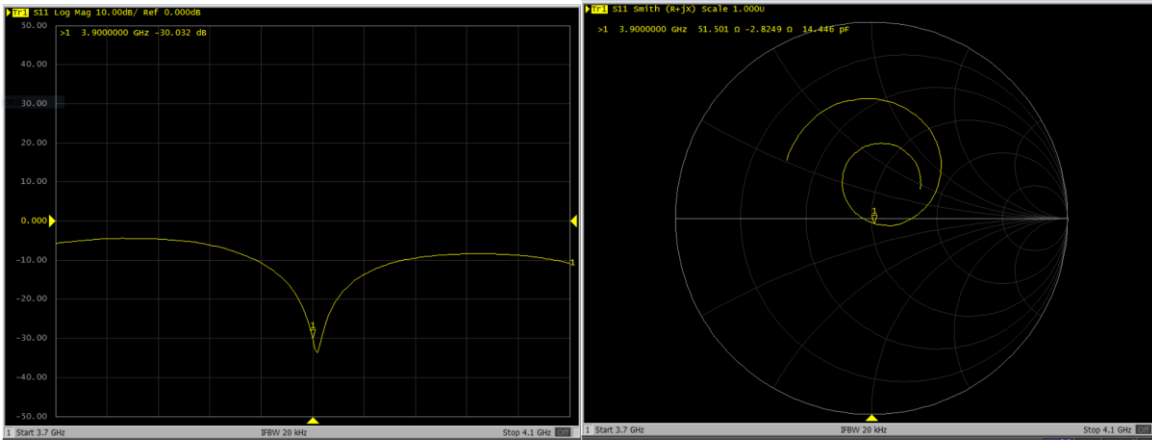


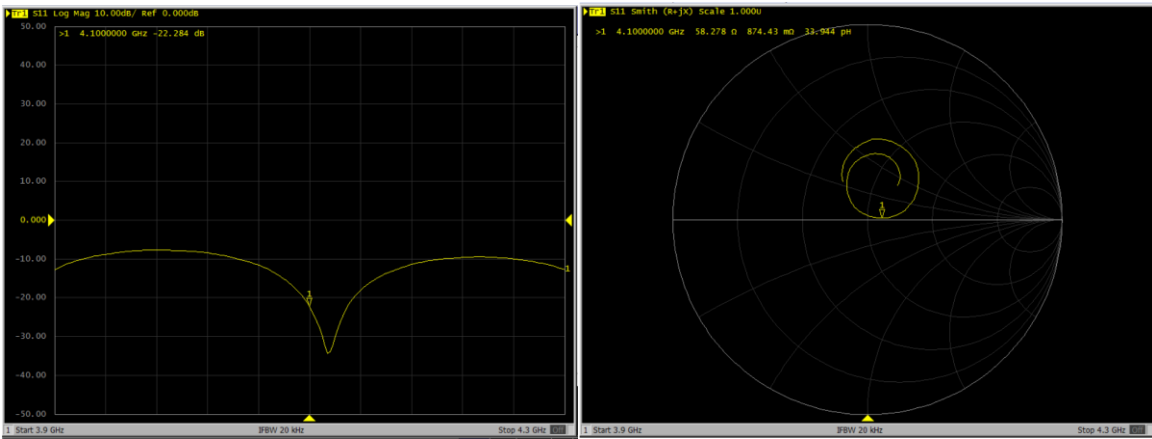


Dipole Verification Data> D3900V2, serial no. 1048

3900MHz – Head



4100MHz – Head





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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 $(22 \pm 3)^{\circ}\text{C}$ 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: 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 Jeton Kastrati	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Function Technical Manager	Signature

Issued: September 25, 2019

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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:

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

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz	

Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.1 ± 6 %	4.53 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °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 ± 19.9 % (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 ± 19.5 % (k=2)

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.6 ± 6 %	4.88 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °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 ± 19.9 % (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 ± 19.5 % (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
----------------------------------	----------

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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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: $f = 5250$ MHz; $\sigma = 4.53$ S/m; $\epsilon_r = 35.1$; $\rho = 1000$ kg/m³,

Medium parameters used: $f = 5600$ MHz; $\sigma = 4.88$ S/m; $\epsilon_r = 34.6$; $\rho = 1000$ kg/m³,

Medium parameters used: $f = 5750$ MHz; $\sigma = 5.03$ S/m; $\epsilon_r = 34.4$; $\rho = 1000$ kg/m³

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,

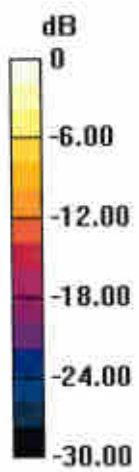
dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

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

Peak SAR (extrapolated) = 31.8 W/kg

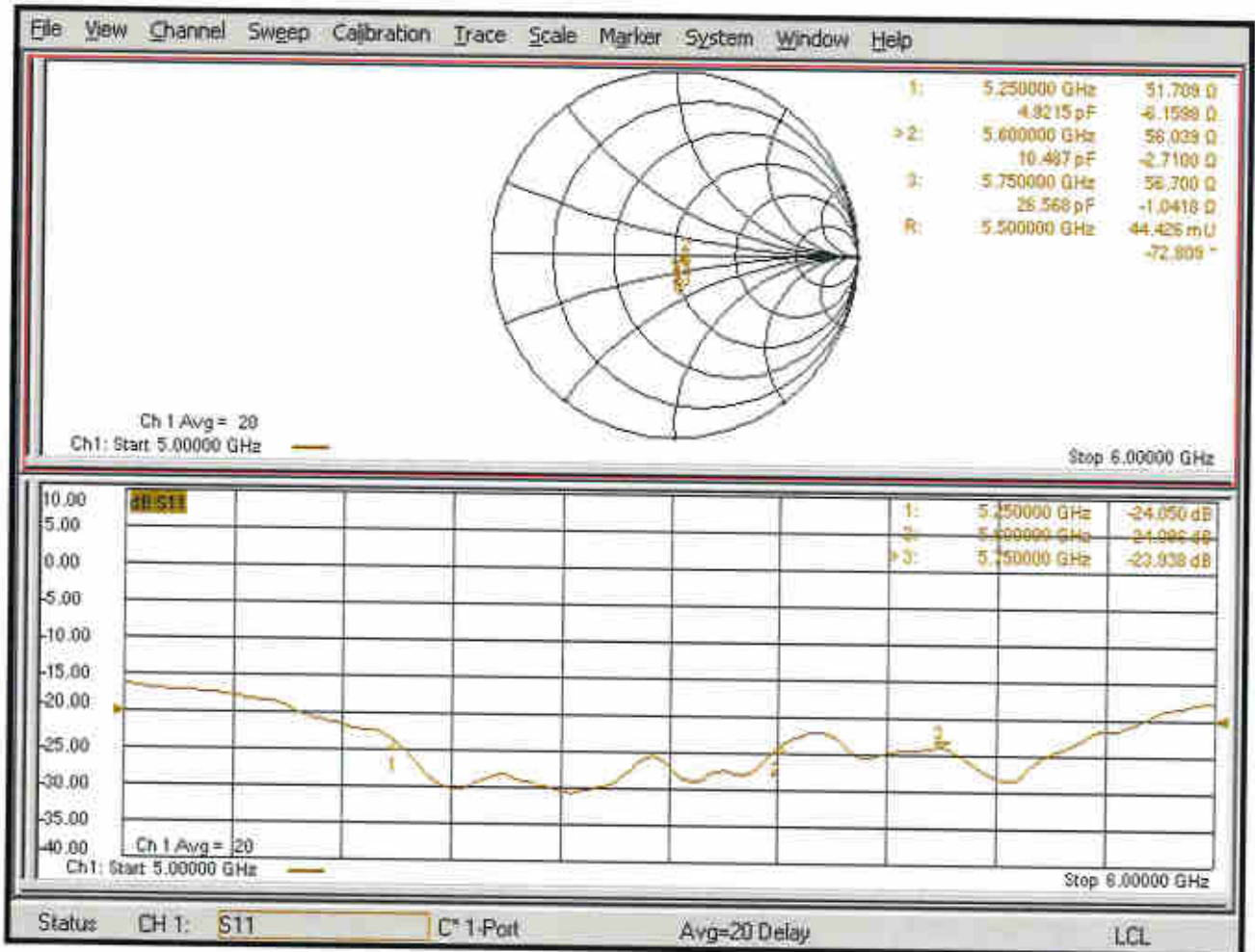
SAR(1 g) = 8.06 W/kg; SAR(10 g) = 2.30 W/kg

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



0 dB = 18.1 W/kg = 12.58 dBW/kg

Impedance Measurement Plot for Head TSL





D5GHzV2, Serial No. 1113 Extended Dipole Calibrations

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

D5GHzV2 – serial no. 1113						
5250 Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
2019.9.24	-24.05		51.71		-6.16	
2020.9.23	-24.80	-0.03	50.56	1.15	-5.94	-0.22

D5GHzV2 – serial no. 1113						
5600 Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
2019.9.24	-24.09		56.04		-2.71	
2020.9.23	-23.95	0.01	57.70	-1.66	-2.85	0.14

D5GHzV2 – serial no. 1113						
5750 Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
2019.9.24	-23.94		56.70		-1.04	
2020.9.23	-21.92	0.08	58.56	-1.86	-1.58	0.54

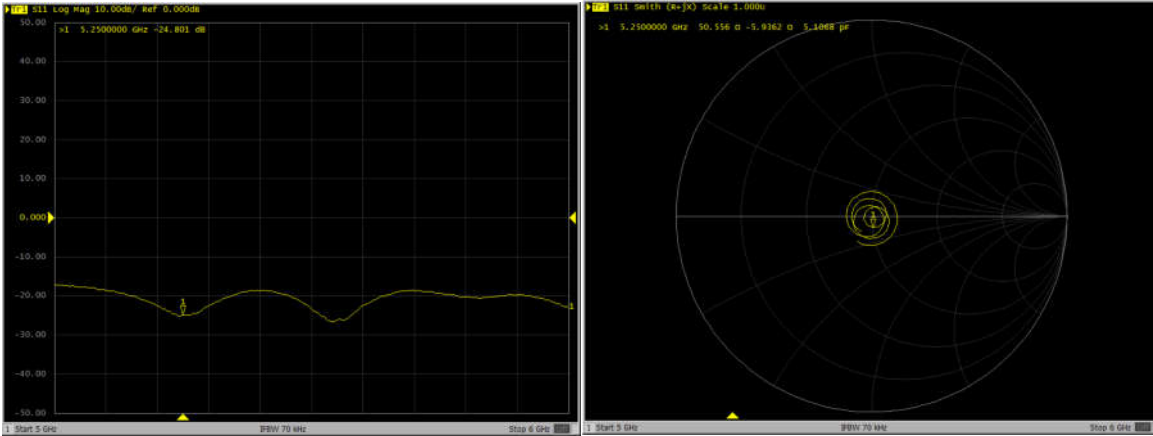
<Justification of the extended calibration>

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

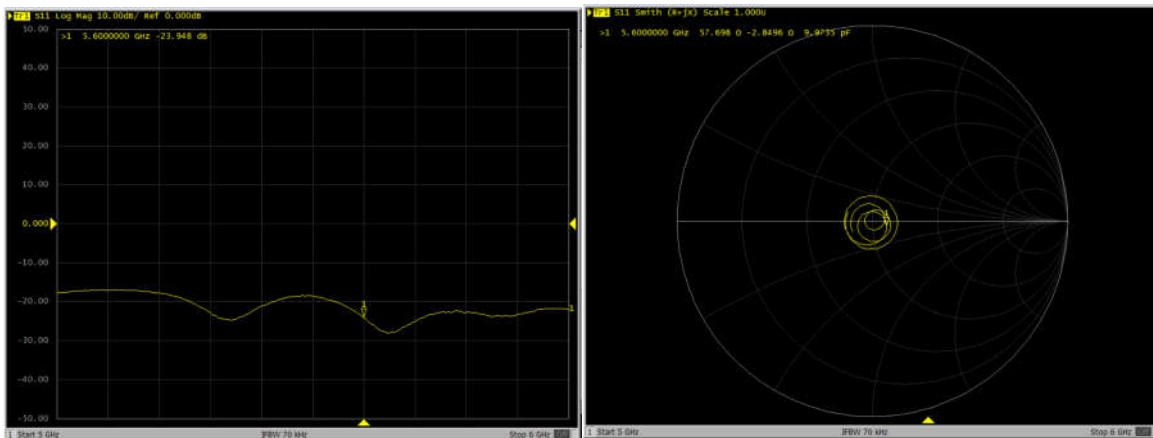


Dipole Verification Data > D3700V2, serial no. 1008

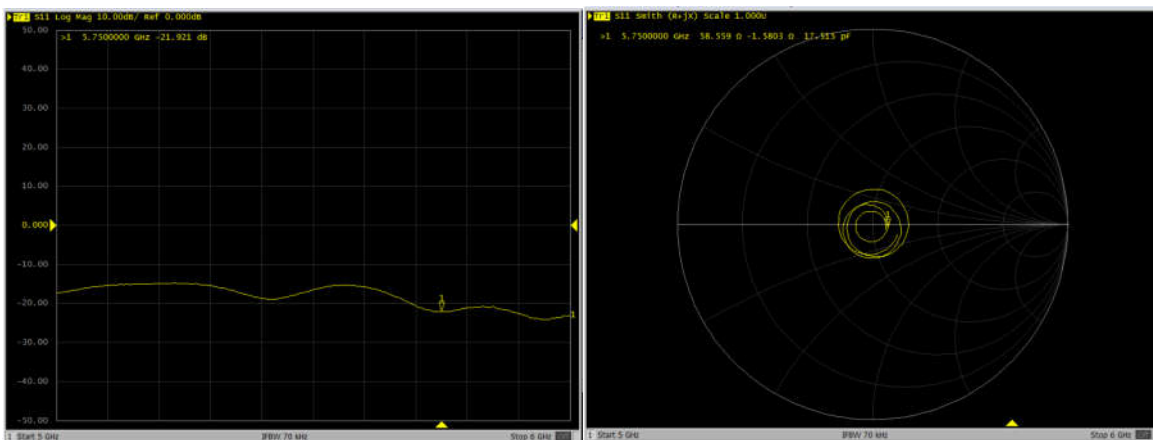
5250MHz – Head



5600MHz – Head



5750MHz – Head





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Accreditation No.: **SCS 0108**

Client **Sporton**

Certificate No: **DAE4-1338_Nov20**

CALIBRATION CERTIFICATE

Object **DAE4 - SD 000 D04 BM - SN: 1338**

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

Calibration date: **November 27, 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
Kelthley Multimeter Type 2001	SN: 0810278	07-Sep-20 (No:28647)	Sep-21
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** Adrian Gehring **Function** Laboratory Technician

Approved by: **Name** Sven Kühn **Function** Deputy Manager

Signature

Issued: November 27, 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 μ V, full range = -100...+300 mV

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

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

Calibration Factors	X	Y	Z
High Range	403.683 \pm 0.02% (k=2)	404.259 \pm 0.02% (k=2)	404.216 \pm 0.02% (k=2)
Low Range	3.97329 \pm 1.50% (k=2)	3.97760 \pm 1.50% (k=2)	3.97480 \pm 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	240.0 $^{\circ}$ \pm 1 $^{\circ}$
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Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range	Reading (μV)	Difference (μV)	Error (%)
Channel X + Input	199991.64	-0.32	-0.00
Channel X + Input	20002.84	1.10	0.01
Channel X - Input	-20001.18	0.25	-0.00
Channel Y + Input	199992.25	0.36	0.00
Channel Y + Input	19999.51	-1.97	-0.01
Channel Y - Input	-20003.41	-1.82	0.01
Channel Z + Input	199993.13	0.96	0.00
Channel Z + Input	20000.60	-0.92	-0.00
Channel Z - Input	-20003.21	-1.57	0.01

Low Range	Reading (μV)	Difference (μV)	Error (%)
Channel X + Input	2001.46	0.54	0.03
Channel X + Input	201.63	0.29	0.14
Channel X - Input	-198.25	0.29	-0.15
Channel Y + Input	2001.07	0.18	0.01
Channel Y + Input	200.68	-0.49	-0.24
Channel Y - Input	-199.20	-0.52	0.26
Channel Z + Input	2000.41	-0.51	-0.03
Channel Z + Input	199.93	-1.28	-0.64
Channel Z - Input	-199.77	-1.08	0.54

2. Common mode sensitivity

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

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	7.08	5.84
	- 200	-6.14	-7.41
Channel Y	200	-21.12	-21.17
	- 200	20.10	20.00
Channel Z	200	-3.05	-2.98
	- 200	0.35	0.59

3. Channel separation

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

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	3.84	-3.07
Channel Y	200	8.29	-	4.87
Channel Z	200	8.97	6.36	-

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	16191	14008
Channel Y	16286	16249
Channel Z	16106	15261

5. Input Offset Measurement

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

Input 10M Ω

	Average (μ V)	min. Offset (μ V)	max. Offset (μ V)	Std. Deviation (μ V)
Channel X	0.57	-0.12	1.34	0.31
Channel Y	-0.39	-0.99	0.23	0.27
Channel Z	-0.35	-1.05	0.40	0.28

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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Accreditation No.: **SCS 0108**

Client **Sporton**

Certificate No: **EX3-3857_Sep20**

CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3857**

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: **September 25, 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 ± 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	01-Apr-20 (No. 217-03100/03101)	Apr-21
Power sensor NRP-Z91	SN: 103244	01-Apr-20 (No. 217-03100)	Apr-21
Power sensor NRP-Z91	SN: 103245	01-Apr-20 (No. 217-03101)	Apr-21
Reference 20 dB Attenuator	SN: CC2552 (20x)	31-Mar-20 (No. 217-03106)	Apr-21
DAE4	SN: 660	27-Dec-19 (No. DAE4-660_Dec19)	Dec-20
Reference Probe ES3DV2	SN: 3013	31-Dec-19 (No. ES3-3013_Dec19)	Dec-20
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-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-19)	In house check: Oct-20

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

Issued: September 30, 2020

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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., $\vartheta = 0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3857

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.18	0.43	0.46	$\pm 10.1 \%$
DCP (mV) ^B	99.3	100.5	102.2	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Max dev.	Unc ^E (k=2)
0	CW	X	0.0	0.0	1.0	0.00	182.0	$\pm 3.0 \%$	$\pm 4.7 \%$
		Y	0.0	0.0	1.0		178.6		
		Z	0.0	0.0	1.0		188.1		

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:3857

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-118.9
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:3857

Calibration Parameter Determined in Head Tissue Simulating Media

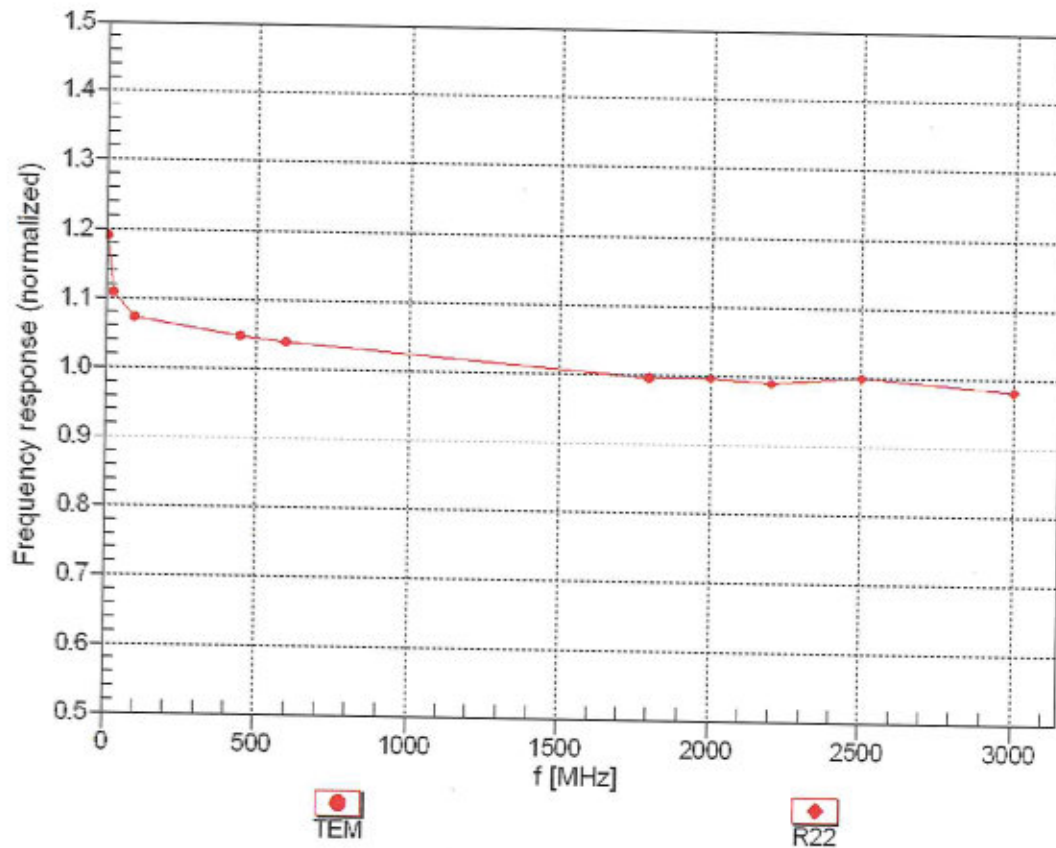
f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth (mm) ^G	Unc (k=2)
750	41.9	0.89	9.50	9.50	9.50	0.32	0.99	± 12.0 %
835	41.5	0.90	9.18	9.18	9.18	0.45	0.80	± 12.0 %
900	41.5	0.97	9.10	9.10	9.10	0.47	0.80	± 12.0 %
1750	40.1	1.37	8.06	8.06	8.06	0.27	0.86	± 12.0 %
1900	40.0	1.40	7.81	7.81	7.81	0.37	0.86	± 12.0 %
2000	40.0	1.40	7.78	7.78	7.78	0.40	0.86	± 12.0 %
2300	39.5	1.67	7.56	7.56	7.56	0.31	0.92	± 12.0 %
2450	39.2	1.80	7.44	7.44	7.44	0.40	0.92	± 12.0 %
2600	39.0	1.96	7.19	7.19	7.19	0.37	0.92	± 12.0 %
3300	38.2	2.71	6.70	6.70	6.70	0.30	1.35	± 14.0 %
3500	37.9	2.91	6.67	6.67	6.67	0.30	1.35	± 14.0 %
3700	37.7	3.12	6.61	6.61	6.61	0.30	1.35	± 14.0 %
3900	37.5	3.32	6.58	6.58	6.58	0.40	1.50	± 14.0 %
4100	37.2	3.53	6.08	6.08	6.08	0.35	1.50	± 14.0 %
4200	37.1	3.63	5.99	5.99	5.99	0.35	1.50	± 14.0 %
4400	36.9	3.84	5.93	5.93	5.93	0.35	1.70	± 14.0 %
4600	36.7	4.04	5.91	5.91	5.91	0.40	1.70	± 14.0 %
4800	36.4	4.25	5.76	5.76	5.76	0.40	1.80	± 14.0 %
4950	36.3	4.40	5.45	5.45	5.45	0.40	1.80	± 14.0 %
5250	35.9	4.71	5.04	5.04	5.04	0.40	1.80	± 14.0 %
5600	35.5	5.07	4.67	4.67	4.67	0.40	1.80	± 14.0 %
5750	35.4	5.22	4.93	4.93	4.93	0.40	1.80	± 14.0 %

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

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

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

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

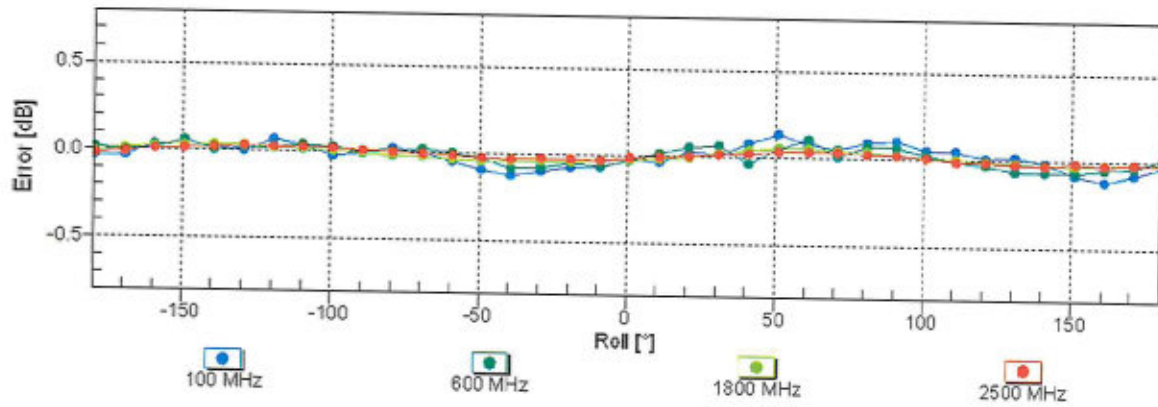
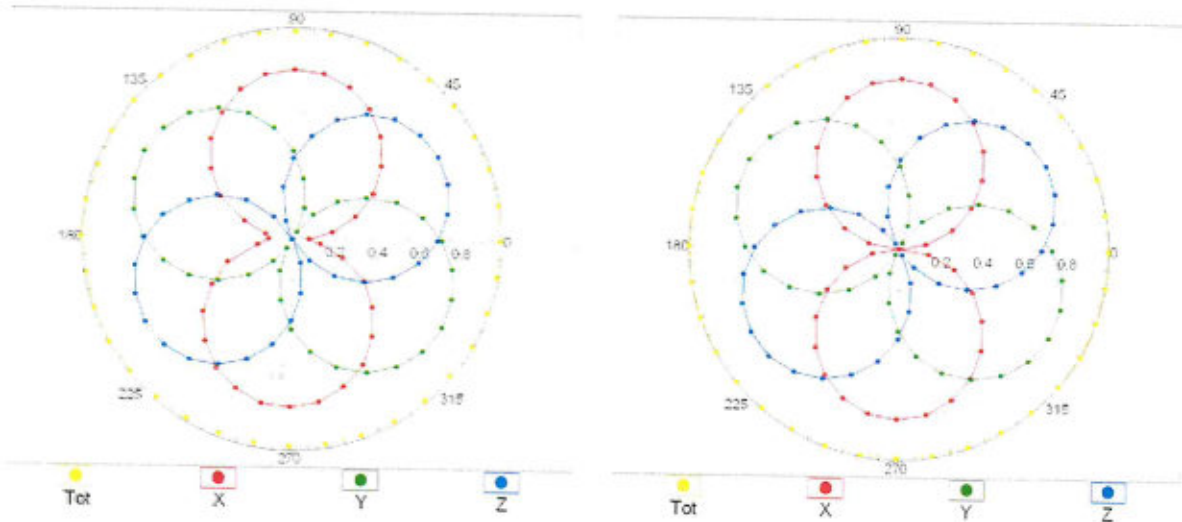


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

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

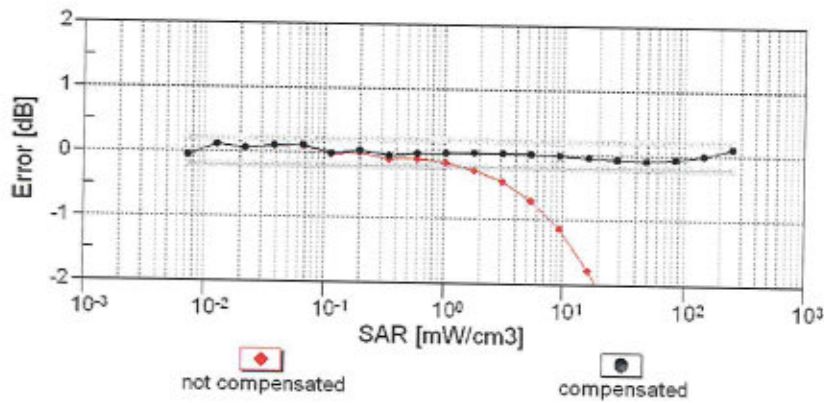
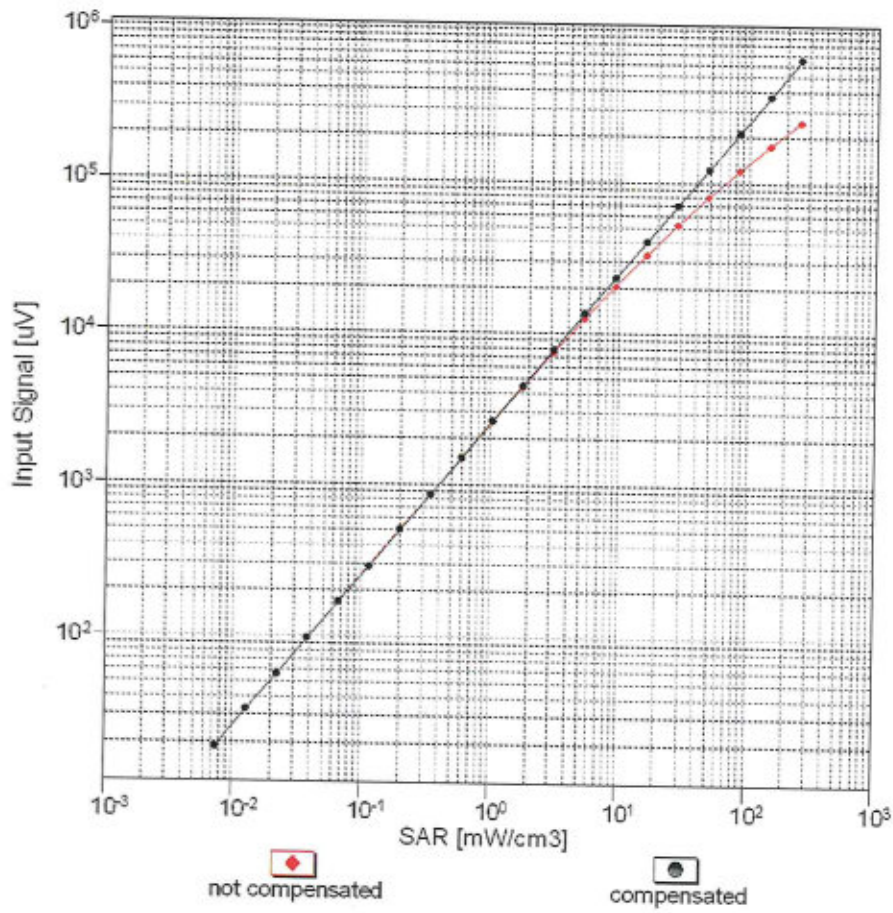
f=600 MHz,TEM

f=1800 MHz,R22



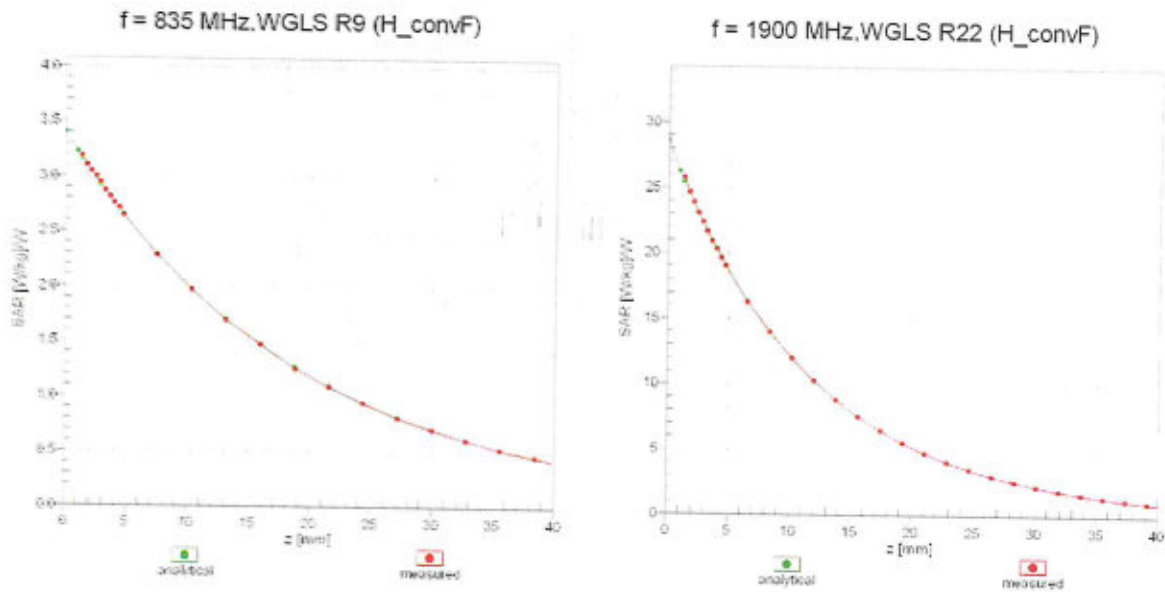
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

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

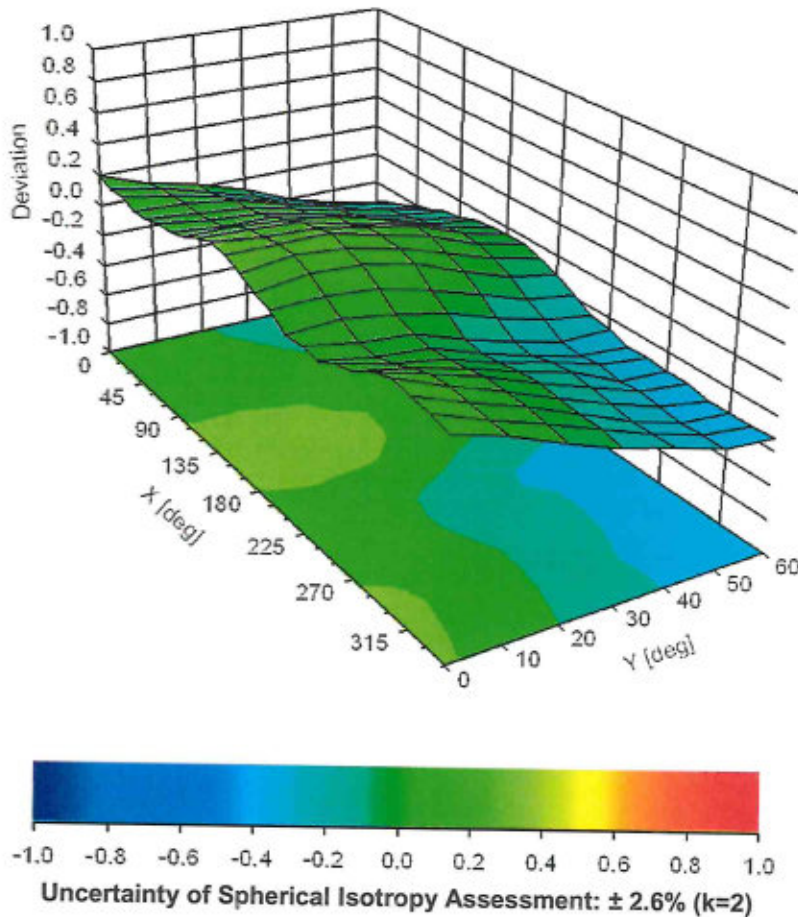


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



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





Appendix E. Conducted RF Output Power Table

The detailed power table are shown as follows.



Full Power Mode

Ant 0									
GSM850	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)	
	TX Channel	128	189		251	128	189		251
Frequency (MHz)	824.2	836.4	848.8	824.2	836.4	848.8			
GSM 1 Tx slot	32.62	32.66	32.67	33.50	23.62	23.66	23.67	24.50	
GPRS 1 Tx slots	32.61	32.64	32.66	33.50	23.61	23.64	23.66	24.50	
GPRS 2 Tx slots	31.80	31.86	31.88	32.50	25.80	25.86	25.88	26.50	
GPRS 3 Tx slots	30.01	30.06	30.12	31.00	25.75	25.80	25.86	26.74	
GPRS 4 Tx slots	29.02	29.16	29.15	30.00	26.02	26.16	26.15	27.00	
EDGE 1 Tx slot	27.24	27.23	27.22	28.00	18.24	18.23	18.22	19.00	
EDGE 2 Tx slots	26.10	26.12	26.15	27.00	20.10	20.12	20.15	21.00	
EDGE 3 Tx slots	24.04	24.04	23.98	25.00	19.78	19.78	19.72	20.74	
EDGE 4 Tx slots	22.95	23.00	22.91	24.00	19.95	20.00	19.91	21.00	

Ant 1									
GSM1900	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)	
	TX Channel	512	661		810	512	661		810
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8			
GSM 1 Tx slot	29.58	29.45	29.35	30.50	20.58	20.45	20.35	21.50	
GPRS 1 Tx slots	29.57	29.44	29.33	30.50	20.57	20.44	20.33	21.50	
GPRS 2 Tx slots	28.84	28.70	28.60	29.50	22.84	22.70	22.60	23.50	
GPRS 3 Tx slots	27.13	27.05	26.95	28.00	22.87	22.79	22.69	23.74	
GPRS 4 Tx slots	26.01	26.02	25.91	27.00	23.01	23.02	22.91	24.00	
EDGE 1 Tx slot	25.12	25.17	25.35	26.00	16.12	16.17	16.35	17.00	
EDGE 2 Tx slots	23.96	23.96	24.10	25.00	17.96	17.96	18.10	19.00	
EDGE 3 Tx slots	21.66	21.70	21.83	22.50	17.40	17.44	17.57	18.24	
EDGE 4 Tx slots	20.37	20.35	20.53	21.50	17.37	17.35	17.53	18.50	

Band	WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	Ant 0				
	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	22.23	22.25	22.20	24.00	22.13	22.20	22.15	24.00	22.30	22.35	22.31	24.00
3GPP Rel 99	RMC 12.2Kbps	22.24	22.30	22.21	24.00	22.20	22.22	22.18	24.00	22.34	22.39	22.36	24.00
3GPP Rel 6	HSDPA Subtest-1	21.47	21.53	21.55	23.00	21.54	21.58	21.60	23.00	21.59	21.59	21.52	23.00
3GPP Rel 6	HSDPA Subtest-2	21.48	21.50	21.52	23.00	21.59	21.56	21.54	23.00	21.55	21.56	21.52	23.00
3GPP Rel 6	HSDPA Subtest-3	21.02	21.05	21.10	22.50	21.12	21.10	21.07	22.50	21.12	21.11	21.06	22.50
3GPP Rel 6	HSDPA Subtest-4	20.99	21.00	21.09	22.50	21.08	21.06	21.00	22.50	21.05	21.05	21.00	22.50
3GPP Rel 6	DC-HSDPA Subtest-1	21.45	21.50	21.51	23.00	21.51	21.54	21.58	23.00	21.56	21.57	21.48	23.00
3GPP Rel 6	DC-HSDPA Subtest-2	21.46	21.47	21.46	23.00	21.56	21.52	21.52	23.00	21.52	21.54	21.48	23.00
3GPP Rel 6	DC-HSDPA Subtest-3	21.00	21.02	21.06	22.50	21.09	21.06	21.05	22.50	21.09	21.09	21.02	22.50
3GPP Rel 6	DC-HSDPA Subtest-4	20.97	20.97	21.05	22.50	21.05	21.02	20.98	22.50	21.02	21.03	20.96	22.50
3GPP Rel 6	HSUPA Subtest-1	21.44	21.42	21.42	23.00	21.72	21.62	21.50	23.00	21.54	21.44	21.51	23.00
3GPP Rel 6	HSUPA Subtest-2	19.45	19.43	19.43	21.00	19.60	19.64	19.76	21.00	19.55	19.34	19.50	21.00
3GPP Rel 6	HSUPA Subtest-3	20.47	20.48	20.49	22.00	20.78	20.70	20.68	22.00	20.58	20.43	20.55	22.00
3GPP Rel 6	HSUPA Subtest-4	19.67	19.76	19.44	21.00	19.79	20.02	19.74	21.00	19.04	19.05	19.03	21.00
3GPP Rel 6	HSUPA Subtest-5	21.40	21.30	21.54	23.00	21.57	21.55	21.68	23.00	21.50	21.43	21.40	23.00
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	19.00	18.86	19.12	20.50	19.18	19.07	19.42	20.50	18.73	18.66	18.76	20.50



Band 7 (2600MHz Band)									
Ant 4 For ENDC									
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				20850	21100	21350			
Frequency (MHz)				2510	2535	2560			
20	QPSK	1	0	22.92	23.19	23.02	24	0	
20	QPSK	1	49	23.06	23.18	23.02			
20	QPSK	1	99	22.88	23.17	22.89			
20	QPSK	50	0	22.11	22.25	22.14	23	1	
20	QPSK	50	24	22.20	22.22	22.14			
20	QPSK	50	50	22.11	22.21	22.03			
20	QPSK	100	0	22.13	22.17	22.08	23	1	
20	16QAM	1	0	22.41	22.18	22.33			
20	16QAM	1	49	22.49	22.28	22.41			
20	16QAM	1	99	22.21	22.23	22.23	22	2	
20	16QAM	50	0	21.18	21.20	21.14			
20	16QAM	50	24	21.19	21.18	21.12			
20	16QAM	50	50	21.12	21.12	21.04	22	2	
20	16QAM	100	0	21.06	21.17	21.07			
20	64QAM	1	0	21.16	21.17	21.22			
20	64QAM	1	49	21.32	21.18	21.29	22	2	
20	64QAM	1	99	21.21	20.98	21.19			
20	64QAM	50	0	20.10	20.02	20.15			
20	64QAM	50	24	20.17	20.08	20.13	21	3	
20	64QAM	50	50	20.10	20.02	20.05			
20	64QAM	100	0	20.10	20.03	20.08			
Channel				20825	21100	21375			
Frequency (MHz)				2507.5	2535	2562.5			
15	QPSK	1	0	23.02	23.00	23.03	24	0	
15	QPSK	1	37	23.20	23.01	23.04			
15	QPSK	1	74	23.04	22.97	22.94			
15	QPSK	36	0	22.21	22.15	22.13	23	1	
15	QPSK	36	20	22.28	22.12	22.14			
15	QPSK	36	39	22.25	22.08	22.04			
15	QPSK	75	0	22.29	22.13	22.12	23	1	
15	16QAM	1	0	22.53	22.30	22.40			
15	16QAM	1	37	22.61	22.40	22.45			
15	16QAM	1	74	22.37	22.33	22.28	22	2	
15	16QAM	36	0	21.20	21.16	21.23			
15	16QAM	36	20	21.24	21.13	21.13			
15	16QAM	36	39	21.27	21.09	21.06	22	2	
15	16QAM	75	0	21.24	21.10	21.10			
15	64QAM	1	0	21.27	21.26	21.32			
15	64QAM	1	37	21.43	21.32	21.32	22	2	
15	64QAM	1	74	21.35	21.28	21.21			
15	64QAM	36	0	20.25	20.15	20.13			
15	64QAM	36	20	20.27	20.20	20.13	21	3	
15	64QAM	36	39	20.28	20.10	20.07			
15	64QAM	75	0	20.23	20.08	20.12			
Channel				20800	21100	21400			
Frequency (MHz)				2505	2535	2565			
10	QPSK	1	0	23.09	23.04	23.06	24	0	
10	QPSK	1	25	23.17	23.11	23.06			
10	QPSK	1	49	23.15	23.02	23.00			
10	QPSK	25	0	22.27	22.21	22.17	23	1	
10	QPSK	25	12	22.29	22.13	22.20			
10	QPSK	25	25	22.31	22.16	22.16			
10	QPSK	50	0	22.25	22.18	22.22	23	1	
10	16QAM	1	0	22.48	22.37	22.54			
10	16QAM	1	25	22.50	22.41	22.44			
10	16QAM	1	49	22.57	22.46	22.44	22	2	
10	16QAM	25	0	21.29	21.20	21.18			
10	16QAM	25	12	21.29	21.14	21.17			
10	16QAM	25	25	21.33	21.18	21.11	22	2	
10	16QAM	50	0	21.31	21.21	21.15			
10	64QAM	1	0	21.35	21.28	21.30			
10	64QAM	1	25	21.39	21.28	21.35	22	2	
10	64QAM	1	49	21.38	21.31	21.23			
10	64QAM	25	0	20.25	20.16	20.15			
10	64QAM	25	12	20.23	20.13	20.14	21	3	
10	64QAM	25	25	20.26	20.14	20.12			
10	64QAM	50	0	20.24	20.18	20.13			
Channel				20775	21100	21425			
Frequency (MHz)				2502.5	2535	2567.5			
5	QPSK	1	0	23.09	23.10	23.04	24	0	
5	QPSK	1	12	23.13	23.06	23.06			
5	QPSK	1	24	23.15	23.08	23.05			
5	QPSK	12	0	22.23	22.16	22.18	23	1	
5	QPSK	12	7	22.25	22.15	22.15			
5	QPSK	12	13	22.24	22.14	22.12			
5	QPSK	25	0	22.28	22.16	22.17	23	1	
5	16QAM	1	0	22.31	22.40	22.41			
5	16QAM	1	12	22.48	22.34	22.42			
5	16QAM	1	24	22.49	22.41	22.35	22	2	
5	16QAM	12	0	21.23	21.13	21.19			
5	16QAM	12	7	21.24	21.07	21.11			
5	16QAM	12	13	21.21	21.10	21.11	22	2	
5	16QAM	25	0	21.24	21.14	21.18			
5	64QAM	1	0	21.36	21.42	21.31			
5	64QAM	1	12	21.36	21.36	21.24	22	2	
5	64QAM	1	24	21.46	21.33	21.28			
5	64QAM	12	0	20.23	20.20	20.18			
5	64QAM	12	7	20.26	20.14	20.16	21	3	
5	64QAM	12	13	20.23	20.12	20.16			
5	64QAM	25	0	20.27	20.16	20.16			



Reduced power Mode

Ant 0 -Body Worn and Hotspot									
GSM850	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)	
	133	189	251		824.2	836.4	848.8		
TX Channel	824.2	836.4	848.8	824.2	836.4	848.8			
Frequency (MHz)	29.77	29.79	29.66	31.00	29.77	29.79	20.66	22.00	
GSM 1 Tx slot	29.76	29.78	29.65	31.00	20.76	20.78	20.65	22.00	
GPRS 1 Tx slots	28.60	28.63	28.75	30.00	22.60	22.63	22.75	24.00	
GPRS 2 Tx slots	27.05	27.11	27.13	28.50	22.79	22.85	22.87	24.24	
GPRS 4 Tx slots	25.88	26.09	26.07	27.50	22.88	23.09	23.07	24.50	
EDGE 1 Tx slot	24.12	24.08	24.19	25.50	15.12	15.08	15.19	16.50	
EDGE 2 Tx slots	22.89	23.01	22.95	24.50	16.89	17.01	16.95	18.50	
EDGE 3 Tx slots	20.95	20.91	20.96	22.50	16.69	16.65	16.70	18.24	
EDGE 4 Tx slots	19.99	19.87	19.96	21.50	16.99	16.87	16.96	18.50	

Ant 1-Body Worn and Hotspot									
GSM1900	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)	
	512	661	810		1652.2	1660	1669.3		
TX Channel	512	661	810	512	661	810			
Frequency (MHz)	28.98	29.07	28.83	30.00	19.98	20.07	19.83	21.00	
GSM 1 Tx slot	28.97	29.06	28.82	30.00	19.97	20.06	19.82	21.00	
GPRS 1 Tx slot	28.21	28.46	28.02	29.00	22.21	22.46	22.02	23.00	
GPRS 2 Tx slots	26.83	26.76	26.72	27.50	22.57	22.50	22.46	23.24	
GPRS 4 Tx slots	25.74	25.75	25.68	26.50	22.74	22.75	22.68	23.50	
EDGE 1 Tx slot	24.72	24.57	24.87	25.50	15.72	15.57	15.87	16.50	
EDGE 2 Tx slots	23.41	23.51	23.59	24.50	17.41	17.51	17.59	18.50	
EDGE 3 Tx slots	21.23	21.15	21.39	22.00	16.97	16.89	17.13	17.74	
EDGE 4 Tx slots	19.94	19.75	19.99	21.00	16.94	16.75	16.99	18.00	

Ant 1-Body Worn and Hotspot										Ant 0 -Body Worn and Hotspot			
Band	WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)	
	9262	9400	9538		1312	1413	1513		4132	4182	4233		
TX Channel	9262	9400	9538	1537	1638	1738	4357	4407	4458				
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	18.62	18.67	18.65	20.00	19.43	19.45	19.42	21.00	20.43	20.44	20.40	22.00
3GPP Rel 99	RMC 12.2Kbps	18.63	18.69	18.66	20.00	19.44	19.46	19.43	21.00	20.44	20.45	20.41	22.00
3GPP Rel 6	HSDPA Subtest-1	17.60	17.62	17.65	19.00	18.44	18.50	18.50	20.00	19.53	19.50	19.45	21.00
3GPP Rel 6	HSDPA Subtest-2	17.61	17.62	17.65	19.00	18.42	18.45	18.46	20.00	19.53	19.48	19.45	21.00
3GPP Rel 6	HSDPA Subtest-3	17.15	17.14	17.09	18.50	17.96	17.98	17.97	19.50	19.04	19.05	18.96	20.50
3GPP Rel 6	HSDPA Subtest-4	17.10	17.08	17.10	18.50	17.93	17.95	17.96	19.50	19.01	18.96	18.92	20.50
3GPP Rel 6	DC-HSDPA Subtest-1	17.44	17.35	17.52	19.00	18.40	18.45	18.45	20.00	19.47	19.42	19.14	21.00
3GPP Rel 8	DC-HSDPA Subtest-2	17.44	17.46	17.38	19.00	18.45	18.40	18.45	20.00	19.44	19.40	19.36	21.00
3GPP Rel 8	DC-HSDPA Subtest-3	17.14	16.90	17.20	18.50	18.03	17.96	17.96	19.50	18.94	18.98	18.96	20.50
3GPP Rel 8	DC-HSDPA Subtest-4	17.02	17.04	16.94	18.50	17.98	17.92	17.91	19.50	18.95	18.93	18.85	20.50
3GPP Rel 6	HSUPA Subtest-1	17.58	17.52	17.61	19.00	18.76	18.82	18.88	20.00	19.42	19.40	19.34	21.00
3GPP Rel 6	HSUPA Subtest-2	15.99	15.99	15.47	17.00	16.28	16.34	16.35	18.00	17.42	17.38	17.29	19.00
3GPP Rel 6	HSUPA Subtest-3	16.55	16.55	16.56	18.00	17.52	17.45	17.40	19.00	18.40	18.46	18.36	20.00
3GPP Rel 6	HSUPA Subtest-4	15.54	15.52	15.46	17.00	16.83	16.90	16.91	18.00	17.16	17.10	17.05	19.00
3GPP Rel 6	HSUPA Subtest-5	17.30	17.45	17.48	19.00	18.30	18.50	18.38	20.00	19.40	19.40	19.30	21.00
3GPP Rel 7	HSPA+ (16QAM) Subtest	14.95	14.83	15.18	16.50	16.06	15.94	16.34	17.50	16.69	16.66	16.65	18.50



Ant 1 -Extremity

Band	WCDMA II			Turn-Up Limit (dBm)	WCDMA IV			Turn-Up Limit (dBm)
	9262	9400	9538		1312	1413	1513	
Tx Channel	9662	9800	9938	1537	1638	1738		
Rx Channel	9662	9800	9938	1724	1824	1924		
Frequency (MHz)	1935	1940	1944	21.00	20.40	20.42	20.41	
3GPP Rel 09	AMR 12.2Kbps	19.35	19.40	19.38	21.00	20.40	20.42	20.41
3GPP Rel 09	RMC 12.2Kbps	19.36	19.41	19.40	21.00	20.41	20.43	20.42
3GPP Rel 6	HSDPA Subtest-1	18.40	18.19	18.21	20.00	19.40	19.44	19.42
3GPP Rel 6	HSDPA Subtest-2	18.18	18.35	18.35	20.00	19.37	19.40	19.41
3GPP Rel 6	HSDPA Subtest-3	17.95	17.74	17.87	19.50	18.91	18.95	18.95
3GPP Rel 6	HSDPA Subtest-4	17.66	17.95	17.94	19.50	18.88	18.89	18.87
3GPP Rel 8	DC-HSDPA Subtest-1	18.22	18.31	18.30	20.00	19.39	19.45	19.51
3GPP Rel 8	DC-HSDPA Subtest-2	18.29	18.37	18.41	20.00	19.45	19.39	19.21
3GPP Rel 8	DC-HSDPA Subtest-3	17.64	17.90	17.96	19.50	19.04	18.97	18.99
3GPP Rel 8	DC-HSDPA Subtest-4	17.72	17.87	18.00	19.50	18.94	18.84	18.75
3GPP Rel 6	HSUPA Subtest-1	18.20	18.13	18.30	20.00	19.45	19.37	19.19
3GPP Rel 6	HSUPA Subtest-2	16.36	16.32	16.28	18.00	17.51	17.54	17.65
3GPP Rel 6	HSUPA Subtest-3	17.41	17.20	17.29	19.00	18.43	18.57	18.58
3GPP Rel 6	HSUPA Subtest-4	16.41	16.66	16.44	18.00	17.56	17.71	17.44
3GPP Rel 6	HSUPA Subtest-5	18.30	18.02	18.43	20.00	19.32	19.44	19.34
3GPP Rel 7	SPA+ (16QAM) Subtest	15.87	15.83	16.05	17.50	17.01	16.79	17.15



Band 7 (2600MHz Band)
Ant 0-Hotspot

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				20850	21100	21350	19	0		
Frequency (MHz)				2510	2535	2560				
20	QPSK	1	0	17.24	17.45	17.42	18	1		
20	QPSK	1	49	17.28	17.34	17.39				
20	QPSK	1	99	17.25	17.40	17.41				
20	QPSK	50	0	16.31	16.49	16.48				
20	QPSK	50	24	16.33	16.37	16.46				
20	QPSK	50	50	16.29	16.39	16.41				
20	QPSK	100	0	16.38	16.40	16.39				
20	16QAM	1	0	16.62	16.68	16.73	18	1		
20	16QAM	1	49	16.71	16.74	16.79				
20	16QAM	1	99	16.64	16.79	16.81				
20	16QAM	50	0	15.31	15.37	15.44	17	2		
20	16QAM	50	24	15.34	15.37	15.44				
20	16QAM	50	50	15.32	15.34	15.45				
20	16QAM	100	0	15.34	15.38	15.47				
20	64QAM	1	0	15.54	15.51	15.59				
20	64QAM	1	49	15.60	15.57	15.63				
20	64QAM	1	99	15.56	15.59	15.64				
20	64QAM	50	0	14.26	14.35	14.42	16	3		
20	64QAM	50	24	14.27	14.32	14.44				
20	64QAM	50	50	14.24	14.31	14.41				
20	64QAM	100	0	14.34	14.35	14.45				
Channel				20825	21100	21375			19	0
Frequency (MHz)				2507.5	2535	2562.5				
15	QPSK	1	0	17.07	17.10	17.19	18	1		
15	QPSK	1	37	17.17	17.27	17.41				
15	QPSK	1	74	17.14	17.28	17.41				
15	QPSK	36	0	16.20	16.25	16.39				
15	QPSK	36	20	16.22	16.37	16.39				
15	QPSK	36	39	16.29	16.33	16.38				
15	QPSK	75	0	16.26	16.39	16.40				
15	16QAM	1	0	16.54	16.57	16.65	18	1		
15	16QAM	1	37	16.61	16.73	16.81				
15	16QAM	1	74	16.65	16.68	16.77				
15	16QAM	36	0	15.20	15.25	15.35	17	2		
15	16QAM	36	20	15.24	15.37	15.39				
15	16QAM	36	39	15.31	15.40	15.40				
15	16QAM	75	0	15.25	15.33	15.42				
15	64QAM	1	0	15.37	15.38	15.51				
15	64QAM	1	37	15.43	15.56	15.61				
15	64QAM	1	74	15.47	15.57	15.60				
15	64QAM	36	0	14.20	14.26	14.35	16	3		
15	64QAM	36	20	14.25	14.33	14.42				
15	64QAM	36	39	14.31	14.40	14.36				
15	64QAM	75	0	14.25	14.33	14.37				
Channel				20800	21100	21400			19	0
Frequency (MHz)				2505	2535	2565				
10	QPSK	1	0	17.15	17.20	17.33	18	1		
10	QPSK	1	25	17.23	17.29	17.35				
10	QPSK	1	49	17.19	17.32	17.38				
10	QPSK	25	0	16.31	16.33	16.43				
10	QPSK	25	12	16.25	16.36	16.46				
10	QPSK	25	25	16.32	16.42	16.46				
10	QPSK	50	0	16.33	16.42	16.46				
10	16QAM	1	0	16.52	16.57	16.73	18	1		
10	16QAM	1	25	16.59	16.70	16.80				
10	16QAM	1	49	16.51	16.71	16.78				
10	16QAM	25	0	15.30	15.33	15.41				
10	16QAM	25	12	15.27	15.36	15.44				
10	16QAM	25	25	15.33	15.43	15.39				
10	16QAM	50	0	15.27	15.37	15.46				
10	64QAM	1	0	15.36	15.40	15.52	17	2		
10	64QAM	1	25	15.45	15.53	15.60				
10	64QAM	1	49	15.38	15.53	15.58				
10	64QAM	25	0	14.27	14.33	14.41				
10	64QAM	25	12	14.30	14.38	14.43				
10	64QAM	25	25	14.31	14.43	14.39				
10	64QAM	50	0	14.24	14.36	14.39				
Channel				20775	21100	21425	19	0		
Frequency (MHz)				2502.5	2535	2567.5				
5	QPSK	1	0	17.00	17.05	17.10	18	1		
5	QPSK	1	12	17.12	17.28	17.37				
5	QPSK	1	24	17.17	17.24	17.36				
5	QPSK	12	0	16.17	16.31	16.43				
5	QPSK	12	7	16.34	16.36	16.42				
5	QPSK	12	13	16.27	16.41	16.43				
5	QPSK	25	0	16.24	16.33	16.41				
5	16QAM	1	0	16.45	16.44	16.55	18	1		
5	16QAM	1	12	16.61	16.72	16.79				
5	16QAM	1	24	16.61	16.68	16.72				
5	16QAM	12	0	15.21	15.25	15.36	17	2		
5	16QAM	12	7	15.25	15.38	15.41				
5	16QAM	12	13	15.29	15.36	15.35				
5	16QAM	25	0	15.21	15.33	15.39				
5	64QAM	1	0	15.25	15.26	15.34				
5	64QAM	1	12	15.44	15.53	15.61				
5	64QAM	1	24	15.37	15.50	15.57				
5	64QAM	12	0	14.21	14.23	14.37	16	3		
5	64QAM	12	7	14.27	14.32	14.40				
5	64QAM	12	13	14.24	14.37	14.33				
5	64QAM	25	0	14.22	14.32	14.37				

Band 7 (2600MHz Band) Ant 0 for ENDC-Hotspot												
Band	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)				
Channel				20850	21100	21350	15.5	0				
Frequency (MHz)				2510	2535	2560						
20	QPSK	1	0	13.83	14.02	13.81						
20	QPSK	1	49	13.81	13.73	13.76	14.5	1				
20	QPSK	1	99	13.80	13.66	13.76						
20	QPSK	50	0	12.83	12.83	12.70						
20	QPSK	50	24	12.80	12.73	12.76						
20	QPSK	50	50	12.85	12.72	12.72						
20	QPSK	100	0	12.83	12.76	12.75						
20	16QAM	1	0	12.82	12.85	12.90	14.5	1				
20	16QAM	1	49	12.89	13.01	13.03						
20	16QAM	1	99	12.90	12.98	13.01						
20	16QAM	50	0	11.57	11.62	11.71	13.5	2				
20	16QAM	50	24	11.80	11.70	11.84						
20	16QAM	50	50	11.67	11.70	11.82						
20	16QAM	100	0	11.82	11.66	11.82						
20	64QAM	1	0	11.89	11.71	11.76						
20	64QAM	1	49	11.77	11.90	11.93			13.5	2		
20	64QAM	1	99	11.77	11.84	11.90						
20	64QAM	50	0	10.56	10.63	10.69						
20	64QAM	50	24	10.82	10.69	10.83						
20	64QAM	50	50	10.83	10.67	10.81						
20	64QAM	100	0	10.83	10.67	10.83						
Channel				20825	21100	21375	15.5	0				
Frequency (MHz)				2507.5	2535	2562.5						
15	QPSK	1	0	13.63	13.59	13.71						
15	QPSK	1	37	13.78	13.69	13.73	14.5	1				
15	QPSK	1	74	13.74	13.84	13.89						
15	QPSK	36	0	12.69	12.81	12.92						
15	QPSK	36	20	12.80	12.92	12.94						
15	QPSK	36	39	12.82	12.92	12.96						
15	QPSK	75	0	12.78	12.88	12.94						
15	16QAM	1	0	12.90	12.90	12.98	14.5	1				
15	16QAM	1	37	13.05	13.17	13.25						
15	16QAM	1	74	13.03	13.10	13.15						
15	16QAM	36	0	11.72	11.82	11.87						
15	16QAM	36	20	11.80	11.86	12.04			13.5	2		
15	16QAM	36	39	11.77	11.89	12.06						
15	16QAM	75	0	11.75	11.86	11.97						
15	64QAM	1	0	11.76	11.77	11.82						
15	64QAM	1	37	11.92	12.04	12.12	13.5	2				
15	64QAM	1	74	11.89	11.96	12.03						
15	64QAM	36	0	10.70	10.79	10.89						
15	64QAM	36	20	10.78	10.87	11.02			12.5	3		
15	64QAM	36	39	10.79	10.88	11.01						
15	64QAM	75	0	10.74	10.86	11.02						
Channel				20800	21100	21400	15.5	0				
Frequency (MHz)				2505	2535	2565						
10	QPSK	1	0	13.54	13.59	13.71						
10	QPSK	1	25	13.66	13.71	13.80	14.5	1				
10	QPSK	1	49	13.60	13.74	13.75						
10	QPSK	25	0	12.62	12.67	12.75						
10	QPSK	25	12	12.63	12.73	12.79						
10	QPSK	25	25	12.64	12.76	12.74						
10	QPSK	50	0	12.66	12.71	12.80						
10	16QAM	1	0	12.85	12.83	12.98	14.5	1				
10	16QAM	1	25	12.93	13.01	13.06						
10	16QAM	1	49	12.85	12.99	13.00						
10	16QAM	25	0	11.64	11.65	11.87						
10	16QAM	25	12	11.63	11.69	11.91			13.5	2		
10	16QAM	25	25	11.65	11.72	11.84						
10	16QAM	50	0	11.62	11.70	11.91						
10	64QAM	1	0	11.71	11.74	11.85	13.5	2				
10	64QAM	1	25	11.82	11.89	11.94						
10	64QAM	1	49	11.73	11.88	11.90						
10	64QAM	25	0	10.63	10.65	10.87			12.5	3		
10	64QAM	25	12	10.62	10.71	10.91						
10	64QAM	25	25	10.66	10.72	10.83						
10	64QAM	50	0	10.61	10.67	10.84						
Channel				20775	21100	21425	15.5	0				
Frequency (MHz)				2502.5	2535	2567.5						
5	QPSK	1	0	13.60	13.54	13.64						
5	QPSK	1	12	13.68	13.62	13.71	14.5	1				
5	QPSK	1	24	13.61	13.63	13.69						
5	QPSK	12	0	12.61	12.63	12.64						
5	QPSK	12	7	12.57	12.59	12.67						
5	QPSK	12	13	12.55	12.59	12.66						
5	QPSK	25	0	12.58	12.60	12.68						
5	16QAM	1	0	12.79	12.82	12.91	14.5	1				
5	16QAM	1	12	12.86	12.88	12.96						
5	16QAM	1	24	12.79	12.88	12.91						
5	16QAM	12	0	11.55	11.57	11.73			13.5	2		
5	16QAM	12	7	11.55	11.55	11.77						
5	16QAM	12	13	11.53	11.57	11.81						
5	16QAM	25	0	11.58	11.58	11.81						
5	64QAM	1	0	11.69	11.69	11.77	13.5	2				
5	64QAM	1	12	11.76	11.81	11.84						
5	64QAM	1	24	11.67	11.76	11.80						
5	64QAM	12	0	10.53	10.57	10.78			12.5	3		
5	64QAM	12	7	10.53	10.52	10.74						
5	64QAM	12	13	10.73	10.52	10.74						
5	64QAM	25	0	10.57	10.57	10.78						



Band 7 (2600MHz Band)												
Ant 4 for ENDC-Head												
BW (MHz)	Modulation	RB Size	RB Offset	Power	Power	Power	Tune-up limit (dBm)	MPR (dB)				
				Low Ch. / Freq.	Middle Ch. / Freq.	High Ch. / Freq.						
Channel				20850	21100	21350						
Frequency (MHz)				2510	2535	2560						
20	QPSK	1	0	13.26	13.41	13.35	14.5	0				
20	QPSK	1	49	13.10	13.07	13.37						
20	QPSK	1	99	12.96	12.93	13.07						
20	QPSK	50	0	13.21	13.34	13.17						
20	QPSK	50	24	13.24	13.24	13.17						
20	QPSK	50	50	13.09	13.22	13.13						
20	QPSK	100	0	12.92	13.22	13.13	14.5	0				
20	16QAM	1	0	12.92	12.94	13.33						
20	16QAM	1	49	13.31	12.94	13.14						
20	16QAM	1	99	13.02	13.16	13.18						
20	16QAM	50	0	12.85	12.88	13.02						
20	16QAM	50	24	13.18	13.03	13.14						
20	16QAM	50	50	13.05	12.96	12.86	14.5	0				
20	16QAM	100	0	13.34	13.35	13.37						
20	64QAM	1	0	13.05	13.00	13.21						
20	64QAM	1	49	13.21	13.08	13.10						
20	64QAM	1	99	12.99	13.02	13.30						
20	64QAM	50	0	13.18	12.99	13.20						
20	64QAM	50	24	12.82	13.11	12.88	14.5	0				
20	64QAM	50	50	13.19	13.11	13.22						
20	64QAM	100	0	13.20	12.80	12.89						
Channel				20825	21100	21375						
Frequency (MHz)				2507.5	2535	2562.5						
15	QPSK	1	0	12.79	13.17	13.06				14.5	0	
15	QPSK	1	37	13.11	13.17	13.19						
15	QPSK	1	74	12.81	12.85	12.86						
15	QPSK	36	0	12.81	13.00	12.87						
15	QPSK	36	20	13.11	13.16	12.96						
15	QPSK	36	39	12.89	12.89	12.85						
15	QPSK	75	0	12.85	12.91	12.77	14.5	0				
15	16QAM	1	0	12.91	12.76	12.99						
15	16QAM	1	37	12.96	12.74	12.81						
15	16QAM	1	74	12.73	12.90	12.98						
15	16QAM	36	0	12.74	12.80	12.88						
15	16QAM	36	20	12.94	12.79	12.94						
15	16QAM	36	39	12.98	12.94	12.92	14.5	0				
15	16QAM	75	0	13.11	13.09	13.26						
15	64QAM	1	0	12.75	12.88	12.86						
15	64QAM	1	37	12.82	12.76	12.76						
15	64QAM	1	74	13.01	12.91	12.86						
15	64QAM	36	0	13.02	12.90	13.01						
15	64QAM	36	20	12.77	13.00	12.79	14.5	0				
15	64QAM	36	39	12.92	13.00	12.89						
15	64QAM	75	0	12.90	12.80	12.78						
Channel				20800	21100	21400						
Frequency (MHz)				2505	2535	2565						
10	QPSK	1	0	13.03	13.38	13.11				14.5	0	
10	QPSK	1	25	13.10	13.02	13.13						
10	QPSK	1	49	12.95	12.92	12.89						
10	QPSK	25	0	12.86	13.23	12.89						
10	QPSK	25	12	13.19	13.23	13.10						
10	QPSK	25	25	12.84	13.08	13.01						
10	QPSK	50	0	12.94	12.93	12.92	14.5	0				
10	16QAM	1	0	12.80	13.00	13.14						
10	16QAM	1	25	13.05	12.96	12.89						
10	16QAM	1	49	12.83	12.95	13.02						
10	16QAM	25	0	12.77	12.87	13.09						
10	16QAM	25	12	13.26	13.03	13.06						
10	16QAM	25	25	13.09	12.94	12.94	14.5	0				
10	16QAM	50	0	13.14	13.11	13.25						
10	64QAM	1	0	12.73	12.97	12.99						
10	64QAM	1	25	12.94	12.92	12.90						
10	64QAM	1	49	13.05	12.89	13.06						
10	64QAM	25	0	13.00	12.89	13.01						
10	64QAM	25	12	12.77	13.01	12.82	14.5	0				
10	64QAM	25	25	12.99	13.05	13.02						
10	64QAM	50	0	12.83	12.96	12.81						
Channel				20775	21100	21425						
Frequency (MHz)				2502.5	2535	2567.5						
5	QPSK	1	0	12.97	13.25	13.17				14.5	0	
5	QPSK	1	12	13.14	12.89	13.14						
5	QPSK	1	24	12.89	12.87	12.95						
5	QPSK	12	0	12.79	13.26	12.94						
5	QPSK	12	7	13.15	13.15	13.13						
5	QPSK	12	13	12.82	13.01	12.97						
5	QPSK	25	0	12.88	12.98	12.97	14.5	0				
5	16QAM	1	0	12.83	13.03	13.14						
5	16QAM	1	12	13.04	12.98	12.92						
5	16QAM	1	24	12.86	12.91	13.06						
5	16QAM	12	0	12.80	12.92	13.08						
5	16QAM	12	7	13.20	12.99	13.08						
5	16QAM	12	13	13.04	12.97	12.79	14.5	0				
5	16QAM	25	0	13.07	13.11	13.24						
5	64QAM	1	0	12.77	13.05	12.97						
5	64QAM	1	12	12.97	12.94	12.91						
5	64QAM	1	24	13.05	12.91	13.09						
5	64QAM	12	0	13.02	12.93	13.01						
5	64QAM	12	7	12.79	13.03	12.86	14.5	0				
5	64QAM	12	13	12.94	13.11	13.09						
5	64QAM	25	0	13.01	12.78	12.83						



Band 7 (2600MHz Band)										
Ant 4 for ENDC-Body Worn										
BW (MHz)	Modulation	RB Size	RB Offset	Power	Power	Power	Tune-up	MPR		
				Low	Middle	High				
Channel				Ch. / Freq.	Ch. / Freq.	Ch. / Freq.	Tune-up	MPR		
Frequency (MHz)				20850	21100	21350	limit	(dB)		
				2510	2535	2560				
20	QPSK	1	0	16.90	17.14	17.10				
20	QPSK	1	49	17.08	16.92	16.96	18.5	0		
20	QPSK	1	99	16.89	16.85	16.89				
20	QPSK	50	0	16.85	16.99	16.72				
20	QPSK	50	24	16.95	16.94	16.97	18.5	0		
20	QPSK	50	50	16.74	16.91	16.83				
20	QPSK	100	0	16.79	16.87	16.83				
20	16QAM	1	0	16.76	16.85	16.97				
20	16QAM	1	49	17.03	16.90	16.86	18.5	0		
20	16QAM	1	99	16.83	16.91	16.84				
20	16QAM	50	0	16.73	16.91	17.01				
20	16QAM	50	24	16.96	16.78	17.02	18.5	0		
20	16QAM	50	50	16.97	16.78	16.73				
20	16QAM	100	0	16.85	17.00	17.02				
20	64QAM	1	0	16.58	16.82	16.73				
20	64QAM	1	49	16.86	16.91	16.84	18.5	0		
20	64QAM	1	99	17.00	16.89	16.82				
20	64QAM	50	0	16.84	16.83	16.78				
20	64QAM	50	24	16.74	16.76	16.85	18.5	0		
20	64QAM	50	50	16.76	16.92	16.91				
20	64QAM	100	0	16.93	16.73	16.76				
Channel				20825	21100	21375	Tune-up	MPR		
Frequency (MHz)				2507.5	2535	2562.5	limit	(dB)		
15	QPSK	1	0	17.05	16.95	16.94				
15	QPSK	1	37	16.94	16.83	16.93	18.5	0		
15	QPSK	1	74	16.80	16.64	16.78				
15	QPSK	36	0	16.75	16.71	16.88				
15	QPSK	36	20	16.79	16.73	16.90	18.5	0		
15	QPSK	36	39	16.80	16.79	16.90				
15	QPSK	75	0	16.74	16.93	16.69				
15	16QAM	1	0	16.78	16.62	16.65				
15	16QAM	1	37	16.83	16.92	16.83	18.5	0		
15	16QAM	1	74	16.76	16.86	16.63				
15	16QAM	36	0	16.82	16.84	16.66				
15	16QAM	36	20	16.89	16.86	16.74	18.5	0		
15	16QAM	36	39	16.70	16.83	16.71				
15	16QAM	75	0	16.91	16.86	16.73				
15	64QAM	1	0	16.55	16.59	16.67				
15	64QAM	1	37	16.84	16.88	16.76	18.5	0		
15	64QAM	1	74	16.76	16.69	16.67				
15	64QAM	36	0	16.84	16.62	16.72				
15	64QAM	36	20	16.87	16.76	16.71	18.5	0		
15	64QAM	36	39	16.64	16.74	16.89				
15	64QAM	75	0	16.65	16.74	16.64				
Channel				20800	21100	21400	Tune-up	MPR		
Frequency (MHz)				2505	2535	2565	limit	(dB)		
10	QPSK	1	0	17.05	16.91	16.79				
10	QPSK	1	25	16.82	16.91	16.78	18.5	0		
10	QPSK	1	49	16.67	16.76	16.69				
10	QPSK	25	0	16.79	16.85	16.83				
10	QPSK	25	12	16.71	16.87	16.87	18.5	0		
10	QPSK	25	25	16.82	16.90	16.73				
10	QPSK	50	0	16.89	16.73	16.68				
10	16QAM	1	0	16.69	16.64	16.81				
10	16QAM	1	25	16.76	16.73	16.75	18.5	0		
10	16QAM	1	49	16.90	16.80	16.89				
10	16QAM	25	0	16.77	16.79	16.81				
10	16QAM	25	12	16.68	16.66	16.86	18.5	0		
10	16QAM	25	25	16.84	16.67	16.61				
10	16QAM	50	0	16.77	16.69	16.71				
10	64QAM	1	0	16.74	16.76	16.69				
10	64QAM	1	25	16.86	16.74	17.02	18.5	0		
10	64QAM	1	49	16.80	16.82	16.90				
10	64QAM	25	0	16.81	16.58	16.77				
10	64QAM	25	12	16.79	16.66	16.68	18.5	0		
10	64QAM	25	25	16.71	16.85	16.69				
10	64QAM	50	0	16.66	16.74	16.69				
Channel				20775	21100	21425	Tune-up	MPR		
Frequency (MHz)				2502.5	2535	2567.5	limit	(dB)		
5	QPSK	1	0	16.90	16.86	17.06				
5	QPSK	1	12	16.81	16.93	16.95	18.5	0		
5	QPSK	1	24	16.65	16.62	16.62				
5	QPSK	12	0	16.76	16.66	16.69				
5	QPSK	12	7	16.82	16.74	16.76	18.5	0		
5	QPSK	12	13	16.86	16.71	16.69				
5	QPSK	25	0	16.67	16.87	16.87				
5	16QAM	1	0	16.80	16.73	16.68				
5	16QAM	1	12	16.94	16.83	16.85	18.5	0		
5	16QAM	1	24	16.69	16.90	16.83				
5	16QAM	12	0	16.79	16.63	16.68				
5	16QAM	12	7	16.63	16.78	16.90	18.5	0		
5	16QAM	12	13	16.78	16.82	16.81				
5	16QAM	25	0	16.86	16.93	16.87				
5	64QAM	1	0	16.73	16.52	16.56				
5	64QAM	1	12	16.80	16.75	17.00	18.5	0		
5	64QAM	1	24	16.72	16.64	16.71				
5	64QAM	12	0	16.68	16.56	16.68				
5	64QAM	12	7	16.64	16.67	16.72	18.5	0		
5	64QAM	12	13	16.81	16.80	16.65				
5	64QAM	25	0	16.74	16.77	16.81				



**Band 7 (2600MHz Band)
Ant 4 for ENDC-Hotspot**

BW (MHz)	Modulation	RB Size	RB Offset	Power	Power	Power	Tune-up limit (dBm)	MPR (dB)
				Low Ch. / Freq.	Middle Ch. / Freq.	High Ch. / Freq.		
Channel				20850	21100	21350	15	0
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	13.88	14.10	13.91	15	0
20	QPSK	1	49	13.87	13.68	13.92		
20	QPSK	1	99	13.83	13.67	13.69		
20	QPSK	50	0	13.80	14.00	13.70		
20	QPSK	50	24	13.96	13.97	13.91		
20	QPSK	50	50	13.82	13.82	13.75		
20	QPSK	100	0	13.88	13.72	13.71		
20	16QAM	1	0	13.76	13.75	13.94		
20	16QAM	1	49	13.83	13.71	13.70		
20	16QAM	1	99	13.82	13.70	13.81		
20	16QAM	50	0	13.75	13.69	13.81	15	0
20	16QAM	50	24	13.99	13.78	13.87		
20	16QAM	50	50	13.84	13.74	13.76		
20	16QAM	100	0	13.87	13.88	14.04		
20	64QAM	1	0	13.72	13.78	13.77		
20	64QAM	1	49	13.76	13.71	13.65		
20	64QAM	1	99	13.77	13.65	13.86		
20	64QAM	50	0	13.75	13.66	13.79		
20	64QAM	50	24	13.70	13.77	13.63		
20	64QAM	50	50	13.72	13.83	13.84		
20	64QAM	100	0	13.73	13.69	13.63		
Channel				20825	21100	21375	15	0
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	13.78	13.92	13.99	15	0
15	QPSK	1	37	13.73	13.60	13.62		
15	QPSK	1	74	13.79	13.80	13.61		
15	QPSK	36	0	13.76	13.80	13.70		
15	QPSK	36	20	13.87	13.75	13.69		
15	QPSK	36	39	13.67	13.65	13.68		
15	QPSK	75	0	13.75	13.71	13.68		
15	16QAM	1	0	13.73	13.76	13.80		
15	16QAM	1	37	13.84	13.76	13.69		
15	16QAM	1	74	13.60	13.62	13.71		
15	16QAM	36	0	13.65	13.81	13.78	15	0
15	16QAM	36	20	13.64	13.74	13.85		
15	16QAM	36	39	13.63	13.64	13.60		
15	16QAM	75	0	13.73	13.75	13.93		
15	64QAM	1	0	13.60	13.73	13.62		
15	64QAM	1	37	13.76	13.75	13.63		
15	64QAM	1	74	13.79	13.76	13.64		
15	64QAM	36	0	13.61	13.72	13.68		
15	64QAM	36	20	13.65	13.61	13.70		
15	64QAM	36	39	13.75	13.80	13.78		
15	64QAM	75	0	13.63	13.61	13.70		
Channel				20800	21100	21400	15	0
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	13.78	13.98	13.82	15	0
10	QPSK	1	25	13.81	13.83	13.65		
10	QPSK	1	49	13.77	13.74	13.77		
10	QPSK	25	0	13.67	13.72	13.62		
10	QPSK	25	12	13.63	13.83	13.83		
10	QPSK	25	25	13.68	13.83	13.60		
10	QPSK	50	0	13.81	13.73	13.75		
10	16QAM	1	0	13.68	13.68	13.82		
10	16QAM	1	25	13.91	13.67	13.61		
10	16QAM	1	49	13.73	13.74	13.68		
10	16QAM	25	0	13.60	13.75	13.79	15	0
10	16QAM	25	12	13.74	13.64	13.79		
10	16QAM	25	25	13.72	13.79	13.62		
10	16QAM	50	0	13.62	13.71	13.85		
10	64QAM	1	0	13.64	13.62	13.61		
10	64QAM	1	25	13.72	13.84	13.66		
10	64QAM	1	49	13.77	13.79	13.74		
10	64QAM	25	0	13.71	13.72	13.75		
10	64QAM	25	12	13.67	13.69	13.64		
10	64QAM	25	25	13.71	13.74	13.67		
10	64QAM	50	0	13.76	13.74	13.75		
Channel				20775	21100	21425	15	0
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	13.75	13.90	13.92	15	0
5	QPSK	1	12	13.81	13.82	13.62		
5	QPSK	1	24	13.64	13.77	13.76		
5	QPSK	12	0	13.72	13.72	13.78		
5	QPSK	12	7	13.62	13.68	13.70		
5	QPSK	12	13	13.60	13.77	13.63		
5	QPSK	25	0	13.79	13.67	13.76		
5	16QAM	1	0	13.69	13.76	13.69		
5	16QAM	1	12	13.97	13.60	13.61		
5	16QAM	1	24	13.67	13.66	13.74		
5	16QAM	12	0	13.64	13.77	13.70	15	0
5	16QAM	12	7	13.87	13.68	13.97		
5	16QAM	12	13	13.84	13.67	13.63		
5	16QAM	25	0	13.67	13.89	13.86		
5	64QAM	1	0	13.66	13.66	13.74		
5	64QAM	1	12	13.74	13.66	13.79		
5	64QAM	1	24	13.94	13.70	13.71		
5	64QAM	12	0	13.69	13.77	13.66		
5	64QAM	12	7	13.70	13.74	13.68		
5	64QAM	12	13	13.67	13.60	13.78		
5	64QAM	25	0	13.61	13.60	13.61		



Band 7 (2600MHz Band) Ant 4 for ENDC-Extremity									
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				20850	21100	21350	19.5	0	
Frequency (MHz)				2510	2535	2560			
20	QPSK	1	0	18.60	18.84	18.80			
20	QPSK	1	49	18.78	18.62	18.66			
20	QPSK	1	99	18.39	18.55	18.59			
20	QPSK	50	0	18.55	18.69	18.42			
20	QPSK	50	24	18.65	18.64	18.67			
20	QPSK	50	50	18.44	18.61	18.53			
20	QPSK	100	0	18.49	18.57	18.53			
20	16QAM	1	0	18.46	18.55	18.67			
20	16QAM	1	49	18.73	18.60	18.56			
20	16QAM	1	99	18.53	18.61	18.54			
20	16QAM	50	0	18.43	18.61	18.71			
20	16QAM	50	24	18.66	18.48	18.72			
20	16QAM	50	50	18.67	18.48	18.43			
20	16QAM	100	0	18.55	18.70	18.72			
20	64QAM	1	0	18.28	18.52	18.43			
20	64QAM	1	49	18.56	18.61	18.54			
20	64QAM	1	99	18.70	18.59	18.52			
20	64QAM	50	0	18.54	18.53	18.48			
20	64QAM	50	24	18.44	18.46	18.55			
20	64QAM	50	50	18.46	18.62	18.61			
20	64QAM	100	0	18.63	18.43	18.46			
Channel				20825	21100	21375	19.5	0	
Frequency (MHz)				2507.5	2535	2562.5			
15	QPSK	1	0	18.75	18.65	18.64			
15	QPSK	1	37	18.64	18.53	18.63			
15	QPSK	1	74	18.50	18.34	18.48			
15	QPSK	36	0	18.45	18.41	18.58			
15	QPSK	36	20	18.49	18.43	18.60			
15	QPSK	36	39	18.50	18.49	18.60			
15	QPSK	75	0	18.44	18.63	18.39			
15	16QAM	1	0	18.48	18.32	18.35			
15	16QAM	1	37	18.53	18.62	18.53			
15	16QAM	1	74	18.46	18.56	18.33			
15	16QAM	36	0	18.52	18.54	18.36			
15	16QAM	36	20	18.59	18.56	18.44			
15	16QAM	36	39	18.40	18.53	18.41			
15	16QAM	75	0	18.61	18.56	18.43			
15	64QAM	1	0	18.25	18.19	18.37			
15	64QAM	1	37	18.54	18.58	18.46			
15	64QAM	1	74	18.46	18.39	18.37			
15	64QAM	36	0	18.54	18.32	18.42			
15	64QAM	36	20	18.57	18.46	18.41			
15	64QAM	36	39	18.34	18.44	18.59			
15	64QAM	75	0	18.35	18.44	18.34			
Channel				20800	21100	21400	19.5	0	
Frequency (MHz)				2505	2535	2565			
10	QPSK	1	0	18.75	18.61	18.49			
10	QPSK	1	25	18.52	18.61	18.48			
10	QPSK	1	49	18.37	18.46	18.39			
10	QPSK	25	0	18.49	18.55	18.53			
10	QPSK	25	12	18.41	18.57	18.57			
10	QPSK	25	25	18.52	18.60	18.43			
10	QPSK	50	0	18.59	18.43	18.38			
10	16QAM	1	0	18.39	18.34	18.51			
10	16QAM	1	25	18.46	18.43	18.45			
10	16QAM	1	49	18.60	18.50	18.59			
10	16QAM	25	0	18.47	18.49	18.51			
10	16QAM	25	12	18.38	18.36	18.56			
10	16QAM	25	25	18.54	18.37	18.31			
10	16QAM	50	0	18.47	18.39	18.41			
10	64QAM	1	0	18.44	18.46	18.39			
10	64QAM	1	25	18.56	18.44	18.72			
10	64QAM	1	49	18.50	18.52	18.60			
10	64QAM	25	0	18.51	18.28	18.47			
10	64QAM	25	12	18.49	18.36	18.38			
10	64QAM	25	25	18.41	18.55	18.39			
10	64QAM	50	0	18.36	18.44	18.39			
Channel				20775	21100	21425	19.5	0	
Frequency (MHz)				2502.5	2535	2567.5			
5	QPSK	1	0	18.60	18.56	18.76			
5	QPSK	1	12	18.51	18.63	18.65			
5	QPSK	1	24	18.35	18.32	18.32			
5	QPSK	12	0	18.46	18.36	18.39			
5	QPSK	12	7	18.52	18.44	18.46			
5	QPSK	12	13	18.56	18.41	18.39			
5	QPSK	25	0	18.37	18.57	18.57			
5	16QAM	1	0	18.50	18.43	18.38			
5	16QAM	1	12	18.64	18.53	18.55			
5	16QAM	1	24	18.39	18.60	18.53			
5	16QAM	12	0	18.49	18.33	18.38			
5	16QAM	12	7	18.33	18.48	18.60			
5	16QAM	12	13	18.48	18.52	18.51			
5	16QAM	25	0	18.56	18.63	18.57			
5	64QAM	1	0	18.43	18.22	18.26			
5	64QAM	1	12	18.50	18.45	18.70			
5	64QAM	1	24	18.42	18.34	18.41			
5	64QAM	12	0	18.38	18.26	18.38			
5	64QAM	12	7	18.34	18.37	18.42			
5	64QAM	12	13	18.51	18.50	18.35			
5	64QAM	25	0	18.44	18.47	18.51			



UL Intra Band CA

Full Power								
CA_7C								
Combination 20MHz+20MHz (100RB+100RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
20850	21048	QPSK	1	0	0	0	22.34	24.00
21100	20902	QPSK	1	0	1	99	22.52	24.00
21350	21152	QPSK	1	0	1	99	22.48	24.00
20850	21048	16QAM	1	0	0	0	21.89	23.00
21100	20902	16QAM	1	0	1	99	21.77	23.00
21350	21152	16QAM	1	0	1	99	21.80	23.00
20850	21048	64QAM	1	0	0	0	20.90	22.00
21100	20902	64QAM	1	0	1	99	21.02	22.00
21350	21152	64QAM	1	0	1	99	20.87	22.00

Body Worn								
CA_7C								
Combination 20MHz+20MHz (100RB+100RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
20850	21048	QPSK	1	0	0	0	19.69	21.00
21100	20902	QPSK	1	0	1	99	19.69	21.00
21350	21152	QPSK	1	0	1	99	19.53	21.00
20850	21048	16QAM	1	0	0	0	18.77	20.00
21100	20902	16QAM	1	0	1	99	18.63	20.00
21350	21152	16QAM	1	0	1	99	18.59	20.00
20850	21048	64QAM	1	0	0	0	17.88	19.00
21100	20902	64QAM	1	0	1	99	17.81	19.00
21350	21152	64QAM	1	0	1	99	17.85	19.00

Hotspot								
CA_7C								
Combination 20MHz+20MHz (100RB+100RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
20850	21048	QPSK	1	0	0	0	17.36	19.00
21100	20902	QPSK	1	0	1	99	17.36	19.00
21350	21152	QPSK	1	0	1	99	17.31	19.00
20850	21048	16QAM	1	0	0	0	16.88	18.00
21100	20902	16QAM	1	0	1	99	16.81	18.00
21350	21152	16QAM	1	0	1	99	16.85	18.00
20850	21048	64QAM	1	0	0	0	15.92	17.00
21100	20902	64QAM	1	0	1	99	15.99	17.00
21350	21152	64QAM	1	0	1	99	15.90	17.00

Extremity								
CA_7C								
Combination 20MHz+20MHz (100RB+100RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
20850	21048	QPSK	1	0	0	0	21.11	23.00
21100	20902	QPSK	1	0	1	99	21.19	23.00
21350	21152	QPSK	1	0	1	99	21.21	23.00
20850	21048	16QAM	1	0	0	0	20.78	22.00
21100	20902	16QAM	1	0	1	99	20.76	22.00
21350	21152	16QAM	1	0	1	99	20.73	22.00
20850	21048	64QAM	1	0	0	0	19.82	21.00
21100	20902	64QAM	1	0	1	99	19.86	21.00
21350	21152	64QAM	1	0	1	99	19.75	21.00



2CA DL

CA List	PCC								SCC					Power	
	LTE	BW	UL	UL	Mod.	UL#	UL	DL Antenna Configuration	LTE	BW	DL	DL	DL Antenna Configuration	With CA	Without CA
	Band	(MHz)	Freq. (MHz)	Channel		RB	RB		Offset	Band	(MHz)	Freq. (MHz)		Channel	Tx. Power (dBm)
CA_2A-4A	Band 2	20M	1880	1890	QPSK	1	0		Band 4	20M	2132.5	2175	4x4MIMO	22.34	22.50
	Band 4	20M	1732.5	20175	QPSK	1	0	4x4MIMO	Band 2	20M	1960	900		22.22	22.41
CA_2A-5A	Band 2	20M	1880	1890	QPSK	1	0		Band 5	10M	881.5	2525		22.43	22.50
	Band 5	10M	836.5	20525	QPSK	1	0		Band 2	20M	1960	900		22.45	22.62
CA_2A-7A	Band 2	20M	1880	1890	QPSK	1	0		Band 7	20M	2655	3100	4x4MIMO	22.34	22.50
	Band 7	20M	2535	21100	QPSK	1	0	4x4MIMO	Band 2	20M	1960	900		22.67	22.84
CA_4A-5A	Band 4	20M	1732.5	20175	QPSK	1	0		Band 5	10M	881.5	2525		22.32	22.41
	Band 5	10M	836.5	20525	QPSK	1	0		Band 4	20M	2132.5	2175	4x4MIMO	22.57	22.62
CA_4A-7A	Band 4	20M	1732.5	20175	QPSK	1	0	4x4MIMO	Band 7	20M	2655	3100	4x4MIMO	22.32	22.41
	Band 7	20M	2535	21100	QPSK	1	0	4x4MIMO	Band 4	20M	2132.5	2175	4x4MIMO	22.78	22.84
CA_4A-12A	Band 4	20M	1732.5	20175	QPSK	1	0	4x4MIMO	Band 12	10M	737.5	5095		22.32	22.41
	Band 12	10M	707.5	23095	QPSK	1	0		Band 4	20M	2132.5	2175	4x4MIMO	22.68	22.79
CA_4A-17A	Band 4	10M	1732.5	20175	QPSK	1	0	4x4MIMO	Band 17	10M	740	5790		22.20	22.41
	Band 17	10M	710	23790	QPSK	1	0		Band 4	10M	2132.5	2175	4x4MIMO	22.70	22.77
CA_5A-7A	Band 5	10M	836.5	20525	QPSK	1	0		Band 7	20M	2655	3100	4x4MIMO	22.45	22.62
	Band 7	20M	2535	21100	QPSK	1	0	4x4MIMO	Band 5	10M	881.5	2525		22.76	22.84
CA_5A-38A	Band 5	10M	836.5	20525	QPSK	1	0		Band 38	20M	2595	38000	4x4MIMO	22.56	22.62
	Band 38	20M	2595	38000	QPSK	1	0	4x4MIMO	Band 5	10M	881.5	2525		22.67	22.94
CA_5A-41A	Band 5	10M	836.5	20525	QPSK	1	0		Band 41	20M	2593	40620	4x4MIMO	22.45	22.62
	Band 41	20M	2598	40670	QPSK	1	0	4x4MIMO	Band 5	10M	881.5	2525		22.98	23.11
CA_5A-66A	Band 5	10M	836.5	20525	QPSK	1	0		Band 66	20M	2155	66886		22.54	22.62
	Band 66	20M	1745	132322	QPSK	1	0		Band 5	10M	881.5	2525		22.32	22.44
CA_12A-66A	Band 12	10M	707.5	23095	QPSK	1	0		Band 66	20M	2155	66886		22.66	22.79
	Band 66	20M	1745	132322	QPSK	1	0		Band 12	10M	737.5	5095		22.32	22.44
CA_26A-41A	Band 26	15M	831.5	28865	QPSK	1	0		Band 41	20M	2593	40620	4x4MIMO	22.56	22.67
	Band 41	20M	2598	40670	QPSK	1	0	4x4MIMO	Band 26	15M	876.5	8865		23.04	23.11
CA_7B	Band 7	15M	2535	21100	QPSK	1	0	4x4MIMO	Band 7	5M	2664.3	3193	4x4MIMO	22.67	22.83
CA_7C	Band 7	20M	2535	21100	QPSK	1	0	4x4MIMO	Band 7	20M	2674.8	3298	4x4MIMO	22.76	22.84
CA_38C	Band 38	20M	2595.1	37901	QPSK	1	0	4x4MIMO	Band 38	20M	2604.9	38099	4x4MIMO	22.76	22.81
CA_41C	Band 41	20M	2598	40670	QPSK	1	0	4x4MIMO	Band 41	20M	2617.9	40868	4x4MIMO	22.98	23.11
CA_66B	Band 66	15M	1745	132322	QPSK	1	0		Band 66	5M	2164.3	66979		22.23	22.32
CA_66C	Band 66	20M	1745	132322	QPSK	1	0		Band 66	20M	2174.8	67084		22.23	22.44
CA_4A-4A	Band 4	20M	1732.5	20175	QPSK	1	0	4x4MIMO	Band 4	5M	2152.5	2375	4x4MIMO	22.33	22.41
CA_7A-7A	Band 7	20M	2535	21100	QPSK	1	0	4x4MIMO	Band 7	5M	2687.5	3425	4x4MIMO	22.76	22.84
CA_41A-41A	Band 41	20M	2598	40670	QPSK	1	0	4x4MIMO	Band 41	5M	2498.5	39675	4x4MIMO	22.98	23.11
CA_66A-66A	Band 66	20M	1745	132322	QPSK	1	0		Band 66	5M	2197.5	67311		22.23	22.44



Reduced power Mode

n7_Ant 4 for Head								
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				502000	507000	512000		
Frequency (MHz)				2510	2535	2560		
20	PI/2 BPSK	1	1	13.27	13.16	13.13	15.0	0.0
20	PI/2 BPSK	1	53	13.35	13.30	13.31		
20	PI/2 BPSK	1	104	13.16	13.22	13.15		
20	PI/2 BPSK	50	0	13.26	13.33	13.27	15.0	0.0
20	PI/2 BPSK	50	28	13.30	13.35	13.34	15.0	0.0
20	PI/2 BPSK	50	56	13.27	13.30	13.23	15.0	0.0
20	PI/2 BPSK	100	0	13.26	13.31	13.24		
20	QPSK	1	1	13.22	13.38	13.13		
20	QPSK	1	53	13.30	13.34	13.33	15.0	0.0
20	QPSK	1	104	13.19	13.21	13.20	15.0	0.0
20	QPSK	50	0	13.23	13.32	13.27		
20	QPSK	50	28	13.27	13.37	13.36		
20	QPSK	50	56	13.16	13.26	13.22	15.0	0.0
20	QPSK	100	0	13.30	13.32	13.29		
20	16QAM	1	1	12.92	12.99	12.95		
20	64QAM	1	1	12.94	13.02	12.98	15.0	0.0
20	256QAM	1	1	13.31	13.26	13.30	15.0	0.0
Channel				501500	507000	512500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	1	13.09	13.28	13.15	15.0	0.0
Channel				501000	507000	513000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	1	13.00	13.22	13.01	15.0	0.0
Channel				500500	507000	513500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	1	13.10	13.15	12.92	15.0	0.0



n77_Ant 5 for Head									
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)									
100	PV2 BPSK	1	1	11.88	12.08	11.97			
100	PV2 BPSK	1	137	12.65	12.75	12.61	14.0	0.0	
100	PV2 BPSK	1	271	11.86	12.05	11.93			
100	PV2 BPSK	135	0	12.52	12.66	12.60	14.0	0.0	
100	PV2 BPSK	135	69	12.53	12.72	12.55	14.0	0.0	
100	PV2 BPSK	135	138	12.51	12.71	12.66			
100	PV2 BPSK	270	0	12.56	12.69	12.59	14.0	0.0	
100	QPSK	1	1	11.96	12.06	11.95			
100	QPSK	1	137	12.67	12.76	12.54	14.0	0.0	
100	QPSK	1	271	11.93	12.06	11.84			
100	QPSK	135	0	12.48	12.66	12.41			
100	QPSK	135	69	12.54	12.68	12.61	14.0	0.0	
100	QPSK	135	138	12.61	12.62	12.60			
100	QPSK	270	0	12.08	12.18	11.95	14.0	0.0	
100	16QAM	1	1	12.00	12.21	12.12	14.0	0.0	
100	64QAM	1	1	11.84	12.05	11.97	14.0	0.0	
100	256QAM	1	1	12.14	12.19	12.11	14.0	0.0	
Channel									
Frequency (MHz)									
90	QPSK	1	120	649668	650000	662334	tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
80	QPSK	1	109	649334	650000	662668	tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
70	QPSK	1	94	649000	650000	663000	tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
60	QPSK	1	81	648668	650000	663334	tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
50	QPSK	1	67	648334	650000	663668	tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
40	QPSK	1	53	648000	650000	664000	tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
20	QPSK	1	26	647334	650000	664668	tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
15	QPSK	1	19	647168	650000	664834	tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
10	QPSK	1	12	3707.52	3840	3972.51	tune-up limit (dBm)	MPR (dB)	

n78_Ant 5 for Head									
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)									
100	PV2 BPSK	1	1						
100	PV2 BPSK	1	137				14.0	0.0	
100	PV2 BPSK	1	271						
100	PV2 BPSK	135	0				14.0	0.0	
100	PV2 BPSK	135	69				14.0	0.0	
100	PV2 BPSK	135	138						
100	PV2 BPSK	270	0				14.0	0.0	
100	QPSK	1	1						
100	QPSK	1	137				14.0	0.0	
100	QPSK	1	271						
100	QPSK	135	0						
100	QPSK	135	69				14.0	0.0	
100	QPSK	135	138						
100	QPSK	270	0				14.0	0.0	
100	16QAM	1	1				14.0	0.0	
100	64QAM	1	1				14.0	0.0	
100	256QAM	1	1				14.0	0.0	
Channel									
Frequency (MHz)									
90	QPSK	1	120	649668	650000	663034	tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
80	QPSK	1	109	649334	650000	663368	tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
70	QPSK	1	94	649000	650000	663700	tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
60	QPSK	1	81	648668	650000	664034	tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
50	QPSK	1	67	648334	650000	664368	tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
40	QPSK	1	53	648000	650000	664700	tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
20	QPSK	1	26	647334	650000	665034	tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
15	QPSK	1	19	647168	650000	665368	tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
10	QPSK	1	12	3707.52	3840	3975	tune-up limit (dBm)	MPR (dB)	



n7_Ant 4 for Hotspot								
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				502000	507000	512000		
Frequency (MHz)				2510	2535	2560		
20	PI/2 BPSK	1	1	14.23	14.16	14.23		
20	PI/2 BPSK	1	53	14.22	14.28	14.13	15.5	0.0
20	PI/2 BPSK	1	104	14.18	14.11	14.15		
20	PI/2 BPSK	50	0	14.13	14.25	14.21	15.5	0.0
20	PI/2 BPSK	50	28	14.26	14.26	14.23	15.5	0.0
20	PI/2 BPSK	50	56	14.13	14.22	14.08		
20	PI/2 BPSK	100	0	14.11	14.14	14.12	15.5	0.0
20	QPSK	1	1	14.26	14.45	14.14		
20	QPSK	1	53	14.29	14.20	14.20	15.5	0.0
20	QPSK	1	104	14.07	14.07	14.20		
20	QPSK	50	0	14.07	14.24	14.27	15.5	0.0
20	QPSK	50	28	14.35	14.42	14.29	15.5	0.0
20	QPSK	50	56	13.99	14.15	14.22		
20	QPSK	100	0	14.20	14.23	14.21	15.5	0.0
20	16QAM	1	1	13.81	13.82	13.84	15.5	0.0
20	64QAM	1	1	13.95	13.97	13.98	15.5	0.0
20	256QAM	1	1	14.18	14.24	14.18	15.5	0.0
Channel				501500	507000	512500		
Frequency (MHz)				2507.5	2535	2562.5	tune-up limit (dBm)	MPR (dB)
15	QPSK	1	1	14.18	14.24	13.83	15.5	0.0
Channel				501000	507000	513000		
Frequency (MHz)				2505	2535	2565	tune-up limit (dBm)	MPR (dB)
10	QPSK	1	1	14.11	14.24	13.95	15.5	0.0
Channel				500500	507000	513500		
Frequency (MHz)				2502.5	2535	2567.5	tune-up limit (dBm)	MPR (dB)
5	QPSK	1	1	14.19	14.17	14.06	15.5	0.0



n7_Ant 4 for Extremity									
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				502000	507000	512000			
Frequency (MHz)				2510	2535	2560			
20	PI/2 BPSK	1	1	19.40	19.21	19.12			
20	PI/2 BPSK	1	53	19.17	19.28	19.32			
20	PI/2 BPSK	1	104	19.04	18.85	19.12			
20	PI/2 BPSK	50	0	19.09	19.28	19.04	20.0	0.0	
20	PI/2 BPSK	50	28	19.25	19.03	19.17	20.0	0.0	
20	PI/2 BPSK	50	56	19.04	19.02	18.92			
20	PI/2 BPSK	100	0	19.16	19.06	19.22	20.0	0.0	
20	QPSK	1	1	19.37	19.41	19.11			
20	QPSK	1	53	19.25	18.80	19.21	20.0	0.0	
20	QPSK	1	104	19.36	19.03	18.96			
20	QPSK	50	0	19.25	18.88	19.25	20.0	0.0	
20	QPSK	50	28	19.14	19.38	19.27	20.0	0.0	
20	QPSK	50	56	19.04	18.92	19.05			
20	QPSK	100	0	19.07	19.18	19.04	20.0	0.0	
20	16QAM	1	1	18.94	19.04	18.98	20.0	0.0	
20	64QAM	1	1	18.97	19.08	19.03	20.0	0.0	
20	256QAM	1	1	18.58	18.56	18.68	19.5	0.5	
Channel				501500	507000	512500			
Frequency (MHz)				2507.5	2535	2562.5	Tune-up limit (dBm)	MPR (dB)	
15	QPSK	1	1	19.19	19.32	19.88	20.0	0.0	
Channel				501000	507000	513000			
Frequency (MHz)				2505	2535	2565	Tune-up limit (dBm)	MPR (dB)	
10	QPSK	1	1	19.22	19.20	18.89	20.0	0.0	
Channel				500500	507000	513500			
Frequency (MHz)				2502.5	2535	2567.5	Tune-up limit (dBm)	MPR (dB)	
5	QPSK	1	1	19.18	19.17	18.92	20.0	0.0	

n66_Ant 1 for Extremity									
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				346000	349000	352000			
Frequency (MHz)				1730	1745	1760			
40	PI/2 BPSK	1	1	19.17	19.18	19.18			
40	PI/2 BPSK	1	108	19.09	19.11	19.17			
40	PI/2 BPSK	1	214	19.05	18.96	18.94	20.0	0.0	
40	PI/2 BPSK	108	0	19.16	18.93	19.11	20.0	0.0	
40	PI/2 BPSK	108	54	19.11	18.95	18.83	20.0	0.0	
40	PI/2 BPSK	108	108	18.99	19.10	19.03			
40	PI/2 BPSK	216	0	19.20	19.13	18.89	20.0	0.0	
40	QPSK	1	1	19.16	19.21	19.11			
40	QPSK	1	108	19.02	18.93	19.01	20.0	0.0	
40	QPSK	1	214	19.11	18.76	18.95			
40	QPSK	108	0	19.01	19.08	18.98	20.0	0.0	
40	QPSK	108	54	19.08	19.14	19.14	20.0	0.0	
40	QPSK	108	108	19.11	19.13	19.11			
40	QPSK	216	0	19.00	19.06	19.02	20.0	0.0	
40	16QAM	1	1	19.04	18.65	18.76	20.0	0.0	
40	64QAM	1	1	18.54	18.57	18.77	20.0	0.0	
40	256QAM	1	1	18.67	18.59	18.76	19.5	0.5	
Channel				344000	349000	354000			
Frequency (MHz)				1720	1745	1770	Tune-up limit (dBm)	MPR (dB)	
20	QPSK	1	1	19.94	19.02	18.88	20.0	0.0	
Channel				343500	349000	354500			
Frequency (MHz)				1717.5	1745	1772.5	Tune-up limit (dBm)	MPR (dB)	
15	QPSK	1	1	19.93	18.99	18.96	20.0	0.0	
Channel				343000	349000	355000			
Frequency (MHz)				1715	1745	1775	Tune-up limit (dBm)	MPR (dB)	
10	QPSK	1	1	18.86	19.00	18.99	20.0	0.0	
Channel				342500	349000	355500			
Frequency (MHz)				1712.5	1745	1777.5	Tune-up limit (dBm)	MPR (dB)	
5	QPSK	1	1	19.11	19.01	18.89	20.0	0.0	

