



D2600V2, Serial No. 1061 Extended Dipole Calibrations

Referring to KDB 865664 D01 v01r02, if dipoles are verified in return loss (<-20dB, 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.

2600V2 – serial no. 1061												
	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)
2018.12.07	-23.1		49.8		-7		-22.8		45.6		-5.41	
2019.11.27	-23.0	0.00	48.9	0.90	-6.83	0.17	-22.6	0.01	44.6	1	-5.29	0.12

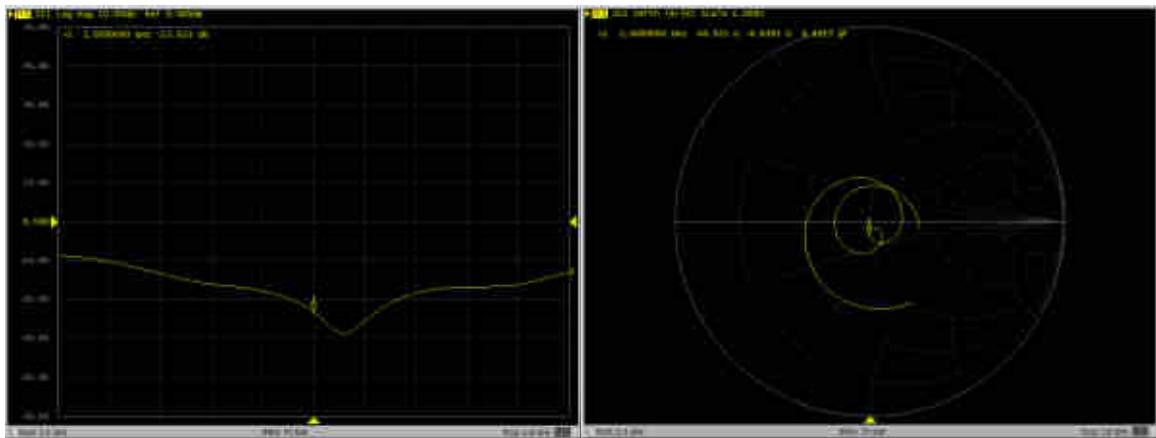
<Justification of the extended calibration>

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

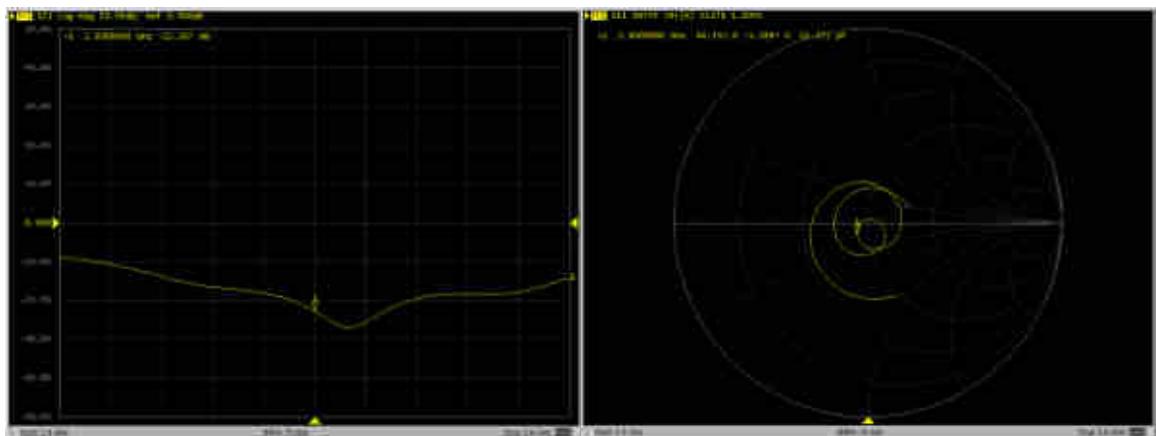


Dipole Verification Data > D2600V2, serial no. 1061

2600MHz – Head



2600MHz – Body





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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client Sporton

Certificate No: D5GHzV2-1113_Sep19

CALIBRATION CERTIFICATE

Object D5GHzV2 - SN:1113

Calibration procedure(s) QA CAL-22.v4
Calibration Procedure for SAR Validation Sources between 3-6 GHz

Calibration date: September 24, 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 (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: 5058 (20k)	04-Apr-19 (No. 217-02894)	Apr-20
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-19 (No. 217-02895)	Apr-20
Reference Probe EX3DV4	SN: 3503	25-Mar-19 (No. EX3-3503_Mar19)	Mar-20
DAE4	SN: 601	30-Apr-19 (No. DAE4-601_Apr19)	Apr-20

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Feb-19)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

Calibrated by:	Name	Function	Signature
	Jeton Kastrati	Laboratory Technician	

Approved by:	Name	Function	Signature
	Katja Pokovic	Technical Manager	

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Issued: September 25, 2019



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

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:

- a) 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
- b) 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
- c) 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
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- e) 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%.

Measurement Conditions

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

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	$dx, dy = 4.0 \text{ mm}, dz = 1.4 \text{ mm}$	Graded Ratio = 1.4 (Z direction)
Frequency	$5250 \text{ MHz} \pm 1 \text{ MHz}$ $5600 \text{ MHz} \pm 1 \text{ MHz}$ $5750 \text{ MHz} \pm 1 \text{ MHz}$	

Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	$22.0 \text{ }^{\circ}\text{C}$	35.9	4.71 mho/m
Measured Head TSL parameters	$(22.0 \pm 0.2) \text{ }^{\circ}\text{C}$	$35.1 \pm 6 \text{ \%}$	$4.53 \text{ mho/m} \pm 6 \text{ \%}$
Head TSL temperature change during test	$< 0.5 \text{ }^{\circ}\text{C}$	---	---

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	8.09 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	80.5 W/kg $\pm 19.9 \text{ \% (k=2)}$
SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.1 W/kg $\pm 19.5 \text{ \% (k=2)}$

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	$22.0 \text{ }^{\circ}\text{C}$	35.5	5.07 mho/m
Measured Head TSL parameters	$(22.0 \pm 0.2) \text{ }^{\circ}\text{C}$	$34.6 \pm 6 \text{ \%}$	$4.88 \text{ mho/m} \pm 6 \text{ \%}$
Head TSL temperature change during test	$< 0.5 \text{ }^{\circ}\text{C}$	---	---

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	8.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	83.4 W/kg $\pm 19.9 \text{ \% (k=2)}$
SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.8 W/kg $\pm 19.5 \text{ \% (k=2)}$

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	34.4 ± 6 %	5.03 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °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	8.06 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	80.0 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.30 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.8 W/kg ± 19.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	51.7 Ω - 6.2 $j\Omega$
Return Loss	- 24.0 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	56.0 Ω - 2.7 $j\Omega$
Return Loss	- 24.1 dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	56.7 Ω - 1.0 $j\Omega$
Return Loss	- 23.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.195 ns
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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
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DASY5 Validation Report for Head TSL

Date: 24.09.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1113

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz

Medium parameters used: $f = 5250 \text{ MHz}$; $\sigma = 4.53 \text{ S/m}$; $\epsilon_r = 35.1$; $\rho = 1000 \text{ kg/m}^3$,

Medium parameters used: $f = 5600 \text{ MHz}$; $\sigma = 4.88 \text{ S/m}$; $\epsilon_r = 34.6$; $\rho = 1000 \text{ kg/m}^3$,

Medium parameters used: $f = 5750 \text{ MHz}$; $\sigma = 5.03 \text{ S/m}$; $\epsilon_r = 34.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.4, 5.4, 5.4) @ 5250 MHz, ConvF(4.95, 4.95, 4.95) @ 5600 MHz, ConvF(4.98, 4.98, 4.98) @ 5750 MHz; Calibrated: 25.03.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 78.54 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 27.9 W/kg

SAR(1 g) = 8.09 W/kg; SAR(10 g) = 2.33 W/kg

Maximum value of SAR (measured) = 18.1 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 78.00 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 31.1 W/kg

SAR(1 g) = 8.40 W/kg; SAR(10 g) = 2.40 W/kg

Maximum value of SAR (measured) = 19.4 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 75.13 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 31.8 W/kg

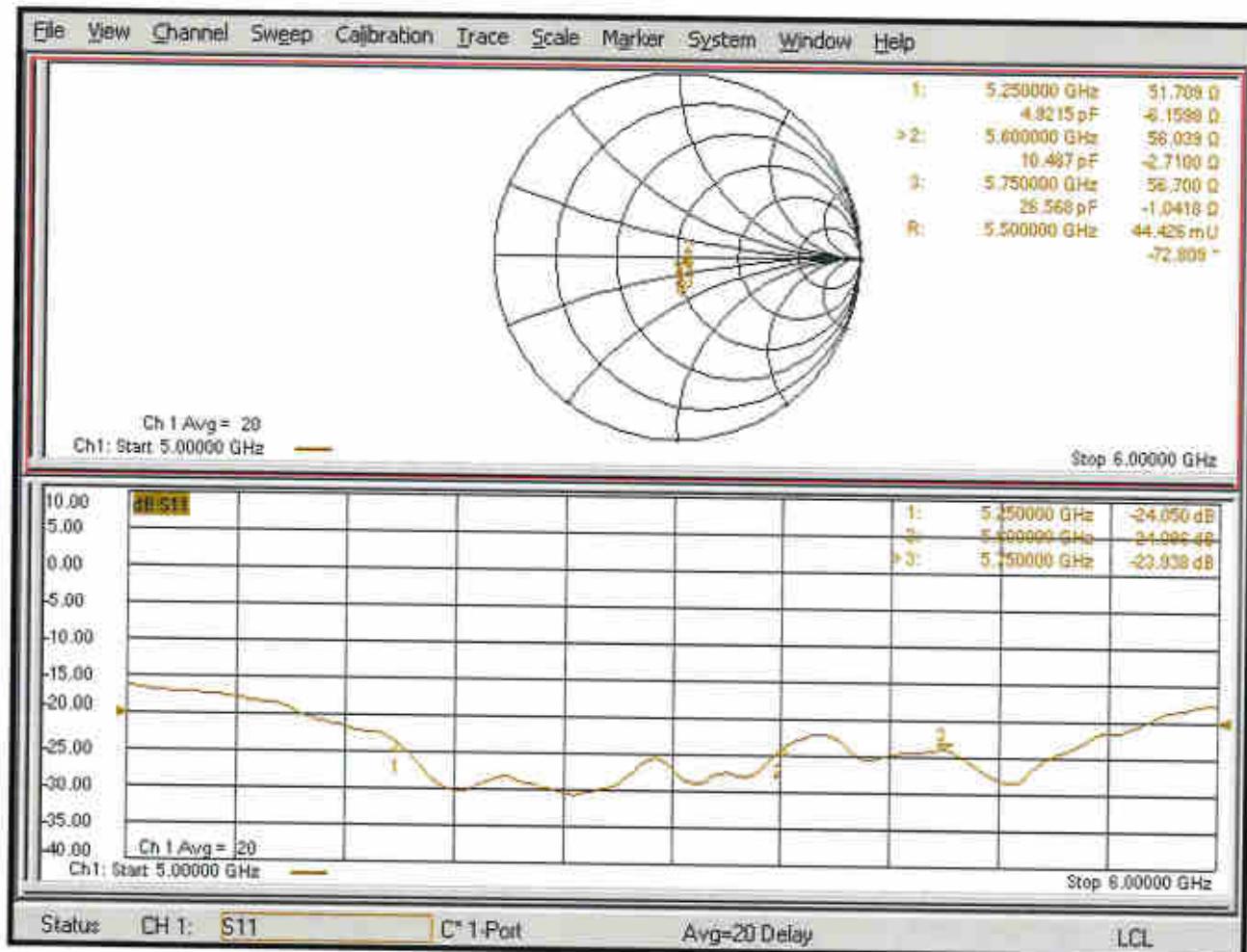
SAR(1 g) = 8.06 W/kg; SAR(10 g) = 2.30 W/kg

Maximum value of SAR (measured) = 19.0 W/kg



$$0 \text{ dB} = 18.1 \text{ W/kg} = 12.58 \text{ dBW/kg}$$

Impedance Measurement Plot for Head TSL





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Client Sporton

Accreditation No.: SCS 0108

Certificate No: DAE4-690_Mar20

CALIBRATION CERTIFICATE

Object DAE4 - SD 000 D04 BM - SN: 690

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

Calibration date: March 26, 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:	Sven Kühn	Deputy Manager	

Issued: March 26, 2020

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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 = $6.1\mu V$, 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	$404.708 \pm 0.02\% (k=2)$	$404.320 \pm 0.02\% (k=2)$	$405.284 \pm 0.02\% (k=2)$
Low Range	$3.98091 \pm 1.50\% (k=2)$	$3.99691 \pm 1.50\% (k=2)$	$3.93809 \pm 1.50\% (k=2)$

Connector Angle

Connector Angle to be used in DASY system	$34.0^\circ \pm 1^\circ$
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Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (μ V)	Difference (μ V)	Error (%)
Channel X	+ Input	200033.46	0.84	0.00
Channel X	+ Input	20008.04	2.81	0.01
Channel X	- Input	-20004.44	1.63	-0.01
Channel Y	+ Input	200033.01	0.28	0.00
Channel Y	+ Input	20004.74	-0.31	-0.00
Channel Y	- Input	-20006.65	-0.48	0.00
Channel Z	+ Input	200032.64	-2.81	-0.00
Channel Z	+ Input	20006.13	1.16	0.01
Channel Z	- Input	-20004.98	1.17	-0.01

Low Range		Reading (μ V)	Difference (μ V)	Error (%)
Channel X	+ Input	2000.43	-0.43	-0.02
Channel X	+ Input	200.02	-0.96	-0.48
Channel X	- Input	-198.74	0.19	-0.09
Channel Y	+ Input	2001.49	0.62	0.03
Channel Y	+ Input	200.61	-0.27	-0.13
Channel Y	- Input	-200.64	-1.61	0.81
Channel Z	+ Input	2001.03	0.27	0.01
Channel Z	+ Input	200.69	-0.18	-0.09
Channel Z	- Input	-199.00	0.18	-0.09

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 (μ V)	Low Range Average Reading (μ V)
Channel X	200	14.15	12.87
	-200	-12.83	-14.22
Channel Y	200	2.88	2.89
	-200	-4.30	-4.61
Channel Z	200	0.04	0.39
	-200	-0.98	-1.01

3. Channel separation

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

	Input Voltage (mV)	Channel X (μ V)	Channel Y (μ V)	Channel Z (μ V)
Channel X	200	-	-2.69	-2.68
Channel Y	200	7.95	-	-0.72
Channel Z	200	6.90	5.66	-

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	16115	16314
Channel Y	16039	16490
Channel Z	16004	15469

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input $10M\Omega$

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.25	-1.26	1.64	0.55
Channel Y	-0.70	-1.97	1.10	0.51
Channel Z	1.51	-0.80	2.84	0.58

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

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Zeughausstrasse 43, 8004 Zurich, Switzerland



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S Swiss Calibration Service

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Accreditation No.: SCS 0108

Client Sporton

Certificate No: EX3-3843 Sep19

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:3843

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: September 26, 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 $(22 \pm 3)^\circ\text{C}$ 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	19-Dec-18 (No. DAE4-660_Dec18)	Dec-19
Reference Probe ES3DV2	SN: 3013	31-Dec-18 (No. ES3-3013_Dec18)	Dec-19
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	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-18)	In house check: Oct-19

Calibrated by:	Name	Function	Signature
	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Polovic	Technical Manager	

Issued: October 1, 2019

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Accreditation No.: SCS 0108

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., $\theta = 0$ 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:

- a) 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
- b) 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
- c) 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
- d) 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 $\theta = 0$ ($f \leq 900$ 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 E^2 -field uncertainty inside TSL (see below ConvF).
- $NORM(f)x,y,z = NORM_{x,y,z} * \text{frequency_response}$ (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.
- $DCPx,y,z$: 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
- $Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z$: 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 $\text{Boundary Effect Parameters}$: 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.
- $\text{Spherical Isotropy (3D deviation from Isotropy)}$: 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:3843

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V/m})^2$) ^A	0.34	0.35	0.25	$\pm 10.1 \%$
DCP (mV) ^B	110.9	96.1	101.1	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB/ μV	C	D dB	VR mV	Max dev.	Unc ^E (k=2)
0	CW	X	0.0	0.0	1.0	0.00	134.1	$\pm 3.8 \%$	$\pm 4.7 \%$
		Y	0.0	0.0	1.0		146.5		
		Z	0.0	0.0	1.0		132.2		

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:3843

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-34.3
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:3843

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 ^G (mm)	Unc (k=2)
750	41.9	0.89	9.37	9.37	9.37	0.50	0.87	± 12.0 %
835	41.5	0.90	9.07	9.07	9.07	0.43	0.80	± 12.0 %
900	41.5	0.97	8.92	8.92	8.92	0.41	0.90	± 12.0 %
1450	40.5	1.20	8.17	8.17	8.17	0.32	0.80	± 12.0 %
1750	40.1	1.37	7.95	7.95	7.95	0.34	0.87	± 12.0 %
1900	40.0	1.40	7.67	7.67	7.67	0.32	0.87	± 12.0 %
2000	40.0	1.40	7.66	7.66	7.66	0.34	0.87	± 12.0 %
2300	39.5	1.67	7.30	7.30	7.30	0.26	0.90	± 12.0 %
2450	39.2	1.80	7.06	7.06	7.06	0.35	0.90	± 12.0 %
2600	39.0	1.96	6.90	6.90	6.90	0.43	0.80	± 12.0 %
5250	35.9	4.71	4.74	4.74	4.74	0.40	1.80	± 14.0 %
5600	35.5	5.07	4.47	4.47	4.47	0.40	1.80	± 14.0 %
5750	35.4	5.22	4.44	4.44	4.44	0.40	1.80	± 14.0 %

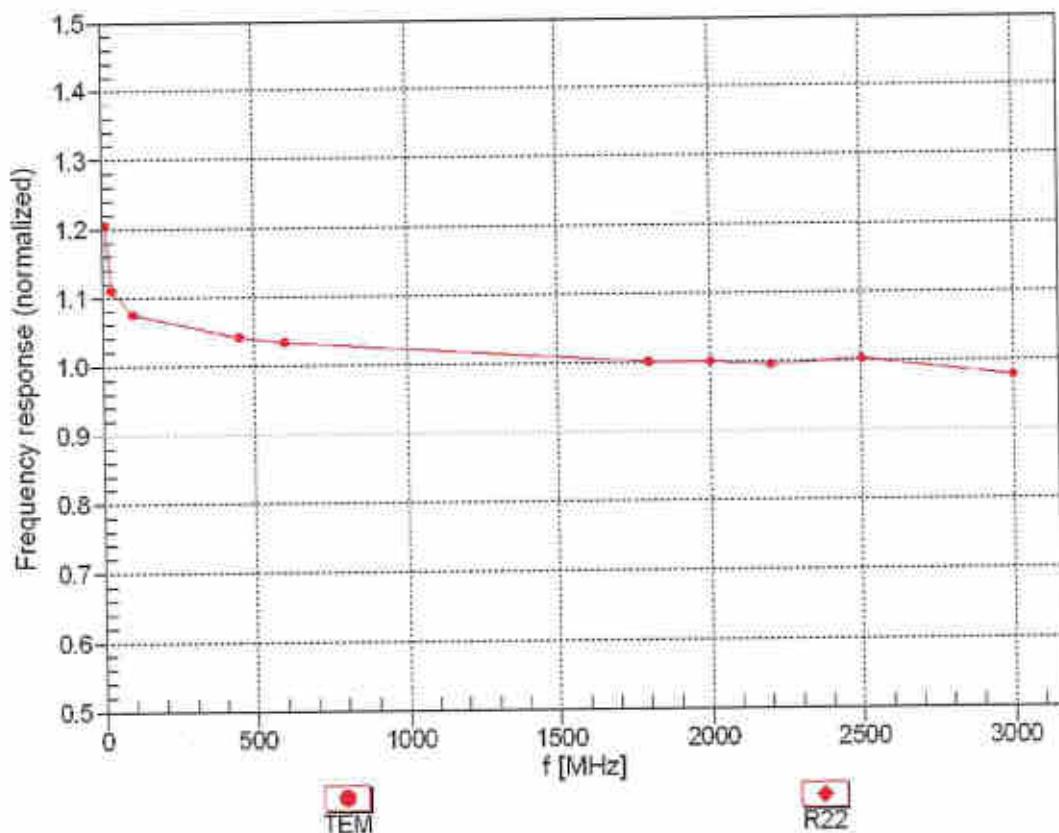
^C Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 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 below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. 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

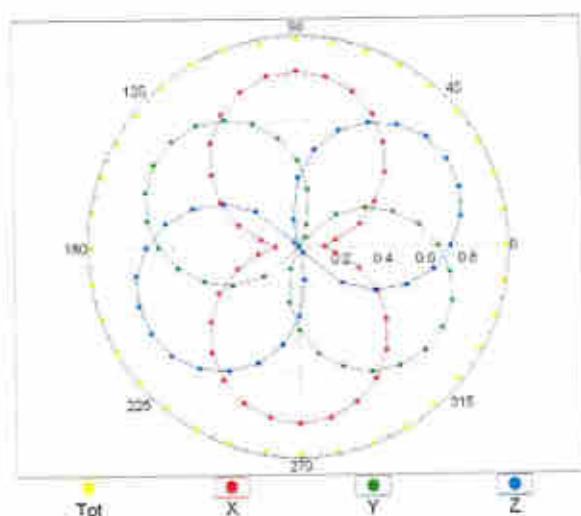
(TEM-Cell:ifi110 EXX, Waveguide: R22)



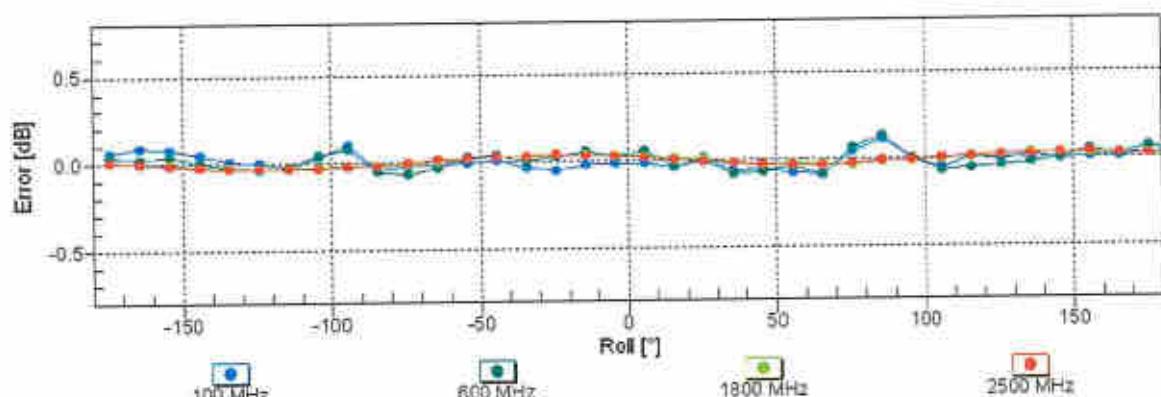
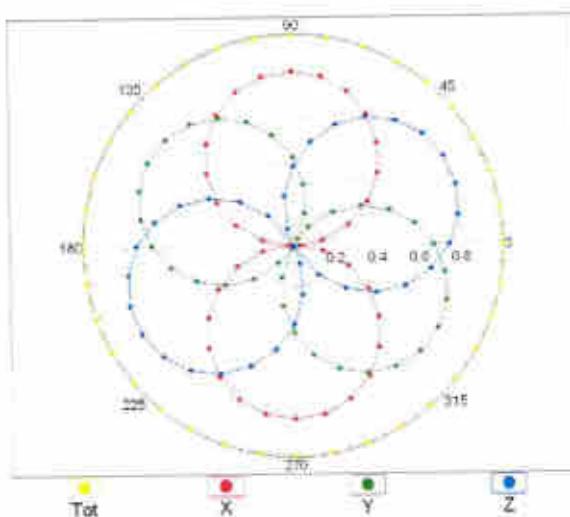
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

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

f=600 MHz, TEM



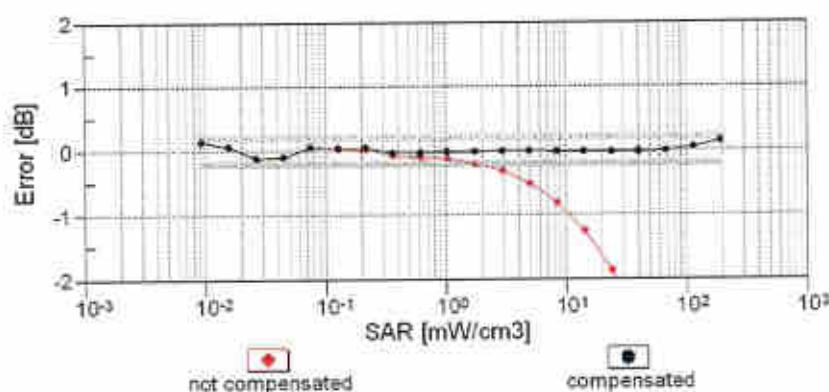
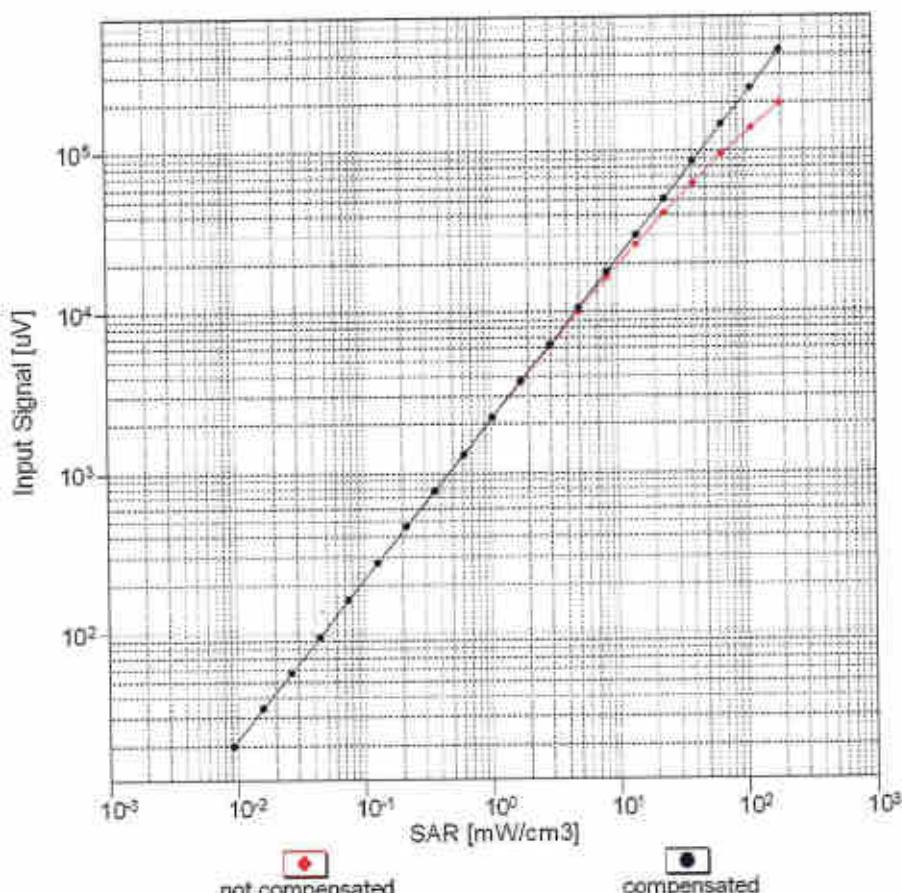
f=1800 MHz, R22



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

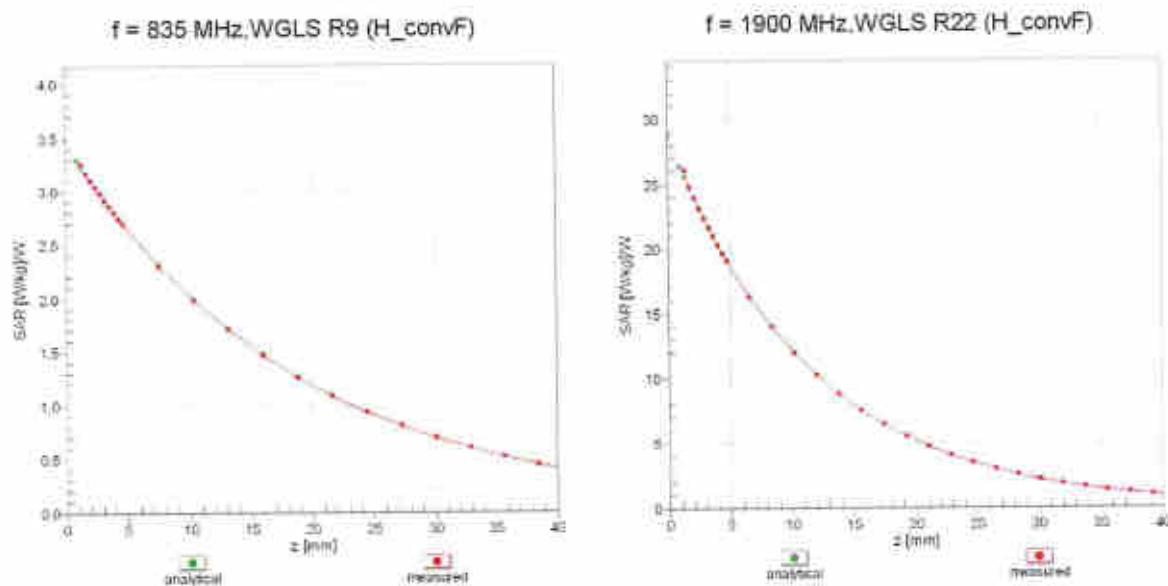
Dynamic Range f(SAR_{head})

(TEM cell , f_{eval}= 1900 MHz)

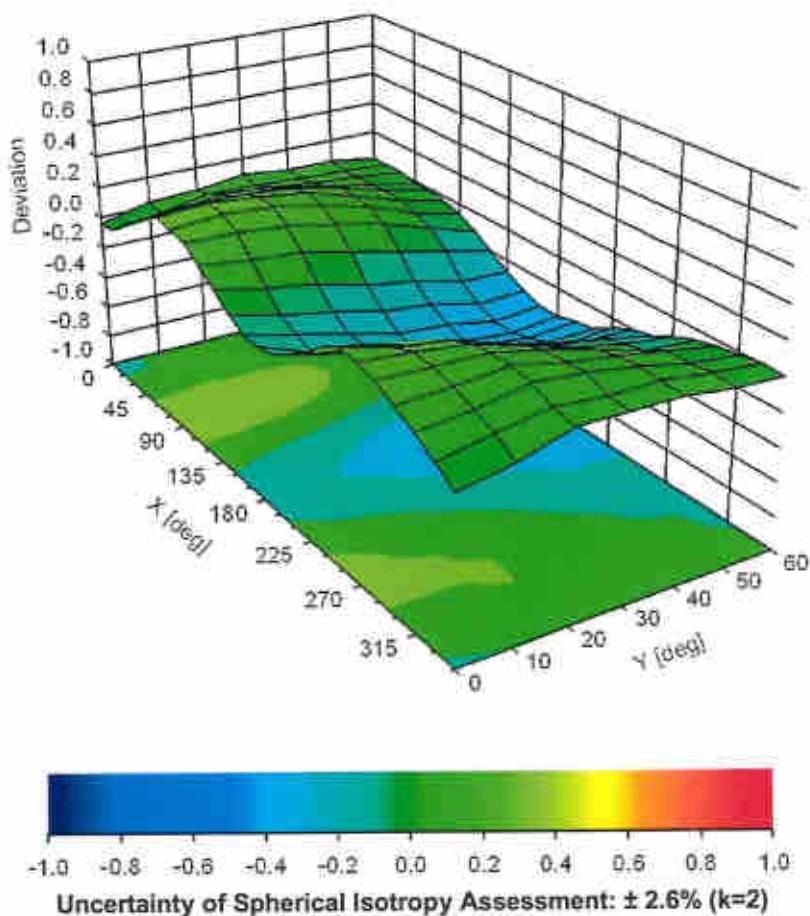


Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

Conversion Factor Assessment



Deviation from Isotropy in Liquid Error (ϕ, θ), $f = 900$ MHz





Appendix E. Conducted RF Output Power Table

The detailed power tables are shown as follows.



Full Power									
GSM850		Burst Average Power (dBm)			Tune-up Limit		Frame-Average Power (dBm)		
Frequency (MHz)	TX Channel	-128	-180	-264	(dBm)	128	-180	-264	(dBm)
GPRS 1 Tx slots	33.43	33.37	33.34	33.50	24.43	24.37	24.34	24.50	
GPRS 2 Tx slots	30.33	30.27	30.26	30.50	24.33	24.27	24.26	24.50	
GPRS 3 Tx slots	28.22	28.21	28.18	28.50	23.96	23.95	23.92	24.24	
GPRS 4 Tx slots	26.87	26.93	26.83	27.00	23.87	23.93	23.83	24.00	
EDGE 1 Tx slot	27.84	27.62	27.57	28.50	18.84	18.62	18.57	19.50	
EDGE 2 Tx slots	24.63	24.39	24.37	25.50	18.63	18.39	18.37	19.50	
EDGE 3 Tx slots	22.73	22.49	22.53	23.50	18.47	18.23	18.27	19.24	
EDGE 4 Tx slots	21.37	21.19	21.13	22.00	18.37	18.19	18.13	19.00	
GSM1900									
TX Channel		512	661	810	Tune-up Limit		Frame-Average Power (dBm)		Tune-up Limit
Frequency (MHz)		1850.2	1880	1909.8	(dBm)		1850.2	1880	1909.8
GPRS 1 Tx slot	30.35	29.94	29.88	30.50	21.35	20.94	20.88	21.50	
GPRS 2 Tx slots	27.53	27.13	27.10	28.50	21.53	21.13	21.10	22.50	
GPRS 3 Tx slots	25.33	24.98	24.90	25.50	21.07	20.72	20.64	21.24	
GPRS 4 Tx slots	24.11	23.67	23.88	24.50	21.11	20.67	20.88	21.50	
EDGE 1 Tx slot	26.43	26.41	26.33	27.50	17.43	17.41	17.33	18.50	
EDGE 2 Tx slots	23.31	23.29	23.25	24.50	17.31	17.29	17.25	18.50	
EDGE 3 Tx slots	21.47	21.45	21.40	22.50	17.21	17.19	17.14	18.24	
EDGE 4 Tx slots	20.15	20.13	20.08	21.00	17.15	17.13	17.08	18.00	
Band									
WCDMA II		Tune-up Limit			WCDMA IV			WCDMA V	
TX Channel	Rx Channel	9262	9400	9538	1312	1413	1513	4132	4182
Frequency (MHz)		1852.4	1880	1907.6	(dBm)	1537	1630	1738	4233
3GPP Rel 99	RMC 12.2Kbps	23.96	23.79	23.85	24.00	23.80	23.94	23.97	24.00
3GPP Rel 6	HSDPA Subtest-1	22.99	22.90	22.84	23.00	22.91	22.98	22.85	23.00
3GPP Rel 6	HSDPA Subtest-2	22.99	22.90	22.89	23.00	22.90	23.00	22.89	23.00
3GPP Rel 6	HSDPA Subtest-3	22.44	22.43	22.42	22.50	22.38	22.42	22.35	22.50
3GPP Rel 6	HSDPA Subtest-4	22.44	22.45	22.34	22.50	22.45	22.49	22.36	22.50
3GPP Rel 8	DCH-HSDPA Subtest-1	22.68	22.53	22.50	23.00	22.61	22.53	22.41	23.00
3GPP Rel 8	DCH-HSDPA Subtest-2	22.64	22.50	22.47	23.00	22.49	22.50	22.41	23.00
3GPP Rel 8	DCH-HSDPA Subtest-3	22.10	22.04	22.01	22.50	22.01	22.01	22.06	22.50
3GPP Rel 8	DCH-HSDPA Subtest-4	22.05	22.01	22.03	22.50	22.06	22.04	22.01	22.50
3GPP Rel 6	HSUPA Subtest-1	22.98	22.95	22.87	23.00	22.92	22.89	22.84	23.00
3GPP Rel 6	HSUPA Subtest-2	20.97	20.90	20.93	21.00	20.96	20.98	20.84	21.00
3GPP Rel 6	HSUPA Subtest-3	21.99	21.91	21.93	22.00	21.97	21.92	21.88	22.00
3GPP Rel 6	HSUPA Subtest-4	20.92	20.95	20.91	21.00	20.92	20.98	20.89	21.00
3GPP Rel 6	HSUPA Subtest-5	23.00	22.90	22.90	23.00	22.95	22.95	22.75	23.00
Band									
CDMA BC0		Tune-up Limit			CDMA BC1			CDMA BC10	
TX Channel	Frequency (MHz)	1013	384	777	26	600	1175	476	580
		824.7	836.52	848.31	(dBm)	1851.25	1880	1908.75	684
RTAP 163.8Kbps		24.45	24.48	24.28	25.00	23.25	23.28	23.19	24.00
RETAPE 4096Bits		24.46	24.47	24.27	25.00	23.23	23.25	23.20	24.00
								23.90	23.89
								23.50	23.50
WCDMA V									
		Tune-up Limit						Tune-up Limit	
		4357	4407	4458	4132	4182	4233	826.4	836.4
		(dBm)						846.6	846.6



Band 2 (1900MHz Band) Part 24E									
Full Power									
BW [MHz]	Modulation	RB Size	RB Offset	Power Ch. / Freq.	Power Ch. / Freq.	Power Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)	
Channel				18700	18900	19100			
Frequency (MHz)				1860	1880	1900			
20	QPSK	1	0	23.10	23.13	22.87			
20	QPSK	1	49	22.90	22.87	22.84	24	0	
20	QPSK	1	99	22.86	22.98	22.83			
20	QPSK	50	0	21.91	21.92	21.80			
20	QPSK	50	24	21.88	21.90	21.67	23	1	
20	QPSK	50	50	21.75	21.85	21.89			
20	QPSK	100	0	21.80	21.91	21.81			
20	16QAM	1	0	22.50	22.45	22.35			
20	16QAM	1	49	22.24	22.23	22.08	23	1	
20	16QAM	1	99	22.30	22.33	22.03			
20	16QAM	50	0	21.06	21.04	20.96			
20	16QAM	50	24	21.04	21.02	20.81	22	2	
20	16QAM	50	50	20.98	20.99	20.76			
20	16QAM	100	0	20.68	20.65	20.51			
20	64QAM	1	0	21.42	21.42	21.22			
20	64QAM	1	49	21.17	21.16	20.97	22	2	
20	64QAM	1	99	21.29	21.30	20.96			
20	64QAM	50	0	20.06	20.07	20.00			
20	64QAM	50	24	20.06	20.08	19.82			
20	64QAM	50	50	19.88	19.98	19.79	21	3	
20	64QAM	100	0	19.92	19.99	19.98			
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				1857.5	1880	1902.5			
15	QPSK	1	0	22.93	22.96	22.78			
15	QPSK	1	57	22.27	22.81	22.68	24	0	
15	QPSK	1	74	22.54	22.87	22.57			
15	QPSK	35	0	21.98	21.99	21.90			
15	QPSK	35	20	21.04	21.93	21.71	23	1	
15	QPSK	35	39	21.87	21.82	21.67			
15	QPSK	75	0	21.95	21.92	21.71			
15	16QAM	1	0	22.25	22.28	22.15			
15	16QAM	1	37	22.27	22.21	22.00	23	1	
15	16QAM	1	74	22.28	22.29	22.05			
15	16QAM	36	0	21.03	21.08	20.86			
15	16QAM	36	20	21.05	21.03	20.83	22	2	
15	16QAM	36	50	21.04	21.00	20.84			
15	16QAM	75	0	21.04	21.02	20.84			
15	64QAM	1	0	21.25	21.31	21.14			
15	64QAM	1	37	21.19	21.19	20.90	22	2	
15	64QAM	1	74	21.16	21.24	20.90			
15	64QAM	36	0	20.11	20.10	19.86			
15	64QAM	36	20	20.06	20.08	19.86	21	3	
15	64QAM	36	39	20.03	20.07	19.85			
15	64QAM	75	0	20.04	20.03	19.80			
Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				1855	1880	1905			
10	QPSK	1	0	23.04	23.07	22.70			
10	QPSK	1	25	22.82	22.82	22.64	24	0	
10	QPSK	1	49	23.02	22.98	22.64			
10	QPSK	25	0	21.88	21.91	21.65			
10	QPSK	25	12	21.85	21.89	21.66			
10	QPSK	25	25	21.92	21.83	21.67	23	1	
10	QPSK	50	0	21.85	21.88	21.69			
10	16QAM	1	0	22.45	22.33	21.95			
10	16QAM	1	25	22.20	22.24	21.97	23	1	
10	16QAM	1	49	22.44	22.42	21.96			
10	16QAM	25	0	21.08	21.09	20.81			
10	16QAM	25	12	21.03	21.04	20.76	22	2	
10	16QAM	25	25	21.02	20.95	20.79			
10	16QAM	50	0	21.02	21.00	20.74			
10	64QAM	1	0	21.41	21.35	21.02			
10	64QAM	1	25	21.14	21.09	21.08	22	2	
10	64QAM	1	49	21.32	21.34	21.10			
10	64QAM	25	0	20.07	20.07	19.82			
10	64QAM	25	12	20.02	20.00	19.80			
10	64QAM	25	25	20.02	20.01	19.79	21	3	
10	64QAM	50	0	20.02	20.04	19.80			
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				1852.5	1880	1907.5			
5	QPSK	1	0	22.84	22.87	22.66			
5	QPSK	1	12	22.80	22.78	22.61	24	0	
5	QPSK	1	24	22.85	22.82	22.62			
5	QPSK	12	0	21.90	21.86	21.64			
5	QPSK	12	7	21.85	21.84	21.65			
5	QPSK	12	13	21.85	21.86	21.66	23	1	
5	QPSK	25	0	21.82	21.83	21.68			
5	QPSK	25	12	21.85	21.88	21.69			
5	QPSK	25	25	21.83	21.87	21.70	23	1	
5	QPSK	50	0	21.85	21.88	21.69			
5	16QAM	1	0	22.28	22.26	21.94			
5	16QAM	1	12	22.24	22.17	21.94	23	1	
5	16QAM	1	24	22.33	22.18	22.03			
5	16QAM	12	0	21.08	21.05	20.74			
5	16QAM	12	7	21.01	21.02	20.80			
5	16QAM	12	13	21.02	21.01	20.74	22	2	
5	16QAM	25	0	20.96	20.97	20.75			
5	16QAM	25	1	21.17	21.17	20.88			
5	16QAM	25	12	21.16	21.16	20.88	22	2	
5	16QAM	25	24	21.23	21.20	20.99			
5	16QAM	50	0	20.06	20.08	19.84			
5	16QAM	50	7	20.11	20.03	19.83			
5	16QAM	50	12	20.02	20.00	19.80			
5	16QAM	50	25	20.02	20.01	19.79	21	3	
5	64QAM	1	0	19.97	19.97	19.77			
5	64QAM	1	12	19.95	19.95	19.75			
5	64QAM	1	24	19.90	19.90	19.70			
5	64QAM	1	49	19.95	19.95	19.75			
5	64QAM	25	0	19.99	19.92	19.78			
5	64QAM	25	12	19.95	19.95	19.75			
5	64QAM	25	24	19.90	19.90	19.70			
5	64QAM	50	0	19.95	19.95	19.75			
5	64QAM	50	12	19.95	19.95	19.75			
5	64QAM	50	24	19.90	19.90	19.70			
5	64QAM	75	0	19.95	19.95	19.75			
5	64QAM	75	12	19.95	19.95	19.75			
5	64QAM	75	24	19.90	19.90	19.70			
5	64QAM	125	0	19.95	19.95	19.75			
5	64QAM	125	24	19.90	19.90	19.70			
5	64QAM	125	49	19.95	19.95	19.75			
5	64QAM	125	75	19.95	19.95	19.75			
5	64QAM	125	125	19.95	19.95	19.75			
5	64QAM	125	249	19.95	19.95	19.75			
5	64QAM	125	499	19.95	19.95	19.75			
5	64QAM	125	799	19.95	19.95	19.75			
5	64QAM	125	1599	19.95	19.95	19.75			
5	64QAM	125	2399	19.95	19.95	19.75			
5	64QAM	125	4099	19.95	19.95	19.75			
5	64QAM	125	6499	19.95	19.95	19.75			
5	64QAM	125	9999	19.95	19.95	19.75			
5	64QAM	125	12599	19.95	19.95	19.75			
5	64QAM	125	15299	19.95	19.95	19.75			
5	64QAM	125	17999	19.95	19.95	19.75			
5	64QAM	125	20699	19.95	19.95	19.75			
5	64QAM	125	23399	19.95	19.95	19.75			
5	64QAM	125	26099	19.95	19.95	19.75			
5	64QAM	125	28799	19.95	19.95	19.75			
5	64QAM	125	31499	19.95	19.95	19.75			
5	64QAM	125	34199	19.95	19.95	19.75			
5	64QAM	125	36899	19.95	19.95	19.75			
5	64QAM	125	39599	19.95	19.95	19.75			
5	64QAM	125	42299	19.95	19.95	19.75			
5	64QAM	125	44999	19.95	19.95	19.75			
5	64QAM	125	47699	19.95	19.95	19.75			
5	64QAM	125	50399	19.95	19.95	19.75			
5	64QAM	125	53099	19.95	19.95	19.75			
5	64QAM	125	55799	19.95	19.95	19.75			
5	64QAM								



Band 7 (2600MHz Band)

Band 7 (2600MHz Band)										
Part 27										
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				26510	2535	2560	23.5	0		
20	QPSK	1	0	22.86	23.04	22.98				
20	QPSK	1	49	22.79	22.94	23.02				
20	QPSK	1	99	22.84	22.98	22.97				
20	QPSK	50	0	21.79	22.08	21.92				
20	QPSK	50	24	21.95	22.02	21.97				
20	QPSK	50	50	21.91	22.02	22.05				
20	QPSK	100	0	21.91	21.98	21.95				
20	QAM	1	0	21.87	22.17	22.12				
20	QAM	1	49	22.17	22.28	22.34				
20	QAM	1	99	22.19	22.27	22.29				
20	QAM	50	0	20.86	21.08	20.98				
20	QAM	50	24	21.03	21.10	21.06				
20	QAM	50	50	21.01	21.17	21.14				
20	QAM	100	0	20.98	21.07	21.00				
20	64QAM	1	0	20.75	21.02	21.00				
20	64QAM	1	49	21.02	21.15	21.24				
20	64QAM	1	99	21.15	21.19	21.18				
20	64QAM	50	0	19.85	20.07	20.00				
20	64QAM	50	24	20.02	20.09	20.06				
20	64QAM	50	50	19.99	20.04	20.12				
20	64QAM	100	0	20.00	20.05	20.00				
Channel				26625	21100	21370	21.5	0		
15	QPSK	1	0	22.60	22.79	22.84				
15	QPSK	1	37	22.77	22.96	23.00				
15	QPSK	1	74	22.87	22.92	22.99				
15	QPSK	36	0	21.80	21.95	21.90				
15	QPSK	36	20	21.86	22.02	22.07				
15	QPSK	36	39	21.93	21.98	22.00				
15	QPSK	75	0	21.79	21.97	21.92				
15	16QAM	1	0	21.85	22.14	22.10				
15	16QAM	1	37	22.07	22.24	22.31				
15	16QAM	1	74	22.24	22.22	22.27				
15	16QAM	36	0	20.84	21.07	20.96				
15	16QAM	36	20	20.92	21.08	21.13				
15	16QAM	36	39	21.01	21.05	21.11				
15	16QAM	75	0	20.86	21.08	21.02				
15	64QAM	1	0	20.79	21.03	21.03				
15	64QAM	1	37	20.99	21.16	21.25				
15	64QAM	1	74	21.24	22.22	22.27				
15	64QAM	36	0	19.83	20.07	20.00				
15	64QAM	36	20	19.88	20.07	20.12				
15	64QAM	36	39	20.02	20.05	20.11				
15	64QAM	75	0	19.87	20.07	20.02				
Channel				26800	21100	21400	21.5	0		
10	QPSK	1	0	22.66	22.75	22.90				
10	QPSK	1	25	22.77	22.92	22.93				
10	QPSK	1	49	22.72	22.90	22.94				
10	QPSK	25	0	21.82	21.96	22.01				
10	QPSK	25	12	21.85	21.99	22.02				
10	QPSK	25	25	21.83	21.99	22.00				
10	QPSK	50	0	21.83	21.99	22.00				
10	16QAM	1	0	21.86	22.13	22.18				
10	16QAM	1	25	22.06	22.23	22.28				
10	16QAM	1	49	22.08	22.18	22.22				
10	16QAM	25	0	20.86	21.03	21.04				
10	16QAM	25	12	20.92	21.09	21.09				
10	16QAM	25	25	20.91	21.04	21.05				
10	16QAM	50	0	20.90	21.05	21.07				
10	64QAM	1	0	20.76	20.99	21.06				
10	64QAM	1	25	20.93	21.13	21.14				
10	64QAM	1	49	20.95	21.08	21.12				
10	64QAM	25	0	19.88	20.02	20.03				
10	64QAM	25	12	19.92	20.10	20.10				
10	64QAM	25	25	19.91	20.05	20.04				
10	64QAM	50	0	19.88	20.04	20.06				
Channel				27075	21100	21425	20.5	0		
5	QPSK	1	0	22.64	22.89	22.94				
5	QPSK	1	12	22.68	22.96	22.99				
5	QPSK	1	24	22.78	22.92	22.95				
5	QPSK	12	0	21.72	21.98	21.96				
5	QPSK	12	7	21.74	21.99	22.00				
5	QPSK	12	13	21.85	21.99	21.98				
5	QPSK	25	0	21.83	21.97	21.99				
5	16QAM	1	0	21.89	22.21	22.22				
5	16QAM	1	12	21.94	22.27	22.26				
5	16QAM	1	24	22.04	22.24	22.25				
5	16QAM	12	0	20.78	21.05	21.06				
5	16QAM	12	7	20.83	21.11	21.10				
5	16QAM	12	13	20.90	21.04	21.09				
5	16QAM	25	0	20.88	21.07	21.06				
5	64QAM	1	0	20.81	21.11	21.14				
5	64QAM	1	12	20.87	21.17	21.18				
5	64QAM	1	24	20.96	21.13	21.15				
5	64QAM	12	0	19.72	20.03	20.05				
5	64QAM	12	7	19.80	20.08	20.07				
5	64QAM	12	13	19.81	20.03	20.06				

Band 12 (700MHz Low Band)

Band 12 (700MHz Low Band) Part 27F (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)
				23060	23095	23130	23165	23200	23235		
Channel											
10	QPSK	1	0	23.29	23.40	23.37	23.37	23.37	23.37	24	0
10	QPSK	1	25	23.29	23.29	23.37	23.37	23.37	23.37		
10	QPSK	1	49	23.22	23.27	23.31	23.31	23.31	23.31		
10	QPSK	25	0	22.40	22.41	22.34	22.34	22.34	22.34		
10	QPSK	25	12	22.39	22.38	22.30	22.30	22.30	22.30		
10	QPSK	25	25	22.33	22.26	22.32	22.32	22.32	22.32		
10	QPSK	50	0	22.35	22.37	22.28	22.28	22.28	22.28		
10	QPSK	50	1	22.54	22.47	22.64	22.64	22.64	22.64		
10	16QAM	1	0	22.51	22.54	22.64	22.64	22.64	22.64		
10	16QAM	1	25	22.51	22.54	22.64	22.64	22.64	22.64		
10	16QAM	1	49	22.49	22.61	22.60	22.60	22.60	22.60		
10	16QAM	25	0	21.50	21.43	21.46	21.46	21.46	21.46	22	1
10	16QAM	25	12	21.44	21.47	21.39	21.39	21.39	21.39		
10	16QAM	25	25	21.41	21.35	21.40	21.40	21.40	21.40		
10	16QAM	50	0	21.46	21.39	21.39	21.39	21.39	21.39		
10	64QAM	1	0	21.50	21.55	21.68	21.68	21.68	21.68		
10	64QAM	1	25	21.51	21.49	21.60	21.60	21.60	21.60		
10	64QAM	1	49	21.44	21.50	21.64	21.64	21.64	21.64		
10	64QAM	25	0	20.52	20.49	20.41	20.41	20.41	20.41		
10	64QAM	25	12	20.47	20.43	20.43	20.43	20.43	20.43		
10	64QAM	25	25	20.45	20.35	20.38	20.38	20.38	20.38		
10	64QAM	50	0	20.45	20.43	20.36	20.36	20.36	20.36		
Channel											
5	QPSK	1	0	23.29	23.31	23.37	23.37	23.37	23.37	23	1
5	QPSK	1	12	23.23	23.29	23.26	23.26	23.26	23.26		
5	QPSK	1	24	23.31	23.20	23.38	23.38	23.38	23.38		
5	QPSK	12	0	22.26	22.35	22.36	22.36	22.36	22.36		
5	QPSK	12	7	22.34	22.35	22.40	22.40	22.40	22.40		
5	QPSK	12	13	23.35	22.25	22.32	22.32	22.32	22.32		
5	QPSK	25	0	22.36	22.31	22.35	22.35	22.35	22.35		
5	16QAM	1	0	22.46	22.73	22.63	22.63	22.63	22.63		
5	16QAM	1	12	22.41	22.60	22.50	22.50	22.50	22.50		
5	16QAM	1	24	22.57	22.49	22.70	22.70	22.70	22.70		
5	16QAM	12	0	21.38	21.43	21.46	21.46	21.46	21.46	22	2
5	16QAM	12	7	21.38	21.39	21.45	21.45	21.45	21.45		
5	16QAM	12	13	21.43	21.35	21.40	21.40	21.40	21.40		
5	16QAM	25	0	21.45	21.41	21.43	21.43	21.43	21.43		
5	64QAM	1	0	21.48	21.66	21.70	21.70	21.70	21.70		
5	64QAM	1	12	21.49	21.54	21.51	21.51	21.51	21.51		
5	64QAM	1	24	21.49	21.45	21.66	21.66	21.66	21.66		
5	64QAM	12	0	20.40	20.47	20.51	20.51	20.51	20.51		
5	64QAM	12	7	20.42	20.46	20.53	20.53	20.53	20.53		
5	64QAM	12	13	20.46	20.40	20.42	20.42	20.42	20.42		
5	64QAM	25	0	20.46	20.42	20.45	20.45	20.45	20.45		
Channel											
3	QPSK	1	0	23.31	23.27	23.30	23.30	23.30	23.30	24	0
3	QPSK	1	8	23.19	23.28	23.37	23.37	23.37	23.37		
3	QPSK	1	14	23.24	23.28	23.39	23.39	23.39	23.39		
3	QPSK	8	0	22.27	22.32	22.35	22.35	22.35	22.35		
3	QPSK	8	4	22.27	22.33	22.46	22.46	22.46	22.46		
3	QPSK	8	7	22.23	22.30	22.41	22.41	22.41	22.41		
3	QPSK	15	0	22.27	22.21	22.36	22.36	22.36	22.36		
3	16QAM	1	0	22.41	22.71	22.49	22.49	22.49	22.49		
3	16QAM	1	8	22.40	22.52	22.56	22.56	22.56	22.56		
3	16QAM	1	14	22.49	22.43	22.62	22.62	22.62	22.62		
3	16QAM	8	0	21.43	21.40	21.44	21.44	21.44	21.44	22	2
3	16QAM	8	4	21.42	21.46	21.58	21.58	21.58	21.58		
3	16QAM	8	7	21.32	21.44	21.56	21.56	21.56	21.56		
3	16QAM	15	0	21.33	21.42	21.41	21.41	21.41	21.41		
3	64QAM	1	0	21.52	21.55	21.60	21.60	21.60	21.60		
3	64QAM	1	8	21.43	21.53	21.62	21.62	21.62	21.62		
3	64QAM	1	14	21.45	21.52	21.70	21.70	21.70	21.70		
3	64QAM	8	0	20.44	20.45	20.49	20.49	20.49	20.49		
3	64QAM	8	4	20.39	20.46	20.60	20.60	20.60	20.60		
3	64QAM	8	7	20.37	20.43	20.54	20.54	20.54	20.54		
3	64QAM	15	0	20.42	20.41	20.46	20.46	20.46	20.46		
Channel											
1.4	QPSK	1	0	23.16	23.21	23.29	23.29	23.29	23.29	24	0
1.4	QPSK	1	3	23.18	23.33	23.37	23.37	23.37	23.37		
1.4	QPSK	1	5	23.13	23.20	23.29	23.29	23.29	23.29		
1.4	QPSK	3	0	23.20	23.27	23.38	23.38	23.38	23.38		
1.4	QPSK	3	1	23.26	23.28	23.38	23.38	23.38	23.38		
1.4	QPSK	3	3	23.17	23.27	23.37	23.37	23.37	23.37		
1.4	QPSK	6	0	22.26	22.29	22.36	22.36	22.36	22.36		
1.4	16QAM	1	0	23.24	23.27	22.57	22.57	22.57	22.57		
1.4	16QAM	1	3	22.44	22.53	22.70	22.70	22.70	22.70		
1.4	16QAM	1	5	22.38	22.51	22.59	22.59	22.59	22.59		
1.4	16QAM	3	0	22.25	22.38	22.44	22.44	22.44	22.44	22	1
1.4	16QAM	3	1	22.32	22.37	22.40	22.40	22.40	22.40		
1.4	16QAM	3	3	22.17	22.29	22.38	22.38	22.38	22.38		
1.4	16QAM	6	0	21.31	21.42	21.50	21.50	21.50	21.50		
1.4	64QAM	1	0	21.41	21.43	21.61	21.61	21.61	21.61		
1.4	64QAM	1	3	21.45	21.53	21.65	21.65	21.65	21.65		
1.4	64QAM	1	5	21.41	21.44	21.49	21.49	21.49	21.49		
1.4	64QAM	3	0	21.40	21.42	21.58	21.58	21.58	21.58		
1.4	64QAM	3	1	21.42	21.46	21.61	21.61	21.61	21.61		
1.4	64QAM	3	3	21.41	21.39	21.51	21.51	21.51	21.51		

Band 13(700MHz Band)

Band 13 (700MHz Band) Part 27F										
BW [MHz]	Modulation	RB Size	RB Offset	Power		Power		Tune-up limit (dBm)	MPR (dB)	
				Low Ch. / Freq.	Middle Ch. / Freq.	High Ch. / Freq.				
Channel				Frequency (MHz)					782	
10	QPSK	1	0	782					23.42	
10	QPSK	1	25	782					23.30	
10	QPSK	1	49	782					23.21	
10	QPSK	25	0	782					22.38	
10	QPSK	25	12	782					22.45	
10	QPSK	25	25	782					22.41	
10	QPSK	50	0	782					22.43	
10	16QAM	1	0	782					22.35	
10	16QAM	1	25	782					22.31	
10	16QAM	1	49	782					22.40	
10	16QAM	25	0	782					21.45	
10	16QAM	25	12	782					21.43	
10	16QAM	25	25	782					21.37	
10	16QAM	50	0	782					21.41	
10	64QAM	1	0	782					21.44	
10	64QAM	1	25	782					21.42	
10	64QAM	1	49	782					21.33	
10	64QAM	25	0	782					20.39	
10	64QAM	25	12	782					20.37	
10	64QAM	25	25	782					20.34	
10	64QAM	50	0	782					20.32	
Channel				23205	23230	23255	Tune-up limit (dBm)		MPR (dB)	
Frequency (MHz)				779.5	782	784.5	Tune-up limit (dBm)		MPR (dB)	
5	QPSK	1	0	23.37	23.38	23.30	782		23.35	
5	QPSK	1	12	23.36	23.30	23.27	782		23.35	
5	QPSK	1	24	23.29	23.32	23.15	782		23.35	
5	QPSK	12	0	22.47	22.44	22.30	782		22.55	
5	QPSK	12	7	22.45	22.48	22.29	782		22.55	
5	QPSK	12	13	22.44	22.42	22.29	782		22.55	
5	QPSK	25	0	22.45	22.42	22.29	782		22.55	
5	16QAM	1	0	22.43	22.42	22.42	782		22.55	
5	16QAM	1	12	22.45	22.47	22.37	782		22.55	
5	16QAM	1	24	22.32	22.37	22.27	782		22.55	
5	16QAM	12	0	21.36	21.32	21.23	782		21.23	
5	16QAM	12	7	21.36	21.35	21.23	782		21.23	
5	16QAM	12	13	21.33	21.29	21.16	782		21.23	
5	16QAM	25	0	21.34	21.31	21.19	782		21.23	
5	64QAM	1	0	21.36	21.47	21.29	782		21.25	
5	64QAM	1	12	21.43	21.36	21.35	782		21.25	
5	64QAM	1	24	21.44	21.41	21.25	782		21.25	
5	64QAM	12	0	20.40	20.43	20.32	782		20.32	
5	64QAM	12	7	20.41	20.36	20.29	782		20.32	
5	64QAM	12	13	20.33	20.35	20.23	782		20.32	
5	64QAM	25	0	20.33	20.31	20.18	782		20.32	



Band 17 (700MHz Band) Part 27H (only on channel required)									
BW [MHz]	Modulation	RB Size	RB Offset	Power Ch. / Freq.	Power Ch. / Freq.	Power Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)	
Channel				23760	23790	23800			
Frequency (MHz)	709	710	711						
10	QPSK	1	0	23.24	23.35	23.31			
10	QPSK	1	25	23.25	23.27	23.23	24	0	
10	QPSK	1	49	23.22	23.24	23.21			
10	QPSK	25	0	22.30	22.34	22.33			
10	QPSK	25	12	22.32	22.32	22.29			
10	QPSK	25	25	22.23	22.24	22.21			
10	QPSK	50	0	22.31	22.33	22.26			
10	16QAM	1	0	22.51	22.65	22.63			
10	16QAM	1	25	22.54	22.55	22.48	23	1	
10	16QAM	1	49	22.54	22.44	22.44			
10	16QAM	25	0	21.42	21.41	21.41			
10	16QAM	25	12	21.43	21.31	21.37			
10	16QAM	25	25	21.31	21.36	21.24			
10	16QAM	50	0	21.36	21.38	21.35			
10	64QAM	1	0	21.50	21.48	21.42			
10	64QAM	1	25	21.59	21.45	21.47	22	2	
10	64QAM	1	49	21.43	21.51	21.41			
10	64QAM	25	0	20.43	20.43	20.40			
10	64QAM	25	12	20.43	20.41	20.43			
10	64QAM	25	25	20.34	20.33	20.35			
10	64QAM	50	0	20.39	20.40	20.35			
10	Channel				23755	23790	23826		
Frequency (MHz)	705.5	710	713.5						
5	QPSK	1	0	23.24	23.34	23.29			
5	QPSK	1	12	23.33	23.22	23.25	24	0	
5	QPSK	1	24	23.21	23.30	23.24			
5	QPSK	12	0	22.30	22.28	22.27			
5	QPSK	12	7	22.32	22.29	22.36			
5	QPSK	12	13	22.30	22.26	22.22			
5	QPSK	25	0	22.35	22.28	22.24			
5	16QAM	1	0	22.29	22.41	22.30			
5	16QAM	1	12	22.40	22.34	22.40	23	1	
5	16QAM	1	24	22.35	22.35	22.42			
5	16QAM	12	0	21.13	21.17	21.16			
5	16QAM	12	7	21.22	21.20	21.28			
5	16QAM	12	13	21.14	21.15	21.21			
5	16QAM	25	0	21.17	21.14	21.11			
5	64QAM	1	0	21.38	21.37	21.33			
5	64QAM	1	12	21.35	21.26	21.34	22	2	
5	64QAM	1	24	21.27	21.27	21.31			
5	64QAM	12	0	20.18	20.22	20.19			
5	64QAM	12	7	20.30	20.22	20.20			
5	64QAM	12	13	20.25	20.18	20.20			
5	64QAM	25	0	20.21	20.17	20.13			
5	Channel				23755	23790	23826		
Frequency (MHz)	705.5	710	713.5						
15	QPSK	1	0	22.82	23.00	22.82			
15	QPSK	1	57	22.50	22.82	22.24	24	0	
15	QPSK	1	74	22.50	22.50	22.59			
15	QPSK	36	0	21.69	21.67	21.69			
15	QPSK	36	20	21.90	21.94	21.76			
15	QPSK	36	39	21.85	21.93	21.57			
15	QPSK	75	0	21.92	21.98	21.75			
15	16QAM	1	0	22.33	22.30	22.16			
15	16QAM	1	37	22.15	22.10	21.86	23	1	
15	16QAM	1	74	22.19	22.08	21.85			
15	16QAM	36	0	21.03	20.99	20.70			
15	16QAM	36	39	20.06	20.05	19.70	21	3	
15	64QAM	75	0	20.04	20.04	19.88			
15	Channel				28115	28340	28615		
Frequency (MHz)	1857.5	1880	1907.5						
15	QPSK	1	0	22.82	23.00	22.82			
15	QPSK	1	57	22.50	22.82	22.24	24	0	
15	QPSK	1	74	22.50	22.50	22.59			
15	QPSK	36	0	21.69	21.67	21.69			
15	QPSK	36	20	21.90	21.94	21.76			
15	QPSK	36	39	21.85	21.93	21.57			
15	QPSK	75	0	21.92	21.98	21.75			
15	16QAM	1	0	22.33	22.41	22.30			
15	16QAM	1	37	22.15	22.10	21.86	23	1	
15	16QAM	1	74	22.19	22.08	21.85			
15	16QAM	36	0	21.03	20.99	20.70			
15	16QAM	36	39	20.06	20.05	19.70	21	3	
15	64QAM	75	0	20.04	20.04	19.88			
15	Channel				26900	26340	26640		
Frequency (MHz)	1855	1880	1910						
10	QPSK	1	0	23.09	23.15	22.79			
10	QPSK	1	25	22.83	22.86	22.74	24	0	
10	QPSK	1	49	23.01	23.05	22.75			
10	QPSK	25	0	21.94	21.92	21.63			
10	QPSK	25	12	21.89	21.92	21.61			
10	QPSK	25	25	21.87	21.90	21.61			
10	QPSK	50	0	21.88	21.91	21.63			
10	16QAM	1	0	22.33	22.39	21.91			
10	16QAM	1	25	22.18	22.23	22.01	23	1	
10	16QAM	1	49	22.25	22.23	21.98			
10	16QAM	25	0	21.01	21.03	20.74			
10	16QAM	25	12	21.01	21.03	20.68	22	2	
10	16QAM	25	25	21.01	21.00	20.69			
10	16QAM	50	0	20.98	21.03	20.70			
10	64QAM	1	0	21.30	21.29	20.83			
10	64QAM	1	25	21.12	21.17	20.98	22	2	
10	64QAM	1	49	21.28	21.30	20.89			
10	64QAM	25	0	20.10	20.02	19.71			
10	64QAM	25	12	20.02	20.04	19.70			
10	64QAM	25	25	19.97	20.04	19.66			
10	64QAM	50	0	20.05	20.08	19.70			
10	Channel				26055	26340	26655		
Frequency (MHz)	1852.5	1880	1912.5						
5	QPSK	1	0	22.93	22.90	22.60			
5	QPSK	1	12	22.84	22.84	22.50	24	0	
5	QPSK	1	24	22.88	22.86	22.59			
5	QPSK	12	0	21.89	21.92	21.60			
5	QPSK	12	7	21.89	21.91	21.65			
5	QPSK	12	13	21.87	21.89	21.58			
5	QPSK	25	0	21.86	21.88	21.60			
5	16QAM	1	0	22.17	22.30	21.82			
5	16QAM	1	12	22.26	22.07	21.93	23	1	
5	16QAM	1	24	22.20	22.14	21.82			
5	16QAM	12	0	20.99	21.03	20.66			
5	16QAM	12	7	21.02	21.01	20.68			
5	16QAM	12	13	21.00	21.00	20.62	22	2	
5	16QAM	25	0	20.96	20.99	20.69			
5	64QAM	1	0	21.16	21.21	20.78			
5	64QAM	1	12	21.14	21.09	20.94	22	2	
5	64QAM	1	24	21.15	21.13	20.91			
5	64QAM	12	0	20.07	20.07	19.72			
5	64QAM	12	7	20.05	20.08	19.75			
5	64QAM	12	13	20.06	20.07	19.71	21	3	
5	64QAM	25	0	20.03	20.02	19.66			
5	Channel				26055	26340	26655		
Frequency (MHz)	1851.5	1880	1913.5						
3	QPSK	1	0	22.86	22.90	22.59			
3	QPSK	1	8	22.82	22.83	22.57	24	0	
3	QPSK	1	14	22.79	22.82	22.53			
3	QPSK	8	0	21.84	21.85	21.59			
3	QPSK	8	4	21.87	21.90	21.61			
3	QPSK	8	7	21.85	21.88	21.54			
3	QPSK	15	0	21.86	21.88	21.57			
3	16QAM	1	0	22.24	22.17	21.80			
3	16QAM	1	6	22.19	22.09	21.93	23	1	
3	16QAM	1	14	22.03	22.06	21.76			
3	16QAM	8	0	21.02	21.07	20.67			
3	16QAM	8	4	21.04	21.07	20.69			
3	16QAM	8	7	20.99	21.01	20.64	22	2	
3	16QAM	15	0	20.96	20.99	20.69			
3	64QAM	1	0	21.16	21.21	20.78			
3	64QAM	1	6	21.08	21.07	20.73	22	2	



Band 38 (only on channel required)										
Full Power										
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)		
				37850	38000	38150				
				2580	2595	2610				
20	QPSK	1	0	22.89	23.18	23.05				
20	QPSK	1	49	22.98	23.11	23.15				
20	QPSK	1	99	22.93	23.00	23.01				
20	QPSK	50	0	22.08	22.18	22.13				
20	QPSK	50	24	22.15	22.17	22.11				
20	QPSK	50	50	22.06	22.10	22.10				
20	QPSK	100	0	22.15	22.17	22.07				
20	16QAM	1	0	22.03	22.18	22.20				
20	16QAM	1	49	22.13	22.27	22.33				
20	16QAM	1	99	22.09	22.14	22.19				
20	16QAM	50	0	21.19	21.29	21.24				
20	16QAM	50	24	21.25	21.32	21.22				
20	16QAM	50	50	21.21	21.22	21.24				
20	16QAM	100	0	21.23	21.24	21.18				
20	64QAM	1	0	20.65	20.80	20.83				
20	64QAM	1	49	20.75	20.88	20.93				
20	64QAM	1	99	20.70	20.71	20.77				
20	64QAM	50	0	20.16	20.29	20.22				
20	64QAM	50	24	20.26	20.28	20.22				
20	64QAM	50	50	20.19	20.22	20.27				
20	64QAM	100	0	20.24	20.24	20.15				
				37825	38000	38150	Tune-up limit (dBm)	MPR (dB)		
				2577.5	2595	2612.5				
15	QPSK	1	0	22.84	23.02	23.07				
15	QPSK	1	37	22.94	23.16	23.17				
15	QPSK	1	74	22.91	23.03	23.05				
15	QPSK	36	0	21.94	22.05	22.07				
15	QPSK	36	20	22.05	22.14	22.20				
15	QPSK	36	39	21.96	22.07	22.11				
15	QPSK	75	0	21.96	22.02	22.05				
15	16QAM	1	0	21.98	22.14	22.20				
15	16QAM	1	37	22.04	22.30	22.31				
15	16QAM	1	74	22.00	22.14	22.19				
15	16QAM	36	0	21.01	21.19	21.15				
15	16QAM	36	20	21.05	21.21	21.27				
15	16QAM	36	39	21.07	21.17	21.22				
15	16QAM	75	0	21.04	21.19	21.17				
15	64QAM	1	0	20.59	20.78	20.81				
15	64QAM	1	37	20.76	20.91	20.90				
15	64QAM	1	74	20.68	20.77	20.74				
15	64QAM	36	0	20.13	20.27	20.18				
15	64QAM	36	20	20.20	20.29	20.31				
15	64QAM	36	39	20.13	20.22	20.26				
15	64QAM	75	0	20.16	20.25	20.14				
				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)		
				2575	2595	2615				
10	QPSK	1	0	22.82	23.00	23.15				
10	QPSK	1	25	22.90	22.98	23.14				
10	QPSK	1	49	22.81	22.95	23.09				
10	QPSK	25	0	21.95	22.01	22.14				
10	QPSK	25	12	21.93	22.07	22.15				
10	QPSK	25	25	21.91	21.97	22.12				
10	QPSK	50	0	21.96	22.03	22.15				
10	16QAM	1	0	21.95	22.15	22.27				
10	16QAM	1	25	22.02	22.14	22.25				
10	16QAM	1	49	21.96	22.05	22.15				
10	16QAM	25	0	21.05	21.11	21.28				
10	16QAM	25	12	21.06	21.14	21.30				
10	16QAM	25	25	21.00	21.10	21.21				
10	16QAM	50	0	21.05	21.14	21.29				
10	64QAM	1	0	20.56	20.74	20.90				
10	64QAM	1	25	20.68	20.72	20.90				
10	64QAM	1	49	20.57	20.70	20.80				
10	64QAM	25	0	20.12	20.19	20.34				
10	64QAM	25	12	20.16	20.24	20.36				
10	64QAM	25	25	20.09	20.15	20.32				
10	64QAM	50	0	20.06	20.14	20.30				
				3775	38000	38225	Tune-up limit (dBm)	MPR (dB)		
				2572.5	2595	2617.5				
5	QPSK	1	0	22.78	22.97	23.11				
5	QPSK	1	12	22.79	23.01	23.11				
5	QPSK	1	24	22.78	22.92	23.02				
5	QPSK	12	0	21.84	22.04	22.12				
5	QPSK	12	7	21.87	22.07	22.22				
5	QPSK	12	13	21.95	22.03	22.08				
5	QPSK	25	0	21.92	22.00	22.12				
5	16QAM	1	0	21.90	22.09	22.21				
5	16QAM	1	12	21.94	22.16	22.22				
5	16QAM	1	24	21.97	22.07	22.16				
5	16QAM	12	0	20.89	21.07	21.21				
5	16QAM	12	7	20.93	21.12	21.24				
5	16QAM	12	13	21.00	21.04	21.20				
5	16QAM	25	0	21.04	21.11	21.25				
5	64QAM	1	0	20.58	20.72	20.85				
5	64QAM	1	12	20.53	20.73	20.83				
5	64QAM	1	24	20.60	20.71	20.87				
5	64QAM	12	0	19.97	20.21	20.32				
5	64QAM	12	7	20.01	20.19	20.30				
5	64QAM	12	13	20.09	20.19	20.33				
5	64QAM	25	0	20.12	20.21	20.29				

Band 41 (2.6G Band)										
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)		
				39750	40185	40620	41055	41490		
				2506	2549.5	2593	2637.8	2682.5		
20	QPSK	1	0	22.87	23.00	23.24	23.00	22.93		
20	QPSK	1	49	23.00	23.09	23.13	22.85	22.85	24	0
20	QPSK	1	99	22.97	22.97	22.97	22.92	22.92		
20	QPSK	50	0	22.05	22.15	22.19	22.10	21.99		
20	QPSK	50	24	22.10	22.16	22.24	22.05	21.94	23	1
20	QPSK	50	50	22.10	22.20	21.95	22.01	21.81		
20	QPSK	100	0	22.09	22.11	22.13	22.00	21.87		
20	16QAM	1	0	21.96	22.09	22.12	22.02	21.92		
20	16QAM	1	49	22.08	22.07	22.11	22.05	21.79		
20	16QAM	1	99	22.08	22.07	22.11	22.05	21.79		
20	16QAM	50	0	21.14	21.26	21.16	21.06	21.05	22	2
20	16QAM	50	24	21.20	21.30	21.10	20.97	20.87		
20	16QAM	50	50	21.20	21.30	21.10	20.97	20.87		
20	16QAM	100	0	21.15	21.21	21.11	20.97	20.87		
20	64QAM	1	0	20.55	20.72	20.80	20.78	20.54		
20	64QAM	1	37	20.73	20.72	20.77	20.73	20.56	22	2
20	64QAM	1	74	20.70	20.72	20.77	20.73	20.56		
20	64QAM	36	0	20.12	20.17	20.15	20.12	20.09		
20	64QAM	36	20	20.17	20.21	20.14	20.18	20.08	21	3
20	64QAM	36	39	20.15	20.17	20.11	20.12	20.09		
20	64QAM	75	0	20.16	20.25	20.12	20.14	20.11		
				39700	40160	40620	41080	41540	Tune-up limit (dBm)	MPR (dB)
				2501	2547	2593	2639	2685		
10	QPSK	1	0	22.92	23.12	22.96	22.98	23.23		
10	QPSK	1	25	22.99	23.13	22.97	22.99	22.78	24	0
10	QPSK	1	49	23.00	23.03	22.91	23.01	23.11		
10	QPSK	25	0	22.01	22.12	21.97	21.98	22.02		
10	QPSK	25	12	22.07	22.14	21.98	22.02	21.87	23	1
10	QPS									



Reduced Power Mode

GSM850		Burst Average Power (dBm)		Frame-Average Power (dBm)		
TX Channel	128	189	251	128	189	251
Frequency (MHz)	824.2	836.4	848.6	824.2	836.4	848.6
GPRS 1 Tx slot	29.90	29.92	29.82	31.00	20.90	20.92
GPRS 2 Tx slots	27.34	27.33	27.32	28.00	21.34	21.33
GPRS 3 Tx slots	25.38	25.36	25.30	26.00	20.40	21.73
GPRS 4 Tx slots	23.87	23.04	23.09	24.50	20.87	20.94
EDGE 1 Tx slot	27.26	27.02	26.82	28.50	18.02	19.50
EDGE 2 Tx slots	24.01	23.78	23.58	25.50	18.01	17.78
EDGE 3 Tx slots	22.05	21.97	21.69	23.50	17.79	17.71
EDGE 4 Tx slots	20.75	20.55	20.35	22.00	17.75	17.58

Band	WCDMA II			WCDMA V			WCDMA VI		
TX Channel	9262	9400	9538	Tune-up Limit	4132	4182	4233	Tune-up Limit	
Rx Channel	9652	9800	9938	(dBm)	4357	4407	4458	(dBm)	
Frequency (MHz)	1852.4	1880	1907.5		826.4	836.4	846.6		
3GPP Rel 99	RMC 12.2kOps	20.55	20.43	20.52	21.50	21.98	21.83	21.88	22.50
3GPP Rel 6	HSDPA Subtest-1	19.42	19.32	19.41	20.50	20.91	20.91	20.95	21.50
3GPP Rel 6	HSDPA Subtest-2	19.39	19.29	19.37	20.50	20.93	20.96	20.98	21.50
3GPP Rel 6	HSDPA Subtest-3	18.92	18.85	18.87	20.00	20.42	20.43	20.46	21.00
3GPP Rel 6	HSDPA Subtest-4	18.96	18.81	18.91	20.00	20.48	20.45	20.39	21.00
3GPP Rel 8	DCH-HSDPA Subtest-1	19.23	19.98	19.20	20.50	20.50	20.44	20.41	21.50
3GPP Rel 8	DCH-HSDPA Subtest-2	19.15	18.84	19.11	20.50	20.44	20.48	20.37	21.50
3GPP Rel 8	DCH-HSDPA Subtest-3	18.56	18.39	18.61	20.00	20.00	19.89	19.91	21.00
3GPP Rel 8	DCH-HSDPA Subtest-4	18.55	18.31	18.49	20.00	20.02	19.88	19.87	21.00
3GPP Rel 6	HSUPA Subtest-1	19.39	19.47	19.59	20.50	20.89	20.88	20.86	21.50
3GPP Rel 6	HSUPA Subtest-2	17.41	17.43	17.54	18.50	18.89	18.86	18.88	19.50
3GPP Rel 6	HSUPA Subtest-3	18.39	18.49	18.62	19.50	19.87	19.93	19.86	20.50
3GPP Rel 6	HSUPA Subtest-4	17.44	17.48	17.56	18.50	18.85	18.90	18.84	19.50
3GPP Rel 6	HSUPA Subtest-5	19.57	19.46	19.54	20.50	20.50	20.80	20.90	21.50

Band	CDMA BC0			Tune-up Limit (dBm)	CDMA BC1			Tune-up Limit (dBm)	CDMA BC10			Tune-up Limit (dBm)	
	TX Channel	1013	384	777	25	600	1175	476	580	684	817.9	820.5	823.1
Frequency (MHz)	824.7	836.52	848.31	1851.25	1880	1908.75	817.9	820.5	823.1				
RTAP_153.8Kbps	21.08	21.11	20.99	22.00	20.46	20.52	20.45	21.00	21.18	21.20	21.14	22.00	
RFATP_4096Bits	21.09	21.08	21.02	22.00	20.44	20.51	20.46	21.50	21.15	21.18	21.12	22.00	



Band 2 (1900MHz Band)

Part 24E

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								
Frequency (MHz)								
18700	18900	19100						
1860	1880	1900						
20	QPSK	1	0	20.44	20.58	20.33		
20	QPSK	1	49	20.23	20.39	20.12	21	0
20	QPSK	1	99	20.46	20.55	20.19		
20	QPSK	50	0	19.21	19.45	19.29		
20	QPSK	50	24	19.27	19.32	19.12	20	1
20	QPSK	50	50	19.20	19.35	19.14		
20	QPSK	100	0	19.29	19.38	19.30		
20	16QAM	1	0	19.78	19.86	19.87		
20	16QAM	1	49	19.80	19.77	19.74	20	1
20	16QAM	1	99	19.87	19.77	19.70		
20	16QAM	50	0	18.38	18.58	18.41		
20	16QAM	50	24	18.36	18.49	18.32	19	2
20	16QAM	50	49	18.41	18.52	18.20		
20	16QAM	100	0	18.38	18.49	18.43		
20	64QAM	1	0	18.70	18.65	18.56		
20	64QAM	1	49	18.53	18.50	18.46	19	2
20	64QAM	1	99	18.46	18.57	18.47		
20	64QAM	50	0	17.48	17.58	17.41		
20	64QAM	50	24	17.38	17.56	17.29	18	3
20	64QAM	50	50	17.35	17.53	17.28		
20	64QAM	100	0	17.35	17.50	17.47		
Channel								
18750	18900	19125						
1860	1880	19025						
20	QPSK	1	0	20.14	20.44	20.24		
20	QPSK	1	37	20.17	20.28	20.14	21	0
20	QPSK	1	74	20.22	20.34	20.10		
20	QPSK	38	0	19.29	19.45	19.21		
20	QPSK	38	20	19.22	19.42	19.10	20	1
20	QPSK	38	59	19.21	19.40	19.12		
20	QPSK	75	0	19.20	19.40	19.14		
20	16QAM	1	0	19.80	19.74	19.36		
20	16QAM	1	37	19.51	19.61	19.64	20	1
20	16QAM	1	74	19.57	19.67	19.61		
20	16QAM	36	0	18.33	18.49	18.37		
20	16QAM	36	20	18.33	18.49	18.33	19	2
20	16QAM	36	39	18.39	18.46	18.23		
20	16QAM	75	0	18.27	18.50	18.26		
20	64QAM	1	0	18.61	18.62	18.60		
20	64QAM	1	37	18.65	18.64	18.61	19	2
20	64QAM	1	74	18.73	18.80	18.52		
20	64QAM	36	0	17.44	17.55	17.26		
20	64QAM	36	20	17.42	17.50	17.40	18	3
20	64QAM	36	39	17.32	17.47	17.25		
20	64QAM	75	0	17.29	17.52	17.30		
Channel								
18650	18900	19150						
18655	18800	19050						
20	QPSK	1	0	20.41	20.56	20.22		
20	QPSK	1	25	20.15	20.44	20.17	21	0
20	QPSK	1	49	20.31	20.54	20.07		
20	QPSK	25	0	19.16	19.47	19.16		
20	QPSK	25	12	19.27	19.43	19.14	20	1
20	QPSK	25	25	19.17	19.37	19.13		
20	QPSK	50	0	19.18	19.37	19.11		
20	16QAM	1	0	19.53	19.57	19.35		
20	16QAM	1	25	19.39	19.45	19.47	20	1
20	16QAM	1	49	19.62	19.77	19.66		
20	16QAM	25	0	18.43	18.62	18.23		
20	16QAM	25	12	18.28	18.46	18.25	19	2
20	16QAM	25	25	18.39	18.48	18.22		
20	16QAM	50	0	18.37	18.48	18.24		
20	64QAM	1	0	18.55	18.75	18.54		
20	64QAM	1	25	18.55	18.45	18.46	19	2
20	64QAM	1	49	18.75	18.67	18.55		
20	64QAM	25	0	17.27	17.64	17.21		
20	64QAM	25	12	17.36	17.47	17.26	18	3
20	64QAM	25	25	17.37	17.48	17.21		
20	64QAM	50	0	17.37	17.60	17.28		
Channel								
18625	18900	19175						
18625	18800	19075						
20	QPSK	1	0	20.22	20.43	20.16		
20	QPSK	1	12	20.02	20.34	20.22	21	0
20	QPSK	1	24	20.19	20.34	20.20		
20	QPSK	12	0	19.18	19.37	19.12		
20	QPSK	12	7	19.18	19.34	19.19	20	1
20	QPSK	12	13	19.17	19.39	19.14		
20	QPSK	25	0	19.11	19.28	19.16		
20	16QAM	1	0	19.37	19.43	19.58		
20	16QAM	1	12	19.51	19.57	19.44	20	1
20	16QAM	1	24	19.71	19.57	19.34		
20	16QAM	12	0	18.24	18.50	18.28		
20	16QAM	12	7	18.40	18.47	18.24	19	2
20	16QAM	12	13	18.39	18.45	18.20		
20	16QAM	25	0	18.34	18.48	18.26		
20	64QAM	1	0	18.68	18.75	18.68		
20	64QAM	1	12	18.74	18.63	18.60	19	2
20	64QAM	1	24	18.33	18.49	18.59		
20	64QAM	12	0	17.42	17.56	17.31		
20	64QAM	12	7	17.41	17.42	17.31	18	3
20	64QAM	12	13	17.27	17.48	17.21		
20	64QAM	25	0	17.27	17.44	17.22		
Channel								
18615	18900	19185						
18615	18800	19085						
20	QPSK	1	0	20.10	20.37	20.11		
20	QPSK	1	8	20.15	20.30	20.06	21	0
20	QPSK	1	14	20.10	20.25	20.04		
20	QPSK	8	0	19.24	19.24	19.13		
20	QPSK	8	4	19.17	19.27	19.19	20	1
20	QPSK	8	7	19.13	19.43	19.11		
20	QPSK	15	0	19.15	19.26	19.07		
20	16QAM	1	0	19.54	19.70	19.21		
20	16QAM	1	8	19.33	19.38	19.26	20	1
20	16QAM	1	14	19.34	19.45	19.45		
20	16QAM	8	0	18.45	18.53	18.35		
20	16QAM	8	4	18.38	18.56	18.38	19	2
20	16QAM	8	7	18.43	18.66	18.39		
20	16QAM	15	0	18.30	18.46	18.26		
20	64QAM	1	0	18.31	18.58	18.45		
20	64QAM	1	8	18.32	18.74	18.40	19	2
20	64QAM	1	14	18.53	18.34	18.41		
20	64QAM	8	0	17.35	17.59	17.30		
20	64QAM	8	4	17.41	17.48	17.14	18	3
20	64QAM	8	7	17.34	17.40	17.31		
20	64QAM	15	0	17.28	17.50	17.15		
Channel								
18607	18900	19193						
18607	18800	19093						
20	QPSK	1	0	20.07	20.22	19.95		
20	QPSK	1	3	20.34	20.34	20.16	21	0
20	QPSK	1	5	20.03	20.24	20.05		
20	QPSK	3	0	20.12	20.21	20.16		
20	QPSK	3	1	20.10	20.38	20.13		
20	QPSK	3	3	20.11	20.24	20.06		
20	QPSK	6	0	19.06	19.25	18.98	20	1
20	16QAM	1	0	19.52	19.38	19.15		
20	16QAM	1	3	19.59	19.46	19.49		
20	16QAM	1	5	19.44	19.44	19.45	20	1
20	16QAM	3	0	19.26	19.41	19.34		
20	16QAM	3	1	19.28	19.54	19.18		
20	16QAM	3	3	19.21	19.44	19.06		
20	16QAM	6	0	18.17	18.51	18.35	19	2
20	64QAM	1	0	18.39	18.39	18.36		
20	64QAM	1	3	18.52	18.43	18.58		
20	64QAM	1	5	18.47	18.51	18.40	19	2
20	64QAM	3	0	18.61	18.78	18.40		
20	64QAM	3	1	18.31	18.63	18.29	19	2
20	64QAM	3	7	18.44	18.43	18.36		
20	64QAM	6	0	17.16	17.38	17.13	18	3

Band 5 (Cellular Band)
Part 22H (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)

<tbl_r cells="1" ix="5" maxcspan="9" maxrspan



Band 12 (700MHz Low Band)
Part 27F(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								
Frequency (MHz)								
704				707.5	711			
10	QPSK	1	0	20.53	20.64	20.58		
10	QPSK	1	25	20.52	20.46	20.57	21	0
10	QPSK	1	49	20.36	20.54	20.49		
10	QPSK	25	0	19.54	19.69	19.64		
10	QPSK	25	12	19.68	19.65	19.58		
10	QPSK	25	25	19.56	19.59	19.44		
10	QPSK	50	0	19.51	19.66	19.56		
10	16QAM	1	0	19.70	19.72	19.75		
10	16QAM	1	25	19.78	19.89	19.85	20	1
10	16QAM	1	49	19.98	19.96	19.82		
10	16QAM	25	0	18.61	18.54	18.71		
10	16QAM	25	12	18.42	18.56	18.62		
10	16QAM	25	25	18.54	18.56	18.63		
10	16QAM	50	0	18.48	18.48	18.57		
10	64QAM	1	0	18.53	18.54	18.55		
10	64QAM	1	25	18.52	18.40	18.67	19	2
10	64QAM	1	49	18.54	18.57	18.52		
10	64QAM	25	0	17.66	17.65	17.64		
10	64QAM	25	12	17.58	17.70	17.68		
10	64QAM	25	25	17.49	17.52	17.40	18	3
10	64QAM	50	0	17.49	17.62	17.75		
Channel								
Frequency (MHz)								
701.5				707.5	713.5			
5	QPSK	1	0	20.52	20.48	20.44		
5	QPSK	1	12	20.59	20.58	20.35	21	0
5	QPSK	1	24	20.54	20.51	20.39		
5	QPSK	12	0	19.84	19.88	19.40		
5	QPSK	12	1	19.53	19.24	19.07		
5	QPSK	12	13	19.59	19.54	19.55		
5	QPSK	25	0	19.63	19.80	19.51		
5	16QAM	1	0	19.87	19.92	19.89		
5	16QAM	1	12	19.71	19.90	19.82	20	1
5	16QAM	1	24	19.75	19.81	19.76		
5	16QAM	12	0	18.64	18.60	18.50		
5	16QAM	12	7	18.47	18.58	18.45	19	2
5	16QAM	12	13	18.51	18.68	18.26		
5	16QAM	25	0	18.60	18.71	18.33		
5	64QAM	1	0	18.57	18.52	18.48		
5	64QAM	1	12	18.72	18.55	18.62	19	2
5	64QAM	1	24	18.72	18.65	18.64		
5	64QAM	12	0	17.57	17.66	17.50		
5	64QAM	12	7	17.44	17.63	17.39	18	3
5	64QAM	12	13	17.37	17.48	17.33		
5	64QAM	25	0	17.71	17.59	17.35		
Channel								
Frequency (MHz)								
700.5				707.5	714.5			
3	QPSK	1	0	20.48	20.55	20.54		
3	QPSK	1	8	20.42	20.58	20.52	21	0
3	QPSK	1	14	20.38	20.54	20.46		
3	QPSK	8	0	19.53	19.55	19.60		
3	QPSK	8	4	19.47	19.62	19.50		
3	QPSK	8	7	19.38	19.62	19.45		
3	QPSK	15	0	19.46	19.63	19.59		
3	16QAM	1	0	19.48	19.57	19.28		
3	16QAM	1	8	19.76	19.68	19.29		
3	16QAM	1	14	19.63	19.59	19.26		
3	16QAM	6	0	18.60	18.63	18.35		
3	16QAM	6	4	18.50	18.75	18.31		
3	16QAM	6	7	18.31	18.74	18.53		
3	16QAM	15	0	18.41	18.61	18.51		
3	64QAM	1	0	18.89	18.56	18.62		
3	64QAM	1	8	18.83	18.85	18.62	19	2
3	64QAM	1	14	18.58	18.55	18.57		
3	64QAM	8	0	17.66	17.69	17.36		
3	64QAM	8	4	17.53	17.79	17.32		
3	64QAM	8	7	17.38	17.59	17.38	18	3
3	64QAM	15	0	17.60	17.79	17.44		
Channel								
Frequency (MHz)								
699.7				707.5	715.3			
1.4	QPSK	1	0	20.43	20.53	20.30		
1.4	QPSK	1	3	20.36	20.60	20.42		
1.4	QPSK	1	5	20.34	20.54	20.39	21	0
1.4	QPSK	3	0	20.40	20.59	20.45		
1.4	QPSK	3	1	20.36	20.61	20.51		
1.4	QPSK	3	3	20.38	20.61	20.48		
1.4	QPSK	6	0	19.31	19.54	19.59	20	1
1.4	16QAM	1	0	19.64	19.58	19.56		
1.4	16QAM	1	3	19.75	19.92	19.56		
1.4	16QAM	1	5	19.73	19.71	19.62		
1.4	16QAM	3	0	19.43	19.59	19.48		
1.4	16QAM	3	1	19.62	19.70	19.52		
1.4	16QAM	3	3	19.40	19.84	19.75		
1.4	16QAM	6	0	18.69	18.69	18.30	19	2
1.4	64QAM	1	0	18.68	18.74	18.41		
1.4	64QAM	1	3	18.61	18.87	18.59		
1.4	64QAM	1	5	18.61	18.65	18.64		
1.4	64QAM	3	0	18.58	18.59	18.60		
1.4	64QAM	3	1	18.75	18.65	18.49		
1.4	64QAM	3	3	18.50	18.71	18.64		
1.4	64QAM	6	0	17.60	17.55	17.38	18	3

Band 13(700MHz Band)
Part 27F

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								
Frequency (MHz)								
762								
10	QPSK	1	0	20.93				
10	QPSK	1	25	20.89				
10	QPSK	1	49	20.71				
10	QPSK	25	0	19.90				
10	QPSK	25	12	19.89				
10	QPSK	25	25	19.79				
10	QPSK	50	0	19.83				
10	16QAM	1	0	19.86				
10	16QAM	1	25	19.88				
10	16QAM	1	49	19.44				
10	16QAM	25	0	18.87				
10	16QAM	25	12	18.82				
10	16QAM	25	25	18.83				
10	16QAM	50	0	18.85				
10	64QAM	1	0	18.00				
10	64QAM	1	25	18.55				
10	64QAM	1	49	18.61				
10	64QAM	25	0	18.58				
10	64QAM	25	12	18.62				
10	64QAM	25	25	18.63				
10	64QAM	50	0	18.65				
10	64QAM	50	12	18.71				
10	64QAM	50	25	18.72				
10	64QAM	50	0	18.73				
10	64QAM	12	0	18.92				
10	64QAM	12	7	18.83	18.87	18.62	19	2
10	64QAM	12	13	18.80	18.82	18.65		
10	64QAM	25	0	18.85	18.80	18.69		
10	64QAM	1	0	18.85	18.74	18.78		
10	64QAM	1	24	18.90	18.85	18.84	19	2
10	64QAM	12	0	17.71	17.77	17.69		
10	64QAM	12	7	17.94	17.85	17.72	18	3
10	64QAM	12	13	17.80	17.80	17.67		
10	64QAM	25	0	17.90	17.90	17.73		
Channel								
Frequency (MHz)								
762								
7	QPSK	1	0	20.86				
7	QPSK	1	25	20.73				
7	QPSK	1	49	20.71				
7	QPSK	25	0	19.93				
7	QPSK	25	12	19.89				
7	QPSK	25	25	19.74				
7	QPSK	50	0	19.86				
7	16QAM	1	0	19.86				
7	16QAM	1	25	19.81				
7	16QAM	1	49	19.77				
7	16QAM	25	0	19.84				
7	16QAM	25	12	19.79				
7	16QAM	25	25	19.75				
7	16QAM	50	0	19.88				



Band 25 (1900MHz Band) Part 24E										
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				26140	26340	26590				
Frequency (MHz)				1860	1880	1905				
20	QPSK	1	0	20.43	20.61	20.34		21	0	
20	QPSK	1	49	20.25	20.12	20.14				
20	QPSK	1	99	20.60	20.30	20.33				
20	QPSK	50	0	19.60	19.67	19.29				
20	QPSK	50	24	19.50	19.44	19.27		20	1	
20	QPSK	50	50	19.50	19.38	19.23				
20	QPSK	100	0	19.39	19.41	19.27				
20	16QAM	1	0	19.53	19.57	19.54				
20	16QAM	1	49	19.51	19.51	19.58		20	1	
20	16QAM	1	99	19.68	19.57	19.51				
20	16QAM	50	0	18.84	18.60	18.42				
20	16QAM	50	24	18.56	18.59	18.44		19	2	
20	16QAM	50	50	18.65	18.50	18.35				
20	16QAM	100	0	18.64	18.64	18.31				
20	64QAM	1	0	18.86	18.81	18.68				
20	64QAM	1	49	18.82	18.85	18.64		19	2	
20	64QAM	1	99	18.81	18.74	18.61				
20	64QAM	50	0	17.84	17.61	17.42				
20	64QAM	50	24	17.70	17.48	17.40		18	3	
20	64QAM	50	50	17.55	17.48	17.41				
20	64QAM	100	0	17.59	17.53	17.41				
Channel				26115	26340	26515	Tune-up limit (dBm)	MPR (dB)		
Frequency (MHz)				1857.5	1880	1907.5				
15	QPSK	1	0	20.51	20.43	20.34		21	0	
15	QPSK	1	37	20.43	20.28	20.21				
15	QPSK	1	74	20.31	20.40	20.25				
15	QPSK	36	0	19.68	19.45	19.29				
15	QPSK	36	39	19.44	19.38	19.19		20	1	
15	QPSK	75	0	19.50	19.41	19.19				
15	16QAM	1	0	19.55	19.57	19.51				
15	16QAM	1	37	19.79	19.63	19.33		20	1	
15	16QAM	1	74	19.58	19.76	19.48				
15	16QAM	36	0	18.69	18.59	18.42				
15	16QAM	36	39	18.77	18.60	18.40		19	2	
15	16QAM	75	0	18.60	18.49	18.31				
15	64QAM	1	0	18.83	18.63	18.69				
15	64QAM	1	37	18.98	18.74	18.67		19	2	
15	64QAM	1	74	18.93	18.67	18.50				
15	64QAM	36	0	17.79	17.63	17.35				
15	64QAM	36	20	17.77	17.57	17.35				
15	64QAM	36	39	17.65	17.47	17.30		18	3	
15	64QAM	75	0	17.58	17.46	17.29				
Channel				26090	26340	26540	Tune-up limit (dBm)	MPR (dB)		
Frequency (MHz)				1855	1880	1910				
10	QPSK	1	0	20.49	20.46	20.28				
10	QPSK	1	25	20.41	20.46	20.31		21	0	
10	QPSK	1	49	20.56	20.54	20.42				
10	QPSK	25	0	19.60	19.31	19.21				
10	QPSK	25	12	19.63	19.38	19.16				
10	QPSK	25	25	19.59	19.35	19.15		20	1	
10	QPSK	50	0	19.56	19.44	19.07				
10	16QAM	1	0	19.61	19.76	19.57				
10	16QAM	1	25	19.74	19.56	19.49		20	1	
10	16QAM	1	49	19.99	19.58	19.51				
10	16QAM	25	0	18.61	18.48	18.33				
10	16QAM	25	12	18.61	18.48	18.33		19	2	
10	16QAM	25	25	18.79	18.49	18.30				
10	16QAM	50	0	18.74	18.53	18.26				
10	64QAM	1	0	18.89	18.80	18.87				
10	64QAM	1	25	18.83	18.83	18.81		19	2	
10	64QAM	1	49	18.85	18.88	18.85				
10	64QAM	25	0	17.71	17.50	17.25				
10	64QAM	25	12	17.61	17.58	17.22		18	3	
10	64QAM	25	25	17.66	17.55	17.27				
10	64QAM	50	0	17.75	17.50	17.28				
Channel				26065	26340	26665	Tune-up limit (dBm)	MPR (dB)		
Frequency (MHz)				1852.5	1880	1912.5				
5	QPSK	1	0	20.54	20.46	20.28				
5	QPSK	1	12	20.41	20.46	20.31		21	0	
5	QPSK	1	24	20.55	20.54	20.42				
5	QPSK	12	0	19.60	19.31	19.21				
5	QPSK	12	7	19.63	19.38	19.18				
5	QPSK	12	13	19.59	19.35	19.14		20	1	
5	QPSK	25	0	19.56	19.44	19.07				
5	16QAM	1	0	19.61	19.76	19.57				
5	16QAM	1	12	19.74	19.56	19.49		20	1	
5	16QAM	1	24	19.99	19.58	19.51				
5	16QAM	12	0	18.74	18.48	18.38				
5	16QAM	12	7	18.61	18.48	18.30		19	2	
5	16QAM	12	13	18.79	18.49	18.35				
5	16QAM	25	0	18.74	18.53	18.26				
5	64QAM	1	0	18.87	18.80	18.87				
5	64QAM	1	12	18.83	18.83	18.81		19	2	
5	64QAM	1	24	18.85	18.86	18.85				
5	64QAM	12	0	17.71	17.50	17.25				
5	64QAM	12	7	17.61	17.58	17.22		18	3	
5	64QAM	12	13	17.66	17.55	17.27				
5	64QAM	25	0	17.75	17.50	17.28				
Channel				26055	26340	26675	Tune-up limit (dBm)	MPR (dB)		
Frequency (MHz)				1851.5	1880	1913.5				
3	QPSK	1	0	20.53	20.41	20.37				
3	QPSK	1	8	20.51	20.32	20.41		21	0	
3	QPSK	1	14	20.47	20.38	20.29				
3	QPSK	8	0	19.56	19.33	19.22				
3	QPSK	8	4	19.63	19.35	19.15				
3	QPSK	8	7	19.49	19.32	19.21		20	1	
3	QPSK	15	0	19.53	19.32	19.21				
3	16QAM	1	0	19.87	19.83	19.67				
3	16QAM	1	8	19.71	19.69	19.81		20	1	
3	16QAM	1	14	19.77	19.89	19.49				
3	16QAM	8	0	18.66	18.41	18.28				
3	16QAM	8	4	18.73	18.52	18.27		19	2	
3	16QAM	8	7	18.64	18.42	18.26				
3	16QAM	15	0	18.67	18.57	18.25				
3	64QAM	1	0	18.85	18.69	18.61				
3	64QAM	1	14	18.63	18.56	18.59				
3	64QAM	8	0	17.78	17.65	17.40				
3	64QAM	8	4	17.73	17.55	17.38				
3	64QAM	8	7	17.72	17.57	17.46		18	3	
3	64QAM	15	0	17.84	17.49	17.23				



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)		2590		2595	2610					
20	QPSK	1	0	17.19	17.46	17.23	18.5	0		
20	QPSK	1	49	17.33	17.33	17.38				
20	QPSK	1	99	17.38	17.39	17.22				
20	QPSK	50	0	16.30	16.41	16.42				
20	QPSK	50	24	16.34	16.43	16.42				
20	QPSK	50	50	16.31	16.49	16.41				
20	QPSK	100	0	16.32	16.42	16.40				
20	16QAM	1	0	16.24	16.25	16.25				
20	16QAM	1	49	16.26	16.39	16.44				
20	16QAM	1	99	16.29	16.39	16.19				
20	16QAM	50	0	15.35	15.44	15.44	17.5	1		
20	16QAM	50	24	15.32	15.48	15.50				
20	16QAM	50	50	15.24	15.54	15.43				
20	16QAM	100	0	15.34	15.46	15.45				
20	64QAM	1	0	16.09	16.08	16.07				
20	64QAM	1	49	16.07	16.20	16.20				
20	64QAM	1	99	16.11	16.22	16.02				
20	64QAM	50	0	15.38	15.46	15.33				
20	64QAM	50	24	15.33	15.49	15.34				
20	64QAM	50	50	15.29	15.44	15.49				
20	64QAM	100	0	15.31	15.47	15.30				
Channel		37825		38000	38175					
Frequency (MHz)		2577.5		2595	2612.5					
15	QPSK	1	0	17.38	17.44	17.42	18.5	0		
15	QPSK	1	37	17.37	17.18	17.41				
15	QPSK	1	74	17.45	17.43	17.42				
15	QPSK	36	0	16.41	16.31	16.27				
15	QPSK	36	20	16.45	16.34	16.34				
15	QPSK	36	39	16.38	16.29	16.30				
15	QPSK	75	0	16.22	16.32	16.31				
15	16QAM	1	0	16.27	16.30	16.27				
15	16QAM	1	37	16.24	16.32	16.34				
15	16QAM	1	74	16.28	16.28	16.30				
15	16QAM	36	0	15.10	15.24	15.27	17.5	1		
15	16QAM	36	20	15.10	15.26	15.29				
15	16QAM	36	39	15.05	15.37	15.31				
15	16QAM	75	0	15.05	15.29	15.34				
15	64QAM	1	0	15.87	15.99	15.96				
15	64QAM	1	37	15.85	16.04	16.04				
15	64QAM	1	74	15.98	16.02	16.04				
15	64QAM	36	0	15.25	15.15	15.22				
15	64QAM	36	20	15.23	15.22	15.22				
15	64QAM	36	39	15.22	15.24	15.15				
15	64QAM	75	0	15.17	15.19	15.23				
Channel		37800		38000	38200					
Frequency (MHz)		2575		2595	2615					
10	QPSK	1	0	17.41	17.42	17.45	18.5	0		
10	QPSK	1	25	17.18	17.41	17.32				
10	QPSK	1	49	17.43	17.42	17.41				
10	QPSK	25	0	16.31	16.27	16.32				
10	QPSK	25	12	16.34	16.34	16.48				
10	QPSK	25	25	16.25	16.29	16.30				
10	QPSK	50	0	16.32	16.31	16.38				
10	16QAM	1	0	16.20	16.27	16.23				
10	16QAM	1	25	16.32	16.34	16.38				
10	16QAM	1	49	16.28	16.30	16.30				
10	16QAM	25	0	15.24	15.27	15.37	17.5	1		
10	16QAM	25	12	15.26	15.29	15.53				
10	16QAM	25	25	15.37	15.31	15.46				
10	16QAM	50	0	15.29	15.34	15.42				
10	64QAM	1	0	15.99	15.98	16.04				
10	64QAM	1	25	16.04	16.04	16.19				
10	64QAM	1	49	16.02	16.04	16.13				
10	64QAM	25	0	15.15	15.22	15.31				
10	64QAM	25	12	15.22	15.22	15.37				
10	64QAM	25	25	15.24	15.15	15.41				
10	64QAM	50	0	15.19	15.23	15.36				
Channel		37775		38000	38225					
Frequency (MHz)		2672.5		2595	2617.5					
5	QPSK	1	0	16.92	17.08	17.24	18.5	0		
5	QPSK	1	12	16.92	17.11	17.08				
5	QPSK	1	24	16.87	17.06	17.23				
5	QPSK	12	0	15.97	16.23	16.33				
5	QPSK	12	7	16.01	16.18	16.18				
5	QPSK	12	13	15.95	16.25	16.28				
5	QPSK	25	0	15.95	15.97	16.37				
5	16QAM	1	0	16.08	16.08	16.22				
5	16QAM	1	12	16.14	16.14	16.07				
5	16QAM	1	24	16.04	16.01	16.46				
5	16QAM	12	0	15.04	15.07	15.22	17.5	1		
5	16QAM	12	7	15.05	15.09	15.23				
5	16QAM	12	13	15.00	15.07	15.19				
5	16QAM	25	0	15.11	15.06	15.34				
5	64QAM	1	0	15.87	16.12	16.11				
5	64QAM	1	12	15.84	16.14	15.84				
5	64QAM	1	24	15.81	16.11	16.00				
5	64QAM	12	0	15.07	15.00	15.15				
5	64QAM	12	7	15.09	15.02	15.20				
5	64QAM	12	13	15.04	15.01	15.11				
5	64QAM	25	0	15.07	15.11	15.14				
Channel		37775		38000	38225					
Frequency (MHz)		2672.5		2595	2617.5					

Band 41 (2.6G Band)										
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		39750		40185	40620	41068	41515			
Frequency (MHz)		2505		2549.5	2593	2639	2682.5			
20</td										



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2CA DL

Configure	CA List	PCC							SCC				Power		
		LTE	BW	UL	UL	Mod.	UL#	UL	LTE	BW	DL	DL	With CA	Without CA	
		Band	(MHz)	Freq. (MHz)	Channel		RB	RB	Band	(MHz)	Freq. (MHz)	Channel	Tx. Power (dBm)	Tx. Power (dBm)	
Inter-Band	CA_2A-4A	Band 2	20M	1880	18900	QPSK	1	0	Band 4	20M	2132.5	2175	23.10	23.13	
	CA_2A-5A	Band 4	20M	1732.5	20175	QPSK	1	0	Band 2	20M	1960	900	23.67	23.98	
	CA_2A-12A	Band 2	20M	1880	18900	QPSK	1	0	Band 5	10M	881.5	2525	23.01	23.13	
	CA_2A-13A	Band 5	10M	836.5	20525	QPSK	1	0	Band 2	20M	1960	900	23.10	23.32	
	CA_2A-29A	Band 2	20M	1880	18900	QPSK	1	0	Band 12	10M	707.5	5095	23.09	23.13	
	CA_4A-5A	Band 12	10M	707.5	23095	QPSK	1	0	Band 2	20M	1960	900	23.32	23.40	
	CA_4A-12A	Band 2	20M	1880	18900	QPSK	1	0	Band 13	10M	751	5230	23.03	23.13	
	CA_4A-13A	Band 13	10M	782	23230	QPSK	1	0	Band 2	20M	1960	900	23.22	23.42	
	CA_4A-29A	Band 2	20M	1880	18900	QPSK	1	0	Band 29	10M	722.5	9715	23.10	23.13	
	CA_5A-7A	Band 4	20M	1732.5	20175	QPSK	1	0	Band 4	20M	2132.5	2175	23.11	23.32	
Intra-Band	CA_2C	Band 5	10M	836.5	20525	QPSK	1	0	Band 4	20M	2132.5	2175	23.91	23.98	
	CA_7B	Band 4	20M	1732.5	20175	QPSK	1	0	Band 12	10M	737.5	5095	23.22	23.40	
	CA_2A-2A	Band 12	10M	707.5	23095	QPSK	1	0	Band 4	20M	2132.5	2175	23.22	23.40	
	CA_4A-4A	Band 4	20M	1732.5	20175	QPSK	1	0	Band 13	10M	751	5230	23.90	23.98	
	CA_4A-41A	Band 13	10M	782	23230	QPSK	1	0	Band 4	20M	2132.5	2175	23.22	23.42	
	CA_41A-41A	Band 4	20M	1732.5	20175	QPSK	1	0	Band 29	10M	722.5	9715	23.91	23.98	
	CA_5A-7A	Band 5	10M	836.5	20525	QPSK	1	0	Band 7	20M	2655	3100	23.22	23.32	
	CA_7C	Band 7	20M	2535	21100	QPSK	1	0	Band 5	10M	881.5	2525	22.89	23.04	
	CA_41C	Band 2	20M	1880	18900	QPSK	1	0	Band 2	20M	1979.8	1098	23.23	23.13	
	CA_7A-7A	Band 7	15M	2535	21100	QPSK	1	0	Band 7	5M	2664.3	3193	22.67	22.79	
Contiguous	CA_41A-41A	Band 7	20M	2535	21100	QPSK	1	0	Band 7	20M	2674.8	3298	23.00	23.04	
	CA_7A-7A	Band 41	20M	2593	40620	QPSK	1	0	Band 41	20M	2612.8	40818	23.01	23.24	
	CA_41A-41A	CA_2A-2A	Band 2	20M	1880	18900	QPSK	1	0	Band 2	5M	1987.5	1175	23.20	23.13
	CA_41A-41A	CA_4A-4A	Band 4	20M	1732.5	20175	QPSK	1	0	Band 4	5M	2152.5	2375	23.80	23.98
	CA_41A-41A	CA_7A-7A	Band 7	20M	2535	21100	QPSK	1	0	Band 7	5M	2687.5	3425	23.01	23.04
Non-Contiguous	CA_41A-41A	CA_41A-41A	Band 41	20M	2593	40620	QPSK	1	0	Band 41	5M	2687.5	41565	23.32	23.24



2.4GHz WLAN					
Ant 1					
Mode	Channel	Frequency (MHz)	Average power (dBm)	Turn-Up Limit	Duty Cycle %
802.11b 8Mbps	1	2412	15.36	15.50	
	6	2437	15.25	15.50	100.00
	11	2462	14.94	15.50	
	1	2412	14.45	15.50	
	6	2437	14.35	15.50	95.64
	11	2462	14.44	15.50	
	1	2412	12.51	13.00	
	6	2437	14.57	15.00	95.34
	11	2462	10.84	11.00	

2.4GHz WLAN					
Ant 2					
Mode	Channel	Frequency (MHz)	Average power (dBm)	Turn-Up Limit	Duty Cycle %
802.11b 8Mbps	1	2412	15.26	15.50	
	6	2437	15.33	15.50	100.00
	11	2462	15.08	15.50	
	1	2412	15.00	15.50	
	6	2437	15.21	15.50	95.64
	11	2462	15.05	15.50	
	1	2412	12.20	13.00	
	6	2437	14.69	15.00	95.32
	11	2462	10.43	11.00	

2.4GHz WLAN					
Ant 1+2					
Mode	Channel	Frequency (MHz)	Average power (dBm)	Turn-Up Limit	Duty Cycle %
802.11b 8Mbps	1	2412	18.32	18.50	
	6	2437	18.35	18.50	100.00
	11	2462	18.02	18.50	
	1	2412	17.20	18.50	
	6	2437	18.77	18.50	95.64
	11	2462	18.17	18.50	
	1	2412	15.28	16.00	
	6	2437	17.84	18.00	95.34
	11	2462	10.43	14.00	

5GHz WLAN					
Ant 1					
Mode	Channel	Frequency (MHz)	Average power (dBm)	Turn-Up Limit	Duty Cycle %
802.11n HT20 MC50	36	5180	11.80	13.00	
	40	5200	11.90	13.00	96.82
	44	5220	12.00	13.00	
	48	5240	12.07	13.00	
	36	5180	11.86	13.00	
	40	5200	11.77	13.00	95.68
	44	5220	11.91	13.00	
	48	5240	11.98	13.00	
	36	5180	12.06	13.00	92.91
	40	5200	11.91	13.00	
802.11n HT40 MC50	36	5180	10.13	10.50	
	40	5200	12.06	13.00	95.36
	44	5220	12.06	13.00	
	48	5240	12.06	13.00	
	36	5190	10.13	10.50	
	40	5200	13.00	13.00	92.31
	44	5220	13.00	13.00	
	48	5240	13.00	13.00	
	36	5190	3.48	3.50	85.79
	40	5210	3.48	3.50	

5GHz WLAN					
Ant 2					
Mode	Channel	Frequency (MHz)	Average power (dBm)	Turn-Up Limit	Duty Cycle %
802.11n HT40 MC50	36	5180	11.81	13.00	
	40	5200	11.89	13.00	95.98
	44	5220	12.01	13.00	
	48	5240	11.90	13.00	
	36	5180	11.80	13.00	
	40	5200	11.84	13.00	95.00
	44	5220	11.85	13.00	
	48	5240	11.80	13.00	
	36	5180	11.81	13.00	95.36
	40	5200	11.86	13.00	
802.11n HT80 MC50	44	5220	12.04	13.00	91.61
	36	5180	11.81	13.00	
	40	5200	11.94	13.00	
	44	5220	11.91	13.00	
	48	5240	11.91	13.00	
	36	5190	9.92	10.50	
	40	5200	12.99	13.00	91.61
	44	5220	12.99	13.00	
	48	5240	12.99	13.00	
	42	5210	2.68	3.50	88.25

5GHz WLAN					
Ant 1+2					
Mode	Channel	Frequency (MHz)	Average power (dBm)	Turn-Up Limit	Duty Cycle %
802.11a 8Mbps	52	5260	11.82	13.00	
	56	5280	11.87	13.00	95.98
	60	5300	12.00	13.00	
	64	5320	11.86	13.00	
	52	5260	11.87	13.00	
	56	5280	11.66	13.00	95.68
	60	5300	11.44	13.00	
	64	5320	11.41	13.00	
	52	5270	12.68	13.00	92.91
	56	5310	5.85	6.00	
802.11ac VHT20 MC50	52	5260	11.82	13.00	
	56	5280	11.82	13.00	
	60	5300	11.69	13.00	95.36
	64	5320	11.69	13.00	
	52	5260	11.82	13.00	
	56	5280	11.69	13.00	
	60	5300	11.50	13.00	92.91
	64	5320	11.50	13.00	
	52	5270	10.78	11.50	
	56	5310	5.83	6.00	92.31
802.11ac VHT40 MC50	100	5500	10.88	11.50	
	116	5540	10.75	11.50	96.82
	124	5620	10.75	11.50	
	132	5690	10.70	11.50	
	140	5700	10.75	11.50	
	144	5720	10.91	11.50	
	100	5500	10.61	11.50	
	116	5580	10.84	11.50	
	124	5620	10.60	11.50	95.68
	132	5690	10.70	11.50	
802.11ac VHT20 MC50	100	5500	10.86	11.50	
	116	5580	10.84	11.50	
	124	5620	10.80	11.50	
	132	5690	10.83	11.50	
	140	5700	10.84	11.50	
	144	5720	10.84	11.50	
	102	5510	9.57	10.00	
	110	5580	10.10	11.50	
	126	5630	10.00	11.50	91.61
	134	5670	9.98	11.50	
802.11ac VHT40 MC50	102	5510	9.57	10.00	
	110	5580	10.10	11.50	
	126	5630	10.20	11.50	
	134	5670	9.98	11.50	
	140	5700	11.02	11.50	
	144	5720	11.05	11.50	
	102	5510	9.54	10.00	
	110	5560	10.13	11.50	
	126	5630	10.20	11.50	91.61
	134	5670	9.98	11.50	
802.11ac VHT80 MC50	106	5630	7.95	8.00	
	122	5610	10.12	11.00	88.25
	138	5690	9.98	11.00	
	144	5745	12.76	13.00	
	150	5755	12.76	13.00	
	156	5765	12.76	13.00	
	162	5775	12.76	13.00	
	168	5785	12.76	13.00	
	174	5795	12.76	13.00	
	180	5805	12.76	13.00	
802.11ac VHT40 MC50	149	5745	12.84	13.00	
	157	5785	12.85	13.00	95.98
	165	5825	12.86	13.00	
	173	5865	12.86	13.00	
	181	5905	12.86	13.00	
	189	5945	12.86	13.00	
	197	5985	12.86	13.00	
	205	6025	12.86	13.00	
	213	6065	12.86	13.00	
	221	6105	12.86	13.00	
802.11ac VHT80 MC50	149	5745	15.33	16.00	
	157	5785	15.33	16.00	
	165	5825	15.33	16.00	
	173	5865	15.33	16.00	
	181	5905	15.33	16.00	
	189	5945	15.33	16.00	
	197	5985	15.33	16.00	
	205	6025	15.33	16.00	95.36
	213	6065	15.33	16.00	