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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.8Ω+ 0.34jΩ
Return Loss	- 34.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.123 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

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DASY5 Validation Report for Head TSL Date: 10.19.2021

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; σ = 1.382 S/m; ε_r = 39.76; ρ = 1000 kg/m^3

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7517; ConvF(8.22, 8.22, 8.22) @ 1750 MHz; Calibrated: 2021-02-03
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2021-01-15
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 97.97 V/m; Power Drift = -0.01 dB

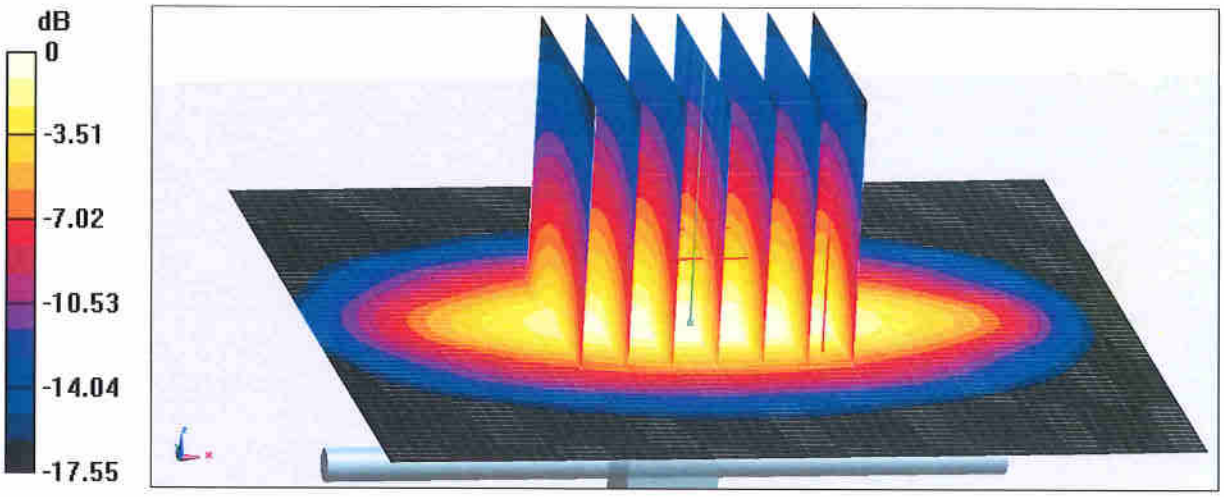
Peak SAR (extrapolated) = 17.3 W/kg

SAR(1 g) = 9.2 W/kg; SAR(10 g) = 4.83 W/kg

Smallest distance from peaks to all points 3 dB below = 10 mm

Ratio of SAR at M2 to SAR at M1 = 53.1%

Maximum value of SAR (measured) = 14.3 W/kg



0 dB = 14.3 W/kg = 11.55 dBW/kg

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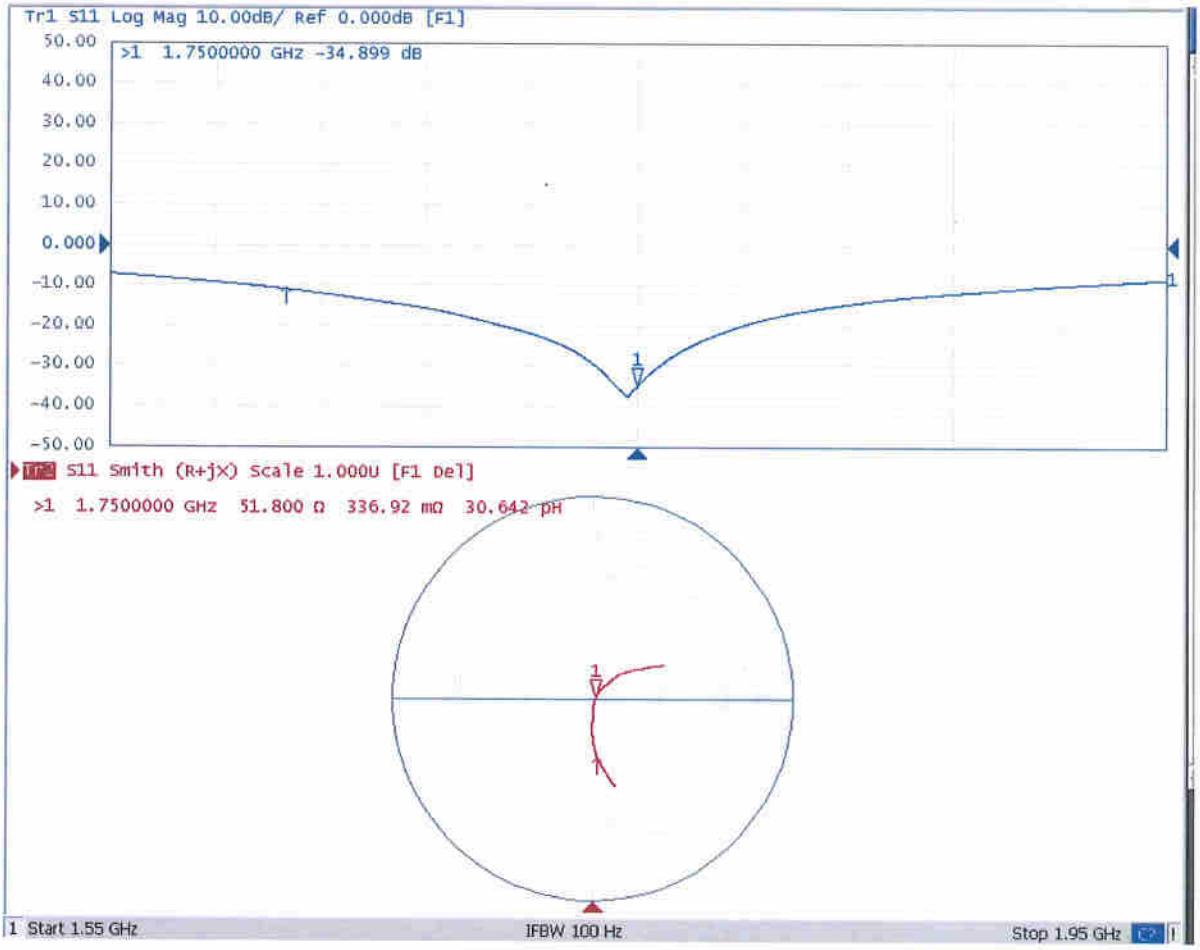
Impedance Measurement Plot for Head TSL



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Client **Sporton** **Certificate No: Z21-60553**

CALIBRATION CERTIFICATE

Object D1900V2 - SN: 5d182

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

Calibration date: December 20, 2021

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)℃ 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	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Power sensor NRP8S	104291	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Reference Probe EX3DV4	SN 7307	26-May-21(SPEAG,No.EX3-7307_May21)	May-22
DAE4	SN 1556	15-Jan-21(SPEAG,No.DAE4-1556_Jan21)	Jan-22
Secondary Standards	**ID #**	**Cal Date (Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	01-Feb-21 (CTTL, No.J21X00593)	Jan-22
NetworkAnalyzer E5071C	MY46110673	14-Jan-21 (CTTL, No.J21X00232)	Jan-22

	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 27, 2021

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lossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,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 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

c) 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

d) KDB865664, 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%.

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Measurement Conditions

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

DASY Version	DASY52	V52.10.4
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	39.4 ± 6 %	1.41 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	10.0 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**39.6 W/kg ± 18.8 % (*k*=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.07 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.2 W/kg ± 18.7 % (*k*=2)**

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.3Ω+ 6.57jΩ
Return Loss	- 22.5dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.112 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

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DASY5 Validation Report for Head TSL Date: 2021-12-20

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; σ = 1.414 S/m; ε_r = 39.36; ρ = 1000 kg/m^3

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7307; ConvF(8.32, 8.32, 8.32) @ 1900 MHz; Calibrated: 2021-05-26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2021-01-15
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 101.3 V/m; Power Drift = -0.01 dB

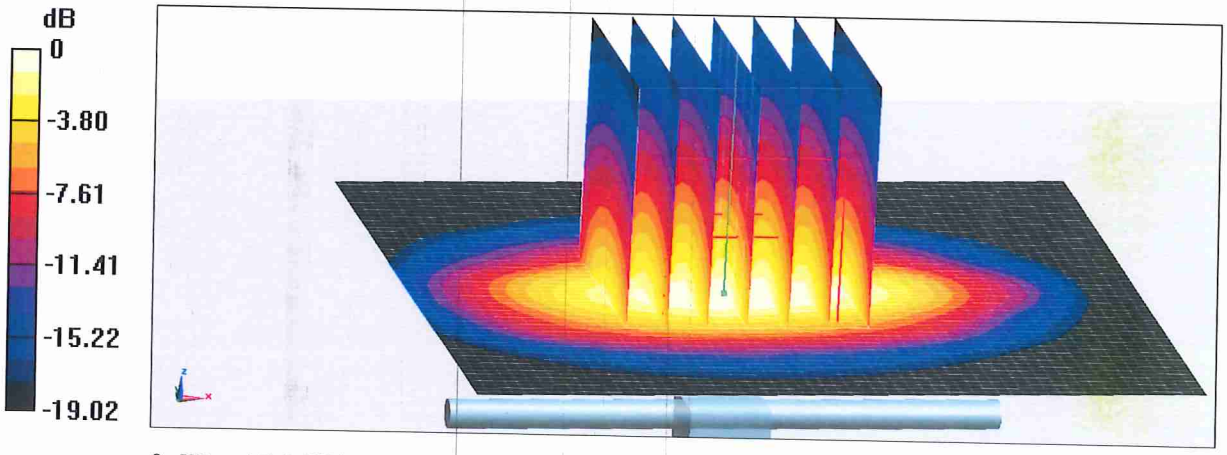
Peak SAR (extrapolated) = 19.6 W/kg

SAR(1 g) = 10 W/kg; SAR(10 g) = 5.07 W/kg

Smallest distance from peaks to all points 3 dB below = 10 mm

Ratio of SAR at M2 to SAR at M1 = 51%

Maximum value of SAR (measured) = 15.9 W/kg



0 dB = 15.9 W/kg = 12.01 dBW/kg

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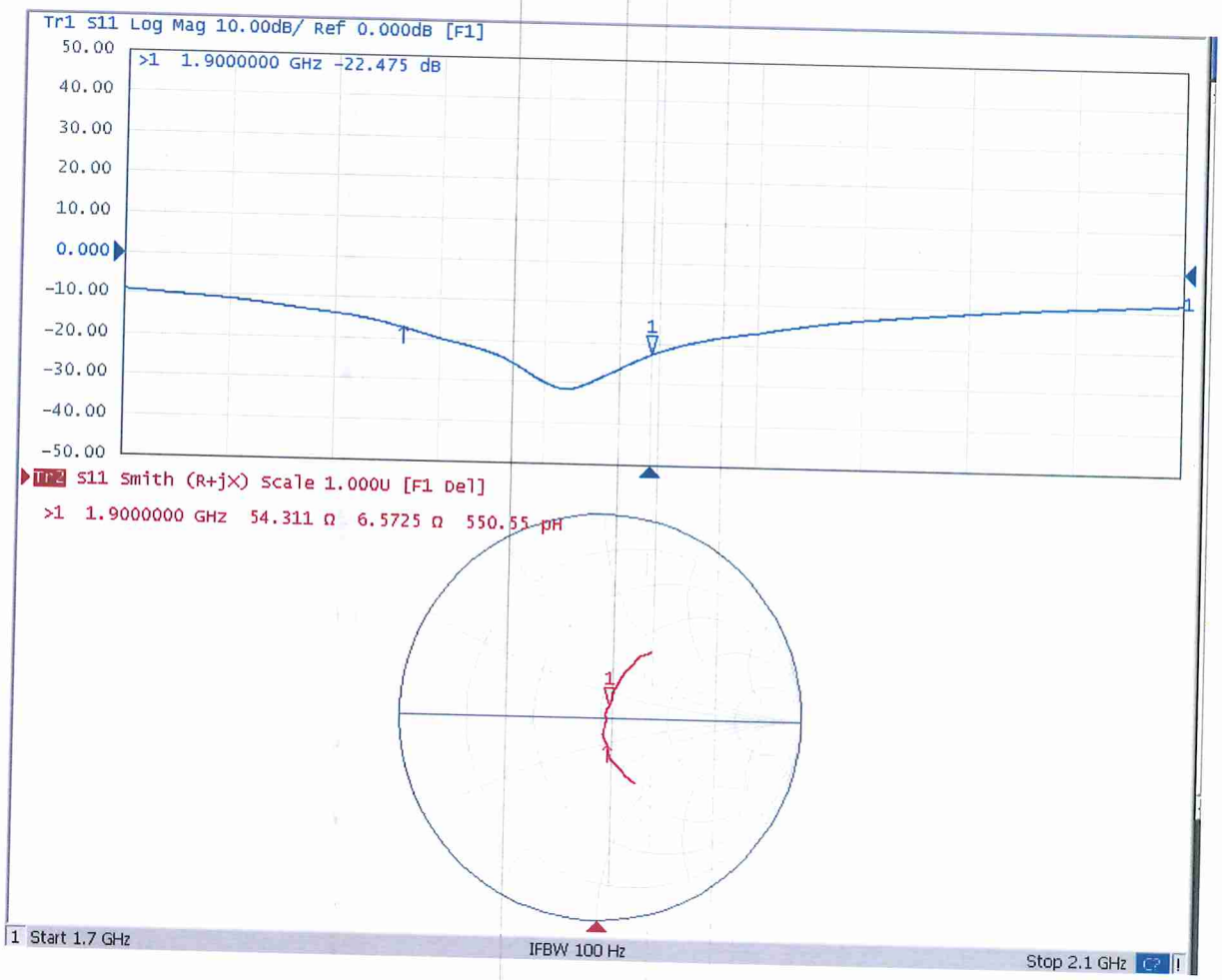
Impedance Measurement Plot for Head TSL



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Client : Sporton Certificate No: Z21-60491

CALIBRATION CERTIFICATE

Object	DAE4 - SN: 715
Calibration Procedure(s)	FF-Z11-002-01 Calibration Procedure for the Data Acquisition Electronics (DAEx)
Calibration date:	December 29, 2021

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)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Process Calibrator 753	1971018	15-Jun-21 (CTTL, No.J21X04465)	Jun-22

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

Issued: December 31, 2021

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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 report provide only calibration results for DAE, it does not contain other performance test results.

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DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV , 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	405.122 ± 0.15% (k=2)	404.671 ± 0.15% (k=2)	404.495 ± 0.15% (k=2)
Low Range	3.99094 ± 0.7% (k=2)	3.97897 ± 0.7% (k=2)	3.97797 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	330.5° ± 1 °

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

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: EX3-3819_Apr21

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3819

Calibration procedure(s): QA CAL-01.v9, QA CAL-14.v6, QA CAL-23.v5, QA CAL-25.v7
Calibration procedure for dosimetric E-field probes

Calibration date: April 30, 2021

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	09-Apr-21 (No. 217-03291/03292)	Apr-22
Power sensor NRP-Z91	SN: 103244	09-Apr-21 (No. 217-03291)	Apr-22
Power sensor NRP-Z91	SN: 103245	09-Apr-21 (No. 217-03292)	Apr-22
Reference 20 dB Attenuator	SN: CC2552 (20x)	09-Apr-21 (No. 217-03343)	Apr-22
DAE4	SN: 660	23-Dec-20 (No. DAE4-660_Dec20)	Dec-21
Reference Probe ES3DV2	SN: 3013	30-Dec-20 (No. ES3-3013_Dec20)	Dec-21
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-20)	In house check: Jun-22
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-21

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 4, 2021

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,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., ϑ = 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:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,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*.
- *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 Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 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 *NORMx,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 *NORMx* (no uncertainty required).

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3819

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.45	0.42	0.46	± 10.1 %
DCP (mV)[B]	103.3	99.8	104.5	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB$\sqrt{\mu V}$	C	D dB	VR mV	Max dev.	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	153.1	±3.3 %	± 4.7 %
		Y	0.0	0.0	1.0		150.1		
		Z	0.0	0.0	1.0		159.6		

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 E^2-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:3819

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-66.3
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

Note: Measurement distance from surface can be increased to 3-4 mm for an *Area Scan* job.

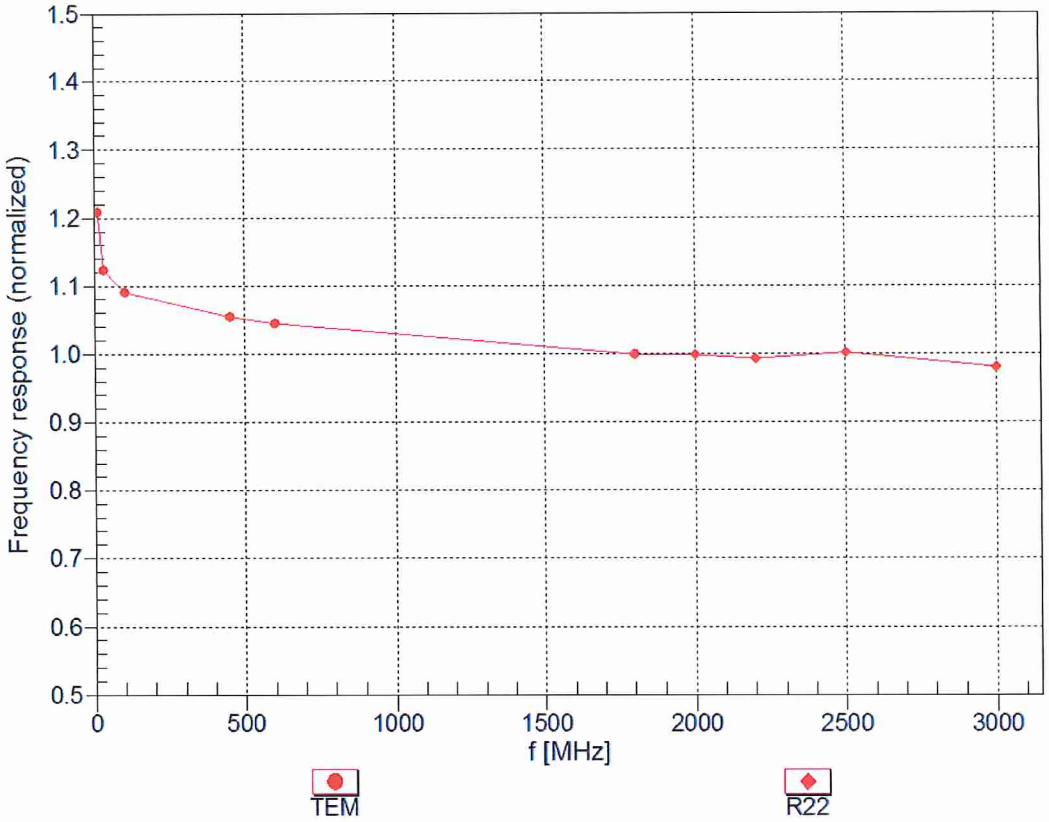
DASY/EASY - Parameters of Probe: EX3DV4 - SN:3819

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	9.79	9.79	9.79	0.52	0.80	± 12.0 %
835	41.5	0.90	9.57	9.57	9.57	0.44	0.80	± 12.0 %
900	41.5	0.97	9.50	9.50	9.50	0.47	0.82	± 12.0 %
1750	40.1	1.37	8.53	8.53	8.53	0.32	0.80	± 12.0 %
1900	40.0	1.40	8.24	8.24	8.24	0.28	0.80	± 12.0 %
2000	40.0	1.40	8.12	8.12	8.12	0.33	0.80	± 12.0 %
2300	39.5	1.67	7.72	7.72	7.72	0.32	0.90	± 12.0 %
2450	39.2	1.80	7.57	7.57	7.57	0.33	0.80	± 12.0 %
2600	39.0	1.96	7.33	7.33	7.33	0.31	0.91	± 12.0 %
3300	38.2	2.71	6.91	6.91	6.91	0.20	1.20	± 14.0 %
3500	37.9	2.91	6.77	6.77	6.77	0.25	1.20	± 14.0 %
3700	37.7	3.12	6.74	6.74	6.74	0.25	1.25	± 14.0 %
3900	37.5	3.32	6.48	6.48	6.48	0.30	1.60	± 14.0 %
4100	37.2	3.53	6.33	6.33	6.33	0.30	1.60	± 14.0 %
4400	36.9	3.84	6.12	6.12	6.12	0.30	1.60	± 14.0 %
4600	36.7	4.04	6.07	6.07	6.07	0.30	1.70	± 14.0 %
4800	36.4	4.25	5.90	5.90	5.90	0.45	1.80	± 14.0 %
4950	36.3	4.40	5.78	5.78	5.78	0.45	1.80	± 14.0 %
5250	35.9	4.71	5.02	5.02	5.02	0.40	1.80	± 14.0 %
5600	35.5	5.07	4.51	4.51	4.51	0.40	1.80	± 14.0 %
5750	35.4	5.22	4.62	4.62	4.62	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.

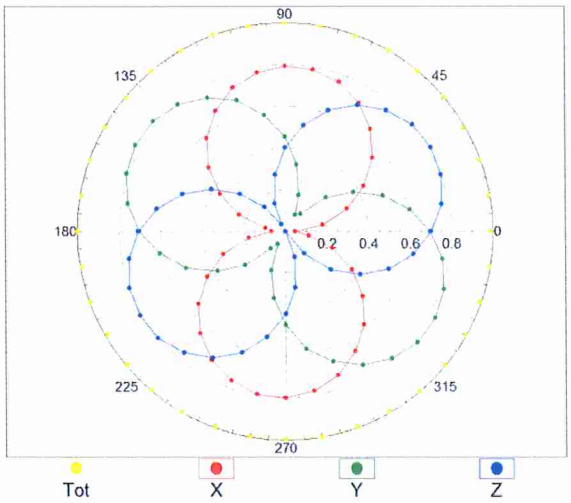
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



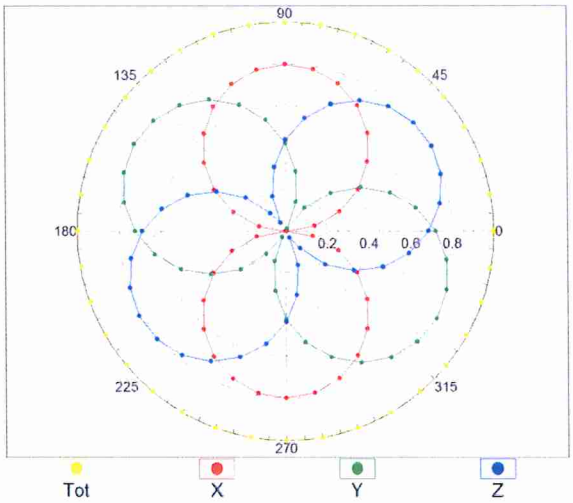
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

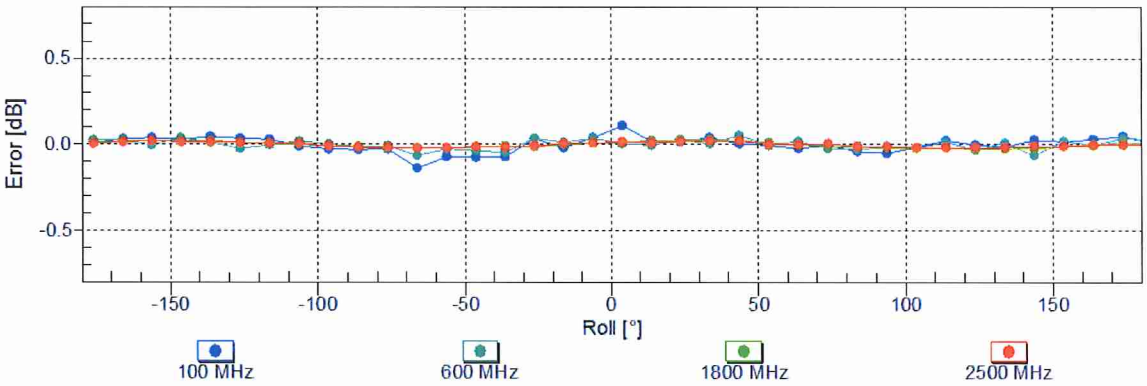
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



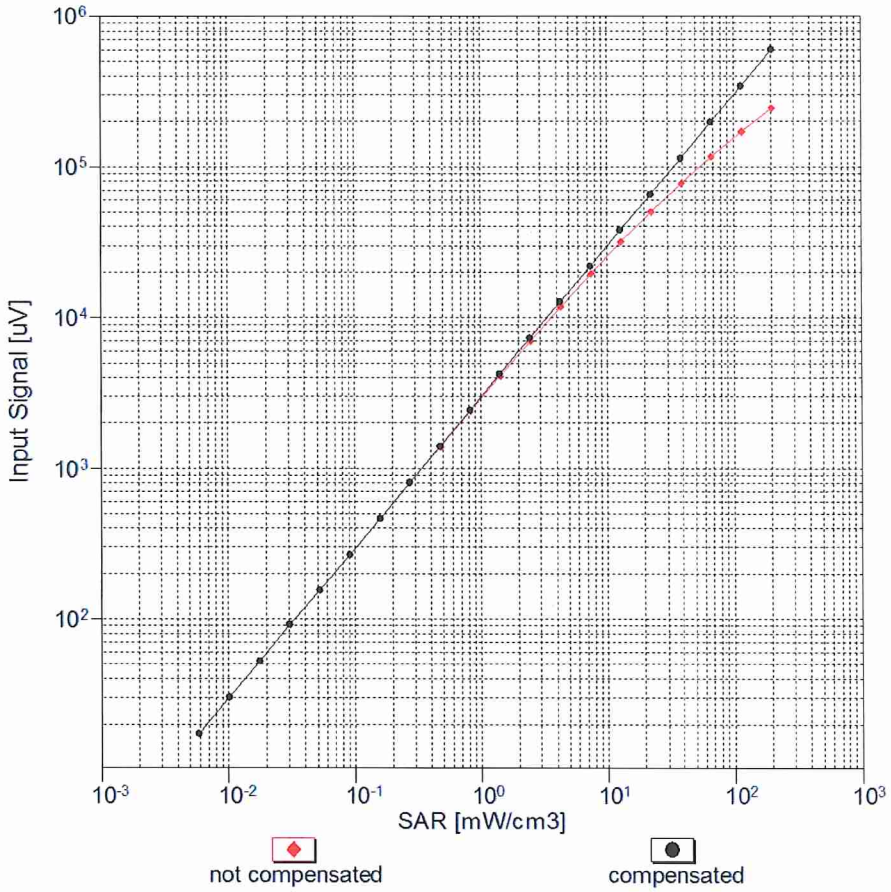
f=1800 MHz,R22

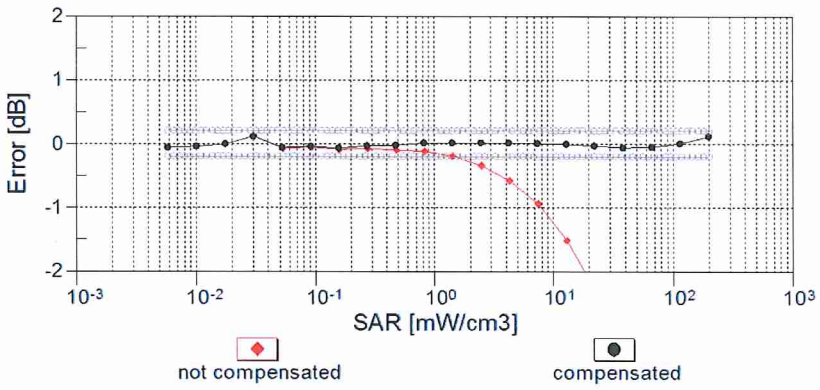




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

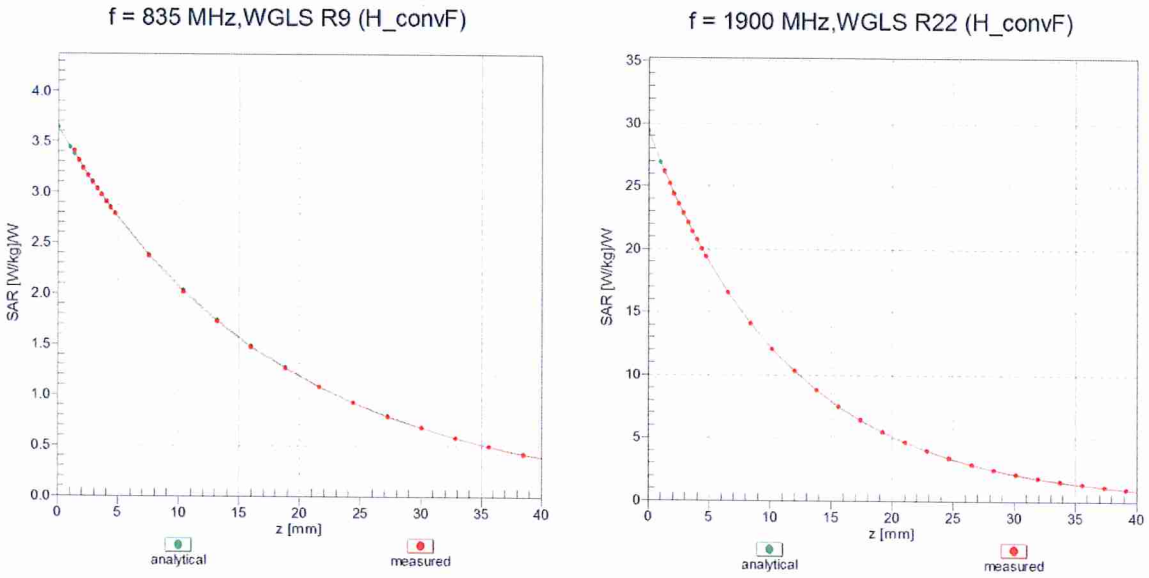
Dynamic Range f(SAR_{head})
(TEM cell , f_{eval}= 1900 MHz)





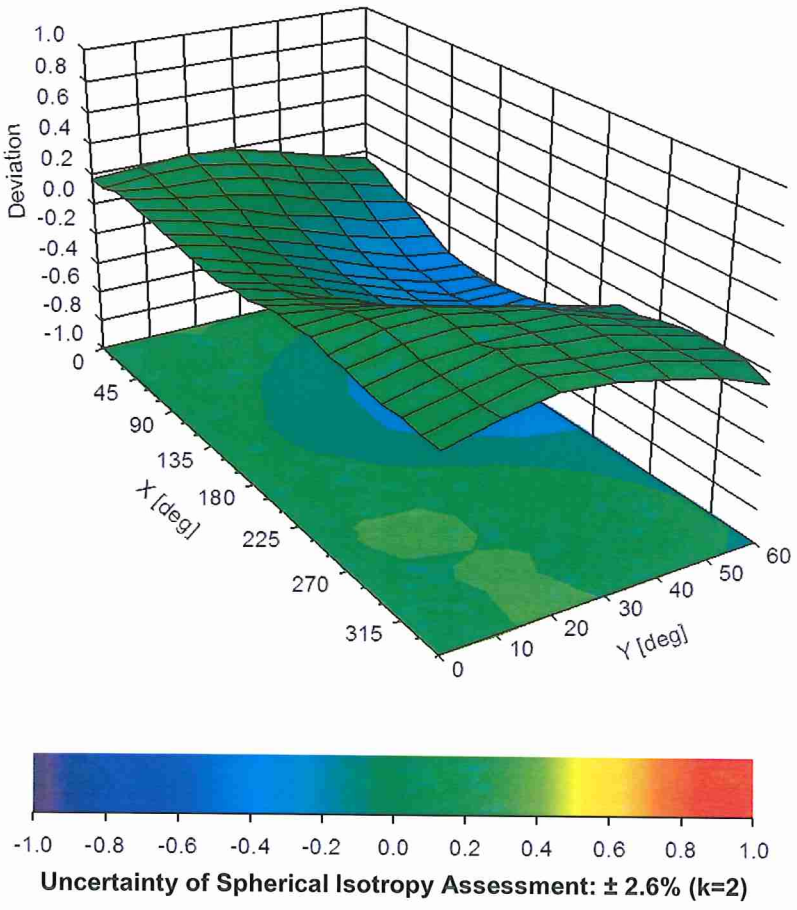
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Appendix E. Conducted RF Output Power Table

The detailed power tables are shown as follows.

Band		WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
TX Channel		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	836.4	846.6	
3GPP Rel 99	AMR 12.2Kbps	22.34	22.30	22.13	24.00	22.02	22.10	22.21	24.00	21.61	21.68	21.65	23.00
3GPP Rel 99	RMC 12.2Kbps	22.56	22.47	22.21	24.00	22.22	22.31	22.48	24.00	21.57	21.53	21.70	23.00
3GPP Rel 6	HSDPA Subtest-1	21.28	21.28	21.05	22.00	21.36	21.33	21.12	22.00	20.58	20.60	20.52	21.00
3GPP Rel 6	HSDPA Subtest-2	21.41	21.40	21.00	22.00	21.52	21.47	21.26	22.00	20.69	20.55	20.62	21.00
3GPP Rel 6	HSDPA Subtest-3	20.94	20.93	20.59	21.50	20.95	20.98	20.77	21.50	20.22	20.18	20.12	20.50
3GPP Rel 6	HSDPA Subtest-4	20.97	20.94	20.60	21.50	21.01	20.98	20.77	21.50	20.17	20.20	20.11	20.50
3GPP Rel 8	DC-HSDPA Subtest-1	21.30	21.33	21.07	22.00	21.40	21.35	21.10	22.00	20.60	20.55	20.50	21.00
3GPP Rel 8	DC-HSDPA Subtest-2	21.46	21.42	21.02	22.00	21.49	21.41	21.22	22.00	20.62	20.58	20.67	21.00
3GPP Rel 8	DC-HSDPA Subtest-3	20.96	20.98	20.64	21.50	20.96	20.90	20.75	21.50	20.16	20.20	20.16	20.50
3GPP Rel 8	DC-HSDPA Subtest-4	21.02	20.96	20.65	21.50	21.03	20.95	20.70	21.50	20.13	20.17	20.15	20.50
3GPP Rel 6	HSUPA Subtest-1	20.63	20.67	20.76	22.00	20.51	20.55	20.60	22.00	19.76	19.72	19.93	21.00
3GPP Rel 6	HSUPA Subtest-2	19.91	19.84	19.95	20.00	19.88	19.79	19.69	20.00	18.89	18.98	18.86	19.00
3GPP Rel 6	HSUPA Subtest-3	20.30	20.11	19.97	21.00	20.14	19.99	19.94	21.00	19.39	19.19	19.13	20.00
3GPP Rel 6	HSUPA Subtest-4	19.98	19.85	19.83	20.00	19.91	19.85	19.99	20.00	18.93	18.99	18.95	19.00
3GPP Rel 6	HSUPA Subtest-5	21.30	21.20	21.20	22.00	21.18	21.00	21.13	22.00	20.37	20.20	20.41	21.00

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				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	21.97	21.55	21.66		
20	QPSK	1	49	22.25	21.77	21.75	23	0
20	QPSK	1	99	21.39	21.37	21.32		
20	QPSK	50	0	21.11	20.88	20.75		
20	QPSK	50	24	20.92	20.78	20.72	22	1
20	QPSK	50	50	20.83	20.68	20.37		
20	QPSK	100	0	20.95	20.70	20.64		
20	16QAM	1	0	20.91	20.77	20.66		
20	16QAM	1	49	20.91	21.12	20.72	22	1
20	16QAM	1	99	20.51	20.45	20.41		
20	16QAM	50	0	20.06	19.76	19.94		
20	16QAM	50	24	19.88	19.86	19.89	21	2
20	16QAM	50	50	19.87	19.86	19.56		
20	16QAM	100	0	19.82	19.88	19.71		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	21.80	21.51	21.30		
15	QPSK	1	37	21.94	21.77	21.43	23	0
15	QPSK	1	74	21.57	21.32	21.10		
15	QPSK	36	0	20.86	20.57	20.46		
15	QPSK	36	20	20.81	20.57	20.46	22	1
15	QPSK	36	39	20.63	20.47	20.20		
15	QPSK	75	0	20.67	20.63	20.33		
15	16QAM	1	0	20.75	20.79	20.39		
15	16QAM	1	37	20.79	20.85	20.35	22	1
15	16QAM	1	74	20.42	20.79	20.10		
15	16QAM	36	0	19.81	19.65	19.55		
15	16QAM	36	20	19.69	19.71	19.47	21	2
15	16QAM	36	39	19.71	19.62	19.25		
15	16QAM	75	0	19.76	19.54	19.36		
Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	21.69	21.36	21.28		
10	QPSK	1	25	21.90	21.53	21.20	23	0
10	QPSK	1	49	21.58	21.15	21.06		
10	QPSK	25	0	20.70	20.61	20.34		
10	QPSK	25	12	20.76	20.51	20.39	22	1
10	QPSK	25	25	20.78	20.43	20.22		
10	QPSK	50	0	20.72	20.44	20.22		
10	16QAM	1	0	20.69	20.76	20.26		
10	16QAM	1	25	20.58	20.70	20.26	22	1
10	16QAM	1	49	20.93	20.34	20.03		
10	16QAM	25	0	19.91	19.62	19.52		
10	16QAM	25	12	19.82	19.62	19.57	21	2
10	16QAM	25	25	19.92	19.66	19.35		
10	16QAM	50	0	19.78	19.46	19.42		
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	21.54	21.42	21.36		
5	QPSK	1	12	21.64	21.60	21.43	23	0
5	QPSK	1	24	21.46	21.36	21.01		
5	QPSK	12	0	20.73	20.54	20.30		
5	QPSK	12	7	20.82	20.53	20.22	22	1
5	QPSK	12	13	20.83	20.52	20.19		
5	QPSK	25	0	20.79	20.52	20.25		
5	16QAM	1	0	20.46	20.37	20.06		
5	16QAM	1	12	20.49	20.44	20.15	22	1
5	16QAM	1	24	20.36	20.25	20.01		
5	16QAM	12	0	19.66	19.67	19.27		
5	16QAM	12	7	19.60	19.66	19.30	21	2
5	16QAM	12	13	19.71	19.58	19.30		
5	16QAM	25	0	19.69	19.68	19.33		
Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	21.61	21.39	21.23		
3	QPSK	1	8	21.56	21.50	21.29	23	0
3	QPSK	1	14	21.65	21.56	21.03		
3	QPSK	8	0	20.66	20.49	20.31		
3	QPSK	8	4	20.81	20.57	20.29	22	1
3	QPSK	8	7	20.67	20.54	20.26		
3	QPSK	15	0	20.70	20.43	20.27		
3	16QAM	1	0	20.54	20.43	20.04		
3	16QAM	1	8	20.39	20.83	20.05	22	1
3	16QAM	1	14	20.56	20.33	20.02		
3	16QAM	8	0	19.72	19.62	19.30		
3	16QAM	8	4	19.70	19.66	19.28	21	2
3	16QAM	8	7	19.80	19.67	19.16		
3	16QAM	15	0	19.52	19.43	19.03		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	21.55	21.45	21.45		
1.4	QPSK	1	3	21.81	21.55	21.35		
1.4	QPSK	1	5	21.53	21.51	21.63	23	0
1.4	QPSK	3	0	21.82	21.66	21.63		
1.4	QPSK	3	1	21.87	21.75	21.57		
1.4	QPSK	3	3	21.74	21.47	21.04		
1.4	QPSK	6	0	20.77	20.54	20.25	22	1
1.4	16QAM	1	0	20.76	20.61	20.24		
1.4	16QAM	1	3	20.50	21.05	20.19		
1.4	16QAM	1	5	20.57	20.75	20.57	22	1
1.4	16QAM	3	0	20.92	20.68	20.62		
1.4	16QAM	3	1	20.83	20.64	20.62		
1.4	16QAM	3	3	20.84	20.59	20.46		
1.4	16QAM	6	0	19.59	19.53	19.48	21	2

Band 4 (AWS Band)
Part 27L (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				20050	20175	20300		
Frequency (MHz)				1720	1732.5	1745		
20	QPSK	1	0	21.96	21.55	21.10		
20	QPSK	1	49	22.07	21.92	22.90	23.5	0
20	QPSK	1	99	21.01	21.27	22.88		
20	QPSK	50	0	21.00	20.94	21.90		
20	QPSK	50	24	20.83	20.75	21.48	22.5	1
20	QPSK	50	50	20.70	20.76	21.40		
20	QPSK	100	0	20.96	20.87	21.65		
20	16QAM	1	0	21.04	20.56	20.13		
20	16QAM	1	49	20.70	20.60	21.73	22.5	1
20	16QAM	1	99	20.02	20.58	21.87		
20	16QAM	50	0	19.97	19.74	20.48		
20	16QAM	50	24	19.70	19.81	20.51	21.5	2
20	16QAM	50	50	19.68	19.69	20.97		
20	16QAM	100	0	19.92	19.84	20.50		
Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	21.91	21.21	21.06		
15	QPSK	1	37	22.10	21.84	22.26	23.5	0
15	QPSK	1	74	21.26	21.48	21.91		
15	QPSK	36	0	21.09	20.86	21.08		
15	QPSK	36	20	20.80	20.63	21.22	22.5	1
15	QPSK	36	39	20.56	20.62	21.68		
15	QPSK	75	0	20.76	20.64	21.43		
15	16QAM	1	0	21.09	20.45	21.11		
15	16QAM	1	37	20.68	20.45	21.43	22.5	1
15	16QAM	1	74	20.53	20.50	21.30		
15	16QAM	36	0	19.78	19.53	19.92		
15	16QAM	36	20	19.69	19.65	20.21	21.5	2
15	16QAM	36	39	19.57	19.61	20.57		
15	16QAM	75	0	19.66	19.66	20.27		
Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	21.94	21.27	21.08		
10	QPSK	1	25	22.02	21.74	22.23	23.5	0
10	QPSK	1	49	21.38	21.54	21.90		
10	QPSK	25	0	20.90	21.44	21.08		
10	QPSK	25	12	20.78	20.50	21.23	22.5	1
10	QPSK	25	25	20.66	20.59	21.69		
10	QPSK	50	0	20.84	20.58	21.44		
10	16QAM	1	0	21.00	20.46	21.12		
10	16QAM	1	25	20.62	20.46	21.39	22.5	1
10	16QAM	1	49	20.54	20.41	21.32		
10	16QAM	25	0	19.98	19.52	19.92		
10	16QAM	25	12	19.68	19.52	20.21	21.5	2
10	16QAM	25	25	19.60	19.50	20.57		
10	16QAM	50	0	19.83	19.52	20.25		
Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	22.10	21.47	21.05		
5	QPSK	1	12	21.96	21.76	22.24	23.5	0
5	QPSK	1	24	21.60	21.74	21.90		
5	QPSK	12	0	21.03	20.61	21.06		
5	QPSK	12	7	21.06	20.51	21.23	22.5	1
5	QPSK	12	13	20.99	20.47	21.67		
5	QPSK	25	0	20.92	20.58	21.43		
5	16QAM	1	0	20.98	20.30	21.16		
5	16QAM	1	12	20.85	20.26	21.38	22.5	1
5	16QAM	1	24	20.45	20.41	21.30		
5	16QAM	12	0	19.97	19.44	19.93		
5	16QAM	12	7	19.89	19.32	20.21	21.5	2
5	16QAM	12	13	20.04	19.30	20.56		
5	16QAM	25	0	19.97	19.41	20.22		
Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	22.02	21.41	21.09		
3	QPSK	1	8	22.13	21.64	22.26	23.5	0
3	QPSK	1	14	21.91	21.64	21.90		
3	QPSK	8	0	21.08	20.71	21.06		
3	QPSK	8	4	21.00	20.61	21.27	22.5	1
3	QPSK	8	7	20.97	20.67	21.69		
3	QPSK	15	0	21.05	20.58	21.40		
3	16QAM	1	0	21.04	20.21	21.16		
3	16QAM	1	8	21.04	20.25	21.39	22.5	1
3	16QAM	1	14	20.79	20.36	21.33		
3	16QAM	8	0	20.09	19.56	19.92		
3	16QAM	8	4	20.11	19.70	20.17	21.5	2
3	16QAM	8	7	20.09	19.53	20.58		
3	16QAM	15	0	19.95	19.55	20.23		
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	21.96	21.39	21.04		
1.4	QPSK	1	3	22.11	21.58	22.21		
1.4	QPSK	1	5	21.87	21.57	21.88	23.5	0
1.4	QPSK	3	0	21.84	21.49	21.83		
1.4	QPSK	3	1	21.76	21.37	22.00		
1.4	QPSK	3	3	21.70	21.45	22.47		
1.4	QPSK	6	0	21.03	20.52	21.34	22.5	1
1.4	16QAM	1	0	20.98	20.18	21.11		
1.4	16QAM	1	3	20.98	20.18	21.33		
1.4	16QAM	1	5	20.75	20.30	21.29	22.5	1
1.4	16QAM	3	0	20.54	20.00	20.35		
1.4	16QAM	3	1	20.54	20.16	20.63		
1.4	16QAM	3	3	20.56	20.10	21.04		
1.4	16QAM	6	0	19.92	19.51	20.17	21.5	2

Band 5 (Celluar 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)
Channel				20450	20525	20600		
Frequency (MHz)				829	836.5	844		
10	QPSK	1	0	20.84	20.70	20.57	22	0
10	QPSK	1	25	20.69	20.93	20.60		
10	QPSK	1	49	20.85	21.00	20.67		
10	QPSK	25	0	19.72	20.04	19.91	21	1
10	QPSK	25	12	19.82	19.95	19.83		
10	QPSK	25	25	20.90	20.96	20.20		
10	QPSK	50	0	19.74	19.94	19.80		
10	16QAM	1	0	19.75	20.22	20.00	21	1
10	16QAM	1	25	19.40	19.94	19.79		
10	16QAM	1	49	19.05	19.99	19.64		
10	16QAM	25	0	18.80	18.95	19.13	20	2
10	16QAM	25	12	18.99	19.02	19.12		
10	16QAM	25	25	18.82	18.98	18.86		
10	16QAM	50	0	18.77	18.94	18.98		
Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	20.48	20.57	20.55	22	0
5	QPSK	1	12	20.60	20.87	20.85		
5	QPSK	1	24	20.23	20.76	20.47		
5	QPSK	12	0	19.53	19.65	19.74	21	1
5	QPSK	12	7	19.65	19.85	19.68		
5	QPSK	12	13	19.02	19.77	19.74		
5	QPSK	25	0	19.49	19.79	19.59		
5	16QAM	1	0	19.14	19.13	19.35	21	1
5	16QAM	1	12	19.21	19.42	19.12		
5	16QAM	1	24	19.20	19.29	19.42		
5	16QAM	12	0	18.45	18.49	18.64	20	2
5	16QAM	12	7	18.47	18.51	18.53		
5	16QAM	12	13	18.38	18.68	18.55		
5	16QAM	25	0	18.53	18.80	18.71		
Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	20.43	20.52	20.50	22	0
3	QPSK	1	8	20.55	20.82	20.80		
3	QPSK	1	14	20.18	20.71	20.42		
3	QPSK	8	0	19.48	19.60	19.69	21	1
3	QPSK	8	4	19.60	19.80	19.63		
3	QPSK	8	7	19.66	19.72	19.69		
3	QPSK	15	0	19.44	19.74	19.54		
3	16QAM	1	0	19.09	19.08	19.30	21	1
3	16QAM	1	8	19.16	19.37	19.07		
3	16QAM	1	14	19.15	19.24	19.37		
3	16QAM	8	0	18.40	18.44	18.59	20	2
3	16QAM	8	4	18.42	18.46	18.48		
3	16QAM	8	7	18.33	18.63	18.50		
3	16QAM	15	0	18.48	18.75	18.66		
Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	20.40	20.49	20.47	22	0
1.4	QPSK	1	3	20.52	20.79	20.77		
1.4	QPSK	1	5	20.15	20.68	20.39		
1.4	QPSK	3	0	20.95	20.98	20.97		
1.4	QPSK	3	1	20.99	20.94	20.95		
1.4	QPSK	3	3	20.91	20.91	20.90		
1.4	QPSK	6	0	19.41	19.71	19.51	21	1
1.4	16QAM	1	0	19.06	19.05	19.27	21	1
1.4	16QAM	1	3	19.13	19.34	19.04		
1.4	16QAM	1	5	19.12	19.21	19.34		
1.4	16QAM	3	0	20.37	20.41	20.56		
1.4	16QAM	3	1	20.39	20.43	20.45		
1.4	16QAM	3	3	20.30	20.60	20.47		
1.4	16QAM	6	0	18.45	18.72	18.63	20	2

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				23060	23095	23130		
Frequency (MHz)				704	707.5	711		
10	QPSK	1	0	21.18	21.25	20.88	22	0
10	QPSK	1	25	21.17	21.25	21.30		
10	QPSK	1	49	21.20	21.39	21.31		
10	QPSK	25	0	20.24	20.53	20.50	21	1
10	QPSK	25	12	20.11	20.37	20.36		
10	QPSK	25	25	20.19	20.27	20.26		
10	QPSK	50	0	20.07	20.42	20.41		
10	16QAM	1	0	20.11	19.82	19.75	21	1
10	16QAM	1	25	20.33	20.06	19.84		
10	16QAM	1	49	20.14	20.36	19.84		
10	16QAM	25	0	19.11	19.29	19.48	20	2
10	16QAM	25	12	19.19	19.33	19.64		
10	16QAM	25	25	19.36	19.47	19.35		
10	16QAM	50	0	19.13	19.42	19.53		
Channel				23035	23095	23155	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				701.5	707.5	713.5		
5	QPSK	1	0	21.19	21.00	21.07	22	0
5	QPSK	1	12	21.12	21.12	21.05		
5	QPSK	1	24	20.89	21.03	20.43		
5	QPSK	12	0	20.03	19.86	20.13	21	1
5	QPSK	12	7	20.01	20.06	20.05		
5	QPSK	12	13	20.09	20.13	19.96		
5	QPSK	25	0	20.00	19.90	19.84		
5	16QAM	1	0	19.88	19.67	19.91	21	1
5	16QAM	1	12	19.65	19.69	19.78		
5	16QAM	1	24	19.53	19.76	19.56		
5	16QAM	12	0	19.15	19.06	19.05	20	2
5	16QAM	12	7	19.03	19.12	19.01		
5	16QAM	12	13	19.19	19.09	18.86		
5	16QAM	25	0	19.24	19.03	19.08		
Channel				23025	23095	23165	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				700.5	707.5	714.5		
3	QPSK	1	0	21.22	20.97	21.02	22	0
3	QPSK	1	8	21.15	21.09	21.00		
3	QPSK	1	14	20.92	21.00	20.38		
3	QPSK	8	0	20.06	19.83	20.08	21	1
3	QPSK	8	4	20.04	20.03	20.00		
3	QPSK	8	7	20.12	20.10	19.91		
3	QPSK	15	0	20.03	19.87	19.79		
3	16QAM	1	0	19.91	19.64	19.86	21	1
3	16QAM	1	8	19.68	19.66	19.73		
3	16QAM	1	14	19.56	19.73	19.51		
3	16QAM	8	0	19.18	19.03	19.00	20	2
3	16QAM	8	4	19.06	19.09	18.96		
3	16QAM	8	7	19.22	19.06	18.81		
3	16QAM	15	0	19.27	19.00	19.03		
Channel				23017	23095	23173	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				699.7	707.5	715.3		
1.4	QPSK	1	0	21.26	20.99	21.08	22	0
1.4	QPSK	1	3	21.19	21.11	21.06		
1.4	QPSK	1	5	20.96	21.02	20.44		
1.4	QPSK	3	0	20.10	20.13	20.14		
1.4	QPSK	3	1	20.08	20.05	20.06		
1.4	QPSK	3	3	20.16	20.12	20.10		
1.4	QPSK	6	0	20.07	19.89	19.85	21	1
1.4	16QAM	1	0	19.95	19.66	19.92	21	1
1.4	16QAM	1	3	19.72	19.68	19.79		
1.4	16QAM	1	5	19.60	19.75	19.57		
1.4	16QAM	3	0	19.22	19.05	19.06		
1.4	16QAM	3	1	19.10	19.11	19.02		
1.4	16QAM	3	3	19.26	19.08	19.13		
1.4	16QAM	6	0	19.31	19.02	19.09	20	2

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					23230			
Frequency (MHz)					782			
10	QPSK	1	0		20.58		22	0
10	QPSK	1	25		20.58			
10	QPSK	1	49		20.81			
10	QPSK	25	0		19.83		21	1
10	QPSK	25	12		19.61			
10	QPSK	25	25		19.63			
10	QPSK	50	0		19.53			
10	16QAM	1	0		19.23		21	1
10	16QAM	1	25		19.09			
10	16QAM	1	49		19.11			
10	16QAM	25	0		18.64		20	2
10	16QAM	25	12		18.73			
10	16QAM	25	25		18.69			
10	16QAM	50	0		18.67			
Channel				23205	23230	23255	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				779.5	782	784.5		
5	QPSK	1	0	20.39	20.56	20.58	22	0
5	QPSK	1	12	20.75	20.67	20.78		
5	QPSK	1	24	20.37	20.25	20.62		
5	QPSK	12	0	19.58	19.35	19.42	21	1
5	QPSK	12	7	19.54	19.38	19.68		
5	QPSK	12	13	19.46	19.38	19.73		
5	QPSK	25	0	19.52	19.39	19.55		
5	16QAM	1	0	19.03	19.37	19.39	21	1
5	16QAM	1	12	19.31	19.19	19.32		
5	16QAM	1	24	19.15	19.02	19.40		
5	16QAM	12	0	18.27	18.53	18.33	20	2
5	16QAM	12	7	18.43	18.46	18.80		
5	16QAM	12	13	18.27	18.31	18.88		
5	16QAM	25	0	18.38	18.56	18.67		

Band 17 (700MHz Band)
Part 27H(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				23780	23790	23800		
Frequency (MHz)				709	710	711		
10	QPSK	1	0	21.30	20.97	20.91	22	0
10	QPSK	1	25	21.37	21.27	21.30		
10	QPSK	1	49	21.39	21.35	21.31		
10	QPSK	25	0	20.45	20.41	20.33	21	1
10	QPSK	25	12	20.35	20.39	20.31		
10	QPSK	25	25	20.44	20.35	20.29		
10	QPSK	50	0	20.45	20.44	20.22		
10	16QAM	1	0	20.43	19.89	19.48	21	1
10	16QAM	1	25	20.53	20.41	19.93		
10	16QAM	1	49	20.21	20.15	19.83		
10	16QAM	25	0	19.43	19.23	19.49	20	2
10	16QAM	25	12	19.55	19.36	19.34		
10	16QAM	25	25	19.45	19.55	19.36		
10	16QAM	50	0	19.40	19.39	19.39		
Channel				23755	23790	23825	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				706.5	710	713.5		
5	QPSK	1	0	20.79	20.60	20.67	22	0
5	QPSK	1	12	21.12	21.12	21.05		
5	QPSK	1	24	20.89	21.03	20.43		
5	QPSK	12	0	20.03	19.86	20.13	21	1
5	QPSK	12	7	20.01	20.06	20.05		
5	QPSK	12	13	20.09	20.13	19.96		
5	QPSK	25	0	20.00	19.90	19.84		
5	16QAM	1	0	19.88	19.67	19.91	21	1
5	16QAM	1	12	19.65	19.69	19.78		
5	16QAM	1	24	19.53	19.76	19.56		
5	16QAM	12	0	19.15	19.06	19.05	20	2
5	16QAM	12	7	19.03	19.12	19.01		
5	16QAM	12	13	19.19	19.09	18.86		
5	16QAM	25	0	19.24	19.03	19.08		

Band 66

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				132072	132322	132572		
Frequency (MHz)				1720	1745	1770		
20	QPSK	1	0	21.09	21.25	21.34	23	0
20	QPSK	1	49	21.57	21.50	21.58		
20	QPSK	1	99	21.08	21.27	21.09		
20	QPSK	50	0	20.70	20.55	20.72	22	1
20	QPSK	50	24	20.30	20.50	20.67		
20	QPSK	50	50	20.16	20.45	20.60		
20	QPSK	100	0	20.27	20.62	20.69		
20	16QAM	1	0	20.03	20.31	20.43	22	1
20	16QAM	1	49	20.14	20.25	20.95		
20	16QAM	1	99	20.06	20.33	20.28		
20	16QAM	50	0	19.18	19.73	19.69	21	2
20	16QAM	50	24	19.33	19.49	19.73		
20	16QAM	50	50	19.18	19.56	19.63		
20	16QAM	100	0	19.29	19.53	19.73		
Channel				132047	132322	132597	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1745	1772.5		
15	QPSK	1	0	21.13	21.50	21.35	23	0
15	QPSK	1	37	21.16	21.49	21.50		
15	QPSK	1	74	21.06	21.22	21.19		
15	QPSK	36	0	20.13	20.54	20.58	22	1
15	QPSK	36	20	20.18	20.29	20.58		
15	QPSK	36	39	20.11	20.29	20.64		
15	QPSK	75	0	20.11	20.45	20.62		
15	16QAM	1	0	20.13	20.36	20.26	22	1
15	16QAM	1	37	20.09	20.18	20.23		
15	16QAM	1	74	20.02	20.19	20.08		
15	16QAM	36	0	19.16	19.53	19.61	21	2
15	16QAM	36	20	19.11	19.39	19.60		
15	16QAM	36	39	19.13	19.29	19.58		
15	16QAM	75	0	19.23	19.45	19.66		
Channel				132022	132322	132622	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1745	1775		
10	QPSK	1	0	21.05	21.26	21.35	23	0
10	QPSK	1	25	21.03	21.49	21.45		
10	QPSK	1	49	21.03	21.06	21.17		
10	QPSK	25	0	20.08	20.26	20.41	22	1
10	QPSK	25	12	20.04	20.23	20.57		
10	QPSK	25	25	20.10	20.20	20.59		
10	QPSK	50	0	20.09	20.41	20.64		
10	16QAM	1	0	20.06	20.34	20.15	22	1
10	16QAM	1	25	20.02	20.05	20.29		
10	16QAM	1	49	20.01	20.02	20.16		
10	16QAM	25	0	19.06	19.30	19.56	21	2
10	16QAM	25	12	19.11	19.61	19.52		
10	16QAM	25	25	19.16	19.56	19.50		
10	16QAM	50	0	19.17	19.45	19.58		
Channel				131997	132322	132647	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1745	1777.5		
5	QPSK	1	0	21.02	21.21	21.35	23	0
5	QPSK	1	12	21.22	21.28	21.43		
5	QPSK	1	24	21.10	21.32	21.51		
5	QPSK	12	0	20.04	20.19	20.41	22	1
5	QPSK	12	7	20.14	20.22	20.53		
5	QPSK	12	13	20.15	20.22	20.60		
5	QPSK	25	0	20.03	20.26	20.51		
5	16QAM	1	0	20.10	20.00	20.15	22	1
5	16QAM	1	12	20.01	20.09	20.11		
5	16QAM	1	24	20.00	20.05	20.03		
5	16QAM	12	0	19.07	19.24	19.43	21	2
5	16QAM	12	7	19.04	19.42	19.56		
5	16QAM	12	13	19.14	19.32	19.60		
5	16QAM	25	0	19.20	19.33	19.63		
Channel				131987	132322	132657	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1745	1778.5		
3	QPSK	1	0	21.09	21.21	21.52	23	0
3	QPSK	1	8	21.24	21.47	21.51		
3	QPSK	1	14	21.05	21.27	21.41		
3	QPSK	8	0	20.16	20.29	20.58	22	1
3	QPSK	8	4	20.28	20.26	20.55		
3	QPSK	8	7	20.17	20.22	20.60		
3	QPSK	15	0	20.18	20.22	20.64		
3	16QAM	1	0	20.06	20.05	20.17	22	1
3	16QAM	1	8	20.12	20.05	20.26		
3	16QAM	1	14	20.10	20.00	20.07		
3	16QAM	8	0	19.23	19.41	19.70	21	2
3	16QAM	8	4	19.26	19.36	19.70		
3	16QAM	8	7	19.06	19.40	19.60		
3	16QAM	15	0	19.01	19.45	19.64		
Channel				131979	132322	132665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1745	1779.3		
1.4	QPSK	1	0	21.05	21.17	21.48	23	0
1.4	QPSK	1	3	21.20	21.43	21.47		
1.4	QPSK	1	5	21.01	21.23	21.37		
1.4	QPSK	3	0	21.12	21.25	21.18		
1.4	QPSK	3	1	21.24	21.22	21.51		
1.4	QPSK	3	3	21.13	21.18	21.23		
1.4	QPSK	6	0	20.16	20.20	20.62	22	1
1.4	16QAM	1	0	20.04	20.03	20.15	22	1
1.4	16QAM	1	3	20.10	20.03	20.24		
1.4	16QAM	1	5	20.08	20.15	20.05		
1.4	16QAM	3	0	20.52	20.43	20.32		
1.4	16QAM	3	1	20.09	20.22	20.28		
1.4	16QAM	3	3	20.14	20.11	20.31		
1.4	16QAM	6	0	19.42	19.43	19.62	21	2

Band 71

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				133222	133297	133372		
Frequency (MHz)				673	680.5	688		
20	QPSK	1	0	20.99	20.97	20.92	22	0
20	QPSK	1	49	21.23	21.24	21.17		
20	QPSK	1	99	21.15	21.18	21.11		
20	QPSK	50	0	20.29	20.38	20.15	21	1
20	QPSK	50	24	20.33	20.35	20.25		
20	QPSK	50	50	20.28	20.17	20.13		
20	QPSK	100	0	20.30	20.31	20.19		
20	16QAM	1	0	20.27	20.19	20.20	21	1
20	16QAM	1	49	20.28	20.22	20.17		
20	16QAM	1	99	20.26	20.23	20.21		
20	16QAM	50	0	19.49	19.44	19.40	20	2
20	16QAM	50	24	19.56	19.50	19.52		
20	16QAM	50	50	19.53	19.48	19.45		
20	16QAM	100	0	19.45	19.39	19.40		
Channel				133197	133297	133397	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				670.5	680.5	690.5		
15	QPSK	1	0	20.93	20.90	20.78	22	0
15	QPSK	1	37	21.17	21.16	21.03		
15	QPSK	1	74	21.09	20.04	21.00		
15	QPSK	36	0	20.23	20.17	20.02	21	1
15	QPSK	36	20	20.27	20.14	20.14		
15	QPSK	36	39	20.22	20.13	20.01		
15	QPSK	75	0	20.24	20.21	20.10		
15	16QAM	1	0	20.25	20.15	20.11	21	1
15	16QAM	1	37	20.26	20.18	20.08		
15	16QAM	1	74	20.21	20.19	20.12		
15	16QAM	36	0	19.44	19.40	19.31	20	2
15	16QAM	36	20	19.53	19.43	19.43		
15	16QAM	36	39	19.50	19.47	19.36		
15	16QAM	75	0	19.44	19.34	19.31		
Channel				133172	133297	133422	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				668	680.5	693		
10	QPSK	1	0	20.91	20.97	20.77	22	0
10	QPSK	1	25	21.08	21.14	20.17		
10	QPSK	1	49	21.01	20.03	21.09		
10	QPSK	25	0	20.22	20.17	20.19	21	1
10	QPSK	25	12	20.24	20.13	20.17		
10	QPSK	25	25	20.21	20.11	20.11		
10	QPSK	50	0	20.23	20.14	20.13		
10	16QAM	1	0	20.34	20.17	20.14	21	1
10	16QAM	1	25	20.31	20.17	20.07		
10	16QAM	1	49	20.18	20.23	20.17		
10	16QAM	25	0	19.41	19.47	19.45	20	2
10	16QAM	25	12	19.55	19.44	19.44		
10	16QAM	25	25	19.46	19.45	19.33		
10	16QAM	50	0	19.41	19.36	19.24		
Channel				133147	133297	133447	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				665.5	680.5	695.5		
5	QPSK	1	0	20.77	20.78	20.81	22	0
5	QPSK	1	12	21.07	21.01	20.99		
5	QPSK	1	24	21.03	20.97	21.07		
5	QPSK	12	0	20.22	20.21	20.34	21	1
5	QPSK	12	7	20.17	20.17	20.18		
5	QPSK	12	13	20.24	20.23	20.14		
5	QPSK	25	0	20.23	20.17	20.16		
5	16QAM	1	0	20.34	20.17	20.14	21	1
5	16QAM	1	12	20.29	20.28	20.21		
5	16QAM	1	24	20.17	20.34	20.19		
5	16QAM	12	0	19.43	19.51	19.47	20	2
5	16QAM	12	7	19.34	19.43	19.41		
5	16QAM	12	13	19.44	19.46	19.31		
5	16QAM	25	0	19.41	19.38	19.27		