	HQAM	1	14	20.48	20.43	20.43				
3	HQAM	8	0	20.51	20.60	20.67		21.8	0	
3	HQAM	8	0	20.54	20.64	20.64				
3	HQAM	8	0	20.51	20.67	20.66				
3	HQAM	16	0	20.57	20.49	20.56				
3	HQAM	16	0	20.54	20.60	20.66		21.8	0	
3	HQAM	1	0	20.50	20.58	20.58				
3	HQAM	1	8	20.41	20.39	20.39				
3	HQAM	1	14	20.41	19.97	20.03				
3	HQAM	8	0	20.57	19.99	20.00		21.3	0.5	
3	HQAM	8	0	20.56	19.96	20.06				
3	HQAM	16	0	19.94	20.10	20.15				
3	HQAM	16	0	19.94	20.13	20.12				
Channel Frequency (MHz)										
1.4	QPSK	1	0	20.57	20.44	20.62				
1.4	QPSK	1	3	20.67	20.64	20.58		21.8	0	
1.4	QPSK	1	6	20.57	20.56	20.59				
1.4	QPSK	1	9	20.50	20.50	20.60				
1.4	QPSK	3	0	20.57	20.59	20.60				
1.4	QPSK	3	0	20.56	20.48	20.60		21.8	0	
1.4	QPSK	3	0	20.54	20.50	20.45				
1.4	HQAM	1	0	20.54	20.50	20.45				
1.4	HQAM	1	3	20.46	20.52	20.47		21.8	0	
1.4	HQAM	1	6	20.53	20.51	20.48				
1.4	HQAM	3	0	20.60	20.64	20.65				
1.4	HQAM	3	0	20.56	20.60	20.67		21.8	0	
1.4	HQAM	3	0	20.56	20.60	20.63				
1.4	HQAM	6	0	20.62	20.68	20.67		21.8	0	
1.4	HQAM	6	0	20.66	20.66	20.69				
1.4	HQAM	3	0	20.57	20.70	20.62				
1.4	HQAM	3	0	20.58	20.64	20.65		21.8	0	
1.4	HQAM	3	0	20.54	20.57	20.67				
1.4	HQAM	6	0	20.48	20.57	20.70				
1.4	HQAM	6	0	20.34	20.37	20.69		21.3	0.5	
1.4	HQAM	6	0	20.20	20.05	20.20				

Band 4 (AWS Band) Part 2 (only on channels required)										
BW (MHz)	Modulation	RB Size	RB Offset	Power Ch. 1 Ch. 2	Power Ch. 3 Ch. 4	Power Ch. 5 Ch. 6	Power Ch. 7 Ch. 8	Time-up limit (min)	MPR (dB)	
20	QPSK	1	0	19.18	19.17	19.22				10.8



Band 12 (700MHz Low Band) Part 27 (Only on channel required)										
SV (MHz)	Modulation	RB Size	RB Offset	Power Ch./Freq.	Power Ch./Freq.	Power Ch./Freq.	Time-up limit (min)	MPR (dB)		
Channel										
Frequency (MHz)										
10	QPSK	1	0	23.70	23.66	23.66	24.3	0		
10	QPSK	1	40	23.72	23.72	23.71				
10	QPSK	25	0	23.38	23.34	23.28				
10	QPSK	25	40	23.38	23.34	23.28				
10	QPSK	25	80	23.37	23.35	23.30	23.3	1		
10	QPSK	50	0	23.41	23.39	23.33				
10	QPSK	50	40	23.41	23.39	23.33				
10	QPSK	50	80	23.41	23.39	23.33				
10	QPSK	50	120	23.41	23.39	23.33				
10	QPSK	50	160	23.41	23.39	23.33				
10	QPSK	50	200	23.41	23.39	23.33				
10	QPSK	50	240	23.41	23.39	23.33				
10	QPSK	50	280	23.41	23.39	23.33				
10	QPSK	50	320	23.41	23.39	23.33				
10	QPSK	50	360	23.41	23.39	23.33				
10	QPSK	50	400	23.41	23.39	23.33				
10	QPSK	50	440	23.41	23.39	23.33				
10	QPSK	50	480	23.41	23.39	23.33				
10	QPSK	50	520	23.41	23.39	23.33				
10	QPSK	50	560	23.41	23.39	23.33				
10	QPSK	50	600	23.41	23.39	23.33				
10	QPSK	50	640	23.41	23.39	23.33				
10	QPSK	50	680	23.41	23.39	23.33				
10	QPSK	50	720	23.41	23.39	23.33				
10	QPSK	50	760	23.41	23.39	23.33				
10	QPSK	50	800	23.41	23.39	23.33				
10	QPSK	50	840	23.41	23.39	23.33				
10	QPSK	50	880	23.41	23.39	23.33				
10	QPSK	50	920	23.41	23.39	23.33				
10	QPSK	50	960	23.41	23.39	23.33				
10	QPSK	50	1000	23.41	23.39	23.33				
10	QPSK	50	1040	23.41	23.39	23.33				
10	QPSK	50	1080	23.41	23.39	23.33				
10	QPSK	50	1120	23.41	23.39	23.33				
10	QPSK	50	1160	23.41	23.39	23.33				
10	QPSK	50	1200	23.41	23.39	23.33				
10	QPSK	50	1240	23.41	23.39	23.33				
10	QPSK	50	1280	23.41	23.39	23.33				
10	QPSK	50	1320	23.41	23.39	23.33				
10	QPSK	50	1360	23.41	23.39	23.33				
10	QPSK	50	1400	23.41	23.39	23.33				
10	QPSK	50	1440	23.41	23.39	23.33				
10	QPSK	50	1480	23.41	23.39	23.33				
10	QPSK	50	1520	23.41	23.39	23.33				
10	QPSK	50	1560	23.41	23.39	23.33				
10	QPSK	50	1600	23.41	23.39	23.33				
10	QPSK	50	1640	23.41	23.39	23.33				
10	QPSK	50	1680	23.41	23.39	23.33				
10	QPSK	50	1720	23.41	23.39	23.33				
10	QPSK	50	1760	23.41	23.39	23.33				
10	QPSK	50	1800	23.41	23.39	23.33				
10	QPSK	50	1840	23.41	23.39	23.33				
10	QPSK	50	1880	23.41	23.39	23.33				
10	QPSK	50	1920	23.41	23.39	23.33				
10	QPSK	50	1960	23.41	23.39	23.33				
10	QPSK	50	2000	23.41	23.39	23.33				
10	QPSK	50	2040	23.41	23.39	23.33				
10	QPSK	50	2080	23.41	23.39	23.33				
10	QPSK	50	2120	23.41	23.39	23.33				
10	QPSK	50	2160	23.41	23.39	23.33				
10	QPSK	50	2200	23.41	23.39	23.33				
10	QPSK	50	2240	23.41	23.39	23.33				
10	QPSK	50	2280	23.41	23.39	23.33				
10	QPSK	50	2320	23.41	23.39	23.33				
10	QPSK	50	2360	23.41	23.39	23.33				
10	QPSK	50	2400	23.41	23.39	23.33				
10	QPSK	50	2440	23.41	23.39	23.33				
10	QPSK	50	2480	23.41	23.39	23.33				
10	QPSK	50	2520	23.41	23.39	23.33				
10	QPSK	50	2560	23.41	23.39	23.33				
10	QPSK	50	2600	23.41	23.39	23.33				
10	QPSK	50	2640	23.41	23.39	23.33				
10	QPSK	50	2680	23.41	23.39	23.33				
10	QPSK	50	2720	23.41	23.39	23.33				
10	QPSK	50	2760	23.41	23.39	23.33				
10	QPSK	50	2800	23.41	23.39	23.33				
10	QPSK	50	2840	23.41	23.39	23.33				
10	QPSK	50	2880	23.41	23.39	23.33				
10	QPSK	50	2920	23.41	23.39	23.33				
10	QPSK	50	2960	23.41	23.39	23.33				
10	QPSK	50	3000	23.41	23.39	23.33				
10	QPSK	50	3040	23.41	23.39	23.33				
10	QPSK	50	3080	23.41	23.39	23.33				
10	QPSK	50	3120	23.41	23.39	23.33				
10	QPSK	50	3160	23.41	23.39	23.33				
10	QPSK	50	3200	23.41	23.39	23.33				
10	QPSK	50	3240	23.41	23.39	23.33				
10	QPSK	50	3280	23.41	23.39	23.33				
10	QPSK	50	3320	23.41	23.39	23.33				
10	QPSK	50	3360	23.41	23.39	23.33				
10	QPSK	50	3400	23.41	23.39	23.33				
10	QPSK	50	3440	23.41	23.39	23.33				
10	QPSK	50	3480	23.41	23.39	23.33				
10	QPSK	50	3520	23.41	23.39	23.33				
10	QPSK	50	3560	23.41	23.39	23.33				
10	QPSK	50	3600	23.41	23.39	23.33				
10	QPSK	50	3640	23.41	23.39	23.33				
10	QPSK	50	3680	23.41	23.39	23.33				
10	QPSK	50	3720	23.41	23.39	23.33				
10	QPSK	50	3760	23.41	23.39	23.33				
10	QPSK	50	3800	23.41	23.39	23.33				
10	QPSK	50	3840	23.41	23.39	23.33				
10	QPSK	50	3880	23.41	23.39	23.33				
10	QPSK	50	3920	23.41	23.39	23.33				
10	QPSK	50	3960	23.41	23.39	23.33				
10	QPSK	50	4000	23.41	23.39	23.33				
10	QPSK	50	4040	23.41	23.39	23.33				
10	QPSK	50	4080	23.41	23.39	23.33				
10	QPSK	50	4120	23.41	23.39	23.33				
10	QPSK	50	4160	23.41	23.39	23.33				
10	QPSK	50	4200	23.41	23.39	23.33				
10	QPSK	50	4240	23.41	23.39	23.33				
10	QPSK	50	4280	23.41	23.39	23.33				
10	QPSK	50	4320	23.41	23.39	23.33				
10	QPSK	50	4360	23.41	23.39	23.33				
10	QPSK	50	4400	23.41	23.39	23.33				
10	QPSK	50	4440	23.41	23.39	23.33				
10	QPSK	50	4480	23.41	23.39	23.33				
10	QPSK	50	4520	23.41	23.39	23.33				
10	QPSK	50	4560	23.41	23.39	23.33				
10	QPSK	50	4600	23.41	23.39	23.33				
10	QPSK	50	4640	23.41	23.39	23.33				
10	QPSK	50	4680	23.41	23.39	23.33				
10	QPSK	50	4720	23.41	23.39	23.33				
10	QPSK	50	4760	23.41	23.39	23.33				
10	QPSK	50	4800	23.41	23.39	23.33				
10	QPSK	50	4840	23.41	23.39	23.33				
10	QPSK	50	4880	23.41	23.39	23.33				
10	QPSK	50	4920	23.41	23.39	23.33				
10	QPSK	50	4960	23.41	23.39	23.33				
10	QPSK	50	5000	23.41	23.3					



Band 38(only on channel required)									
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)	
Channel				37850	38000	38150			
Frequency (MHz)				2580	2595	2610			
20	QPSK	1	0	23.23	23.23	23.30	24.3	0	
20	QPSK	1	49	23.49	23.44	23.46			
20	QPSK	1	99	23.39	23.34	23.40			
20	QPSK	50	0	22.07	22.05	22.11	23.3	1	
20	QPSK	50	24	22.17	22.10	22.16			
20	QPSK	50	50	22.11	22.08	22.10			
20	QPSK	100	0	22.10	22.07	22.09	23.3	1	
20	16QAM	1	0	22.16	22.10	22.22			
20	16QAM	1	49	22.37	22.44	22.45			
20	16QAM	1	99	22.25	22.27	22.35	22.3	2	
20	16QAM	50	0	21.45	21.49	21.50			
20	16QAM	50	24	21.46	21.49	21.52			
20	16QAM	50	50	21.48	21.51	21.52	22.3	2	
20	16QAM	100	0	21.45	21.44	21.50			
20	64QAM	1	0	21.25	21.34	21.40			
20	64QAM	1	49	21.47	21.53	21.58	21.3	3	
20	64QAM	1	99	21.41	21.45	21.52			
20	64QAM	50	0	20.33	20.38	20.48			
20	64QAM	50	24	20.45	20.49	20.45	21.3	3	
20	64QAM	50	50	20.46	20.45	20.49			
20	64QAM	100	0	20.37	20.39	20.45			
Channel				37825	38000	38175	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				2577.5	2595	2612.5			
15	QPSK	1	0	23.22	23.24	23.32	24.3	0	
15	QPSK	1	37	23.34	23.44	23.47			
15	QPSK	1	74	23.40	23.37	23.41			
15	QPSK	36	0	22.09	22.07	22.18	23.3	1	
15	QPSK	36	20	22.12	22.16	22.23			
15	QPSK	36	39	22.13	22.10	22.21			
15	QPSK	75	0	22.15	22.17	22.24	23.3	1	
15	16QAM	1	0	22.19	22.18	22.20			
15	16QAM	1	37	22.32	22.35	22.35			
15	16QAM	1	74	22.33	22.28	22.35	22.3	2	
15	16QAM	36	0	21.38	21.41	21.47			
15	16QAM	36	20	21.40	21.42	21.49			
15	16QAM	36	39	21.44	21.47	21.44	22.3	2	
15	16QAM	75	0	21.40	21.47	21.54			
15	64QAM	1	0	21.36	21.32	21.49			
15	64QAM	1	37	21.45	21.53	21.52	22.3	2	
15	64QAM	1	74	21.54	21.47	21.55			
15	64QAM	36	0	20.37	20.46	20.57			
15	64QAM	36	20	20.45	20.47	20.50	21.3	3	
15	64QAM	36	39	20.39	20.49	20.45			
15	64QAM	75	0	20.39	20.42	20.41			
Channel				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				2575	2595	2615			
10	QPSK	1	0	23.31	23.42	23.35	24.3	0	
10	QPSK	1	25	23.38	23.48	23.43			
10	QPSK	1	49	23.45	23.44	23.49			
10	QPSK	25	0	22.03	22.19	22.18	23.3	1	
10	QPSK	25	12	22.17	22.19	22.24			
10	QPSK	25	25	22.14	22.09	22.24			
10	QPSK	50	0	22.12	22.12	22.17	23.3	1	
10	16QAM	1	0	22.20	22.27	22.28			
10	16QAM	1	25	22.33	22.35	22.41			
10	16QAM	1	49	22.29	22.39	22.40	22.3	2	
10	16QAM	25	0	21.44	21.55	21.55			
10	16QAM	25	12	21.44	21.52	21.59			
10	16QAM	25	25	21.49	21.52	21.60	22.3	2	
10	16QAM	50	0	21.46	21.45	21.59			
10	64QAM	1	0	21.39	21.46	21.47			
10	64QAM	1	25	21.45	21.47	21.60	21.3	3	
10	64QAM	1	49	21.47	21.53	21.56			
10	64QAM	25	0	20.48	20.53	20.53			
10	64QAM	25	12	20.51	20.51	20.66	21.3	3	
10	64QAM	25	25	20.54	20.46	20.63			
10	64QAM	50	0	20.40	20.47	20.54			
Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				2572.5	2595	2617.5			
5	QPSK	1	0	23.31	23.40	23.48	24.3	0	
5	QPSK	1	12	23.34	23.39	23.47			
5	QPSK	1	24	23.40	23.46	23.47			
5	QPSK	12	0	22.11	22.21	22.26	23.3	1	
5	QPSK	12	7	22.12	22.20	22.22			
5	QPSK	12	13	22.11	22.15	22.27			
5	QPSK	25	0	22.19	22.16	22.25	23.3	1	
5	16QAM	1	0	22.26	22.32	22.36			
5	16QAM	1	12	22.29	22.39	22.36			
5	16QAM	1	24	22.24	22.37	22.39	22.3	2	
5	16QAM	12	0	21.38	21.47	21.54			
5	16QAM	12	7	21.37	21.46	21.62			
5	16QAM	12	13	21.42	21.45	21.56	22.3	2	
5	16QAM	25	0	21.43	21.57	21.59			
5	64QAM	1	0	21.44	21.52	21.56			
5	64QAM	1	12	21.46	21.53	21.59	22.3	2	
5	64QAM	1	24	21.49	21.52	21.58			
5	64QAM	12	0	20.38	20.53	20.50			
5	64QAM	12	7	20.41	20.48	20.50	21.3	3	
5	64QAM	12	13	20.46	20.45	20.50			
5	64QAM	25	0	20.47	20.50	20.61			

Band 41 (2.6G Band)										
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				39750	40185	40620	41055	41490		
Frequency (MHz)				2506	2549.5	2593	2636.5	2680		
20	QPSK	1	0	23.40	23.34	23.47	23.49	23.52	24.3	0
20	QPSK	1	49	23.58	23.56	23.67	23.65	23.65		
20	QPSK	1	99	23.45	23.41	23.60	23.60	23.51		
20	QPSK	50	0	22.12	22.04	22.23	22.25	22.25	23.3	1
20	QPSK	50	24	22.21	22.19	22.31	22.29	22.27		
20	QPSK	50	50	22.13	22.15	22.27	22.30	22.26		
20	QPSK	100	0	22.11	22.12	22.28	22.27	22.25	23.3	1
20	16QAM	1	0	22.04	22.10	22.19	22.01	22.04		
20	16QAM	1	49	22.09	22.26	22.30	22.13	22.12		
20	16QAM	1	99	22.19	22.10	22.12	22.06	22.00	22.3	2
20	16QAM	50	0	21.26	21.43	21.58	21.39	21.38		
20	16QAM	50	24	21.38	21.46	21.59	21.44	21.41		
20	16QAM	50	50	21.37	21.51	21.56	21.44	21.36	22.3	2
20	16QAM	100	0	21.29	21.46	21.53	21.41	21.37		
20	64QAM	1	0	21.01	21.09	21.19	21.03	21.00		
20	64QAM	1	49	21.08	21.25	21.28	21.12	21.15	21.3	3
20	64QAM	1	99	21.00	21.09	21.14	21.08	21.04		
20	64QAM	50	0	20.21	20.37	20.52	20.33	20.33		
20	64QAM	50	24	20.34	20.41	20.52	20.43	20.36	21.3	3
20	64QAM	50	50	20.33	20.45	20.51	20.39	20.31		
20	64QAM	100	0	20.26	20.42	20.52	20.38	20.31		
Channel				39725	40173	40620	41068	41515	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5		
15	QPSK	1	0	23.35	23.56	23.51	23.54	23.56	24.3	0
15	QPSK	1	37	23.47	23.57	23.57	23.55	23.55		
15	QPSK	1	74	23.41	23.59	23.52	23.54	23.51		
15	QPSK	36	0	22.15	22.35	22.27	22.36	22.48	23.3	1
15	QPSK	36	20	22.16	22.39	22.28	22.41	22.49		
15	QPSK	36	39	22.14	22.44	22.32	22.42	22.47		
15	QPSK	75	0	22.17	22.43	22.35	22.42	22.51	23.3	1
15	16QAM	1	0	22.13	22.42	22.31	22.37	22.47		
15	16QAM	1	37	22.22	22.50	22.37	22.44	22.53		
15	16QAM	1	74	22.24	22.44	22.33	22.43	22.44	22.3	2
15	16QAM	36	0	21.43	21.64	21.58	21.63	21.75		
15	16QAM	36	20	21.45	21.68	21.59	21.67	21.76		
15	16QAM	36	39	21.47	21.69	21.59	21.73	21.77	22.3	2
15	16QAM	75	0	21.48	21.75	21.66	21.70	21.84		
15	64QAM	1	0	21.17	21.42	21.33	21.40	21.52		
15	64QAM	1	37	21.30	21.52	21.43	21.47	21.56	22.3	2
15	64QAM	1	74	21.27	21.45	21.37	21.45	21.45		
15	64QAM	36	0	20.43	20.63	20.61	20.65	20.77		
15	64QAM	36	20	20.47	20.70	20.56	20.69	20.76	21.3	3
15	64QAM	36	39	20.43	20.68					



Power Level for Body-worn -LAT

GSM850 TX Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	178	169	251		178	169	251	
Frequency (MHz)	824.2	836.4	848.8		824.2	836.4	848.8	
GSM 1 Tx slot	32.06	32.50	32.23	33.30	23.06	23.50	23.23	24.30
GPRS 1 Tx slot	32.04	32.46	32.20	33.30	23.04	23.46	23.20	24.30
GPRS 2 Tx slots	29.80	30.22	30.02	31.30	23.80	24.22	24.02	25.30
GPRS 3 Tx slots	28.23	28.63	28.45	29.80	23.97	24.37	24.19	25.54
GPRS 4 Tx slots	27.33	27.64	27.56	29.30	24.33	24.64	24.56	26.30
EDGE 1 Tx slot	26.65	26.52	26.77	28.30	17.65	17.52	17.77	19.30
EDGE 2 Tx slots	25.45	25.26	25.66	25.80	19.45	19.26	19.66	19.80
EDGE 3 Tx slots	23.25	23.15	23.59	24.30	16.99	16.89	17.33	20.04
EDGE 4 Tx slots	22.20	22.10	22.33	23.80	19.20	19.10	19.33	20.80

GSM1900 TX Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1860	1909.8		1850.2	1860	1909.8	
GSM 1 Tx slot	29.15	29.28	29.26	30.30	20.15	20.28	20.26	21.30
GPRS 1 Tx slot	29.13	29.26	29.23	30.30	20.13	20.26	20.23	21.30
GPRS 2 Tx slots	26.00	26.22	26.19	27.80	20.00	20.22	20.19	21.80
GPRS 3 Tx slots	25.22	25.41	25.39	26.80	20.96	21.15	21.13	22.54
GPRS 4 Tx slots	23.37	23.64	23.53	25.30	20.37	20.54	20.53	22.30
EDGE 1 Tx slot	25.84	25.90	25.72	27.30	16.84	16.90	16.72	18.30
EDGE 2 Tx slots	23.92	24.00	23.89	24.80	17.92	18.00	17.89	18.80
EDGE 3 Tx slots	22.44	22.57	22.32	23.80	18.18	18.31	18.06	19.54
EDGE 4 Tx slots	21.24	21.28	21.12	22.80	18.24	18.28	18.12	19.80

Band TX Channel	WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)	
	9262	9400	9538		1312	1413	1513		4132	4182	4233		
Rx Channel	9662	9800	9938		1537	1638	1738		4357	4407	4458		
Frequency (MHz)	1852.4	1860	1907.8		1712.4	1722.6	1762.6		4264	4364	4464		
3GPP Rel 99	AMR 12.2kbps	22.70	22.68	22.68	23.30	21.10	21.15	21.08	21.80	24.00	24.14	24.14	24.80
3GPP Rel 99	RM-C 12.2kbps	22.72	22.70	22.71	23.30	21.13	21.18	21.00	21.80	24.12	24.14	24.16	24.80
3GPP Rel 6	HSDPA Subtest-1	21.66	21.69	21.67	22.30	20.15	20.18	20.22	20.80	23.17	23.17	23.18	23.80
3GPP Rel 6	HSDPA Subtest-2	21.70	21.64	21.66	22.30	20.09	20.17	20.18	20.80	23.14	23.13	23.21	23.80
3GPP Rel 6	HSDPA Subtest-3	21.19	21.22	21.20	21.80	19.69	19.70	19.72	20.30	22.71	22.67	22.69	23.30
3GPP Rel 6	HSDPA Subtest-4	21.18	21.18	21.17	21.80	19.64	19.66	19.66	20.30	22.71	22.69	22.64	23.30
3GPP Rel 8	DCHSDPA Subtest-1	21.52	21.65	21.32	22.30	20.02	20.14	19.97	20.80	23.01	23.06	23.10	23.80
3GPP Rel 8	DCHSDPA Subtest-2	21.56	21.60	21.50	22.30	19.83	20.17	19.86	20.80	23.03	23.01	23.11	23.80
3GPP Rel 8	DCHSDPA Subtest-3	20.92	21.21	21.10	21.80	19.45	19.68	19.61	20.30	22.63	22.54	22.52	23.30
3GPP Rel 8	DCHSDPA Subtest-4	21.15	21.03	20.95	21.80	19.45	19.57	19.48	20.30	22.51	22.48	22.55	23.30
3GPP Rel 8	HSUPA Subtest-1	20.19	20.17	20.16	20.80	18.61	18.65	18.69	19.30	21.55	21.60	21.59	22.30
3GPP Rel 6	HSUPA Subtest-2	19.85	19.87	19.85	20.30	18.11	18.15	18.17	18.80	21.06	21.10	21.07	21.80
3GPP Rel 6	HSUPA Subtest-3	20.88	20.88	20.70	21.30	19.14	19.17	19.22	19.80	22.12	22.12	22.11	22.80
3GPP Rel 6	HSUPA Subtest-4	19.39	19.36	19.35	19.80	17.59	17.64	17.72	18.30	20.59	20.59	20.80	21.30
3GPP Rel 6	HSUPA Subtest-5	21.70	21.70	21.70	22.30	20.10	20.20	20.20	20.80	23.10	23.10	23.10	23.80
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	18.85	18.79	18.91	19.30	16.95	17.08	17.11	17.80	19.97	19.92	19.99	20.80