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CALIBRATION LABORATORY

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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: 1176

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

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.382$ S/m; $\epsilon_r = 39.76$; $\rho = 1000$ kg/m³

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:

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

Reference Value = 97.37 V/m; Power Drift = 0.01 dB

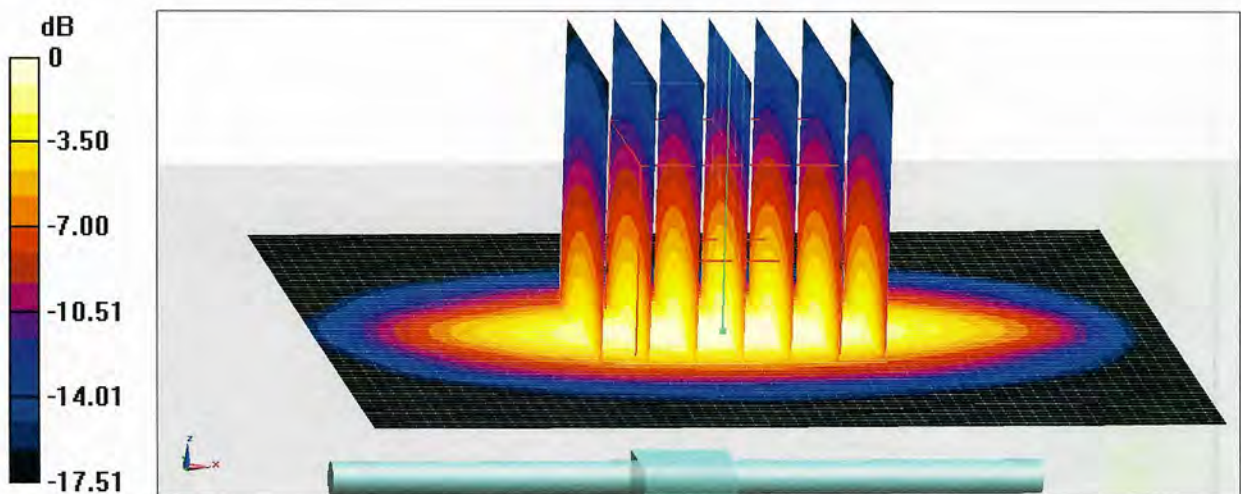
Peak SAR (extrapolated) = 17.4 W/kg

SAR(1 g) = 9.21 W/kg; SAR(10 g) = 4.83 W/kg

Smallest distance from peaks to all points 3 dB below = 10.2 mm

Ratio of SAR at M2 to SAR at M1 = 53%

Maximum value of SAR (measured) = 14.4 W/kg



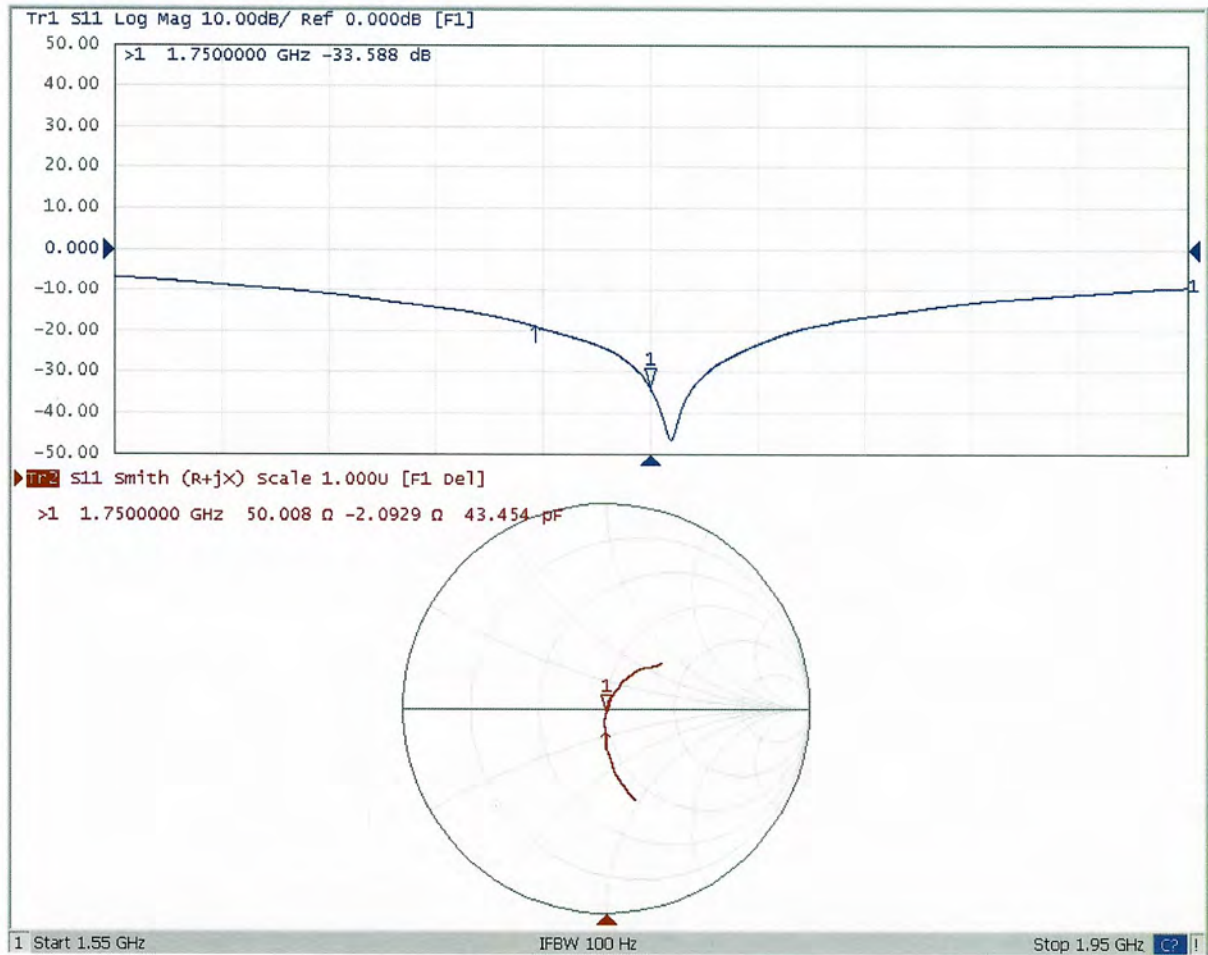
0 dB = 14.4 W/kg = 11.58 dBW/kg



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Impedance Measurement Plot for Head TSL



D1750V2 - SN: 1176 Extended Dipole Calibrations

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

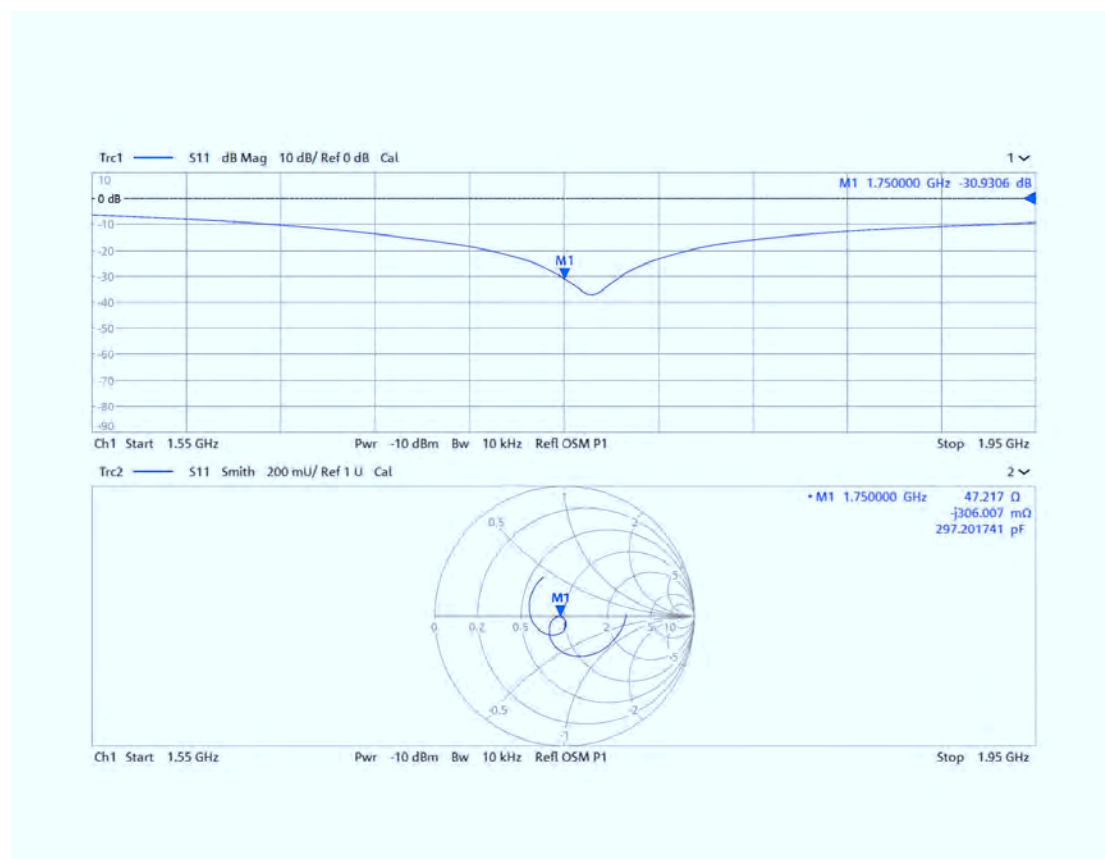
D1750V2 - SN: 1176						
1750MHz Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
10.19.2021	-33.6		50		-2.09	
10.18.2022	-30.93	-7.94	47.22	-2.78	-0.31	1.78
10.17.2023	-30.44	-9.41	47.85	-2.15	1.96	4.05

<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>

Head 1750MHz _2022.10.18

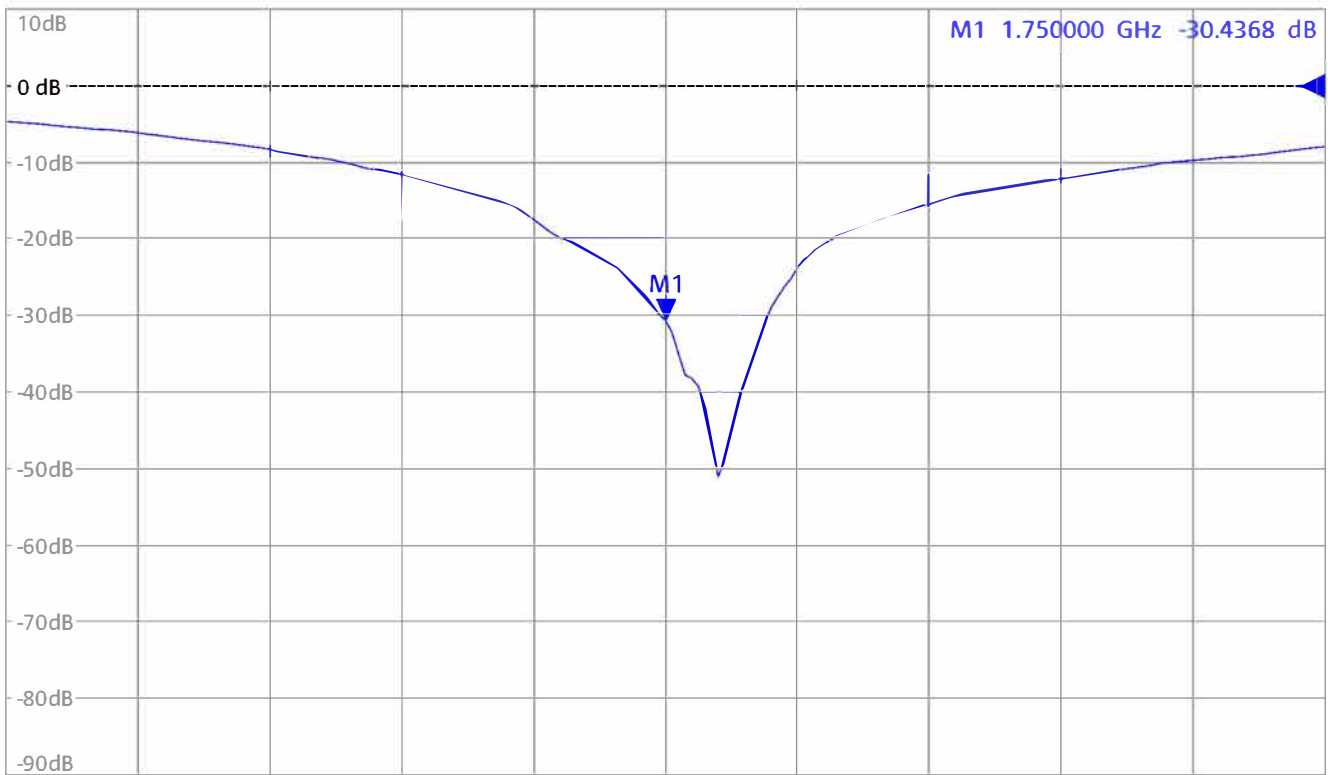


<Dipole Verification Data>

Head 1750MHz _2023.10.17

Trc1 — S11 dB Mag 10 dB/ Ref 0 dB Cal

1

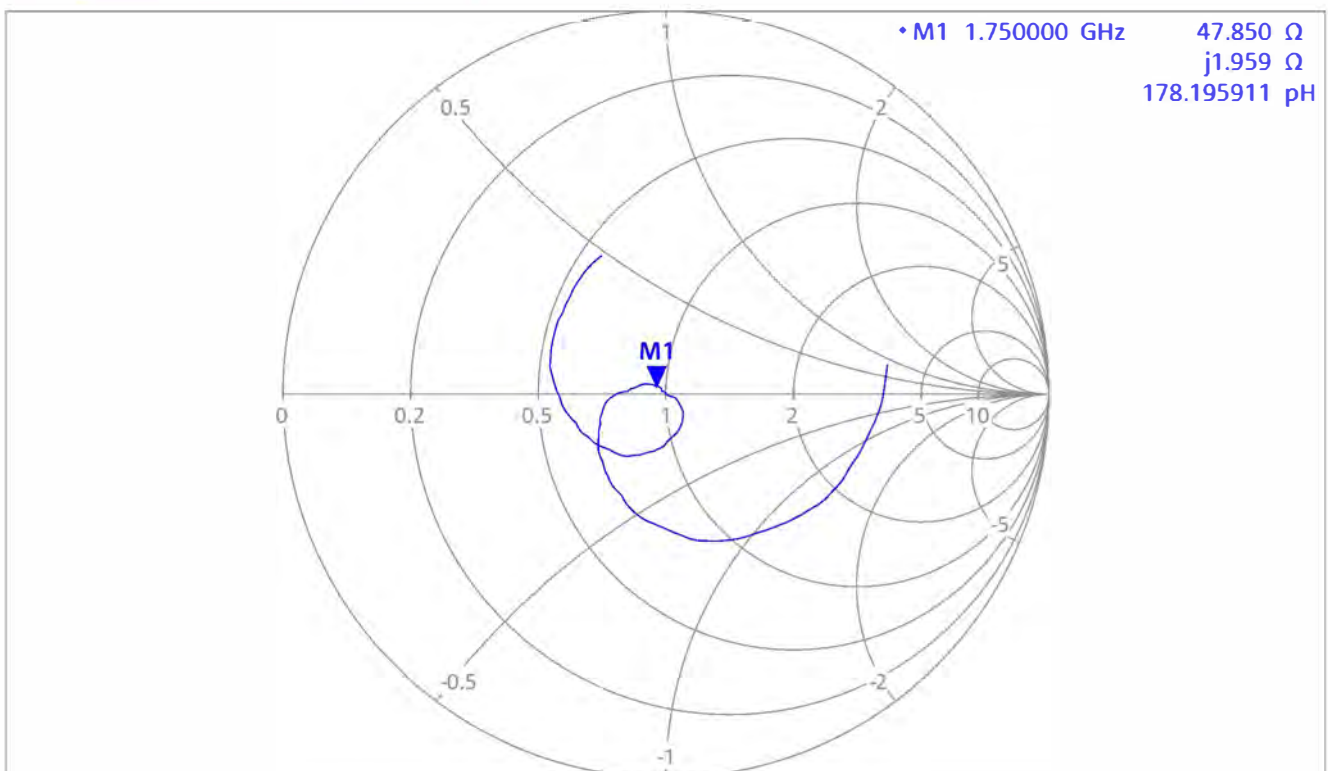


Ch1 Start 1.55 GHz Pwr -10 dBm Bw 10 kHz Refl OSM P1

Stop 1.95 GHz

Trc2 — S11 Smith 200 mU/ Ref 1 U Cal

2



Ch1 Start 1.55 GHz Pwr -10 dBm Bw 10 kHz Refl OSM P1

Stop 1.95 GHz



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CNAS L0570

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Client **7layers**

Certificate No: **Z21-60423**

CALIBRATION CERTIFICATE

Object **D1950V3 - SN: 1229**

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

Calibration date: **October 28, 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 $(22\pm3)^{\circ}\text{C}$ and humidity $<70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Power sensor NRP8S	104291	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Reference Probe EX3DV4	SN 7517	03-Feb-21(CTTL-SPEAG,No.Z21-60001)	Feb-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: October 31, 2021

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Glossary:

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

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for 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	1950 MHz $\pm$ 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 $\pm$ 0.2) °C	38.9 $\pm$ 6 %	1.39 mho/m $\pm$ 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.1 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.3 W/kg $\pm$ 18.8 % (k=2)
SAR averaged over 10 cm³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.08 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.3 W/kg $\pm$ 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	$50.5\Omega + 2.19j\Omega$
Return Loss	- 33.0dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.102 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

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DASY5 Validation Report for Head TSL

Date: 10.28.2021

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 1950 MHz; Type: D1950V3; Serial: D1950V3 - SN: 1229

Communication System: UID 0, CW; Frequency: 1950 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1950$ MHz; $\sigma = 1.39$ S/m; $\epsilon_r = 38.86$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7517; ConvF(7.81, 7.81, 7.81) @ 1950 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:

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

Reference Value = 103.9 V/m; Power Drift = 0.06 dB

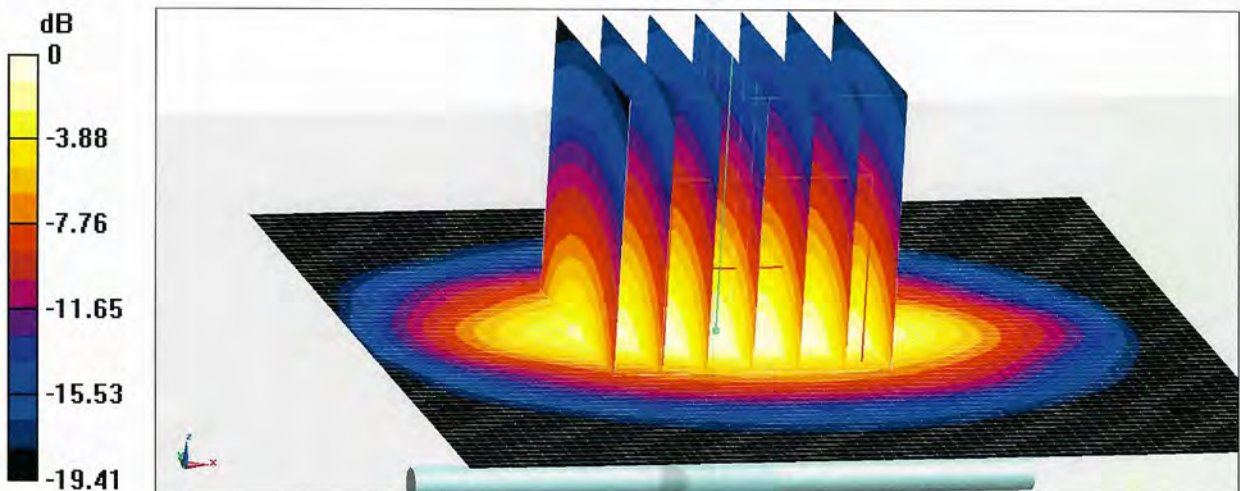
Peak SAR (extrapolated) = 20.0 W/kg

SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.08 W/kg

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

Ratio of SAR at M2 to SAR at M1 = 50.6%

Maximum value of SAR (measured) = 16.3 W/kg



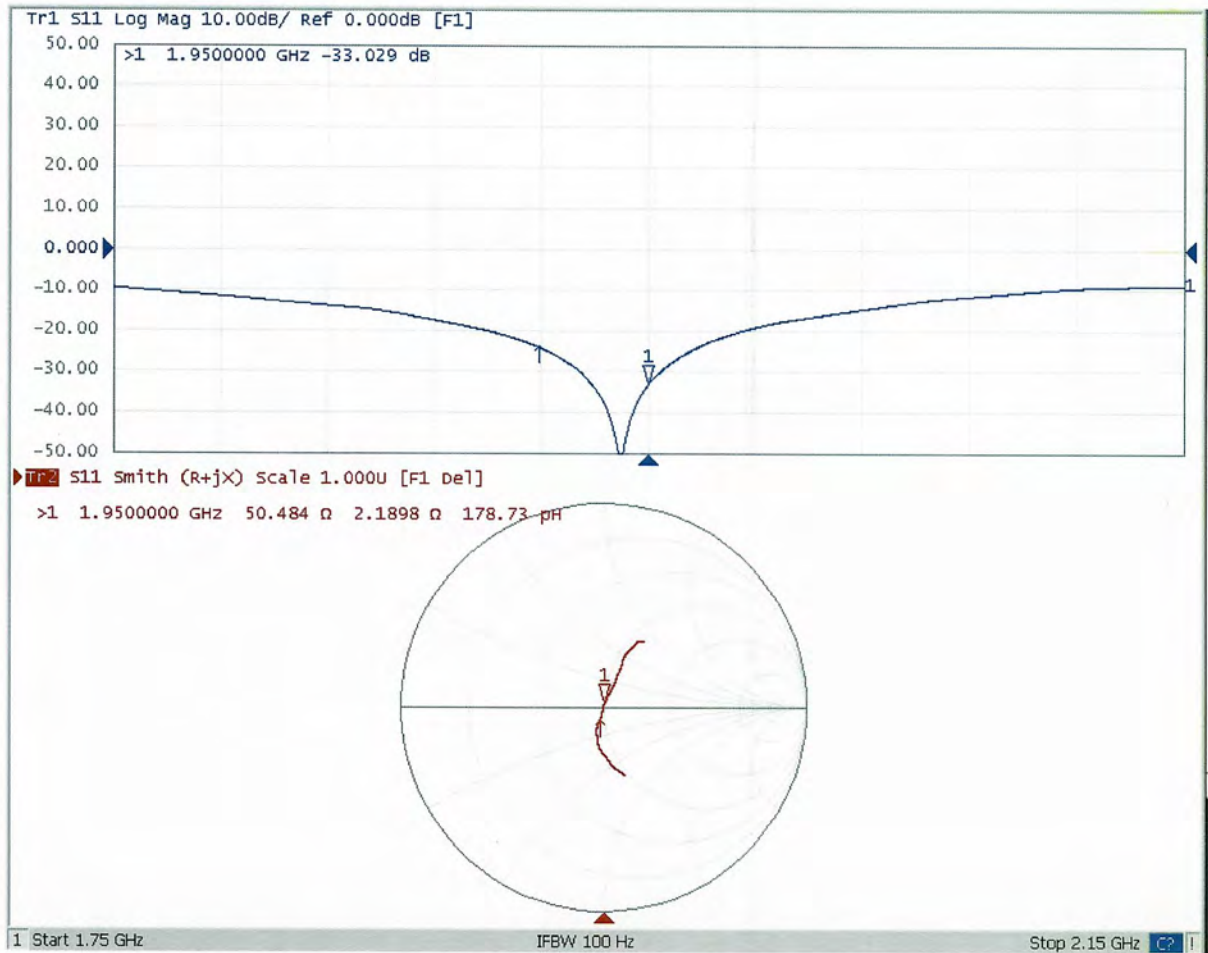
0 dB = 16.3 W/kg = 12.12 dBW/kg



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Impedance Measurement Plot for Head TSL



D1950V3 - SN: 1229 Extended Dipole Calibrations

Referring to KDB 865664 D01, 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.

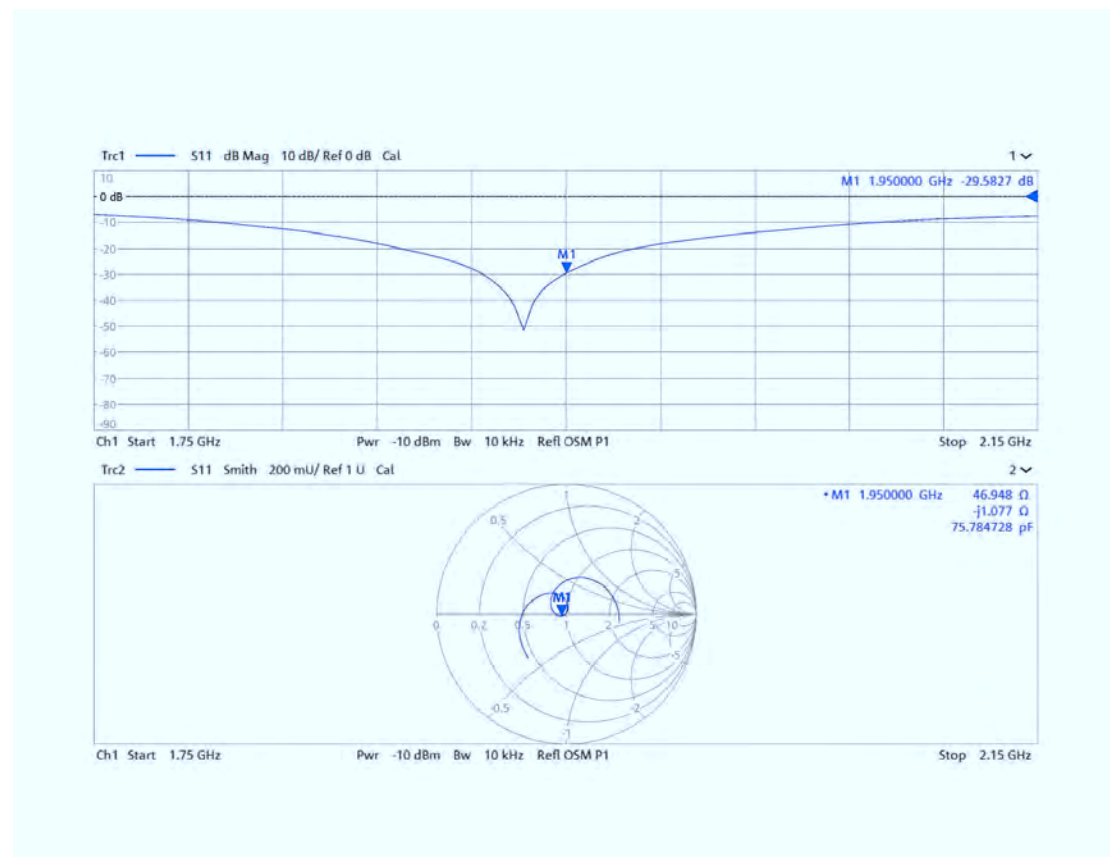
D1950V3 - SN: 1229						
1950MHz Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
10.28.2021	-33		50.5		2.19	
10.27.2022	-29.58	-10.36	46.95	-3.55	-1.08	-3.27
10.26.2023	-28.50	-13.63	46.77	-3.73	3.33	1.14

<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.

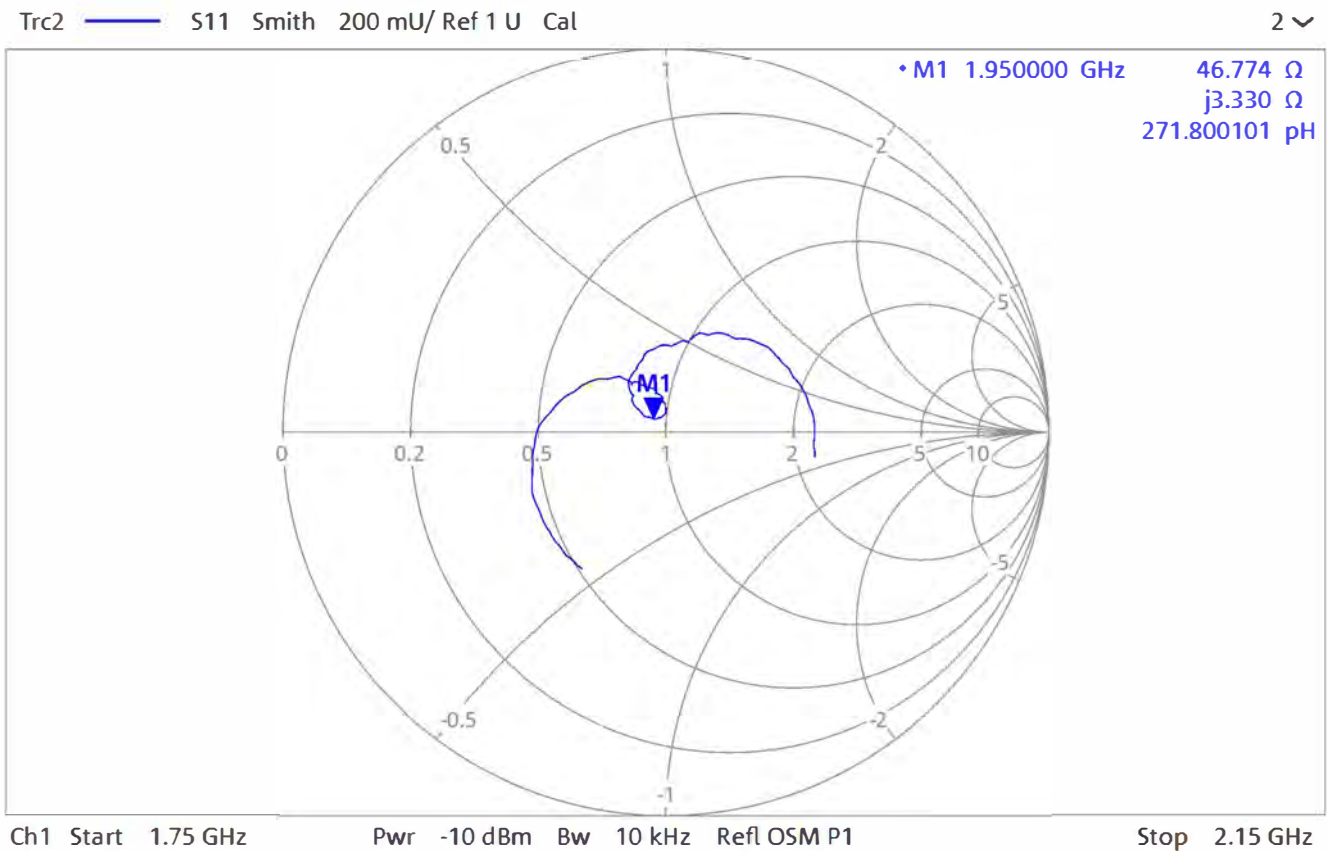
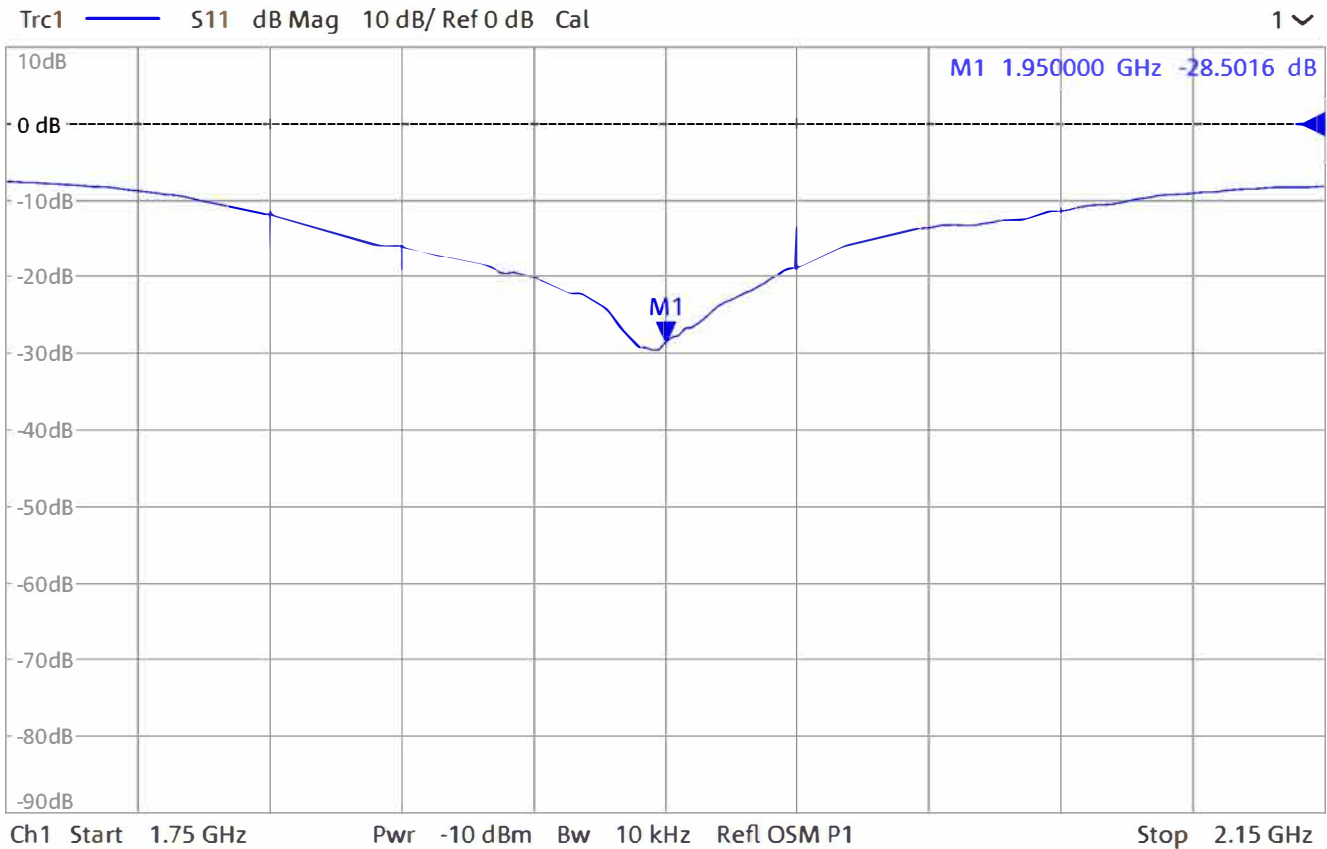
<Dipole Verification Data>

Head 1950MHz _2022.10.27



<Dipole Verification Data>

Head 1950MHz _2023.10.26





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Client

7layers

Certificate No: Z21-60425

CALIBRATION CERTIFICATE

Object D2450V2 - SN: 1048

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

Calibration date: October 21, 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 $(22\pm3)^{\circ}\text{C}$ and humidity $<70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Power sensor NRP8S	104291	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Reference Probe EX3DV4	SN 7517	03-Feb-21(CTTL-SPEAG,No.Z21-60001)	Feb-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: October 27, 2021

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Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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



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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	2450 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	39.5 $\pm$ 6 %	1.81 mho/m $\pm$ 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.2 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	52.8 W/kg $\pm$ 18.8 % (k=2)
SAR averaged over 10 cm³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	6.05 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.2 W/kg $\pm$ 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	50.6Ω+ 8.39jΩ
Return Loss	- 21.6dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.057 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

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

Additional EUT Data

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DASY5 Validation Report for Head TSL

Date: 10.21.2021

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 1048

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

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.809$ S/m; $\epsilon_r = 39.51$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7517; ConvF(7.34, 7.34, 7.34) @ 2450 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)

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

Reference Value = 108.6 V/m; Power Drift = -0.02 dB

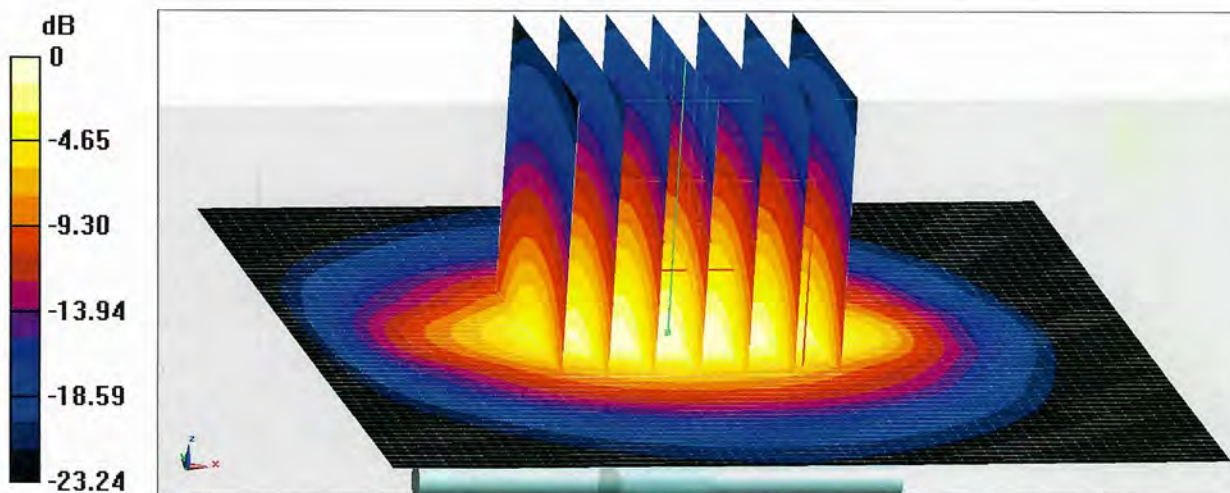
Peak SAR (extrapolated) = 28.0 W/kg

SAR(1 g) = 13.2 W/kg; SAR(10 g) = 6.05 W/kg

Smallest distance from peaks to all points 3 dB below = 9 mm

Ratio of SAR at M2 to SAR at M1 = 47.1%

Maximum value of SAR (measured) = 22.5 W/kg



0 dB = 22.5 W/kg = 13.52 dBW/kg



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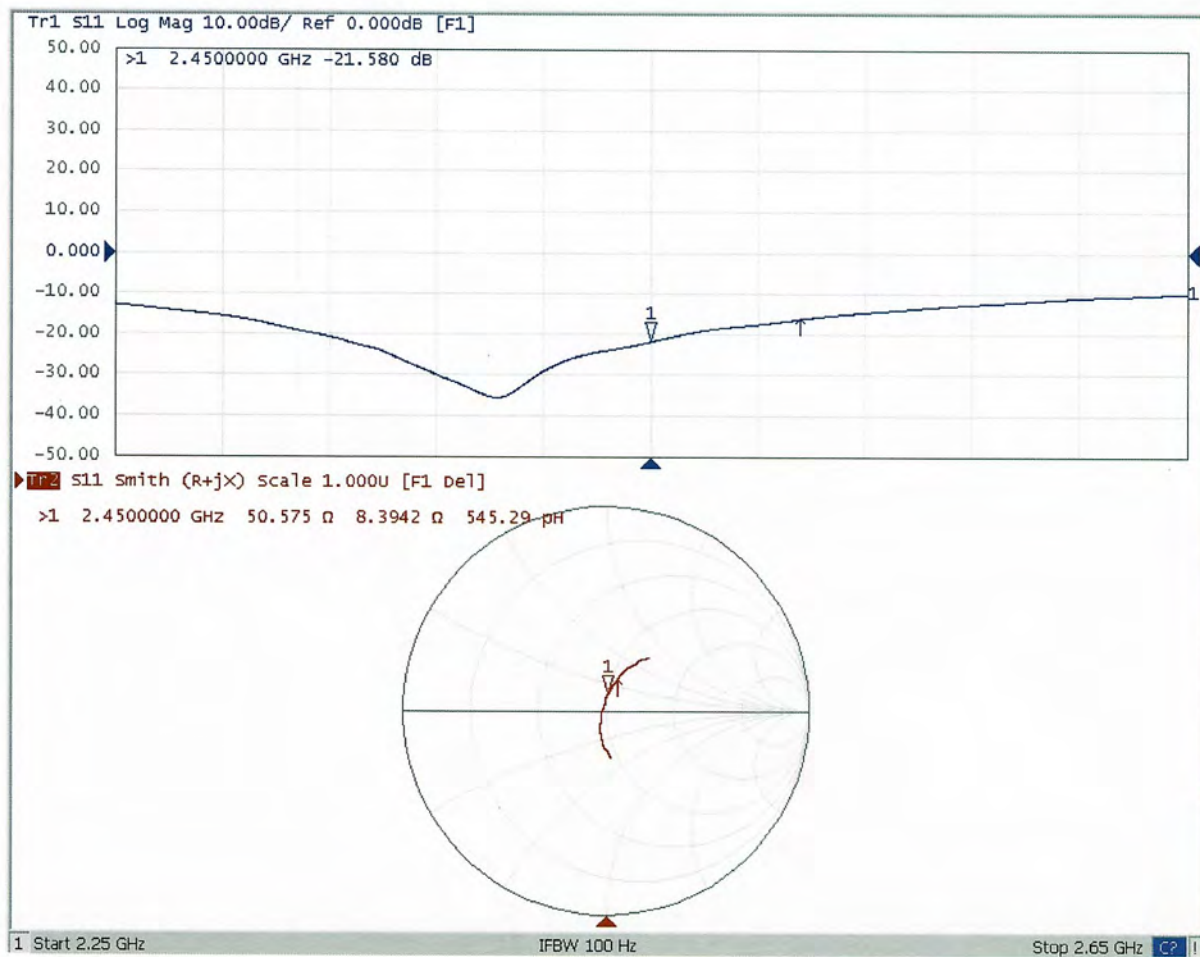
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E-mail: cttl@chinattl.com

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Impedance Measurement Plot for Head TSL



D2450V2 - SN: 1048 Extended Dipole Calibrations

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

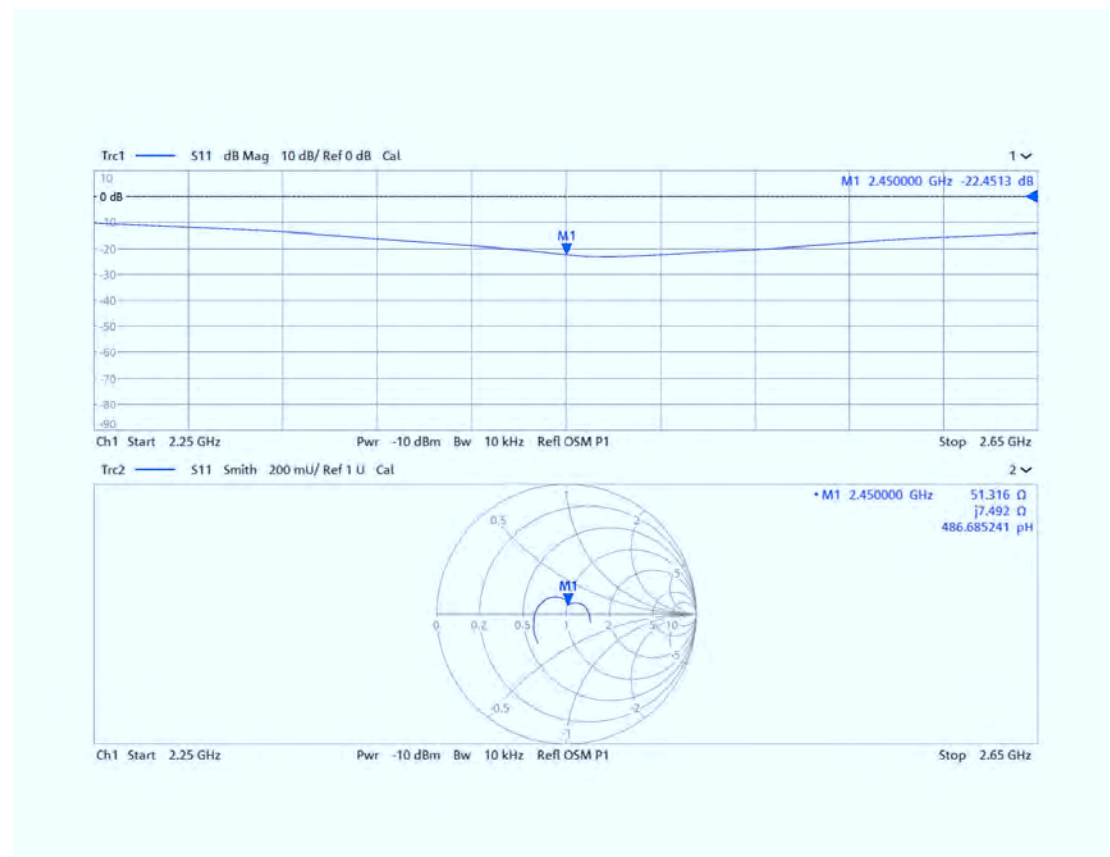
D2450V2 - SN: 1048						
2450MHz Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
10.21.2021	-21.6		50.6		8.39	
10.20.2022	-22.45	3.94	51.32	0.72	7.49	-0.90
10.19.2023	-24.13	11.71	47.08	-3.52	5.46	-2.93

<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.

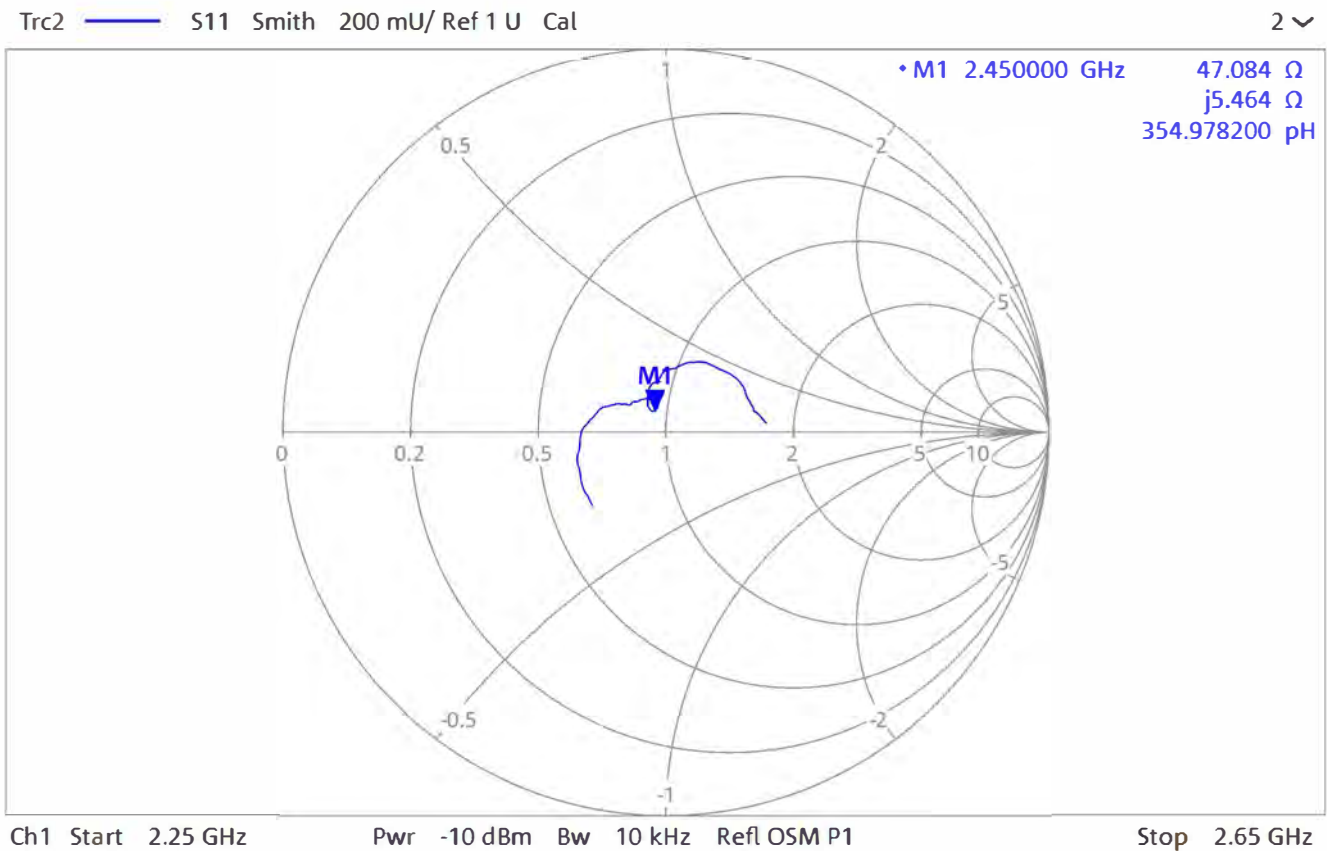
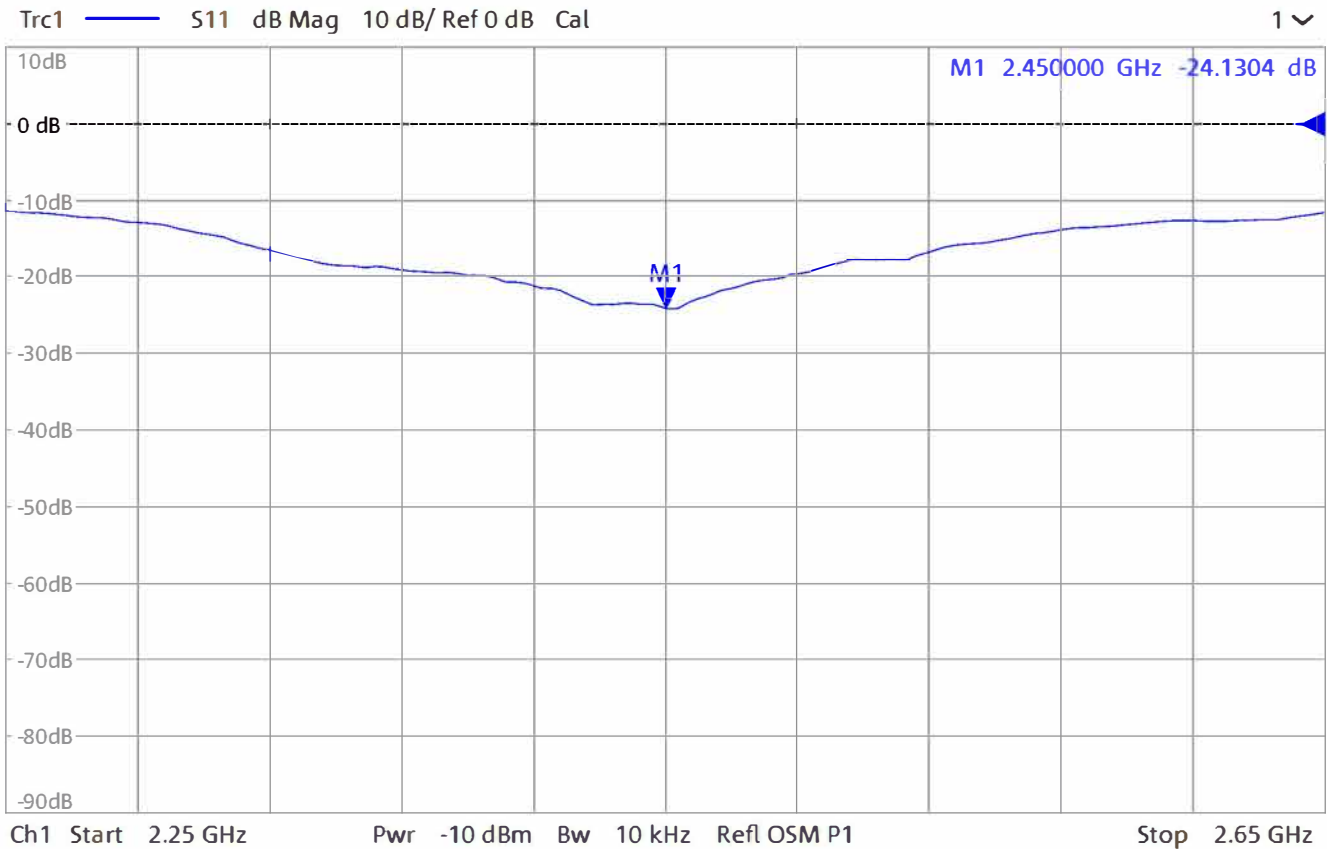
<Dipole Verification Data>

Head 2450MHz _2022.10.20



<Dipole Verification Data>

Head 2450MHz _2023.10.19





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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 **7-Layers (Auden)**

Certificate No: **D2550V2-1022_Sep22**

CALIBRATION CERTIFICATE

Object **D2550V2 - SN:1022**

Calibration procedure(s) **QA CAL-05.v11
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz**

Calibration date: **September 22, 2022**

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	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	Dec-22
DAE4	SN: 601	31-Aug-22 (No. DAE4-601_Aug22)	Aug-23
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Sven Kühn	Technical Manager	

Issued: September 23, 2022

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Accredited by the Swiss Accreditation Service (SAS)

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Glossary:

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

Calibration is Performed According to the Following Standards:

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2550 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.1	1.91 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	37.4 $\pm$ 6 %	1.95 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	53.0 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.13 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.2 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.0 Ω - 4.0 j Ω
Return Loss	- 27.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.157 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: 22.09.2022

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2550 MHz; Type: D2550V2; Serial: D2550V2 - SN:1022

Communication System: UID 0 - CW; Frequency: 2550 MHz

Medium parameters used: $f = 2550$ MHz; $\sigma = 1.95$ S/m; $\epsilon_r = 37.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.85, 7.85, 7.85) @ 2550 MHz; Calibrated: 31.12.2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 31.08.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 113.1 V/m; Power Drift = 0.06 dB

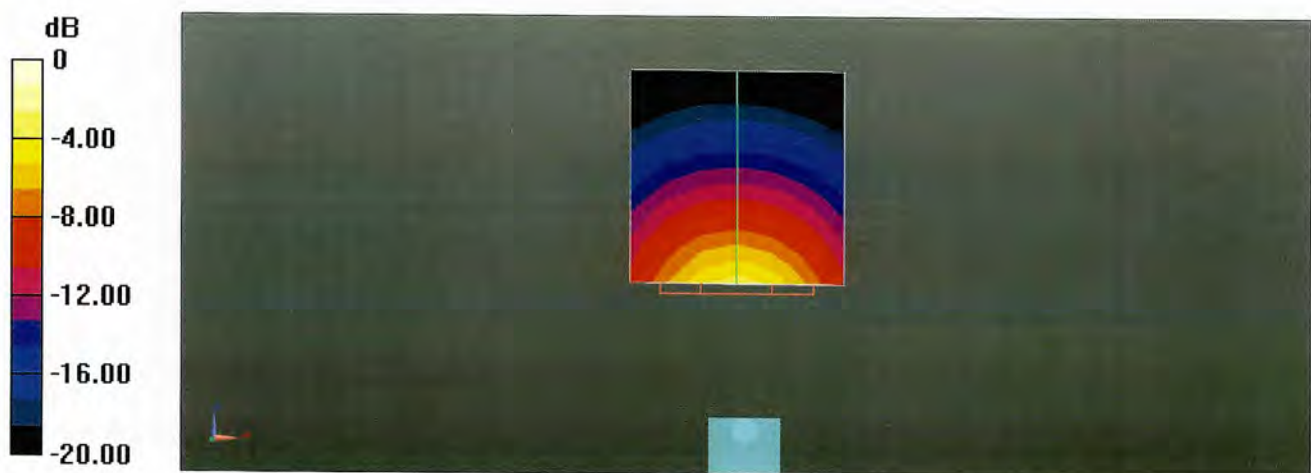
Peak SAR (extrapolated) = 27.5 W/kg

SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.13 W/kg

Smallest distance from peaks to all points 3 dB below = 9 mm

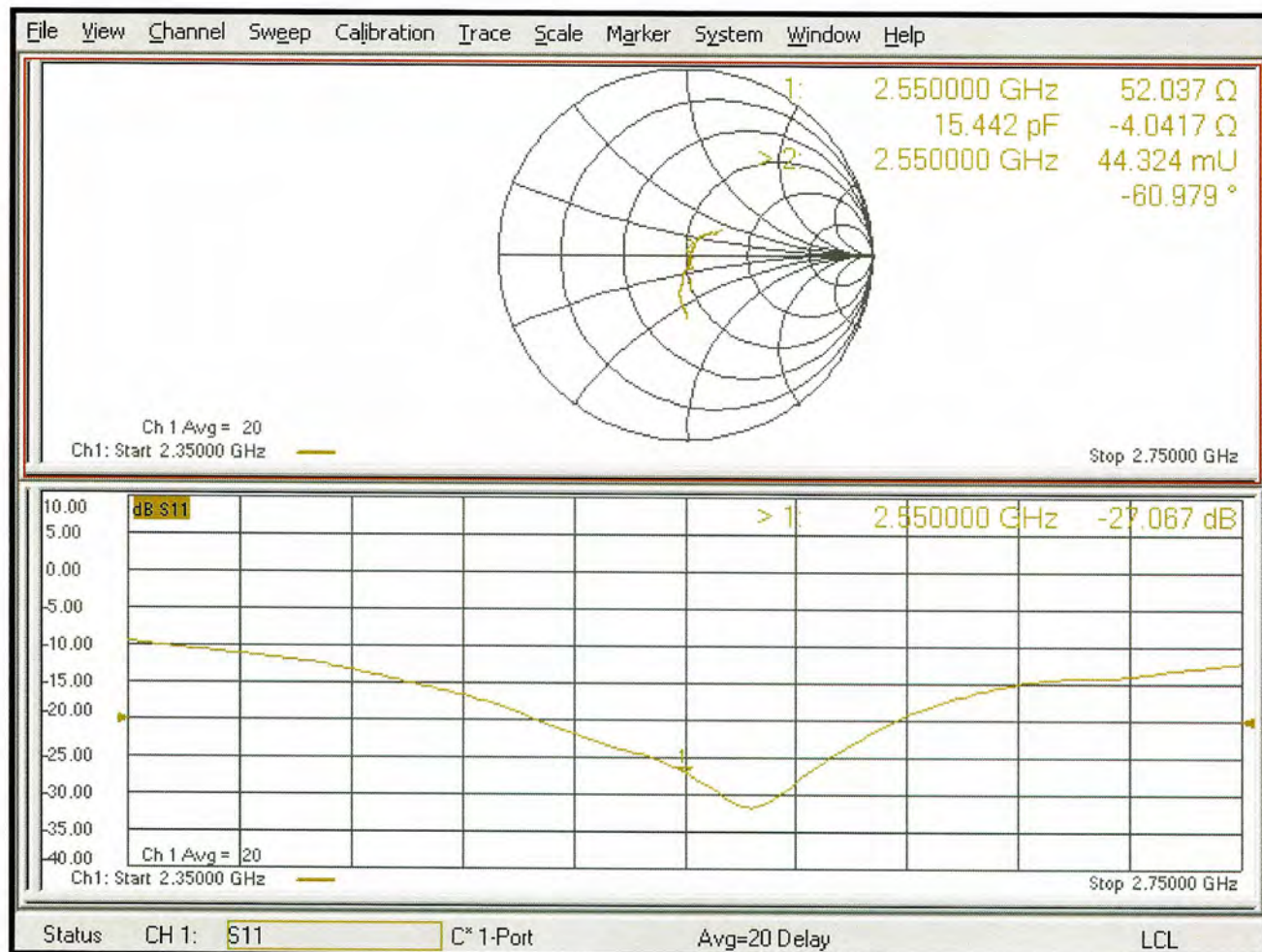
Ratio of SAR at M2 to SAR at M1 = 49%

Maximum value of SAR (measured) = 22.6 W/kg



0 dB = 22.6 W/kg = 13.54 dBW/kg

Impedance Measurement Plot for Head TSL



D2550V2 - SN: 1022 Extended Dipole Calibrations

Referring to KDB 865664 D01, 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.

D2550V2 - SN: 1022						
2550MHz Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
9.22.2022	-27.1		52		-4	
9.21.2023	-23.13	-14.66	54.77	2.77	-5.52	-1.52

<Justification of the extended calibration>

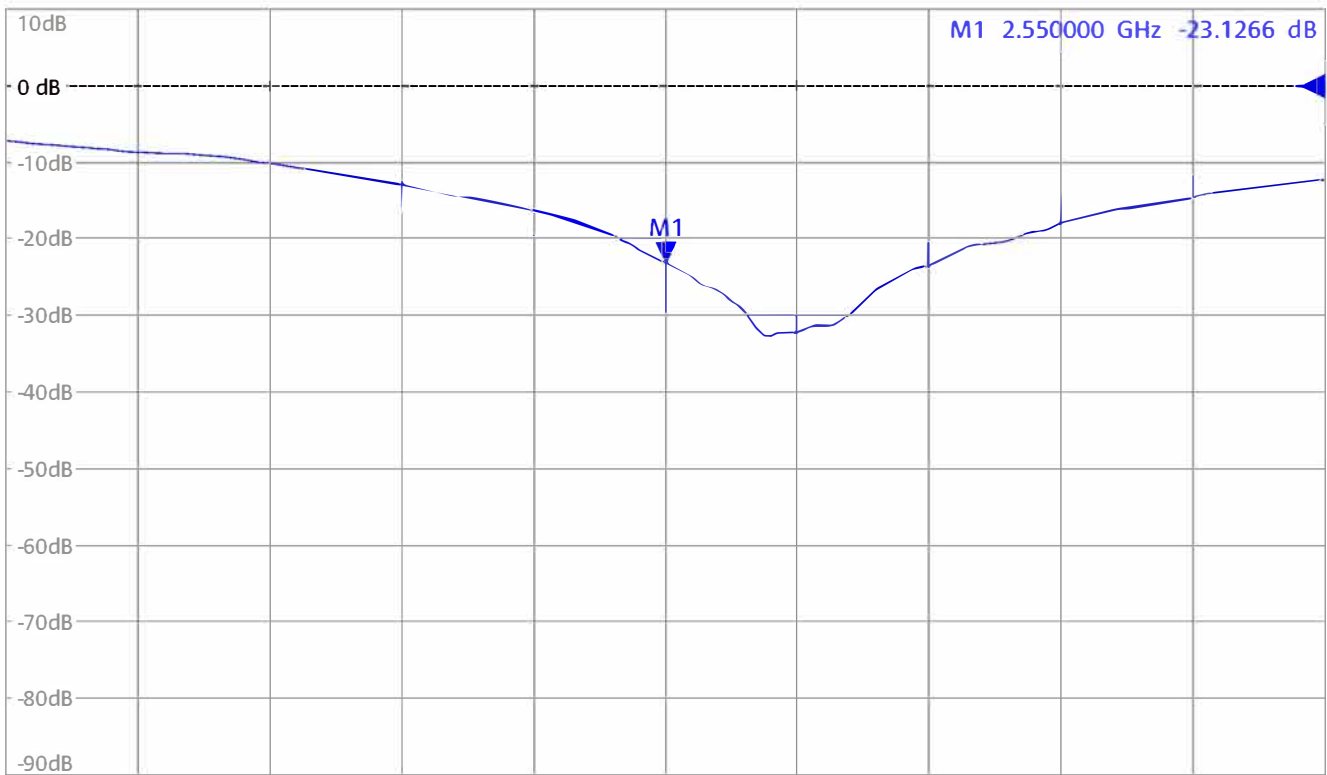
The return loss is $< -20\text{dB}$, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

<Dipole Verification Data>

Head 2550MHz _2023.09.21

Trc1 — S11 dB Mag 10 dB/ Ref 0 dB Cal

1

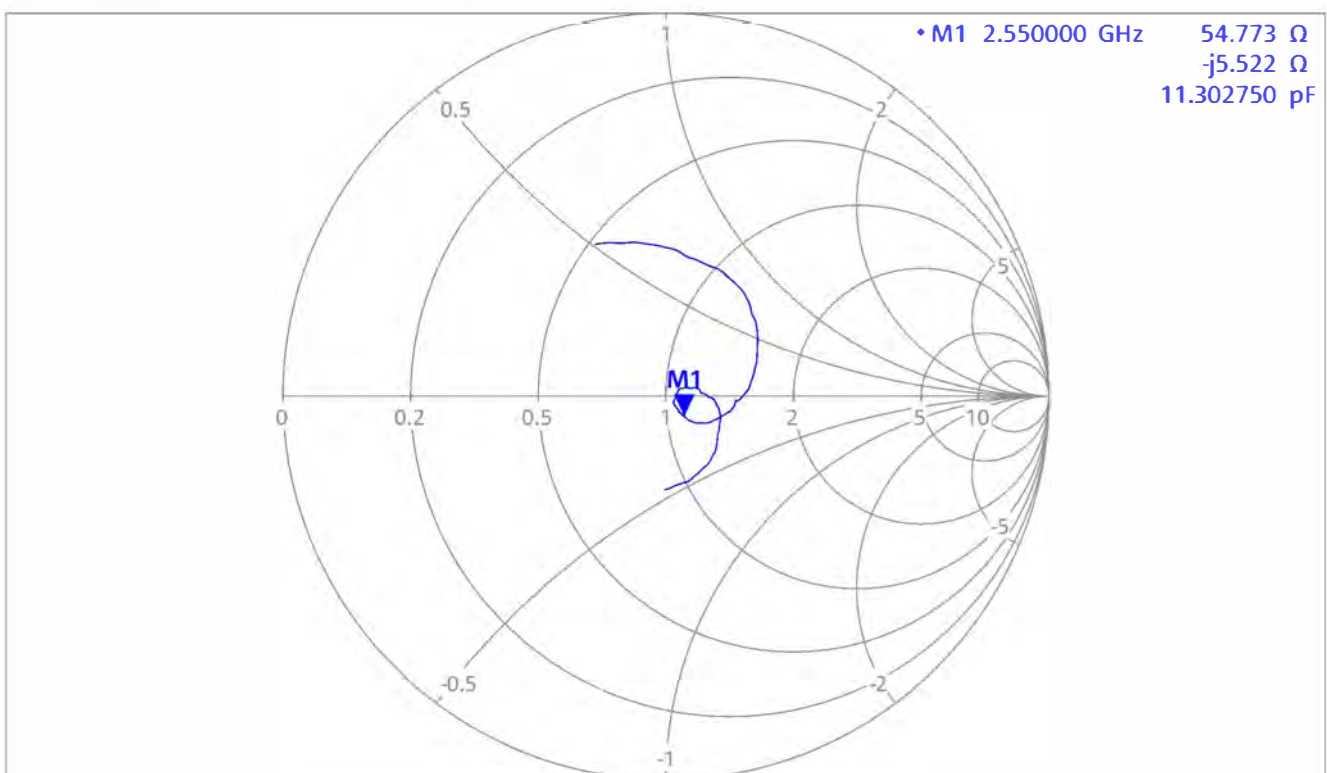


Ch1 Start 2.35 GHz Pwr -10 dBm Bw 10 kHz Refl OSM P1

Stop 2.75 GHz

Trc2 — S11 Smith 200 mU/ Ref 1 U Cal

2



Ch1 Start 2.35 GHz Pwr -10 dBm Bw 10 kHz Refl OSM P1

Stop 2.75 GHz



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Client

7layers

Certificate No: Z21-60431

CALIBRATION CERTIFICATE

Object D5GHzV2 - SN: 1315

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

Calibration date: October 22, 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 $(22\pm3)^{\circ}\text{C}$ and humidity $<70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Power sensor NRP8S	104291	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
ReferenceProbe EX3DV4	SN 7517	03-Feb-21(CTTL-SPEAG,No.Z21-60001)	Feb-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
NetworkAnalyzerE5071C	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: October 27, 2021

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Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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



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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 = 4 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz $\pm$ 1 MHz 5600 MHz $\pm$ 1 MHz 5750 MHz $\pm$ 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 $\pm$ 0.2) °C	36.6 $\pm$ 6 %	4.70 mho/m $\pm$ 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.66 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	76.9 W/kg $\pm$ 24.4 % (k=2)
SAR averaged over 10 cm³ (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.20 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.1 W/kg $\pm$ 24.2 % (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	36.0 ± 6 %	5.08 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.17 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	81.9 W/kg ± 24.4 % (k=2)
SAR averaged over 10 cm³ (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.34 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.5 W/kg ± 24.2 % (k=2)

Head TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.8 ± 6 %	5.25 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL at 5750 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.59 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	76.1 W/kg ± 24.4 % (k=2)
SAR averaged over 10 cm³ (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.16 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	21.7 W/kg ± 24.2 % (k=2)



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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	$50.5\Omega - 3.27j\Omega$
Return Loss	- 29.7dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	$54.2\Omega + 0.81j\Omega$
Return Loss	- 27.8dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	$49.4\Omega + 1.99j\Omega$
Return Loss	- 33.6dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.098 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

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

Additional EUT Data

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DASY5 Validation Report for Head TSL

Date: 10.22.2021

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1315

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

Medium parameters used: $f = 5250$ MHz; $\sigma = 4.704$ S/m; $\epsilon_r = 36.62$; $\rho = 1000$ kg/m³,
Medium parameters used: $f = 5600$ MHz; $\sigma = 5.084$ S/m; $\epsilon_r = 36$; $\rho = 1000$ kg/m³,
Medium parameters used: $f = 5750$ MHz; $\sigma = 5.248$ S/m; $\epsilon_r = 35.78$; $\rho = 1000$ kg/m³,

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7517; ConvF(5.42, 5.42, 5.42) @ 5250 MHz; ConvF(4.75, 4.75, 4.75) @ 5600 MHz; ConvF(4.82, 4.82, 4.82) @ 5750 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)

Dipole Calibration /Pin=100mW, d=10mm, f=5250 MHz/Zoom Scan,

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

Reference Value = 70.32 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 31.0 W/kg

SAR(1 g) = 7.66 W/kg; SAR(10 g) = 2.2 W/kg

Smallest distance from peaks to all points 3 dB below = 7.4 mm

Ratio of SAR at M2 to SAR at M1 = 65%

Maximum value of SAR (measured) = 18.2 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5600 MHz/Zoom Scan,

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

Reference Value = 71.09 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 34.9 W/kg

SAR(1 g) = 8.17 W/kg; SAR(10 g) = 2.34 W/kg

Smallest distance from peaks to all points 3 dB below = 7.4 mm

Ratio of SAR at M2 to SAR at M1 = 63.3%

Maximum value of SAR (measured) = 19.9 W/kg

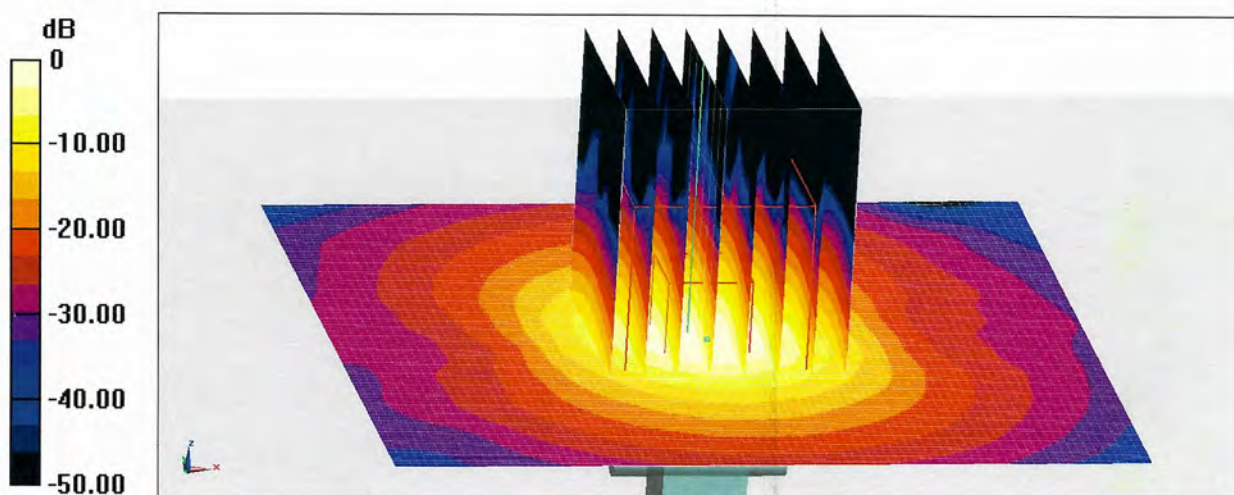


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Dipole Calibration /Pin=100mW, d=10mm, f=5750 MHz/Zoom Scan,
dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 67.72 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 33.5 W/kg
SAR(1 g) = 7.59 W/kg; SAR(10 g) = 2.16 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 62.4%
Maximum value of SAR (measured) = 18.6 W/kg



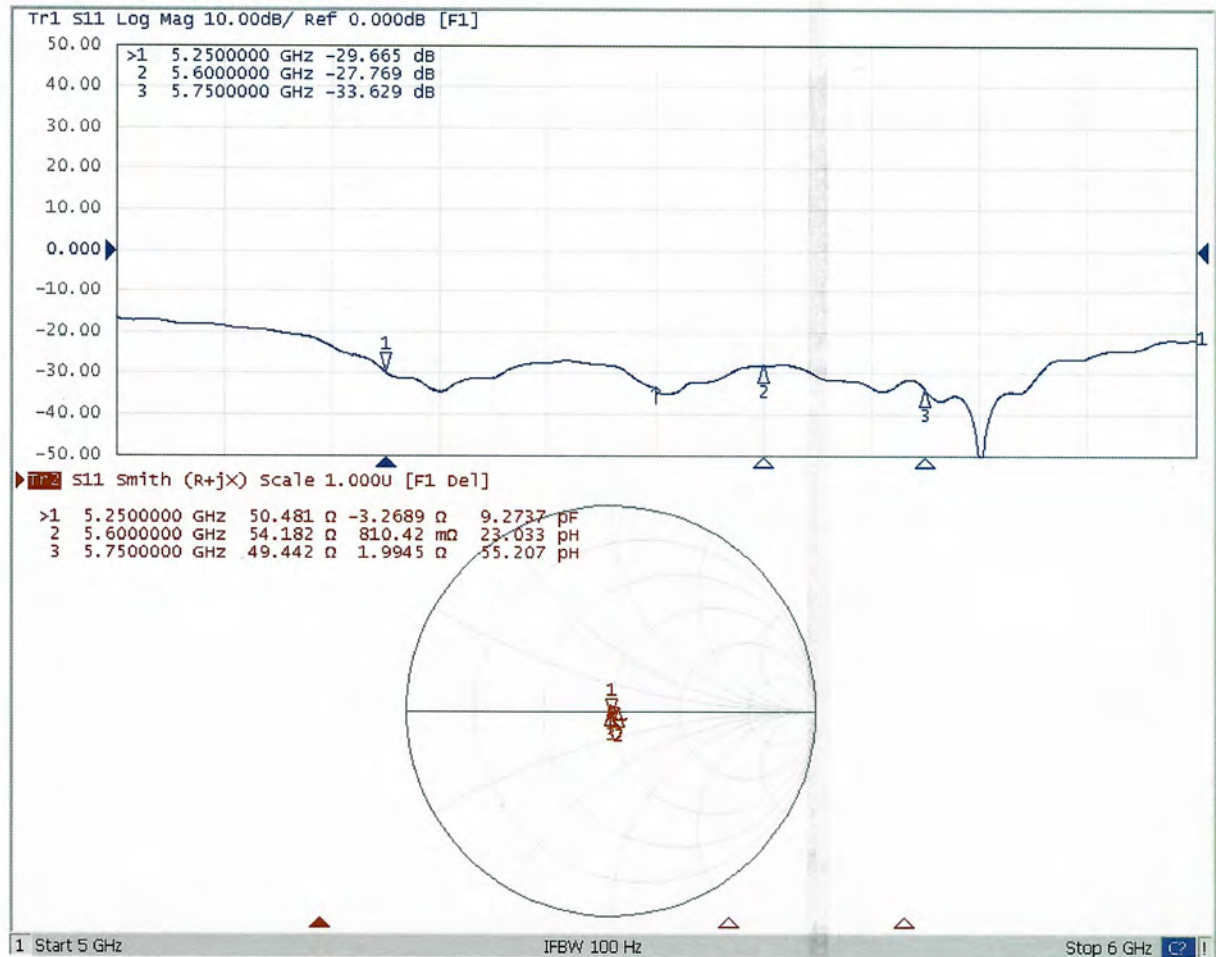
0 dB = 18.6 W/kg = 12.70 dBW/kg



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Impedance Measurement Plot for Head TSL



D5GHzV2 - SN: 1315 Extended Dipole Calibrations

Referring to KDB 865664 D01, 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 - SN: 1315						
5250MHz Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
10.22.2021	-29.7		50.5		-3.27	
10.21.2022	-34.53	16.26	51.16	0.66	1.56	4.83
10.20.2023	-25.84	-12.98	54.50	4.00	-2.96	0.31

D5GHzV2 - SN: 1315						
5600MHz Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
10.22.2021	-27.8		54.2		0.81	
10.21.2022	-31.03	11.63	49.59	-4.61	-2.79	-3.60
10.20.2023	-26.15	-5.95	54.92	0.71	-1.82	-2.63

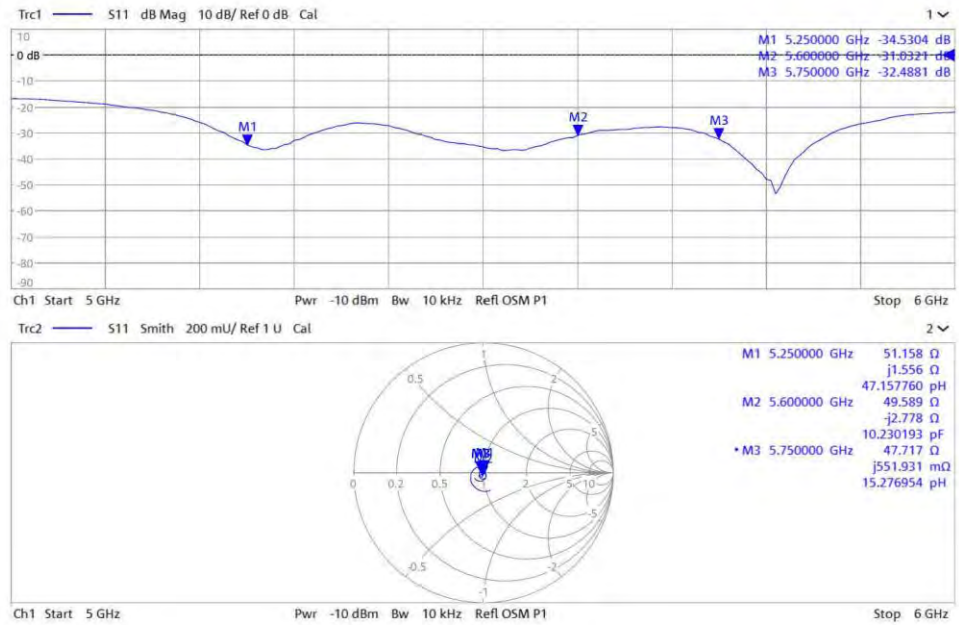
D5GHzV2 - SN: 1315						
5750MHz Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
10.22.2021	-33.6		49.4		1.99	
10.21.2022	-32.49	-3.31	47.72	-1.68	0.55	-1.44
10.20.2023	-36.43	8.41	50.87	1.47	1.34	-0.65

<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>

Head 5250-5750MHz _2022.10.21

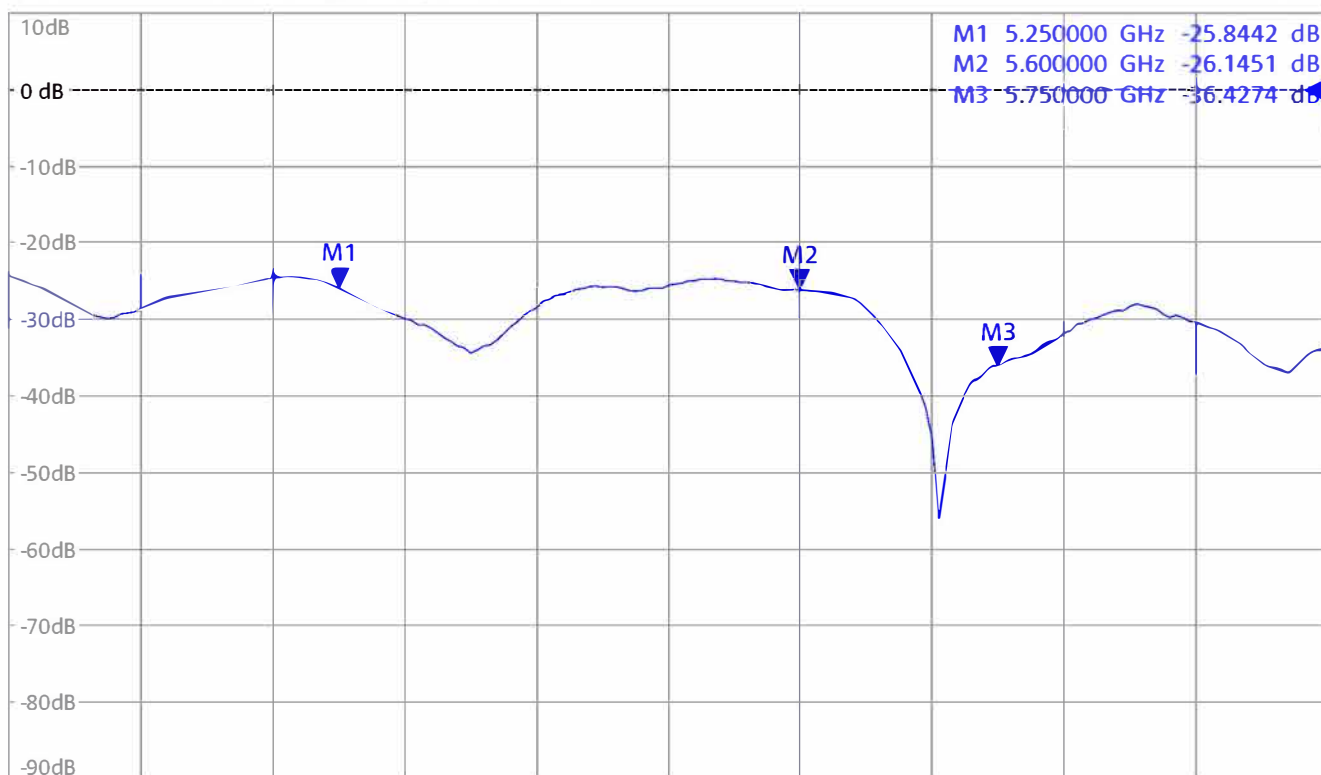


<Dipole Verification Data>

Head 5250-5750MHz _2023.10.20

Trc1 — S11 dB Mag 10 dB/ Ref 0 dB Cal

1

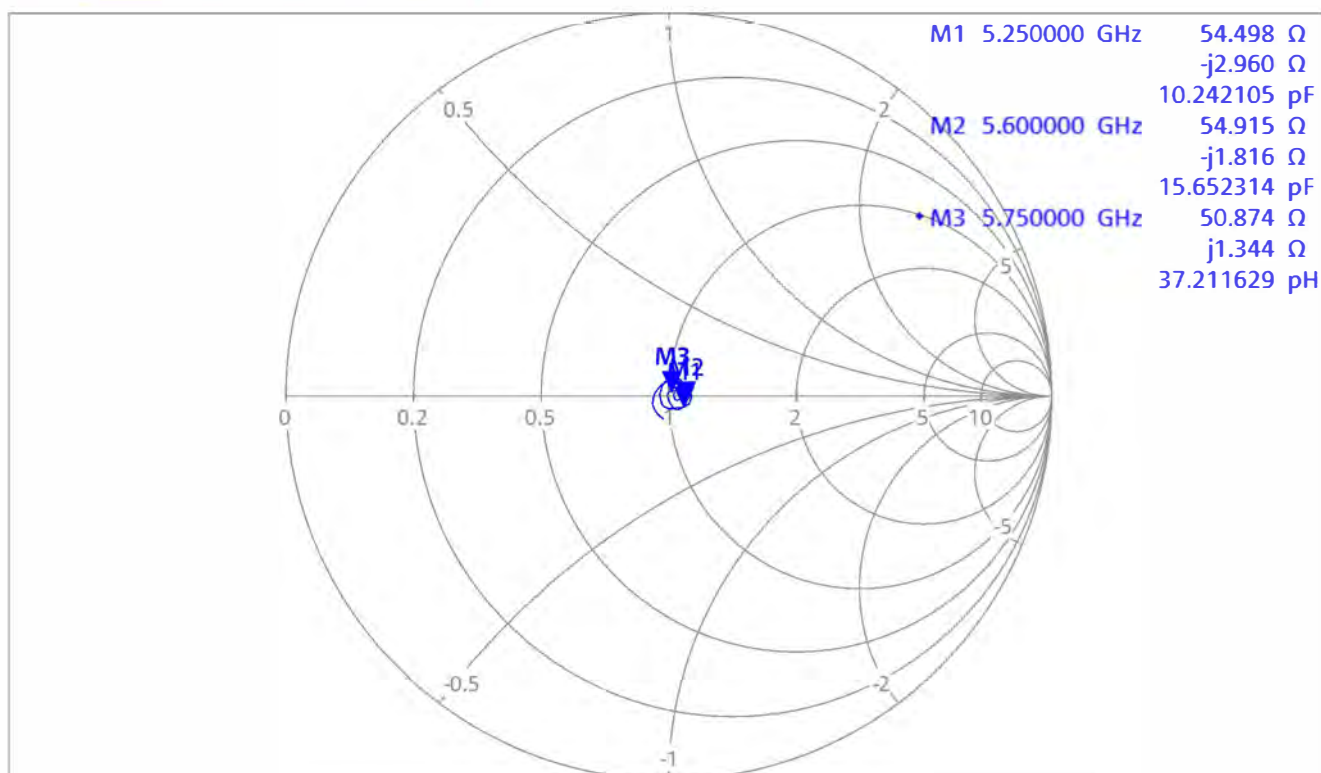


Ch1 Start 5 GHz Pwr -10 dBm Bw 10 kHz Refl OSM P1

Stop 6 GHz

Trc2 — S11 Smith 200 mU/ Ref 1 U Cal

2



Ch1 Start 5 GHz Pwr -10 dBm Bw 10 kHz Refl OSM P1

Stop 6 GHz



Appendix D. Conducted Power Result

Full Power

Band	GSM850				GSM1900			
Channel	128	189	251	Max. Tune-up Power	512	661	810	Max. Tune-up Power
Frequency	824.2	836.4	848.8		1850.2	1880	1909.8	
GSM	32.61	32.56	32.52	34.00	29.39	29.49	29.58	31.00
GPRS 1Tx Slot	32.62	32.55	32.51	34.00	29.38	29.47	29.60	31.00
GPRS 2Tx Slot	31.74	31.73	31.79	33.00	28.72	28.82	28.97	30.00
GPRS 3Tx Slot	29.82	29.88	29.91	31.00	26.66	26.89	27.05	28.00
GPRS 4Tx Slot	28.59	28.70	28.74	30.00	25.61	25.76	25.89	27.00
EDGE 1Tx Slot	27.13	27.27	27.35	28.50	26.01	25.96	26.07	27.50
EDGE 2Tx Slot	25.87	26.07	26.13	27.50	25.05	24.86	25.06	26.50
EDGE 3Tx Slot	23.65	23.71	23.87	25.50	22.84	22.74	22.87	24.50
EDGE 4Tx Slot	22.55	22.58	22.69	24.50	21.63	21.58	21.61	23.50

Band	WCDMA II			WCDMA II	WCDMA IV			WCDMA IV	WCDMA V			WCDMA V
TX Channel	9262	9400	9538	Max. Tune-up Power	1312	1413	1513	Max. Tune-up Power	4132	4182	4233	Max. Tune-up Power
Rx Channel	9662	9800	9938		1537	1638	1738		4357	4407	4458	
Frequency	1852.4	1880	1907.6	25.00	1712.4	1732.6	1752.6	25.00	826.4	836.4	846.6	25.00
RMC 12.2K	23.98	23.86	24.14		24.35	24.62	24.45		24.33	24.36	24.31	
HSDPA Subtest-1	23.40	23.28	23.56	24.00	23.65	23.84	23.77	24.00	23.78	23.65	23.73	24.00
HSDPA Subtest-2	23.39	23.27	23.55	24.00	23.76	23.83	23.82	24.00	23.77	23.64	23.72	24.00
HSDPA Subtest-3	22.88	22.76	23.04	24.00	23.25	23.52	23.35	24.00	23.26	23.13	23.21	24.00
HSDPA Subtest-4	22.87	22.75	23.03	24.00	23.24	23.51	23.34	24.00	23.25	23.12	23.20	24.00
DC-HSDPA Subtest-1	23.32	23.22	23.48	24.00	23.69	23.78	23.79	24.00	23.70	23.59	23.65	24.00
DC-HSDPA Subtest-2	23.31	23.21	23.47	24.00	23.68	23.77	23.78	24.00	23.69	23.58	23.64	24.00
DC-HSDPA Subtest-3	22.89	22.70	22.98	24.00	23.26	23.46	23.29	24.00	23.27	23.07	23.15	24.00
DC-HSDPA Subtest-4	22.88	22.69	22.97	24.00	23.25	23.45	23.28	24.00	23.26	23.06	23.14	24.00
HSUPA Subtest-1	23.36	23.24	23.52	24.00	23.73	23.80	23.83	24.00	23.74	23.61	23.69	24.00
HSUPA Subtest-2	22.35	22.23	22.51	24.00	22.72	22.99	22.82	24.00	22.73	22.60	22.68	24.00
HSUPA Subtest-3	22.83	22.72	23.00	24.00	23.20	23.48	23.31	24.00	23.21	23.09	23.17	24.00
HSUPA Subtest-4	22.32	22.21	22.49	24.00	22.69	22.97	22.80	24.00	22.70	22.58	22.66	24.00
HSUPA Subtest-5	23.31	23.20	23.48	24.00	23.68	23.81	23.79	24.00	23.69	23.57	23.65	24.00
HSPA+ Subtest-1	22.87	22.77	23.05	24.00	23.24	23.53	23.36	24.00	23.25	23.14	23.22	24.00

Reduce Power

Band	GSM850				GSM1900			
Channel	128	189	251	Max. Tune-up Power	512	661	810	Max. Tune-up Power
Frequency	824.2	836.4	848.8		1850.2	1880	1909.8	
GSM	22.25	22.59	22.52	23.00	20.27	20.55	20.64	21.00
GPRS 1Tx Slot	22.14	22.60	22.51	23.00	20.26	20.54	20.63	21.00
GPRS 2Tx Slot	21.03	21.36	21.39	22.00	19.34	19.52	19.64	20.00
GPRS 3Tx Slot	18.85	19.14	19.12	20.00	17.29	17.45	17.63	18.00
GPRS 4Tx Slot	17.73	18.02	18.00	19.00	16.15	16.28	16.52	17.00
EDGE 1Tx Slot	15.50	15.78	15.71	17.00	17.08	17.16	17.30	17.50
EDGE 2Tx Slot	15.11	15.45	15.31	16.00	15.82	16.00	16.05	17.00
EDGE 3Tx Slot	14.28	14.42	14.37	15.00	13.98	14.02	14.28	15.00
EDGE 4Tx Slot	12.68	13.00	12.87	13.50	12.53	12.65	12.83	13.50

Band	WCDMA II			WCDMA II	WCDMA IV			WCDMA IV	WCDMA V			WCDMA V
TX Channel	9262	9400	9538		1312	1413	1513		4132	4182	4233	
Rx Channel	9662	9800	9938	Max. Tune-up Power	1537	1638	1738	Max. Tune-up Power	4357	4407	4458	Max. Tune-up Power
Frequency	1852.4	1880	1907.6		1712.4	1732.6	1752.6		826.4	836.4	846.6	
RMC 12.2K	12.49	12.42	12.55	13.50	14.45	14.59	14.41	15.00	16.13	16.25	16.22	17.00
HSDPA Subtest-1	11.91	11.84	11.97	12.50	13.87	13.91	13.83	14.00	15.55	15.67	15.64	16.00
HSDPA Subtest-2	11.90	11.83	11.96	12.50	13.86	13.90	13.82	14.00	15.54	15.66	15.63	16.00
HSDPA Subtest-3	11.39	11.32	11.45	12.50	13.35	13.49	13.31	14.00	15.03	15.15	15.12	16.00
HSDPA Subtest-4	11.38	11.31	11.44	12.50	13.34	13.48	13.30	14.00	15.02	15.14	15.11	16.00
DC-HSDPA Subtest-1	11.83	11.78	11.89	12.50	13.79	13.95	13.75	14.00	15.47	15.61	15.56	16.00
DC-HSDPA Subtest-2	11.82	11.77	11.88	12.50	13.78	13.94	13.74	14.00	15.46	15.60	15.55	16.00
DC-HSDPA Subtest-3	11.40	11.26	11.39	12.50	13.36	13.43	13.25	14.00	15.04	15.09	15.06	16.00
DC-HSDPA Subtest-4	11.39	11.25	11.38	12.50	13.35	13.42	13.24	14.00	15.03	15.08	15.05	16.00
HSUPA Subtest-1	11.87	11.80	11.93	12.50	13.83	13.97	13.79	14.00	15.51	15.63	15.60	16.00
HSUPA Subtest-2	10.86	10.79	10.92	12.50	12.82	12.96	12.78	14.00	14.50	14.62	14.59	16.00
HSUPA Subtest-3	11.34	11.28	11.41	12.50	13.30	13.45	13.27	14.00	14.98	15.11	15.08	16.00
HSUPA Subtest-4	10.83	10.77	10.90	12.50	12.79	12.94	12.76	14.00	14.47	14.60	14.57	16.00
HSUPA Subtest-5	11.82	11.76	11.89	12.50	13.78	13.93	13.75	14.00	15.46	15.59	15.56	16.00
HSPA+ Subtest-1	11.38	11.33	11.46	12.50	13.34	13.50	13.32	14.00	15.02	15.16	15.13	16.00

Full Power

LTE Band 2									
BW	MCS Index	RB Size	RB Offset	Low	Mid	High			
		Channel		18700	18900	19100	Max. Turn-up (dBm)		
20M									
QPSK	16QAM	1	0	22.90	22.97	22.99	24		
		1	50	23.24	23.38	23.24	24		
		1	99	22.85	22.95	23.12	24		
		50	0	22.16	22.10	22.22	23		
		50	25	22.25	22.26	22.23	23		
		50	50	22.14	22.02	22.09	23		
		100	0	22.11	22.17	22.13	23		
		1	0	22.36	22.27	22.28	23		
		1	50	22.53	22.41	22.36	23		
		1	99	22.23	22.21	22.20	23		
64QAM	16QAM	50	0	21.16	21.14	21.17	22		
		50	25	21.17	21.18	21.20	22		
		50	50	21.08	21.09	21.11	22		
		100	0	21.05	21.09	21.08	22		
		1	0	21.13	21.15	20.17	22		
		1	50	21.38	21.42	21.47	22		
		1	99	21.21	21.25	20.27	22		
		50	0	20.12	20.14	20.15	21		
		50	25	20.18	20.20	20.22	21		
		50	50	20.09	20.09	20.11	21		
3M									
MCS Index	Channel	Frequency (MHz)	1855	1880	1905	Max. Turn-up			
10M									
QPSK	16QAM	1	0	22.85	22.91	22.86	24		
		1	37	23.19	23.24	23.26	24		
		1	74	22.79	22.94	23.09	24		
		36	0	22.13	21.98	22.11	23		
		36	19	22.17	22.21	22.08	23		
		36	39	22.10	21.89	22.03	23		
		75	0	22.01	22.11	22.01	23		
		1	0	22.27	22.16	22.13	23		
		1	37	22.41	22.36	22.21	23		
		1	74	22.22	22.19	22.09	23		
64QAM	16QAM	36	0	21.15	21.10	21.12	22		
		36	19	21.05	21.09	21.08	22		
		36	39	21.01	21.08	21.03	22		
		75	0	20.95	20.95	21.04	22		
		1	0	21.14	21.14	20.02	22		
		1	37	21.28	21.34	21.33	22		
		1	74	21.09	21.14	20.22	22		
		36	0	20.08	20.08	20.06	21		
		36	19	20.14	20.05	20.12	21		
		36	39	20.06	20.06	20.07	21		
1.4M									
MCS Index	Channel	Frequency (MHz)	1850.7	1880	1909.3	Max. Turn-up			
3M									
QPSK	16QAM	1	0	22.75	22.82	22.96	24		
		1	7	23.14	23.29	23.25	24		
		1	14	22.83	22.93	23.10	24		
		8	0	22.06	22.05	22.19	23		
		8	3	22.15	22.05	22.05	23		
		8	7	22.08	21.94	22.02	23		
		15	0	21.98	22.15	22.05	23		
		1	0	22.30	22.26	22.19	23		
		1	7	22.52	22.26	22.30	23		
		1	14	22.08	22.07	22.13	23		
64QAM	16QAM	8	0	21.07	21.13	21.03	22		
		8	3	21.16	21.10	21.18	22		
		8	7	21.07	21.06	21.10	22		
		15	0	20.93	21.01	21.07	22		
		1	0	21.05	21.11	20.04	22		
		1	7	21.28	21.29	21.41	22		
		1	14	21.18	21.20	20.24	22		
		8	0	19.99	20.01	20.09	21		
		8	3	20.09	20.05	20.11	21		
		8	7	20.07	20.02	20.05	21		
1.4M									
MCS Index	Channel	Frequency (MHz)	1850.7	1880	1909.3	Max. Turn-up			
3M									
QPSK	16QAM	1	0	22.86	22.91	22.97	24		
		1	2	23.14	23.27	23.23	24		
		1	5	22.75	22.82	23.11	24		
		3	0	23.14	22.99	23.14	24		
		3	1	23.16	23.21	23.09	24		
		3	3	23.02	22.97	23.02	24		
		6	0	22.04	22.16	21.99	23		
		1	0	22.27	22.22	22.25	23		
		1	2	22.50	22.36	22.38	23		
		1	5	22.09	22.13	22.17	23		
64QAM	16QAM	3	0	22.13	22.02	22.06	23		
		3	1	22.05	22.14	22.10	23		
		3	3	21.98	21.97	22.04	23		
		6	0	20.94	21.03	20.99	22		
		1	0	21.06	21.07	20.95	22		
		1	2	21.29	21.33	21.32	22		
		1	5	21.08	21.21	20.15	22		
		3	0	21.07	21.03	21.05	22		
		3	1	21.04	21.10	21.10	22		
		3	3	21.08	21.03	21.02	22		

LTE Band 7							
BW	Modulation	RB Size	RB Offset	Low	Mid	High	Max. Tune-up (dBm)
		Channel		20850	21100	21350	
		Frequency (MHz)		2510	2535	2560	
20M	QPSK	1	0	23.02	23.13	23.24	24
		1	50	23.19	23.36	23.34	24
		1	99	22.97	23.07	23.07	24
		50	0	22.18	22.33	22.29	23
		50	25	22.21	22.37	22.32	23
		50	50	22.13	22.22	22.21	23
		100	0	22.15	22.27	22.25	23
		1	0	22.19	22.37	22.49	23
		1	50	22.39	22.66	22.53	23
		1	99	22.25	22.38	22.16	23
	16QAM	1	0	21.12	21.30	21.28	22
		50	25	21.15	21.31	21.07	22
		50	50	21.11	21.18	21.22	22
		100	0	21.09	21.23	21.24	22
		1	0	21.16	21.22	21.33	22
		1	50	21.30	21.46	21.50	22
		1	99	21.11	21.18	21.11	22
		50	0	20.13	20.30	20.32	21
		50	25	20.18	20.31	20.28	21
		50	50	20.11	20.18	20.22	21
		100	0	20.12	20.24	20.26	21
	64QAM	Channel		20850	21100	21350	Max. Tune-up (dBm)
		Frequency (MHz)		2507.5	2535	2562.5	
		1	0	22.90	22.98	23.15	24
		1	37	23.05	23.29	23.32	24
		1	74	22.92	22.95	22.94	24
		36	0	22.07	22.30	22.22	23
		36	19	22.08	22.31	22.19	23
		36	39	22.08	22.14	22.10	23
		75	0	22.05	22.23	22.22	23
		1	0	22.09	22.35	22.45	23
15M	QPSK	1	37	22.97	22.63	22.44	23
		1	74	22.19	22.36	22.13	23
		36	0	21.00	21.21	21.14	22
		36	19	21.00	21.18	21.16	22
		36	39	21.02	21.11	21.13	22
		75	0	20.95	21.15	21.18	22
		1	0	21.08	21.11	21.23	22
		1	37	21.20	21.40	21.45	22
		1	74	20.99	21.10	21.08	22
		36	0	20.10	20.16	20.23	21
	16QAM	36	19	20.14	20.24	20.15	21
		36	39	20.09	20.04	20.21	21
		75	0	20.11	20.15	20.15	21
		Channel		20800	21100	21400	Max. Tune-up (dBm)
		Frequency (MHz)		2505	2535	2565	
		1	0	23.01	23.11	23.17	24
		1	24	23.11	23.27	23.26	24
		1	49	22.94	22.99	23.01	24
		25	0	22.17	22.32	22.16	23
		25	12	22.17	22.26	22.25	23
		25	25	21.99	22.20	22.11	23
	64QAM	50	0	22.07	22.26	22.13	23
		1	0	22.15	22.28	22.40	23
		1	24	22.38	22.63	22.51	23
		1	49	22.21	22.31	22.07	23
		25	0	21.03	21.26	21.23	22
		25	12	21.11	21.28	21.24	22
		25	25	21.01	21.17	21.21	22
		50	0	21.01	21.17	21.15	22
		1	0	21.15	21.20	21.21	22
		1	24	21.25	21.42	21.44	22
10M	QPSK	1	49	21.02	21.03	20.97	22
		25	0	20.02	20.16	20.18	21
		25	12	20.13	20.26	20.23	21
		25	25	19.98	20.12	20.10	21
		50	0	20.06	20.14	20.16	21
		Channel		20775	21100	21425	Max. Tune-up (dBm)
		Frequency (MHz)		2502.5	2530	2557.5	
		1	0	23.01	23.05	23.19	24
		1	12	23.07	23.30	23.22	24
		1	24	22.93	22.98	22.99	24
		12	0	22.10	22.30	22.28	23
5M	QPSK	12	6	22.19	22.33	22.17	23
		12	13	22.05	22.15	22.18	23
		25	0	22.11	22.12	22.12	23
		1	0	22.05	22.29	22.36	23
		1	12	22.30	22.52	22.52	23
		1	24	22.20	22.31	22.08	23
		12	0	21.00	21.29	21.14	22
		12	6	21.02	21.18	21.25	22
		25	0	21.07	21.13	21.10	22
		1	0	21.12	21.16	21.22	22
	16QAM	1	12	21.23	21.39	21.35	22
		1	24	21.07	21.05	20.96	22
		12	0	20.02	20.16	20.20	21
		12	6	20.05	20.30	20.24	21
		12	13	19.99	20.08	20.15	21
		25	0	20.02	20.09	20.14	21
		Channel		20775	21100	21425	Max. Tune-up (dBm)
		Frequency (MHz)		2502.5	2530	2557.5	
		1	0	23.01	23.05	23.19	24
		1	12	23.07	23.30	23.22	24
		1	24	22.93	22.98	22.99	24
		12	0	22.10	22.30	22.28	23
	64QAM	12	6	22.19	22.33	22.17	23
		12	13	22.05	22.15	22.18	23
		25	0	22.11	22.12	22.12	23
		1	0	22.05	22.29	22.36	23
		1	12	22.30	22.52	22.52	23
		1	24	22.20	22.31	22.08	23
		12	0	21.00	21.29	21.14	22
		12	6	21.02	21.18	21.25	22
		25	0	21.07	21.13	21.10	22
		1	0	21.12	21.16	21.22	22
	16QAM	1	12	21.23	21.39	21.35	22
		1	24	21.07	21.05	20.96	22
		12	0	20.02	20.16	20.20	21
		12	6	20.05	20.30	20.24	21
		12	13	19.99	20.08	20.15	21
		25	0	20.02	20.09	20.14	21

LTE Band 12							
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	Max. Tune-up (dBm)
		Channel		23060	23095	23130	
		Frequency (MHz)		704	707.5	711	
10M	QPSK	1	0	23.31	23.20	23.28	24
		1	24	23.38	23.30	23.33	24
		1	49	23.20	23.13	23.18	24
		25	0	22.27	22.25	22.23	23
		25	12	22.26	22.22	22.21	23
		25	25	22.22	22.23	22.22	23
		50	0	22.28	22.29	22.25	23
		1	0	22.55	22.35	22.56	23
		1	24	22.70	22.69	22.63	23
		1	49	22.49	22.41	22.38	23
	16QAM	25	0	21.38	21.35	21.32	22
		25	12	21.38	21.33	21.31	22
		25	25	21.38	21.32	21.30	22
		50	0	21.41	21.35	21.32	22
		1	0	21.54	21.44	21.48	22
		1	24	21.58	21.59	21.60	22
		1	49	21.41	21.34	21.37	22
		25	0	20.33	20.31	20.35	21
		25	12	20.32	20.33	20.34	21
		25	25	20.30	20.30	20.32	21
		50	0	20.31	20.32	20.33	21
	64QAM	Channel		23060	23095	23130	Max. Tune-up (dBm)
		Frequency (MHz)		704	707.5	711	
		1	0	23.18	23.17	23.22	24
		1	12	23.27	23.24	23.23	24
		1	24	23.09	23.09	23.11	24
		12	0	22.30	22.11	22.15	23
		12	6	22.11	22.20	22.10	23
		12	13	22.11	22.08	22.09	23
		25	0	22.21	22.20	22.15	23
		1	0	22.51	22.21	22.50	23
5M	QPSK	1	12	22.55	22.64	22.52	23
		1	24	22.46	22.35	22.34	23
		12	0	21.29	21.27	21.25	22
		12	6	21.37	21.23	21.16	22
		12	13	21.29	21.17	21.20	22
		25	0	21.26	21.30	21.28	22
		1	0	21.51	21.38	21.29	22
		1	12	21.45	21.48	21.48	22
		1	24	21.28	21.30	21.28	22
		12	0	20.25	20.20	20.21	21
	16QAM	12	6	20.24	20.31	20.25	21
		12	13	20.19	20.16	20.25	21
		25	0	20.18	20.28	20.25	21
		Channel		23025	23095	23165	Max. Tune-up (dBm)
		Frequency (MHz)		706.5	707.5	714.5	
		1	0	23.27	23.15	23.20	24
		1	7	23.25	23.21	23.20	24

LTE Band 17							
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	Max. Tune-up (dBm)
		Channel		23760	23790	23800	
		Frequency (MHz)	769	710	711		
10M	QPSK	1	0	23.19	23.22	23.11	24
		1	24	23.27	23.33	23.21	24
		1	49	23.08	23.09	22.98	24
		25	0	22.29	22.30	22.21	23
		25	12	22.22	22.26	22.10	23
		25	25	22.23	22.27	22.06	23
	16QAM	50	0	22.25	22.31	22.12	23
		1	0	22.45	22.49	22.39	23
		1	24	22.63	22.63	22.52	23
		1	49	22.29	22.31	22.02	23
		25	0	21.22	21.34	21.02	22
		25	12	21.23	21.33	21.19	22
	64QAM	25	25	21.23	21.29	21.16	22
		50	0	21.18	21.34	21.13	22
		1	0	21.27	21.44	21.21	22
		1	24	21.41	21.52	21.25	22
		1	49	21.21	21.36	21.03	22
		25	0	20.16	20.31	20.04	21
5M	QPSK	25	12	20.15	20.29	20.14	21
		25	25	20.08	20.30	20.11	21
		50	0	20.17	20.32	20.15	21
	16QAM	Channel	23766	23790	23800		
		Frequency (MHz)	765.5	710	713.5		
		1	0	23.14	23.14	22.99	24
		1	12	23.23	23.31	23.07	24
		1	24	22.93	22.94	22.97	24
		12	0	22.28	22.20	22.06	23
	64QAM	12	6	22.15	22.18	22.06	23
		12	13	22.17	22.21	22.00	23
		25	0	22.24	22.19	22.07	23
		1	0	22.44	22.41	22.25	23
		1	12	22.57	22.49	22.48	23
		1	24	22.20	22.25	21.87	23
10M	QPSK	12	0	21.07	21.32	20.90	22
		12	6	21.15	21.25	21.08	22
		12	13	21.18	21.21	21.11	22
		25	0	21.16	21.26	21.11	22
		1	0	21.17	21.33	21.19	22
		1	12	21.38	21.42	21.10	22
	16QAM	1	24	21.17	21.21	20.99	22
		12	0	20.08	20.24	19.95	21
		12	6	20.07	20.23	20.04	21
		12	13	20.04	20.26	20.08	21
		25	0	20.03	20.20	20.02	21
		25	0	20.03	20.20	20.02	21

LTE Band 25							
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	Max. Tune-up (dBm)
		Channel		26140	26240	26360	
20M	QPSK	1	0	22.93	23.02	23.01	24
		1	50	23.11	23.17	23.16	24
		1	99	22.92	23.01	23.09	24
		50	0	22.21	22.26	22.23	23
		50	25	22.16	22.18	22.20	23
		50	50	22.08	22.02	22.01	23
	16QAM	100	0	22.11	22.14	22.07	23
		1	0	22.12	22.27	22.34	23
		1	50	22.22	22.23	22.36	23
		1	99	22.28	22.24	22.26	23
		50	0	21.23	21.08	21.05	22
		50	25	21.15	21.16	21.18	22
	64QAM	50	50	21.06	21.06	21.05	22
		100	0	21.13	21.03	21.06	22
		1	0	21.17	21.11	21.24	22
		1	50	21.43	21.38	21.37	22
		1	99	21.28	21.21	21.23	22
		50	0	20.27	20.16	20.26	21
15M	QPSK	50	25	20.17	20.21	20.27	21
		50	50	20.13	20.09	20.03	21
		100	0	20.20	20.11	20.13	21
	16QAM	Channel	26115	26240	26315		
		Frequency (MHz)	1857.5	1880	1907.5		
		1	0	22.92	22.90	22.88	24
		1	37	23.04	23.05	23.03	24
		1	74	22.91	22.99	23.08	24
		36	0	22.13	22.25	22.19	23
	64QAM	36	19	22.07	22.05	22.05	23
		36	39	21.95	22.01	21.93	23
		75	0	22.08	22.02	21.96	23
		1	0	22.08	22.15	22.24	23
		1	37	22.11	22.12	22.28	23
		1	74	22.26	22.11	22.18	23
10M	QPSK	36	0	21.11	21.05	20.90	22
		36	19	21.08	21.14	21.14	22
		36	39	21.05	21.01	20.99	22
		75	0	21.10	20.92	20.96	22
		1	0	21.12	21.07	21.11	22
		1	37	21.31	21.28	21.34	22
	16QAM	1	74	21.18	21.15	21.16	22
		36	0	20.26	20.06	20.16	21
		36	19	20.03	20.20	20.24	21
		36	39	19.99	19.95	19.91	21
		75	0	20.13	20.02	20.01	21
		75	0	20.13	20.09	19.98	21
5M	QPSK	Channel	26090	26240	26360		
		Frequency (MHz)	1855	1880	1910		
		1	0	22.81	22.95	22.99	24
		1	24	23.01	23.03	23.08	24
		1	49	22.86	22.87	22.96	24
		25	0	22.18	22.15	22.12	23
	16QAM	25	12	22.09	22.12	22.19	23
		25	25	22.02	21.92	21.92	23
		50	0	21.99	22.01	21.97	23
		1	0	22.04	22.12	22.22	23
		1	24	22.17	22.14	22.35	23
		1	49	22.19	22.23	22.21	23
10M	QPSK	25	0	21.20	21.06	21.00	22
		25	12	21.00	21.01	21.08	22
		25	25	20.93	20.88	21.00	22
		50	0	21.08	20.91	21.03	22
		1	0	21.04	21.08	21.20	22
		1	24	21.31	21.27	21.28	22
	16QAM	1	49	21.19	21.18	21.17	22
		25	0	20.21	20.02	20.19	21
		25	12	20.06	20.17	20.25	21
		25	25	19.98	20.05	20.02	21
		50	0	20.13	20.09	19.98	21
		50	0	20.13	20.09	19.98	21
5M	QPSK	Channel	26065	26240	26360		
		Frequency (MHz)	1852.5	1880	1912.5		
		1	0	22.90	22.97	22.99	24
		1	12	22.97	23.03	23.05	24
		1	24	22.79	23.00	22.94	24
		12	0	22.19	22.15	22.22	23
	16QAM	12	6	22.01	22.16	22.15	23
		12	13	21.95	21.97	21.98	23
		25	0	22.09	22.03	22.05	23
		1	0	22.03	22.12	22.30	23
		1	12	22.07	22.13	22.23	23
		1	24	22.18	22.10	22.13	23
10M	QPSK	12	6	21.12	21.00	20.99	22
		12	6	21.13	21.11	21.08	22
		12	13	20.99	20.99	21.02	22
		25	0	21.07	20.88	20.96	22
		1	0	21.08	21.03	21.22	22
		1	12	21.31	21.26	21.27	22
	16QAM	1	24	21.14	21.17	21.15	22
		12	0	20.19	20.12	20.18	21
		12	6	20.04	20.13	20.19	21
		12	13	20.05	20.05	20.02	21
		25	0	20.10	20.02	20.04	21
		25	0	20.10	20.02	20.04	21
5M	QPSK	Channel	26065	26240	26360		
		Frequency (MHz)	1851.5	1880	1913.5		
		1	0	22.81	22.92	22.88	24
		1	7	23.06	23.08	23.07	24
		1	14	22.89	22.86	23.03	24
		8	0	22.07	22.12	22.12	23
	16QAM	8	3	22.05	22.05	22.05	23
		8	7	22.04	21.94	21.89	23
		15	0	22.03	22.05	21.94	23
		1	0	21.98	22.23	22.19	23
		1	7	22.18	22.20	22.32	23
		1	14	22.15	22.19	22.25	23
10M	QPSK	8	0	21.20	21.03	21.04	22
		8	3	21.10	21.12	21.17	22
		8	7	20.92	20.94	21.04	22
		15	0	21.07	20.91	20.92	22
		1	0	21.06	21.04	21.12	22
		1	7	21.34	21.28	21.29	22
	16QAM	1	14	21.21	21.20	21.17	22
		8	0	20.18	20.13	20.25	21
		8	3	20.05	20.11	20.22	21
		8	7	19.98	20.04	19.97	21
		15	0	20.08	20.02	20.01	21
		15	0	20.08	20.02	20.01	21
3M	QPSK	Channel	26047	26240	26363		
		Frequency (MHz)	1850.7	1880	1914.3		
		1	0	22.92	22.88	22.97	24
		1	2	23.01	23.09	23.14	24
		1	5	22.84	22.80	22.92	24
		3	0	22.17	22.16	22.22	24
	16QAM	3	1	23.12	23.09	23.05	24
		3	3	23.01	22.97	22.98	24
		6	0	22.10	21.99	21.93	23
		1	0	22.04	22.23	22.25	23
		1	2	22.21	22.21	22.28	23
		1	5	22.27	22.09	22.17	23
1.4M	QPSK	3	0	22.22	21.98	21.92	23
		3	1	22.08	22.09	22.09	23
		6	0	21.92	20.91	20.95	22
		3	3	21.94	22.02	21.99	23
		1	0	21.93	21.01	21.05	22
		1	0	21.13	21.07	21.21	22
	64QAM	1	2	21.40	21.36	21.28	22
		1	5	21.25	21.06	21.16	22
		3	0	21.16	21.06	21.14	22
		3	1	21.16	21.08	21.18	22
		3	3	21.03	21.01	20.93	22
		6	0	20.14	20.05	20.11	21

LTE Band 38							
BW	Modulation	RB Size	RB Offset	Low	Mid	High	Max. Tune-up (dBm)
		Channel		37850	38000	38150	
		Frequency (MHz)		2580	2595	2610	
20M	QPSK	1	0	22.82	22.93	22.86	24
		1	50	22.99	23.01	23.00	24
		1	99	22.75	22.77	22.78	24
		50	0	21.88	22.05	22.03	23
		50	25	21.82	21.88	21.86	23
		50	50	21.74	21.80	21.80	23
		100	0	21.78	21.86	21.85	23
		1	0	22.05	21.90	21.97	23
		1	50	22.09	22.03	22.06	23
		1	99	21.73	21.75	21.79	23
	16QAM	50	0	20.94	20.99	21.12	22
		50	25	20.90	20.95	20.96	22
		50	50	20.85	20.84	20.86	22
		100	0	20.90	20.82	20.92	22
		1	0	20.57	20.50	20.55	22
		1	50	20.61	20.66	20.65	22
		1	99	20.30	20.34	20.40	22
		50	0	20.00	19.97	20.11	21
		50	25	19.97	19.90	19.96	21
		50	50	19.89	19.82	19.82	21
		100	0	19.91	19.85	19.94	21
	64QAM	Channel		37850	38000	38150	Max. Tune-up (dBm)
		Frequency (MHz)		2577.5	2595	2612.5	
		1	0	22.90	22.67	22.74	24
		1	37	22.87	22.84	22.86	24
		1	74	22.74	22.74	22.75	24
		36	0	21.98	21.73	21.97	23
		36	19	21.86	21.73	21.77	23
		36	39	21.75	21.60	21.77	23
		75	0	21.73	21.73	21.71	23
		1	0	22.02	21.85	21.88	23
15M	QPSK	1	37	22.08	21.97	21.91	23
		1	74	21.59	21.63	21.77	23
		36	0	20.86	20.90	20.99	22
		36	19	20.88	20.80	20.94	22
		36	39	20.81	20.80	20.76	22
		75	0	20.82	20.76	20.76	22
		1	0	20.46	20.38	20.45	22
		1	37	20.50	20.55	20.55	22
		1	74	20.23	20.25	20.33	22
		36	0	19.93	19.88	20.07	21
	16QAM	36	19	19.90	19.89	19.86	21
		36	39	19.81	19.68	19.77	21
		75	0	19.82	19.81	19.93	21
		1	0	20.46	20.38	20.45	22
		1	37	20.50	20.55	20.55	22
		1	74	20.23	20.25	20.33	22
		36	0	19.93	19.88	20.07	21
		36	19	19.90	19.89	19.86	21
		36	39	19.81	19.68	19.77	21
		75	0	19.82	19.81	19.93	21
	64QAM	Channel		37800	38000	38200	Max. Tune-up (dBm)
		Frequency (MHz)		2575	2595	2615	
		1	0	22.88	22.72	22.75	24
		1	24	22.88	22.94	22.94	24
		1	49	22.71	22.73	22.65	24
		25	0	21.99	21.80	21.88	23
		25	12	21.85	21.80	21.75	23
		25	25	21.75	21.63	21.66	23
		50	0	21.85	21.69	21.81	23
		1	0	21.94	21.80	21.86	23
10M	QPSK	1	24	22.04	21.90	22.05	23
		1	49	21.60	21.66	21.78	23
		25	0	20.82	20.88	20.97	22
		25	12	20.86	20.81	20.91	22
		25	25	20.83	20.81	20.82	22
		50	0	20.81	20.78	20.77	22
		1	0	20.51	20.46	20.41	22
		1	24	20.51	20.55	20.52	22
		1	49	20.15	20.28	20.26	22
		25	0	19.85	19.88	19.97	21
	16QAM	25	12	19.87	19.84	19.95	21
		25	25	19.85	19.68	19.69	21
		50	0	19.87	19.73	19.82	21
		1	0	20.51	20.46	20.41	22
		1	24	20.51	20.55	20.52	22
		1	49	20.15	20.28	20.26	22
		25	0	19.85	19.88	19.97	21
		25	12	19.87	19.84	19.95	21
		25	25	19.85	19.68	19.69	21
		50	0	19.87	19.73	19.82	21
	64QAM	Channel		37775	38000	38225	Max. Tune-up (dBm)
		Frequency (MHz)		2572.5	2595	2617.5	
		1	0	22.87	22.73	22.74	24
		1	12	22.91	22.85	22.90	24
		1	24	22.62	22.65	22.67	24
		12	0	21.98	21.78	21.94	23
		12	6	21.85	21.67	21.82	23
		12	13	21.79	21.60	21.78	23
		25	0	21.75	21.74	21.77	23
		1	0	22.00	21.84	21.89	23
5M	QPSK	1	12	22.03	21.97	22.05	23
		1	24	21.80	21.69	21.66	23
		12	0	20.84	20.93	21.03	22
		12	6	20.75	20.84	20.85	22
		12	13	20.72	20.79	20.71	22
		25	0	20.79	20.76	20.81	22
		1	0	20.52	20.39	20.50	22
		1	12	20.50	20.61	20.57	22
		1	24	20.28	20.30	20.28	22
		12	0	19.95	19.82	20.05	21
	16QAM	12	6	19.83	19.84	19.82	21
		12	13	19.85	19.79	19.79	21
		25	0	19.84	19.81	19.84	21
		1	0	20.52	20.39	20.50	22
		1	12	20.50	20.61	20.57	22
		1	24	20.28	20.30	20.28	22
		12	0	19.95	19.82	20.05	21
		12	6	19.83	19.84	19.82	21
		12	13	19.85	19.79	19.79	21
		25	0	19.84	19.81	19.84	21
	64QAM	Channel		39726	40175	40620	Max. Tune-up (dBm)
		Frequency (MHz)		2593.5	2594.5	2593	
		1	0	22.86	22.91	22.87	24
		1	12	22.99	23.16	22.96	24
		1	24	22.74	22.84	22.75	24
		12	0	21.81	21.93	21.84	23
		12	6	21.92	21.69	21.60	23
		12	13	21.82	21.78	21.59	23
		25	0	21.86	21.94	21.58	23
		1	0	21.90	22.12	21.76	23

Reduce Power

LTE Band 2											
BW	MCS Index	RB Size	RB Offset	Low	Mid	High					
		Channel		1870	1890	1910					
20M	QPSK	Frequency (MHz)		1860	1880	1900	Max. Tune-up (dBm)				
		1	0	10.82	10.96	10.91	12				
		1	50	11.19	11.39	11.17	12				
		1	99	10.88	10.87	11.09	12				
		50	0	11.09	11.25	11.18	12				
		50	25	11.01	11.07	11.04	12				
	16QAM	50	50	10.82	10.86	11.02	12				
		100	0	10.97	11.18	10.95	12				
		64QAM	1	0	10.76	10.91	10.90	12			
			1	50	11.15	11.35	11.11	12			
			1	99	10.86	10.85	10.98	12			
			50	0	10.69	10.89	10.83	12			
50	25		10.95	11.16	11.10	12					
50	50		10.80	10.78	11.01	12					
15M	QPSK	100	0	10.64	10.73	10.70	12				
		16QAM	1	0	10.69	10.84	10.76	12			
			1	50	11.17	11.38	11.16	12			
			1	99	10.83	10.82	11.07	12			
			50	0	10.57	10.84	10.76	12			
			50	25	11.03	11.17	11.05	12			
	64QAM		50	50	10.80	10.79	10.88	12			
		100	0	10.65	10.82	10.80	12				
		BW	MCS Index	Channel		18675	18900	19125	Max. Tune-up		
				Frequency (MHz)		1857.5	1880	1892.5			
		10M	QPSK	1	0	10.67	10.82	10.90	12		
				1	37	11.15	11.30	11.10	12		
1	74			10.79	10.83	11.07	12				
36	0			10.66	10.81	10.83	12				
36	19			11.08	11.13	11.09	12				
36	39			10.71	10.83	10.93	12				
75	0			10.57	10.83	10.73	12				
16QAM	1			0	10.68	10.89	10.82	12			
	1			37	11.00	11.25	11.02	12			
	1			74	10.83	10.74	10.83	12			
	36			0	10.55	10.75	10.80	12			
	36			19	10.81	11.09	11.09	12			
	36		39	10.65	10.83	11.00	12				
64QAM	75		0	10.61	10.60	10.64	12				
	1		0	10.59	10.70	10.68	12				
	1		37	11.02	11.25	10.96	12				
	1		74	10.75	10.72	11.03	12				
	36		0	10.47	10.74	10.75	12				
	36		19	10.88	11.09	10.94	12				
5M	QPSK		36	39	10.68	10.84	10.76	12			
			75	0	10.50	10.76	10.68	12			
			16QAM	1	0	10.65	10.74	10.61	12		
				1	24	11.10	11.34	11.00	12		
				1	49	10.68	10.80	10.98	12		
		25		0	10.55	10.78	10.74	12			
	25	12		10.93	11.07	11.01	12				
	64QAM	25		25	10.76	10.76	10.88	12			
		50	0	10.58	10.63	10.63	12				
		16QAM	1	0	10.65	10.74	10.61	12			
			1	24	11.10	11.34	11.00	12			
			1	49	10.68	10.80	10.98	12			
25			0	10.45	10.81	10.66	12				
25	12		10.95	11.03	11.01	12					
25	25		10.73	10.75	10.85	12					
3M	QPSK	50	0	10.53	10.78	10.68	12				
		16QAM	1	0	10.72	10.87	10.80	12			
			1	12	11.00	11.22	11.04	12			
			1	24	10.77	10.79	10.90	12			
			12	0	10.58	10.77	10.78	12			
			12	6	10.93	11.08	11.06	12			
	64QAM		12	13	10.78	10.84	10.94	12			
		25	0	10.54	10.70	10.55	12				
		1	0	10.59	10.74	10.75	12				
		1	12	11.12	11.29	11.02	12				
		1	24	10.69	10.74	11.01	12				
		12	0	10.56	10.78	10.74	12				
1.4M	QPSK	12	6	10.88	11.05	11.03	12				
		12	13	10.78	10.78	10.83	12				
		25	0	10.59	10.79	10.66	12				
		16QAM	1	0	10.72	10.90	10.79	12			
			1	7	11.09	11.26	11.16	12			
			1	14	10.79	10.74	11.02	12			
	64QAM		8	0	10.60	10.83	10.77	12			
			8	3	11.06	11.23	11.16	12			
			8	7	10.70	10.85	10.85	12			
		15	0	10.53	10.77	10.74	12				
		1	0	10.66	10.83	10.89	12				
		1	7	11.12	11.33	11.06	12				
1.4M	QPSK	1	14	10.77	10.79	10.85	12				
		8	0	10.59	10.81	10.73	12				
		8	3	10.89	11.05	10.95	12				
		8	7	10.79	10.73	10.93	12				
		15	0	10.59	10.63	10.67	12				
		1	0	10.55	10.73	10.75	12				
	64QAM	1	7	11.03	11.30	10.99	12				
		1	14	10.80	10.77	10.97	12				
		8	0	10.45	10.74	10.66	12				
		8	3	10.86	11.04	10.95	12				
		8	7	10.76	10.68	10.83	12				
		15	0	10.62	10.80	10.79	12				
1.4M	QPSK	MCS Index	Channel	18607	18900	19193	Max. Tune-up				
			Frequency (MHz)	1855.7	1880	1899.3					
			1	0	10.76	10.85	10.90	12			
			1	2	11.07	11.21	11.08	12			
			3	0	10.63	10.84	10.79	12			
			3	1	11.06	11.13	11.10	12			
			3	3	10.79	10.73	10.91	12			
			6	0	10.57	10.75	10.76	12			
			1	0	10.67	10.90	10.89	12			
			1	2	11.07	11.26	11.04	12			
			1	5	10.77	10.78	10.94	12			
			3	0	10.56	10.83	10.79	12			
	64QAM	3	1	10.91	11.14	11.05	12				
		3	3	10.70	10.66	11.00	12				
		6	0	10.61	10.54	10.58	12				
		1	0	10.65	10.70	10.69	12				
		1	2	11.08	11.33	11.07	12				
		1	5	10.78	10.89	10.94	12				
		3	0	10.55	10.72	10.62	12				
		3	1	10.90	11.05	10.94	12				
		3	3	10.73	10.68	10.78	12				
		6	0	10.62	10.78	10.73	12				

LTE Band 7									
BW	Modulation	RB Size		Low	Mid	High	Max. Tune-up (dBm)		
		RB Offset							
		Channel Frequency (MHz)	20890	21100	21380	21500			
20M	QPSK	1	0	10.87	10.98	11.09	12		
		1	50	11.04	11.21	11.19	12		
		1	99	10.82	10.92	10.92	12		
		50	0	10.81	10.89	11.02	12		
		50	25	10.92	11.16	11.15	12		
		50	50	10.72	10.81	10.79	12		
	16QAM	100	0	10.74	10.96	10.95	12		
		1	0	10.74	10.97	11.01	12		
		1	50	11.03	11.11	11.17	12		
		1	99	10.79	10.85	10.86	12		
		50	0	10.71	10.76	10.89	12		
		50	25	10.77	11.09	11.13	12		
64QAM	50	50	10.64	10.67	10.75	12			
	100	0	10.66	10.88	10.83	12			
	1	0	10.74	10.88	10.95	12			
	1	50	10.90	11.19	11.04	12			
	1	99	10.70	10.86	10.85	12			
	50	0	10.78	10.84	10.93	12			
15M	QPSK	50	25	10.87	11.12	11.01	12		
		50	50	10.60	10.80	10.72	12		
		100	0	10.63	10.95	10.85	12		
		1	0	10.86	10.87	11.01	12		
		1	37	10.96	11.18	11.05	12		
		1	74	10.72	10.90	10.78	12		
	16QAM	36	0	10.70	10.87	10.96	12		
		36	19	10.82	11.03	11.03	12		
		36	39	10.68	10.66	10.67	12		
		75	0	10.72	10.94	10.89	12		
		1	0	10.69	10.93	10.99	12		
		1	37	10.81	11.06	10.99	12		
64QAM	1	74	10.65	10.75	10.82	12			
	36	0	10.68	10.74	10.81	12			
	36	19	10.86	11.07	11.02	12			
	36	39	10.51	10.68	10.62	12			
	75	0	10.48	10.85	10.73	12			
10M	QPSK	Channel Frequency (MHz)	20890	21100	21400	21500	Max. Tune-up (dBm)		
		1	0	10.78	10.92	10.95	12		
		1	24	10.92	11.13	11.04	12		
		1	49	10.81	10.91	10.77	12		
		25	0	10.74	10.82	10.89	12		
		25	12	10.86	11.04	11.13	12		
	16QAM	25	25	10.70	10.68	10.72	12		
		50	0	10.67	10.89	10.86	12		
		1	0	10.59	10.84	10.97	12		
		1	24	10.94	11.08	11.06	12		
		1	49	10.68	10.72	10.78	12		
		25	0	10.67	10.72	10.76	12		
64QAM	25	12	10.67	10.98	10.99	12			
	25	25	10.63	10.62	10.66	12			
	50	0	10.55	10.80	10.68	12			
	1	0	10.69	10.97	10.88	12			
	1	24	10.89	11.13	10.91	12			
	1	49	10.68	10.83	10.75	12			
5M	QPSK	25	0	10.63	10.72	10.86	12		
		25	12	10.76	10.99	10.90	12		
		25	25	10.53	10.67	10.62	12		
		50	0	10.51	10.93	10.78	12		
		Channel Frequency (MHz)	20775	21100	21425	21500	Max. Tune-up (dBm)		
		1	0	10.83	10.83	11.08	12		
	16QAM	1	12	11.01	11.19	11.07	12		
		1	24	10.67	10.89	10.90	12		
		12	0	10.67	10.86	10.91	12		
		12	6	10.85	11.04	11.02	12		
		12	13	10.59	10.73	10.75	12		
		25	0	10.61	10.91	10.90	12		
64QAM	1	0	10.70	10.94	10.96	12			
	1	12	10.99	11.00	11.04	12			
	1	24	10.74	10.79	10.84	12			
	12	0	10.59	10.69	10.86	12			
	12	6	10.63	11.05	11.00	12			
	12	13	10.62	10.54	10.69	12			

LTE Band 12									
BW	MCS Index	RB Size					Max. Tune-up (dBm)		
		Channel	Low	Mid	High				
		Frequency (MHz)	768	23095	23130				
QPSK	10M	1	0	17.18	17.18	17.28	18		
		1	24	17.33	17.28	17.31	18		
		1	49	17.18	17.11	17.16	18		
		25	0	17.27	17.17	17.22	18		
		25	12	17.18	17.14	17.19	18		
		25	25	17.03	17.09	17.14	18		
		50	0	17.25	17.12	17.22	18		
		1	0	17.16	17.15	17.24	18		
		1	24	17.19	17.19	17.27	18		
		1	49	17.12	17.05	17.14	18		
		25	0	17.22	17.13	17.20	18		
		25	12	17.03	17.08	17.12	18		
16QAM	10M	25	25	16.98	17.02	17.07	18		
		50	0	17.15	17.08	17.13	18		
		1	0	17.28	17.08	17.11	18		
		1	24	17.31	17.26	17.19	18		
		1	49	17.06	16.99	17.12	18		
		25	0	17.26	17.04	17.07	18		
		25	12	17.03	17.06	17.17	18		
		25	25	16.95	16.96	17.00	18		
		50	0	17.14	17.10	17.08	18		
		QPSK	5M	Channel	23035	23095	23155	Max. Tune-up	
				Frequency (MHz)	768.5	767.5	763.5		
				1	0	17.14	17.16	17.16	18
1	12			17.24	17.15	17.22	18		
1	24			17.03	16.97	17.12	18		
12	0			17.22	17.09	17.08	18		
12	6			17.15	17.05	17.06	18		
12	13			16.98	16.97	17.11	18		
25	0			17.18	17.11	17.18	18		
1	0			17.14	17.12	17.20	18		
1	12			17.13	17.18	17.12	18		
1	24			17.11	17.03	17.04	18		
16QAM	5M	12	0	17.16	16.98	17.08	18		
		12	6	17.02	17.04	17.08	18		
		12	13	16.92	16.96	16.92	18		
		25	0	17.14	16.97	17.00	18		
		1	0	17.21	16.99	17.02	18		
		1	12	17.26	17.25	17.04	18		
		1	24	16.97	16.95	17.00	18		
		12	0	17.23	17.00	16.96	18		
		12	6	17.02	16.88	17.12	18		
		12	13	16.90	16.85	16.96	18		
		25	0	17.03	17.09	16.95	18		
		QPSK	3M	Channel	23025	23095	23155	Max. Tune-up	
Frequency (MHz)	768.5			767.5	763.5				
1	0			17.25	17.03	17.17	18		
1	7			17.23	17.26	17.19	18		
1	14			17.10	17.04	17.02	18		
8	0			17.16	17.09	17.08	18		
8	3			17.05	17.08	17.08	18		
8	7			16.90	17.00	17.04	18		
15	0			17.14	16.98	17.18	18		
1	0			17.12	17.00	17.23	18		
1	7			17.18	17.11	17.21	18		
1	14			17.03	16.97	17.12	18		
16QAM	3M	8	0	17.13	17.07	17.08	18		
		8	3	17.00	17.07	17.09	18		
		8	7	16.97	16.92	17.06	18		
		15	0	17.05	17.00	16.99	18		
		1	0	17.13	16.96	17.05	18		
		1	7	17.23	17.13	17.12	18		
		1	14	16.92	16.96	16.96	18		
		8	0	17.18	16.93	17.03	18		
		8	3	17.01	16.87	17.09	18		
		8	7	16.88	16.88	16.86	18		
		15	0	17.03	16.95	16.96	18		
		QPSK	BW	Channel	23047	23095	23173	Max. Tune-up	
Frequency (MHz)	698.7			707.5	716.3				
1	0			17.22	17.09	17.11	18		
1	2			17.25	17.14	17.16	18		
1	5			17.10	17.07	17.01	18		
3	0			17.15	17.14	17.08	18		
3	1			17.08	17.01	17.18	18		
3	3			16.93	17.05	17.12	18		
6	0			17.19	17.10	17.12	18		
1	0			17.04	17.01	17.22	18		
1	14			17.14	17.00	17.04	18		
3	0			17.13	17.11	17.18	18		
16QAM	1.4M	3	1	16.98	16.96	17.03	18		
		3	3	16.94	16.96	16.93	18		
		6	0	17.10	17.03	17.06	18		
		6	1	17.13	17.04	16.96	18		
		1	2	17.20	17.14	17.04	18		
		1	5	16.96	16.95	17.09	18		
		3	0	17.22	16.90	17.06	18		
		3	1	16.97	16.86	17.11	18		
		3	3	16.94	16.93	16.95	18		
		6	0	17.02	17.07	17.07	18		

LTE Band 17						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel Frequency (MHz)		2376 769	2379 710	2380 711
10M	QPSK	1	0	17.21	17.15	17.24
		1	24	17.23	17.29	17.26
		1	49	17.13	16.96	17.14
		25	0	17.25	17.29	17.06
		25	12	17.17	17.01	17.07
		25	25	16.91	17.01	17.02
		50	0	17.21	17.22	17.15
		1	0	17.05	17.06	17.11
		1	24	17.17	17.16	17.20
		1	49	17.08	16.91	17.07
	16QAM	25	0	17.09	17.08	17.13
		25	12	16.89	17.04	17.11
		25	25	16.97	16.94	16.99
		50	0	17.05	16.97	17.03
		1	0	17.19	17.03	17.06
		1	24	17.26	17.21	17.07
		1	49	17.02	16.88	17.10
		25	0	17.21	17.00	16.93
		25	12	16.99	16.94	17.16
		25	25	16.81	16.85	16.89
5M	QPSK	50	0	17.06	17.07	16.99
		1	0	17.11	17.12	17.20
		1	12	17.22	17.16	17.23
		1	24	17.07	16.95	17.01
		12	0	17.21	17.23	17.07
		12	6	17.12	16.93	16.93
		12	13	16.88	16.94	16.89
		25	0	17.06	17.08	17.05
		1	0	16.91	16.87	17.02
		1	12	17.02	17.14	17.11
	16QAM	1	24	17.00	16.89	16.95
		12	0	17.07	17.01	17.06
		12	6	16.74	16.92	17.02
		12	13	16.88	16.84	16.90
		25	0	16.91	16.89	16.96
		1	0	17.09	16.97	17.01
		1	12	17.21	17.17	17.00
		1	24	16.97	16.75	17.08
		12	0	17.19	16.89	16.89
		12	6	16.98	16.85	17.14
		12	13	16.72	16.76	16.80
5M	QPSK	25	0	16.99	16.84	16.89
		1	0	17.06	17.07	16.99
		1	12	17.21	17.17	17.00
		1	24	16.97	16.75	17.08
		12	0	17.19	16.89	16.89
		12	6	16.98	16.85	17.14
		12	13	16.72	16.76	16.80
		25	0	16.99	16.84	16.89
		1	0	17.06	17.07	16.99
		1	12	17.21	17.17	17.00
	16QAM	1	24	16.97	16.75	17.08
		12	0	17.19	16.89	16.89
		12	6	16.98	16.85	17.14
		12	13	16.72	16.76	16.80
		25	0	16.99	16.84	16.89
		1	0	17.06	17.07	16.99
		1	12	17.21	17.17	17.00
		1	24	16.97	16.75	17.08
		12	0	17.19	16.89	16.89
		12	6	16.98	16.85	17.14
		12	13	16.72	16.76	16.80

LTE Band 25						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel Frequency (MHz)		2616 1860	2618 1860	2620 1865
20M	QPSK	1	0	10.95	10.91	10.90
		1	50	11.09	11.31	11.16
		1	99	10.92	10.81	11.00
		50	0	10.95	10.91	11.06
		50	25	10.94	11.02	11.01
		50	50	10.88	10.83	10.97
		100	0	10.96	11.08	10.91
		1	0	10.69	10.81	10.85
		1	50	11.06	11.31	10.96
		1	99	10.76	10.70	10.84
	16QAM	50	0	10.59	10.84	10.74
		50	25	10.80	11.03	11.08
		50	50	10.78	10.67	10.89
		100	0	10.61	10.62	10.86
		1	0	10.57	10.79	10.63
		1	50	11.15	11.32	11.00
		1	99	10.77	10.75	10.92
		50	0	10.45	10.76	10.84
		50	25	10.69	11.09	11.03
		50	50	10.70	10.67	10.73
		100	0	10.54	10.69	10.67
15M	QPSK	Channel		2616 1860	2618 1865	Max. Turn-up
		Frequency (MHz)		1867.5	1860	1867.5
		1	0	10.79	10.83	10.72
		1	37	11.08	11.31	11.07
		1	74	10.79	10.69	10.90
		36	0	10.50	10.67	10.71
		36	19	10.99	11.07	10.94
		36	39	10.66	10.79	10.93
		75	0	10.57	10.79	10.63
		1	0	10.88	10.73	10.75
	16QAM	1	37	11.04	11.23	10.86
		1	74	10.61	10.65	10.70
		36	0	10.49	10.81	10.66
		36	19	10.68	10.99	10.90
		36	39	10.65	10.57	10.82
		75	0	10.51	10.61	10.58
		1	0	10.55	10.76	10.48
		1	37	11.13	11.23	10.91
		1	74	10.71	10.62	10.71
		36	0	10.38	10.67	10.54
10M	QPSK	36	19	10.93	10.95	10.92
		36	39	10.56	10.59	10.67
		75	0	10.46	10.56	10.64
	16QAM	Channel		2616 1860	2618 1865	Max. Turn-up
		Frequency (MHz)		1867.5	1860	1867.5
		1	0	10.73	10.87	10.70
		1	24	10.95	11.25	11.14
		1	49	10.72	10.72	10.93
		25	0	10.55	10.71	10.76
		25	12	10.97	11.18	11.05
		25	25	10.66	10.79	10.88
		50	0	10.58	10.79	10.66
		1	0	10.58	10.66	10.75
5M	QPSK	1	24	10.96	11.30	10.91
		1	49	10.64	10.69	10.73
		25	0	10.51	10.70	10.69
		25	12	10.70	10.96	11.02
		25	25	10.76	10.65	10.75
		50	0	10.46	10.59	10.55
	16QAM	1	0	10.43	10.65	10.62
		1	24	11.08	11.29	10.98
		1	49	10.64	10.64	10.82
		25	0	10.41	10.75	10.56
		25	12	10.98	11.00	10.95
		25	25	10.62	10.58	10.95
		50	0	10.43	10.63	10.59
3M	QPSK	Channel		2616 1860	2618 1865	Max. Turn-up
		Frequency (MHz)		1867.5	1860	1867.5
		1	0	10.73	10.81	10.74
		1	7	10.94	11.23	11.13
		1	14	10.67	10.76	10.90
		8	0	10.55	10.63	10.72
		8	3	10.89	11.12	11.00
		8	7	10.60	10.69	10.96
		15	0	10.56	10.77	10.57
		1	0	10.54	10.74	10.75
	16QAM	1	7	10.99	11.20	10.86
		1	14	10.67	10.57	10.70
		8	0	10.50	10.73	10.61
		8	3	10.66	10.93	11.06
		8	7	10.68	10.54	10.75
		15	0	10.60	10.49	10.54
		1	0	10.46	10.78	10.55
		1	7	11.07	11.30	10.91
		1	14	10.66	10.67	10.87
		8	0	10.43	10.68	10.52
1.4M	QPSK	8	3	10.93	10.94	11.01
		8	7	10.65	10.59	10.65
		15	0	10.47	10.65	10.60
	16QAM	Channel		2616 1860	2618 1865	Max. Turn-up
		Frequency (MHz)		1867.5	1860	1867.5
		1	0	10.72	10.87	10.58
		1	2	10.97	11.20	11.08
		1	5	10.73	10.76	10.91
		3	0	10.50	10.75	10.71
		3	1	11.01	11.14	11.04
		3	3	10.65	10.72	10.96
		6	0	10.60	10.83	10.57
		1	0	10.66	10.72	10.75
1.4M	QPSK	1	2	11.05	11.17	10.91
		1	5	10.63	10.68	10.77
		3	0	10.56	10.77	10.63
		3	1	10.70	10.94	10.98
		3	3	10.70	10.63	10.79
		6	0	10.51	10.59	10.61
		1	0	10.46	10.78	10.59
		1	2	11.02	11.19	10.86
		1	5	10.68	10.63	10.81
		3	0	10.33	10.67	10.50
1.4M	QPSK	3	1	10.96	10.93	10.92
		3	3	10.66	10.66	10.61
		6	0	10.43	10.62	10.64
	16QAM	Channel		2616 1860	2618 1865	Max. Turn-up
		Frequency (MHz)		1867.5	1860	186

LTE Band 38										
BW	Modulation	RB Size	RB Offset	Low	Mid	High	Max. Turn-up (dBm)			
		Channel Frequency (MHz)	2580	2595	2610	2580	2595	2610		
20M	QPSK	1	0	13.56	13.67	13.60	14.5			
		1	50	13.73	13.78	13.74	14.5			
		1	99	13.49	13.51	13.52	14.5			
		50	0	13.69	13.73	13.66	14.5			
		50	25	13.65	13.70	13.65	14.5			
		50	50	13.38	13.46	13.38	14.5			
		100	0	13.51	13.65	13.47	14.5			
		1	0	13.42	13.54	13.56	14.5			
		1	50	13.70	13.62	13.68	14.5			
		1	99	13.48	13.45	13.40	14.5			
20M	16QAM	50	0	13.62	13.70	13.65	14.5			
		50	25	13.61	13.66	13.63	14.5			
		50	50	13.33	13.39	13.30	14.5			
		100	0	13.48	13.57	13.36	14.5			
		1	0	13.45	13.61	13.46	14.5			
		1	50	13.64	13.63	13.61	14.5			
		1	99	13.42	13.42	13.37	14.5			
		50	0	13.63	13.66	13.62	14.5			
		50	25	13.55	13.56	13.53	14.5			
		50	50	13.32	13.37	13.25	14.5			
20M	16QAM	100	0	13.42	13.55	13.38	14.5			
		1	0	13.42	13.54	13.56	14.5			
		1	50	13.70	13.62	13.68	14.5			
		1	99	13.42	13.42	13.37	14.5			
		50	0	13.63	13.66	13.62	14.5			
		50	25	13.55	13.56	13.53	14.5			
		50	50	13.32	13.37	13.25	14.5			
		100	0	13.42	13.55	13.38	14.5			
		15M	QPSK	Channel	3782.5	3800.0	3817.5			Max. Turn-up (dBm)
				Frequency (MHz)	2577.5	2595	2612.5			
1	0			13.49	13.52	13.55	14.5			
1	37			13.58	13.73	13.68	14.5			
1	74			13.43	13.50	13.42	14.5			
36	0			13.55	13.65	13.57	14.5			
36	19			13.59	13.55	13.61	14.5			
36	39			13.31	13.41	13.27	14.5			
75	0			13.40	13.59	13.42	14.5			
1	0			13.32	13.44	13.46	14.5			
15M	16QAM	1	37	13.60	13.51	13.66	14.5			
		1	74	13.33	13.32	13.26	14.5			
		36	0	13.53	13.59	13.57	14.5			
		36	19	13.50	13.56	13.59	14.5			
		36	39	13.28	13.37	13.18	14.5			
		75	0	13.40	13.56	13.32	14.5			
		1	0	13.38	13.56	13.36	14.5			
		1	37	13.52	13.50	13.58	14.5			
		1	74	13.35	13.35	13.28	14.5			
		36	0	13.57	13.63	13.56	14.5			
15M	16QAM	36	19	13.44	13.53	13.46	14.5			
		36	39	13.30	13.34	13.24	14.5			
		75	0	13.41	13.41	13.37	14.5			
		Channel	3789.0	3800.0	3820.0			Max. Turn-up (dBm)		
		Frequency (MHz)	2575	2595	2615					
		1	0	13.50	13.63	13.49	14.5			
		1	24	13.70	13.71	13.71	14.5			
		1	49	13.35	13.49	13.46	14.5			
		25	0	13.67	13.70	13.55	14.5			
		25	12	13.67	13.68	13.59	14.5			
10M	QPSK	25	25	13.31	13.41	13.27	14.5			
		50	0	13.36	13.53	13.35	14.5			
		1	0	13.28	13.50	13.53	14.5			
		1	24	13.60	13.49	13.53	14.5			
		1	49	13.37	13.30	13.32	14.5			
		25	0	13.47	13.66	13.63	14.5			
		25	12	13.48	13.65	13.51	14.5			
		25	25	13.31	13.36	13.21	14.5			
		50	0	13.43	13.56	13.28	14.5			
		1	0	13.37	13.54	13.34	14.5			
10M	16QAM	1	24	13.59	13.50	13.46	14.5			
		1	49	13.41	13.37	13.32	14.5			
		25	0	13.60	13.51	13.50	14.5			
		25	12	13.43	13.43	13.42	14.5			
		25	25	13.26	13.27	13.18	14.5			
		50	0	13.39	13.48	13.33	14.5			
		1	0	13.37	13.54	13.34	14.5			
		1	24	13.59	13.50	13.46	14.5			
		1	49	13.41	13.37	13.32	14.5			
		25	0	13.60	13.51	13.50	14.5			
5M	QPSK	25	12	13.43	13.43	13.42	14.5			
		25	25	13.26	13.27	13.18	14.5			
		50	0	13.39	13.46	13.33	14.5			
		1	0	13.39	13.56	13.36	14.5			
		1	24	13.31	13.31	13.28	14.5			
		12	0	13.62	13.59	13.48	14.5			
		12	6	13.40	13.50	13.40	14.5			
		12	13	13.27	13.34	13.24	14.5			
		25	0	13.33	13.46	13.28	14.5			
		5M	16QAM	Channel	3777.5	3800.0	3822.5			Max. Turn-up (dBm)
Frequency (MHz)	2572.5			2595	2617.5					
1	0			13.46	13.57	13.45	14.5			
1	12			13.70	13.69	13.67	14.5			
1	24			13.42	13.45	13.41	14.5			
12	0			13.68	13.66	13.63	14.5			
12	6			13.59	13.60	13.55	14.5			
12	13			13.31	13.39	13.26	14.5			
25	0			13.49	13.58	13.39	14.5			
1	0			13.32	13.42	13.43	14.5			
5M	16QAM	1	12	13.63	13.57	13.56	14.5			
		1	24	13.39	13.36	13.39	14.5			
		12	0	13.50	13.65	13.59	14.5			
		12	6	13.48	13.51	13.49	14.5			
		12	13	13.32	13.31	13.22	14.5			
		25	0	13.33	13.42	13.25	14.5			
		1	0	13.40	13.57	13.42	14.5			
		1	12	13.56	13.52	13.46	14.5			
		1	24	13.41	13.31	13.28	14.5			
		12	0	13.62	13.59	13.48	14.5			
5M	16QAM	12	6	13.40	13.50	13.40	14.5			
		12	13	13.27	13.34	13.24	14.5			
		25	0	13.33	13.46	13.28	14.5			

FCC LTE Band 41 (2496 – 2690MHz)											
BW	MCS Index	RB Size	RB Offset	Low	Low Mid	Mid	High Mid	High	Max. Turn-up		
		Channel	Frequency (MHz)	2679.0	4019.5	4062.0	4159.5	4190.0			
20M	QPSK	1	0	13.65	13.77	13.38	13.53	13.24	14.5		
		1	50	13.81	13.87	13.71	13.56	13.54	14.5		
		1	99	13.47	13.57	13.45	13.30	13.39	14.5		
		50	0	13.76	13.78	13.72	13.58	13.50	14.5		
		50	25	13.75	13.76	13.66	13.46	13.47	14.5		
		50	50	13.45	13.48	13.43	13.15	13.35	14.5		
		100	0	13.61	13.76	13.37	13.52	13.32	14.5		
		1	0	13.63	13.74	13.26	13.45	13.21	14.5		
		1	50	13.75	13.84	13.63	13.43	13.50	14.5		
		1	99	13.36	13.51	13.40	13.18	13.29	14.5		
20M	16QAM	50	0	13.72	13.73	13.59	13.57	13.35	14.5		
		50	25	13.66	13.75	13.51	13.33	13.39	14.5		
		50	50	13.34	13.44	13.35	13.09	13.20	14.5		
		100	0	13.56	13.60	13.28	13.47	13.25	14.5		
		1	0	13.62	13.67	13.37	13.43	13.14	14.5		
		1	50	13.67	13.74	13.56	13.44	13.53	14.5		
		1	99	13.39	13.43	13.31	13.16	13.29	14.5		
		50	0	13.64	13.65	13.62	13.48	13.38	14.5		
		50	25	13.73	13.64	13.56	13.37	13.44	14.5		
		50	50	13.32	13.46	13.35	13.14	13.31	14.5		
20M	64QAM	100	0	13.57	13.72	13.30	13.45	13.30	14.5		
		1	0	13.63	13.74	13.26	13.45	13.21	14.5		
		1	50	13.75	13.84	13.63	13.43	13.50	14.5		
		1	99	13.39	13.43	13.31	13.16	13.29	14.5		
		50	0	13.64	13.65	13.62	13.48	13.38	14.5		
		50	25	13.73	13.64	13.56	13.37	13.44	14.5		
		50	50	13.32	13.46	13.35	13.14	13.31	14.5		
		100	0	13.57	13.72	13.30	13.45	13.30	14.5		
		BW	MCS Index	Channel	Frequency (MHz)	2679.0	2547.5	4062.0	4159.0	4190.0	Max. Turn-up
		20M	QPSK	1	0	13.52	13.64	13.34	13.38	13.16	14.5
1	37			13.73	13.84	13.68	13.42	13.39	14.5		
1	74			13.42	13.53	13.40	13.15	13.36	14.5		
36	0			13.62	13.67	13.61	13.52	13.48	14.5		
36	19			13.64	13.64	13.65	13.41	13.43	14.5		
36	39			13.44	13.44	13.32	13.02	13.30	14.5		
75	0			13.49	13.64	13.30	13.51	13.17	14.5		
1	0			13.59	13.73	13.23	13.34	13.09	14.5		
1	37			13.67	13.72	13.53	13.28	13.45	14.5		
1	74			13.22	13.46	13.33	13.16	13.26	14.5		
20M	16QAM	36	0	13.65	13.58	13.45	13.49	13.23	14.5		
		36	19	13.59	13.68	13.36	13.26	13.27	14.5		
		36	39	13.20	13.31	13.25	12.95	13.13	14.5		
		75	0	13.53	13.57	13.20	13.40	13.20	14.5		
		1	0	13.61	13.52	13.35	13.33	13.10	14.5		
		1	37	13.63	13.71	13.48	13.29	13.45	14.5		
		1	74	13.31	13.38	13.19	13.04	13.21	14.5		
		36	0	13.57	13.56	13.50	13.47	13.35	14.5		
		36	19	13.62	13.53	13.49	13.25	13.33	14.5		
		36	39	13.17	13.36	13.23	13.05	13.17	14.5		
20M	64QAM	75	0	13.45	13.60	13.23	13.34	13.17	14.5		
		BW	MCS Index	Channel	Frequency (MHz)	2679.0	4019.0	4062.0	4190.0	4190.0	Max. Turn-up
		20M	QPSK	1	0	13.55	2547.5	2593	2639	2685	14.5
				1	24	13.80	13.73	13.64	13.51	13.47	14.5
				1	49	13.44	13.46	13.34	13.21	13.30	14.5
				25	0	13.73	13.69	13.70	13.52	13.39	14.5
				25	12	13.72	13.67	13.58	13.43	13.40	14.5
				25	25	13.34	13.33	13.37	13.10	13.22	14.5
				50	0	13.53	13.53	13.28	13.49	13.22	14.5
				1	0	13.61	13.72	13.13	13.38	13.09	14.5
1	24			13.63	13.79	13.50	13.31	13.44	14.5		
1	49			13.22	13.42	13.35	13.12	13.31	14.5		
20M	16QAM	25	0	13.60	13.58	13.55	13.49	13.31	14.5		
		25	12	13.69	13.60	13.50	13.23	13.37	14.5		
		25	25	13.30	13.39	13.30	12.98	13.15	14.5		
		50	0	13.53	13.48	13.26	13.39	13.12	14.5		
		1	0	13.49	13.52	13.33	13.40	12.99	14.5		
		1	24	13.59	13.66	13.51	13.35	13.42	14.5		
		1	49	13.17	13.29	13.16	13.04	13.22	14.5		
		25	0	13.61	13.53	13.49	13.46	13.28	14.5		
		25	12	13.60	13.55	13.50	13.32	13.29	14.5		
		25	25	13.32	13.36	13.32	13.11	13.17	14.5		
20M	64QAM	50	0	13.50	13.51	13.19	13.33	13.20	14.5		
		BW	MCS Index	Channel	Frequency (MHz)	2679.0	2547.5	4062.0	4190.0	4190.0	Max. Turn-up
		20M	QPSK	1	0	13.64	13.70	13.24	13.38	13.16	14.5
				1	12	13.68	13.63	13.57	13.43	13.46	14.5
				1	24	13.33	13.56	13.40	13.25	13.25	14.5
				12	0	13.70	13.75	13.71	13.47	13.41	14.5
				12	6	13.68	13.73	13.57	13.42	13.45	14.5
				12	13	13.33	13.45	13.30	13.04	13.30	14.5
				25	0	13.55	13.64	13.34	13.45	13.25	14.5
				1	0	13.49	13.68	13.13	13.36	13.06	14.5
1	12			13.69	13.61	13.53	13.35	13.43	14.5		
1	24			13.26	13.47	13.28	13.10	13.21	14.5		
20M	16QAM	12	0	13.60	13.60	13.50	13.48	13.31	14.5		
		6	13.55	13.60	13.39	13.19	13.37	14.5			
		12	13	13.33	13.38	13.30	13.04	13.18	14.5		
		25	0	13.45	13.59	13.25	13.32	13.17	14.5		
		1	0	13.51	13.57	13.30	13.28	13.00	14.5		
		1	12	13.65	13.59	13.45	13.31	13.52	14.5		
		1	24	13.30	13.41	13.16	13.04	13.25	14.5		
		12	0	13.53	13.61	13.47	13.33	13.25	14.5		
		12	6	13.71	13.54	13.50	13.58	13.40	14.5		
		12	13	13.34	13.33	13.29	13.13	13.20	14.5		
25	0	13.49	13.69	13.17	13.41	13.28	14.5				

LTE Band 66										
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	Max. Tune-up			
		Channel	132872	133322	132872					
		Frequency (MHz)	1726	1746	1776					
20M	QPSK	1	0	12.18	12.15	12.21	13			
		1	50	12.24	12.43	12.27	13			
		1	99	12.25	12.16	12.17	13			
		50	0	12.19	12.36	12.26	13			
		50	25	12.15	12.34	12.25	13			
		50	50	12.15	12.14	12.15	13			
		100	0	12.19	12.33	12.16	13			
		1	0	12.10	12.23	12.12	13			
	16QAM	1	50	12.11	12.42	12.21	13			
		1	99	12.24	12.15	12.03	13			
		50	0	12.08	12.34	12.21	13			
		50	25	12.10	12.23	12.17	13			
		50	50	12.05	12.03	12.11	13			
		100	0	12.10	12.29	12.09	13			
		1	0	12.17	12.13	12.09	13			
		1	50	12.09	12.32	12.17	13			
	64QAM	1	99	12.15	12.09	12.06	13			
		50	0	12.06	12.22	12.16	13			
		50	25	12.00	12.28	12.13	13			
		50	50	12.08	11.99	12.06	13			
		100	0	12.15	12.22	12.12				
BW		Channel	133047	133522	132847	Max. Tune-up				
		Frequency (MHz)	1732.5	1746	1772.5					
15M	QPSK	1	0	12.12	12.11	12.06	13			
		1	37	12.16	12.41	12.20	13			
		1	74	12.17	12.12	12.06	13			
		36	0	12.11	12.30	12.14	13			
		36	19	12.00	12.24	12.20	13			
		36	39	12.06	12.06	12.12	13			
		75	0	12.11	12.20	12.02	13			
		1	0	11.95	12.18	11.97	13			
	16QAM	1	37	12.10	12.35	12.19	13			
		1	74	12.19	12.03	11.90	13			
		36	0	12.03	12.25	12.14	13			
		36	19	11.98	12.21	12.11	13			
		36	39	11.90	11.97	11.96	13			
		75	0	12.05	12.19	12.01	13			
		1	0	12.12	12.07	12.08	13			
		1	37	11.95	12.17	12.15	13			
	64QAM	1	74	12.14	12.06	12.00	13			
		36	0	11.95	12.12	12.06	13			
		36	19	11.99	12.22	12.08	13			
		36	39	12.05	11.89	11.92	13			
		75	0	12.05	12.12	12.10				
BW		Channel	132022	132322	132822	Max. Tune-up				
		Frequency (MHz)	1716	1746	1776					
10M	QPSK	1	0	12.16	12.13	12.17	13			
		1	24	12.22	12.42	12.20	13			
		1	49	12.14	12.13	12.07	13			
		25	0	12.11	12.25	12.12	13			
		25	12	12.14	12.21	12.18	13			
		25	25	12.02	12.06	12.05	13			
		50	0	12.07	12.21	12.14	13			
		1	0	12.07	12.13	12.00	13			
	16QAM	1	24	12.08	12.33	12.17	13			
		1	49	12.19	12.12	11.92	13			
		25	0	11.96	12.23	12.19	13			
		25	12	12.09	12.15	12.15	13			
		25	25	12.04	12.02	12.02	13			
		50	0	12.04	12.27	12.01	13			
		1	0	12.12	12.08	12.05	13			
		1	24	11.96	12.30	12.11	13			
	64QAM	1	49	12.08	12.06	11.92	13			
		25	0	11.99	12.17	12.08	13			
		25	12	11.90	12.19	12.11	13			
		25	25	11.96	11.93	11.96	13			
		50	0	12.06	12.17	11.99				
BW		Channel	131997	132322	132647	Max. Tune-up				
		Frequency (MHz)	1716	1746	1777.5					
5M	QPSK	1	0	12.03	12.15	12.08	13			
		1	12	12.16	12.31	12.25	13			
		1	24	12.11	12.06	12.10	13			
		12	0	12.04	12.23	12.19	13			
		12	6	12.13	12.28	12.24	13			
		12	13	12.12	12.03	12.03	13			
		25	0	12.10	12.28	12.11	13			
		1	0	11.98	12.10	12.03	13			
	16QAM	1	12	11.98	12.40	12.18	13			
		1	24	12.23	12.08	11.99	13			
		12	0	12.00	12.23	12.11	13			
		12	6	12.02	12.09	12.10	13			
		12	13	11.95	12.06	12.03	13			
		25	0	12.07	12.26	12.03	13			
		1	0	12.10	12.05	12.05	13			
		1	12	11.99	12.30	12.16	13			
	64QAM	1	24	12.13	12.05	11.91	13			
		12	0	11.99	12.13	12.02	13			
		12	6	11.93	12.23	12.11	13			
		12	13	12.02	11.93	12.04	13			
		25	0	12.03	12.19	12.10				
BW		Channel	131987	132322	132667	Max. Tune-up				
		Frequency (MHz)	1711.5	1746	1778.5					
3M	QPSK	1	0	12.04	12.13	12.13	13			
		1	7	12.21	12.33	12.20	13			
		1	14	12.14	12.08	12.05	13			
		8	0	12.07	12.31	12.11	13			
		8	3	12.13	12.24	12.14	13			
		8	7	12.05	12.01	12.04	13			
		15	0	12.09	12.29	12.10	13			
		1	0	12.06	12.11	12.05	13			
	16QAM	1	7	11.98	12.31	12.17	13			
		1	14	12.09	12.01	11.92	13			
		8	0	12.07	12.20	12.14	13			
		8	3	12.07	12.21	12.13	13			
		8	7	12.01	11.97	12.10	13			
		15	0	11.99	12.27	11.97	13			
		1	0	12.13	12.00	12.00	13			
		1	7	11.94	12.28	12.16	13			
	64QAM	1	14	12.13	12.03	11.96	13			
		8	0	11.92	12.16	12.03	13			
		8	3	11.97	12.23	12.00	13			
		8	7	11.96	11.94	11.92	13			
		15	0	12.07	12.08	12.01				
BW		Channel	131979	132322	132866	Max. Tune-up				
		Frequency (MHz)	1716.5	1746	1779.5					
1.4M	QPSK	1	0	12.10	12.21	12.06	13			
		1	2	12.11	12.35	12.25	13			
		1	5	12.21	12.08	12.05	13			
		3	0	12.13	12.24	12.24	13			
		3	1	12.06	12.22	12.22	13			
		3	3	12.14	12.11	12.06	13			
		6	0	12.14	12.21	12.08	13			
		1	0	11.99	12.21	12.10	13			
	16QAM	1	2	12.07	12.29	12.06	13			
		1	5	12.20	12.05	11.90	13			
		3	0	11.96	12.33	12.13	13			
		3	1	12.01	12.08	12.15	13			
		3	3	11.98	12.00	12.05	13			
		6	0	12.06	12.22	11.95	13			
		1	0	12.11	12.07	12.07	13			
		1	2	11.96	12.25	12.16	13			
	64QAM	1	5	12.04	11.94	11.94	13			
		3	0	12.02	12.20	12.14	13			
		3	1	11.96	12.26	12.07	13			
		3	3	12.06	11.85	12.04	13			
		6	0	12.09	12.21	12.09	13			

Full Power

CA_7C Ant0										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	PCC Frequency (MHz)	SCC Channel	SCC Frequency (MHz)	Modulation	PCC		SCC		Measured Power (dBm)	Max Tune-up (dBm)
					RB Size	RB offset	RB Size	RB offset		
20850	2510	21048	2529.8	QPSK	1	99	1	0	22.76	24
				16QAM	1	99	1	0	22.10	23
				64QAM	1	99	1	0	20.20	22
21001	2525.1	21199	2544.9	QPSK	1	99	1	0	22.87	24
				16QAM	1	99	1	0	22.18	23
				64QAM	1	99	1	0	20.31	22
21152	2540.2	21350	2560	QPSK	1	99	1	0	22.71	24
				16QAM	1	99	1	0	22.08	23
				64QAM	1	99	1	0	20.23	22

CA_38C Ant0										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	PCC Frequency (MHz)	SCC Channel	SCC Frequency (MHz)	Modulation	PCC		SCC		Measured Power (dBm)	Max Tune-up (dBm)
					RB Size	RB offset	RB Size	RB offset		
37850	2580	38048	2599.8	QPSK	1	99	1	0	22.37	24
				16QAM	1	99	1	0	21.51	23
				64QAM	1	99	1	0	20.29	22
37901	2585.1	38099	2604.9	QPSK	1	99	1	0	22.45	24
				16QAM	1	99	1	0	21.55	23
				64QAM	1	99	1	0	20.25	22
37952	2590.2	38150	2610	QPSK	1	99	1	0	22.39	24
				16QAM	1	99	1	0	21.52	23
				64QAM	1	99	1	0	20.19	22

CA_41C Ant0										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	PCC Frequency (MHz)	SCC Channel	SCC Frequency (MHz)	Modulation	PCC		SCC		Measured Power (dBm)	Max Tune-up (dBm)
					RB Size	RB offset	RB Size	RB offset		
39750	2506	39948	2525.8	QPSK	1	99	1	0	22.67	24
				16QAM	1	99	1	0	21.74	23
				64QAM	1	99	1	0	20.23	22
40521	2583.1	40719	2602.9	QPSK	1	99	1	0	22.75	24
				16QAM	1	99	1	0	21.64	23
				64QAM	1	99	1	0	20.19	22
41292	2660.2	41490	2680	QPSK	1	99	1	0	22.51	24
				16QAM	1	99	1	0	21.66	23
				64QAM	1	99	1	0	20.21	22

Reduce Power

CA_7C Ant0										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	PCC Frequency (MHz)	SCC Channel	SCC Frequency (MHz)	Modulation	PCC		SCC		Measured Power (dBm)	Max Tune-up (dBm)
					RB Size	RB offset	RB Size	RB offset		
20850	2510	21048	2529.8	QPSK	1	99	1	0	11.10	12
				16QAM	1	99	1	0	11.00	12
				64QAM	1	99	1	0	10.82	12
21001	2525.1	21199	2544.9	QPSK	1	99	1	0	11.19	12
				16QAM	1	99	1	0	11.05	12
				64QAM	1	99	1	0	11.01	12
21152	2540.2	21350	2560	QPSK	1	99	1	0	11.08	12
				16QAM	1	99	1	0	10.97	12
				64QAM	1	99	1	0	10.90	12

CA_38C Ant0										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	PCC Frequency (MHz)	SCC Channel	SCC Frequency (MHz)	Modulation	PCC		SCC		Measured Power (dBm)	Max Tune-up (dBm)
					RB Size	RB offset	RB Size	RB offset		
37850	2580	38048	2599.8	QPSK	1	99	1	0	13.68	14.5
				16QAM	1	99	1	0	13.52	14.5
				64QAM	1	99	1	0	13.51	14.5
37901	2585.1	38099	2604.9	QPSK	1	99	1	0	13.72	14.5
				16QAM	1	99	1	0	13.64	14.5
				64QAM	1	99	1	0	13.56	14.5
37952	2590.2	38150	2610	QPSK	1	99	1	0	13.66	14.5
				16QAM	1	99	1	0	13.51	14.5
				64QAM	1	99	1	0	13.52	14.5

CA_41C Ant0										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	PCC Frequency (MHz)	SCC Channel	SCC Frequency (MHz)	Modulation	PCC		SCC		Measured Power (dBm)	Max Tune-up (dBm)
					RB Size	RB offset	RB Size	RB offset		
39750	2506	39948	2525.8	QPSK	1	99	1	0	13.76	14.5
				16QAM	1	99	1	0	13.60	14.5
				64QAM	1	99	1	0	13.54	14.5
40521	2583.1	40719	2602.9	QPSK	1	99	1	0	13.80	14.5
				16QAM	1	99	1	0	13.72	14.5
				64QAM	1	99	1	0	13.64	14.5
41292	2660.2	41490	2680	QPSK	1	99	1	0	13.76	14.5
				16QAM	1	99	1	0	13.60	14.5
				64QAM	1	99	1	0	13.53	14.5

Full Power

2.4GHz WLAN		Ant 4				
2.4GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Power Setting
	802.11b 1Mbps	1	2412	17.83	19.00	18.50
		6	2437	18.33	19.00	18.50
		11	2462	18.72	19.00	18.50
	802.11g 6Mbps	1	2412	17.30	18.50	18.00
		6	2437	17.61	18.50	18.00
		11	2462	18.22	18.50	18.00
	802.11n-HT20 MCS0	1	2412	14.43	16.00	15.00
		6	2437	14.73	16.00	15.00
		11	2462	15.20	16.00	15.00
	802.11n-HT40 MCS0	3	2422	15.22	16.00	15.00
		6	2437	14.95	16.00	15.00
		9	2452	15.67	16.00	15.00

5GHz WLAN		Ant 4				
5.2GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Power Setting
	802.11a 6Mbps	36	5180	17.29	18.00	17.50
		40	5200	17.20	18.00	17.50
		44	5220	17.13	18.00	17.50
		48	5240	17.02	18.00	17.50
	802.11n-HT20 MCS0	36	5180	15.58	16.00	15.00
		40	5200	14.35	16.00	15.00
		48	5240	14.14	16.00	15.00
	802.11n-HT40 MCS0	38	5190	11.61	13.00	13.00
		46	5230	11.44	13.00	13.00
	802.11ac-VHT20 MCS0	36	5180	13.19	14.00	14.50
		40	5200	13.38	14.00	14.50
		48	5240	13.14	14.00	14.50
	802.11ac-VHT40 MCS0	38	5190	11.14	12.00	12.50
		46	5230	10.82	12.00	12.50
	802.11ac-VHT80 MCS0	42	5210	11.58	12.00	12.50

5GHz WLAN		Ant 4				
5.3GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Power Setting
	802.11a 6Mbps	52	5260	17.22	18.00	17.50
		56	5280	17.17	18.00	17.50
		60	5300	17.38	18.00	17.50
		64	5320	17.24	18.00	17.50
	802.11n-HT20 MCS0	52	5260	14.32	15.00	15.00
		60	5300	14.52	15.00	15.00
		64	5320	14.25	15.00	15.00
	802.11n-HT40 MCS0	54	5270	11.79	13.00	13.00
		62	5310	11.64	13.00	13.00
	802.11ac-VHT20 MCS0	52	5260	13.30	14.00	14.50
		60	5300	13.39	14.00	14.50
		64	5320	13.28	14.00	14.50
	802.11ac-VHT40 MCS0	54	5270	11.31	12.00	12.50
		62	5310	11.22	12.00	12.50
	802.11ac-VHT80 MCS0	58	5290	11.71	12.00	12.50

5GHz WLAN		Ant 4				
5.5GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Power Setting
	802.11a 6Mbps	100	5500	16.80	18.00	17.50
		116	5580	16.66	18.00	17.50
		124	5620	16.88	18.00	17.50
		140	5700	17.27	18.00	17.50
	802.11n-HT20 MCS0	100	5500	13.70	15.00	15.00
		116	5580	13.70	15.00	15.00
		140	5700	14.30	15.00	15.00
	802.11n-HT40 MCS0	102	5510	11.41	13.00	13.00
		110	5550	11.44	13.00	13.00
		134	5670	12.04	13.00	13.00
	802.11ac-VHT20 MCS0	100	5500	12.73	14.00	14.50
		116	5580	12.75	14.00	14.50
		140	5700	13.29	14.00	14.50
	802.11ac-VHT40 MCS0	102	5510	10.99	12.00	12.50
		110	5550	10.97	12.00	12.50
		134	5670	11.64	12.00	12.50
	802.11ac-VHT80 MCS0	106	5530	11.14	12.00	12.50
		122	5610	11.35	12.00	12.50

5GHz WLAN		Ant 4				
5.8GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Power Setting
	802.11a 6Mbps	149	5745	17.58	19.00	17.50
		157	5785	17.79	19.00	17.50
		165	5825	17.70	19.00	17.50
		149	5745	14.68	16.00	15.00
	802.11n-HT20 MCS0	157	5785	14.97	16.00	15.00
		165	5825	14.86	16.00	15.00
		151	5755	12.00	13.00	13.00
	802.11n-HT40 MCS0	159	5795	12.32	13.00	13.00
		149	5745	13.71	15.00	14.50
		157	5785	13.87	15.00	14.50
	802.11ac-VHT20 MCS0	165	5825	13.70	15.00	14.50
		151	5755	11.52	13.00	12.50
		159	5795	11.76	13.00	12.50
	802.11ac-VHT80 MCS0	155	5775	12.05	13.00	12.50

		Ant 4				
BT	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Power Setting
BLE	1M	0	2402	2.00	3.50	6.00
		19	2440	2.93	3.50	6.00
		39	2480	2.13	3.50	6.00
	2M	0	2404	1.91	3.50	6.00
		19	2440	2.96	3.50	6.00
		38	2478	2.28	3.50	6.00
	S2	0	2402	1.97	3.50	6.00
		19	2440	2.91	3.50	6.00
		39	2480	2.11	3.50	6.00
	S8	0	2402	1.95	3.50	6.00
		19	2440	2.89	3.50	6.00
		39	2480	2.08	3.50	6.00
BREDR	GFSK	0	2402	9.05	10.00	7.00
		39	2441	9.08	10.00	7.00
		78	2480	9.09	10.00	7.00
	DQPSK	0	2402	6.53	7.50	7.00
		39	2441	5.86	7.50	7.00
		78	2480	6.35	7.50	7.00
	8DPSK	0	2402	6.44	7.50	7.00
		39	2441	5.87	7.50	7.00
		78	2480	6.33	7.50	7.00

Reduce Power

2.4GHz WLAN		Ant 4				
2.4GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Power Setting
	802.11b 1Mbps	1	2412	10.02	11.00	10.50
		6	2437	10.42	11.00	10.50
		11	2462	10.71	11.00	10.50
	802.11g 6Mbps	1	2412		10.50	
		6	2437		10.50	
		11	2462		10.50	
	802.11n-HT20 MCS0	1	2412		8.00	
		6	2437		8.00	
		11	2462		8.00	
	802.11n-HT40 MCS0	3	2422		8.00	
		6	2437		8.00	
		9	2452		8.00	

5GHz WLAN		Ant 4				
5.2GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Power Setting
	802.11a 6Mbps	36	5180	6.25	7.00	6.50
		40	5200	6.16	7.00	6.50
		44	5220	6.19	7.00	6.50
		48	5240	6.04	7.00	6.50
	802.11n-HT20 MCS0	36	5180		5.00	
		40	5200		5.00	
		48	5240		5.00	
	802.11n-HT40 MCS0	38	5190		2.00	
		46	5230		2.00	
	802.11ac-VHT20 MCS0	36	5180		3.00	
		40	5200		3.00	
		48	5240		3.00	
	802.11ac-VHT40 MCS0	38	5190		1.00	
		46	5230		1.00	
	802.11ac-VHT80 MCS0	42	5210		1.00	

5GHz WLAN		Ant 4				
5.3GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Power Setting
	802.11a 6Mbps	52	5260	6.75	7.50	7.00
		56	5280	6.69	7.50	7.00
		60	5300	6.91	7.50	7.00
		64	5320	6.78	7.50	7.00
	802.11n-HT20 MCS0	52	5260		4.50	
		60	5300		4.50	
		64	5320		4.50	
	802.11n-HT40 MCS0	54	5270		2.50	
		62	5310		2.50	
	802.11ac-VHT20 MCS0	52	5260		3.50	
		60	5300		3.50	
		64	5320		3.50	
	802.11ac-VHT40 MCS0	54	5270		1.50	
		62	5310		1.50	
	802.11ac-VHT80 MCS0	58	5290		1.50	

5GHz WLAN		Ant 4				
5.5GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Power Setting
	802.11a 6Mbps	100	5500	6.36	7.50	7.00
		116	5580	6.21	7.50	7.00
		124	5620	6.42	7.50	7.00
		140	5700	6.75	7.50	7.00
	802.11n-HT20 MCS0	100	5500		15.00	
		116	5580		15.00	
		140	5700		15.00	
		102	5510		13.00	
	802.11n-HT40 MCS0	110	5550		13.00	
		134	5670		13.00	
	802.11ac-VHT20 MCS0	100	5500		14.00	
		116	5580		14.00	
		140	5700		14.00	
		102	5510		12.00	
	802.11ac-VHT40 MCS0	110	5550		12.00	
		134	5670		12.00	
	802.11ac-VHT80 MCS0	106	5530		12.00	
		122	5610		12.00	

5GHz WLAN		Ant 4				
5.8GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Power Setting
	802.11a 6Mbps	149	5745	6.25	7.50	6.00
		157	5785	6.41	7.50	6.00
		165	5825	6.34	7.50	6.00
	802.11n-HT20 MCS0	149	5745		4.50	
		157	5785		4.50	
		165	5825		4.50	
	802.11n-HT40 MCS0	151	5755		1.50	
		159	5795		1.50	
		149	5745		3.50	
	802.11ac-VHT20 MCS0	157	5785		3.50	
		165	5825		3.50	
		151	5755		1.50	
	802.11ac-VHT40 MCS0	159	5795		1.50	
		155	5775		1.50	