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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 0108

Client HCT (Dymstec) Certificate No: D835V2-4d165_Jul20

CALIBRATION CERTIFICATE

Object	D835V2 - SN:4d165
Calibration procedure(s)	QA CAL-05.v11 Calibration Procedure for SAR Validation Sources between 0.7-3 GHz
Calibration date:	July 28, 2020

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	01-Apr-20 (No. 217-03100/03101)	Apr-21
Power sensor NRP-Z91	SN: 103244	01-Apr-20 (No. 217-03100)	Apr-21
Power sensor NRP-Z91	SN: 103245	01-Apr-20 (No. 217-03101)	Apr-21
Reference 20 dB Attenuator	SN: BH9394 (20k)	31-Mar-20 (No. 217-03106)	Apr-21
Type-N mismatch combination	SN: 310982 / 06327	31-Mar-20 (No. 217-03104)	Apr-21
Reference Probe EX3DV4	SN: 7349	29-Jun-20 (No. EX3-7349_Jun20)	Jun-21
DAE4	SN: 601	27-Dec-19 (No. DAE4-601_Dec19)	Dec-20

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

	Name	Function	Signature
Calibrated by:	Jeffrey Katzman	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 29, 2020

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Accreditation No.: SCS 0108

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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 the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.2 ± 6 %	0.93 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.44 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.56 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.58 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.21 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.3 Ω - 2.6 jΩ
Return Loss	- 30.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.443 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

DASY5 Validation Report for Head TSL

Date: 28.07.2020

Test Laboratory: SPEAG, Zurich, Switzerland

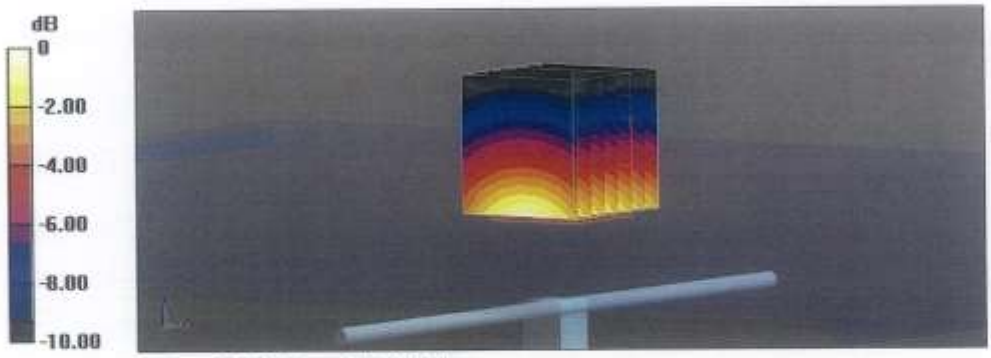
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d165

Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.93 S/m; ε_r = 42.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

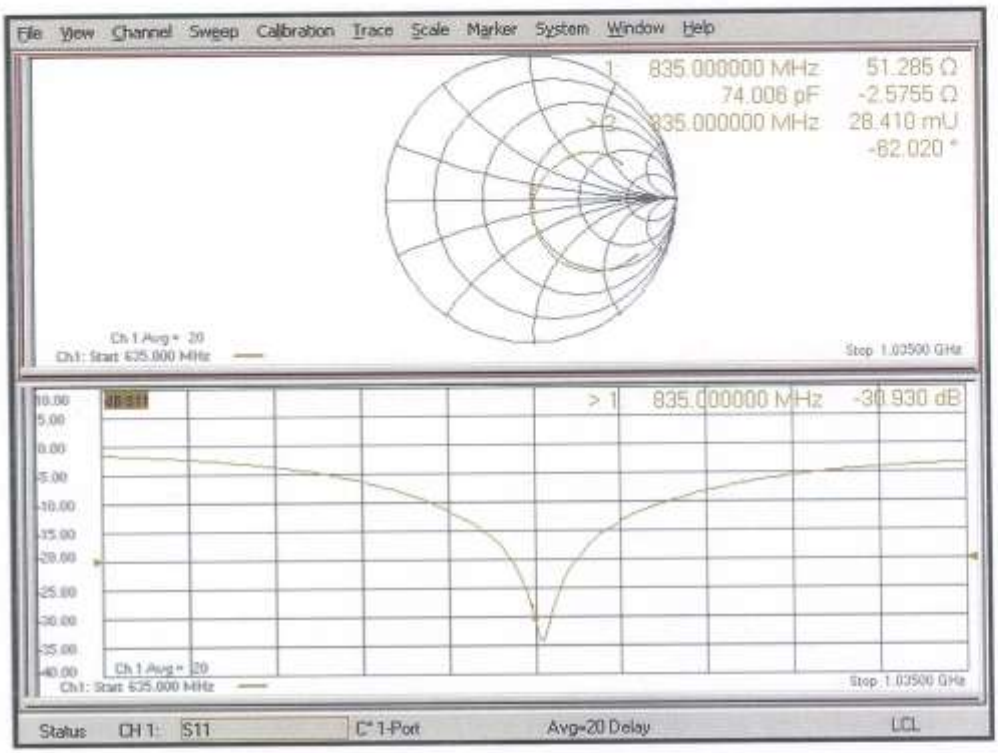
- Probe: EX3DV4 - SN7349; ConvF(9.69, 9.69, 9.69) @ 835 MHz; Calibrated: 29.06.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.12.2019
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 62.81 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.62 W/kg
SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.58 W/kg
Smallest distance from peaks to all points 3 dB below = 16 mm
Ratio of SAR at M2 to SAR at M1 = 66.6%
Maximum value of SAR (measured) = 3.23 W/kg



0 dB = 3.23 W/kg = 5.09 dBW/kg

Impedance Measurement Plot for Head TSL



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Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)**

Certificate No: **D1800V2-2d007_Aug20**

CALIBRATION CERTIFICATE

결재	담당자	확인자
서명		
성명/직급	5u / 선임	63 / 책임
일자	2020 / 10.6	2020 / 10.6

Object	D1800V2 - SN:2d007
Calibration procedure(s)	QA CAL-05.v11 Calibration Procedure for SAR Validation Sources between 0.7-3 GHz
Calibration date:	August 26, 2020

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	01-Apr-20 (No. 217-03100/03101)	Apr-21
Power sensor NRP-Z91	SN: 103244	01-Apr-20 (No. 217-03100)	Apr-21
Power sensor NRP-Z91	SN: 103245	01-Apr-20 (No. 217-03101)	Apr-21
Reference 20 dB Attenuator	SN: BH9394 (20k)	31-Mar-20 (No. 217-03106)	Apr-21
Type-N mismatch combination	SN: 310982 / 06327	31-Mar-20 (No. 217-03104)	Apr-21
Reference Probe EX3DV4	SN: 7349	29-Jun-20 (No. EX3-7349_Jun20)	Jun-21
DAE4	SN: 601	27-Dec-19 (No. DAE4-601_Dec19)	Dec-20

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

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

Issued: August 27, 2020

Certificate No: D1800V2-2d007_Aug20 Page 1 of 6

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Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1800 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.4 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.43 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**38.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.90 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**19.7 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	46.2 Ω - 7.7 jΩ
Return Loss	- 21.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.204 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

DASY5 Validation Report for Head TSL

Date: 26.08.2020

Test Laboratory: SPEAG, Zurich, Switzerland

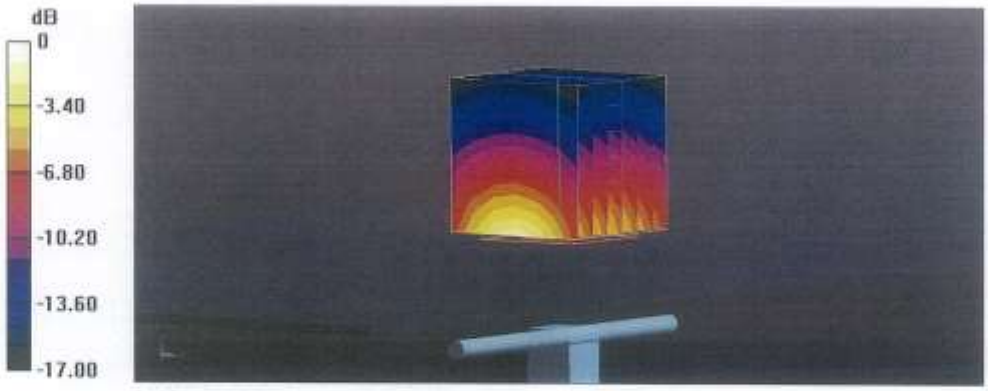
DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:2d007

Communication System: UID 0 - CW; Frequency: 1800 MHz
Medium parameters used: f = 1800 MHz; σ = 1.38 S/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

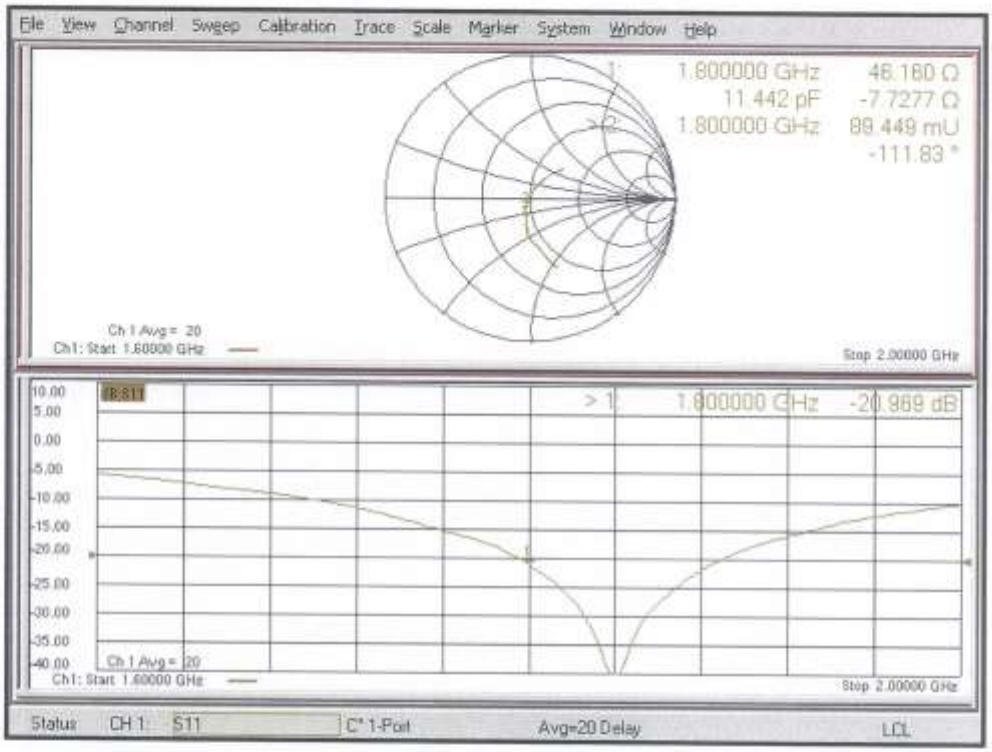
- Probe: EX3DV4 - SN7349; ConvF(8.38, 8.38, 8.38) @ 1800 MHz; Calibrated: 29.06.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.12.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

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 = 106.8 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 17.7 W/kg
SAR(1 g) = 9.43 W/kg; SAR(10 g) = 4.9 W/kg
Smallest distance from peaks to all points 3 dB below = 10 mm
Ratio of SAR at M2 to SAR at M1 = 53.8%
Maximum value of SAR (measured) = 14.7 W/kg



0 dB = 14.7 W/kg = 11.68 dBW/kg

Impedance Measurement Plot for Head TSL



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Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)** Certificate No: **D1900V2-5d032_Jan21**

CALIBRATION CERTIFICATE

결재	담당자	확인자
	DL 박성호 2021. 02. 26	LT 허정선 2021.02.08

Object D1900V2 - SN:5d032

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

Calibration date: January 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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	01-Apr-20 (No. 217-03100/03101)	Apr-21
Power sensor NRP-Z91	SN: 103244	01-Apr-20 (No. 217-03100)	Apr-21
Power sensor NRP-Z91	SN: 103245	01-Apr-20 (No. 217-03101)	Apr-21
Reference 20 dB Attenuator	SN: BH9394 (20k)	31-Mar-20 (No. 217-03106)	Apr-21
Type-N mismatch combination	SN: 310982 / 06327	31-Mar-20 (No. 217-03104)	Apr-21
Reference Probe EX3DV4	SN: 7349	28-Dec-20 (No. EX3-7349_Dec20)	Dec-21
DAE4	SN: 601	02-Nov-20 (No. DAE4-601_Nov20)	Nov-21

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: MY41092317	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-21

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 28, 2021

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Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.2 ± 6 %	1.39 mho/m ± 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	9.89 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**40.0 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.17 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.8 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.4 Ω + 7.4 jΩ
Return Loss	- 22.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.203 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

DASY5 Validation Report for Head TSL

Date: 28.01.2021

Test Laboratory: SPEAG, Zurich, Switzerland

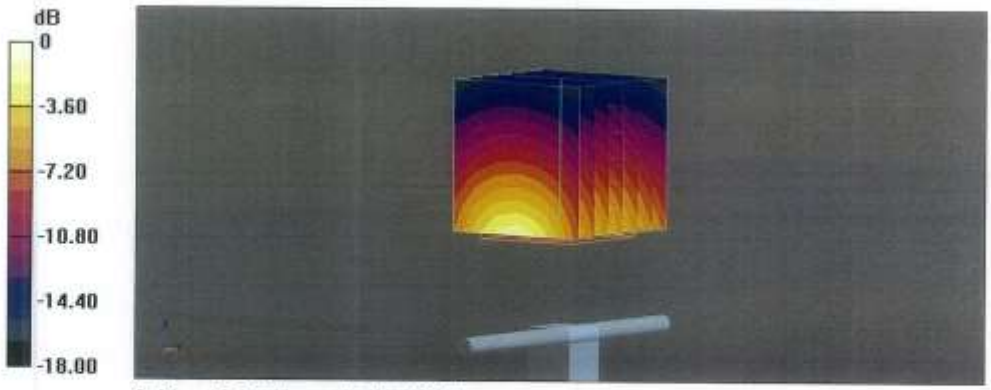
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d032

Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.39 S/m; ε_r = 41.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

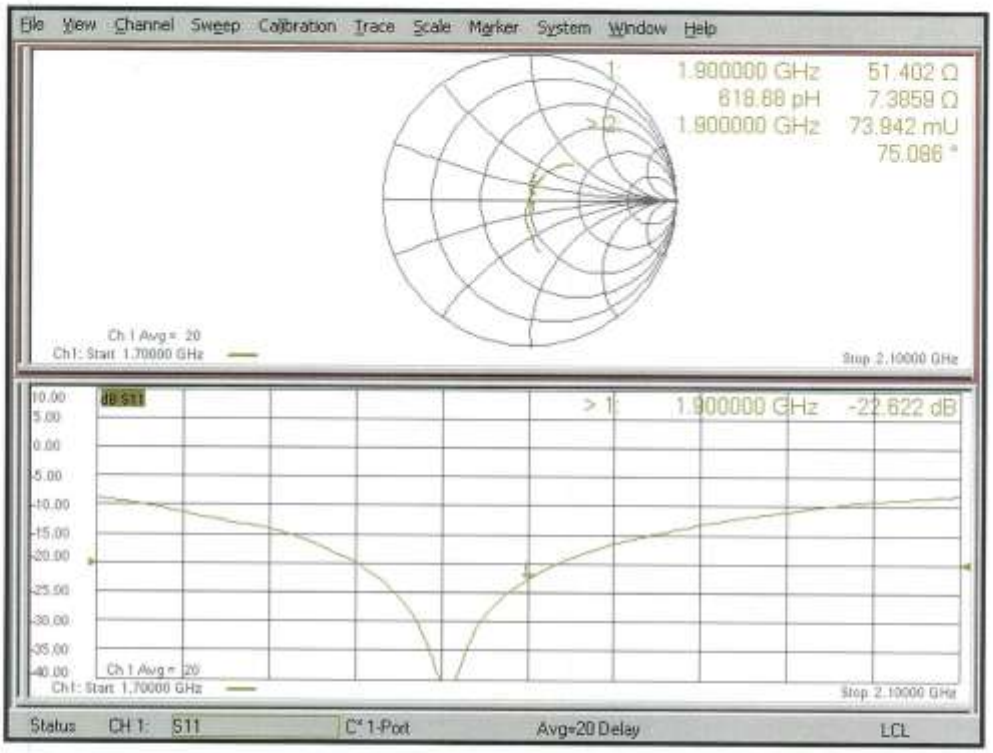
- Probe: EX3DV4 - SN7349; ConvF(8.43, 8.43, 8.43) @ 1900 MHz; Calibrated: 28.12.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.11.2020
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

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 = 109.8 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 18.2 W/kg
SAR(1 g) = 9.89 W/kg; SAR(10 g) = 5.17 W/kg
Smallest distance from peaks to all points 3 dB below = 9.5 mm
Ratio of SAR at M2 to SAR at M1 = 54.9%
Maximum value of SAR (measured) = 15.3 W/kg



0 dB = 15.3 W/kg = 11.85 dBW/kg

Impedance Measurement Plot for Head TSL



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Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)**

Certificate No: **D2300V2-1010_Aug20**

CALIBRATION CERTIFICATE

결재	담당자	확인자
직위/성명	SW /	/
일자	2020 / 10.6	2020 / 12.6

Object: D2300V2 - SN:1010

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

Calibration date: August 26, 2020

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	01-Apr-20 (No. 217-03100/03101)	Apr-21
Power sensor NRP-Z91	SN: 103244	01-Apr-20 (No. 217-03100)	Apr-21
Power sensor NRP-Z91	SN: 103245	01-Apr-20 (No. 217-03101)	Apr-21
Reference 20 dB Attenuator	SN: BH9394 (20k)	31-Mar-20 (No. 217-03106)	Apr-21
Type-N mismatch combination	SN: 310982 / 06327	31-Mar-20 (No. 217-03104)	Apr-21
Reference Probe EX3DV4	SN: 7349	29-Jun-20 (No. EX3-7349_Jun20)	Jun-21
DAE4	SN: 601	27-Dec-19 (No. DAE4-601_Dec19)	Dec-20

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

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

Issued: August 27, 2020

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

Certificate No: D2300V2-1010_Aug20 Page 1 of 6

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Accreditation No.: **SCS 0108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2300 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.5	1.67 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.4 ± 6 %	1.68 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	12.1 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**48.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.88 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.5 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.5 Ω - 2.6 jΩ
Return Loss	- 30.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.170 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

DASY5 Validation Report for Head TSL

Date: 26.08.2020

Test Laboratory: SPEAG, Zurich, Switzerland

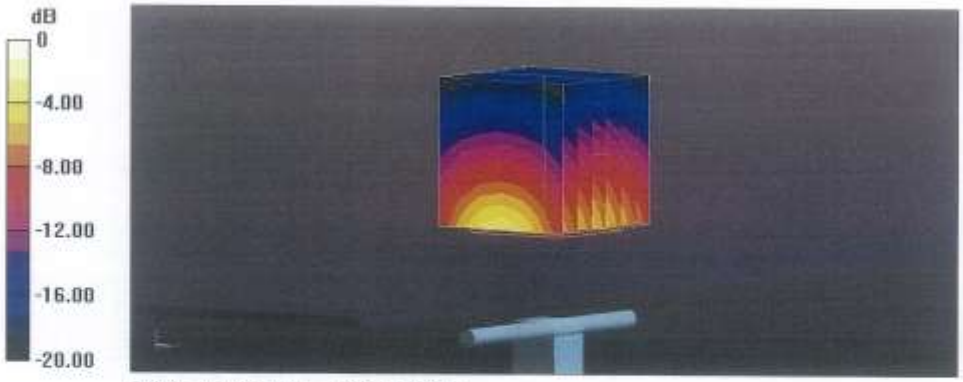
DUT: Dipole 2300 MHz; Type: D2300V2; Serial: D2300V2 - SN:1010

Communication System: UID 0 - CW; Frequency: 2300 MHz
Medium parameters used: f = 2300 MHz; σ = 1.68 S/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

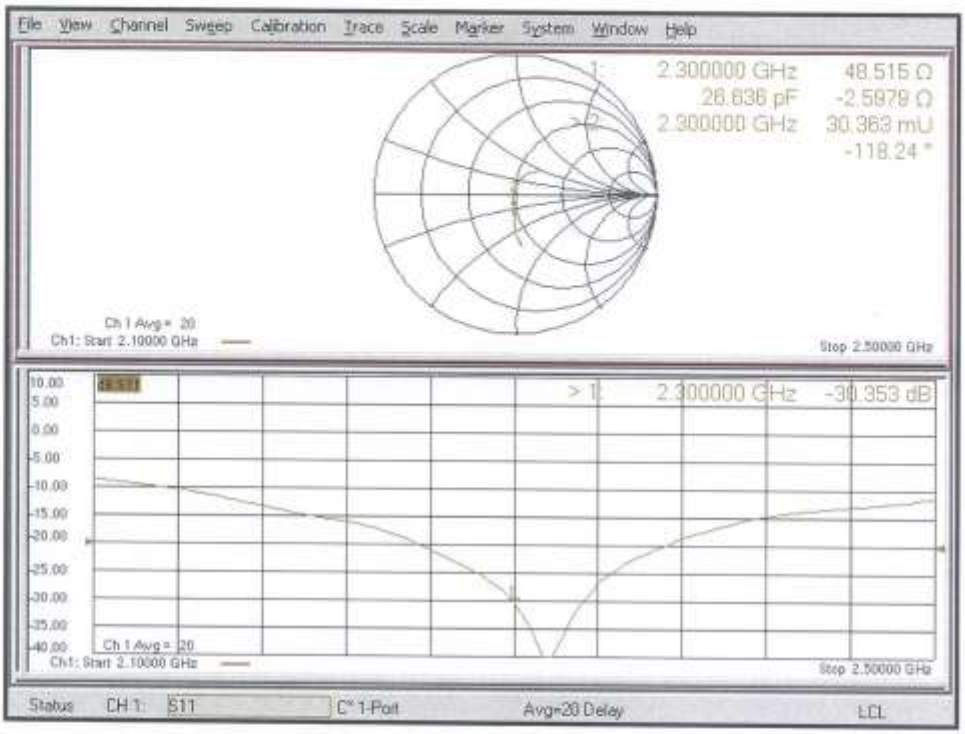
- Probe: EX3DV4 - SN7349; ConvF(7.82, 7.82, 7.82) @ 2300 MHz; Calibrated: 29.06.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.12.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

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 = 114.4 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 22.7 W/kg
SAR(1 g) = 12.1 W/kg; SAR(10 g) = 5.88 W/kg
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 53.7%
Maximum value of SAR (measured) = 19.2 W/kg



0 dB = 19.2 W/kg = 12.83 dBW/kg

Impedance Measurement Plot for Head TSL



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Accreditation No.: **SCS 0108**

Client: **HCT (Dymstec)** Certificate No: **D2450V2-1049_Aug20**

CALIBRATION CERTIFICATE

결	담 당 자	확 인 자
재		
서명/날	5.W / 8.26	8.26 / 8.26
일 자	2020 / 10. 6	2020 / 10. 6

Object: D2450V2 - SN:1049

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

Calibration date: August 26, 2020

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	01-Apr-20 (No. 217-03100/03101)	Apr-21
Power sensor NRP-Z91	SN: 103244	01-Apr-20 (No. 217-03100)	Apr-21
Power sensor NRP-Z91	SN: 103245	01-Apr-20 (No. 217-03101)	Apr-21
Reference 20 dB Attenuator	SN: BH9394 (20k)	31-Mar-20 (No. 217-03106)	Apr-21
Type-N mismatch combination	SN: 310982 / 06327	31-Mar-20 (No. 217-03104)	Apr-21
Reference Probe EX3DV4	SN: 7349	29-Jun-20 (No. EX3-7349_Jun20)	Jun-21
DAE4	SN: 601	27-Dec-19 (No. DAE4-601_Dec19)	Dec-20

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

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

Issued: August 31, 2020

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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: **SCS 0108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.9 ± 6 %	1.84 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.0 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**51.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.06 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.1 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.5 Ω + 8.5 jΩ
Return Loss	- 21.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.161 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

DASY5 Validation Report for Head TSL

Date: 26.08.2020

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:1049

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.84 S/m; ε_r = 38.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

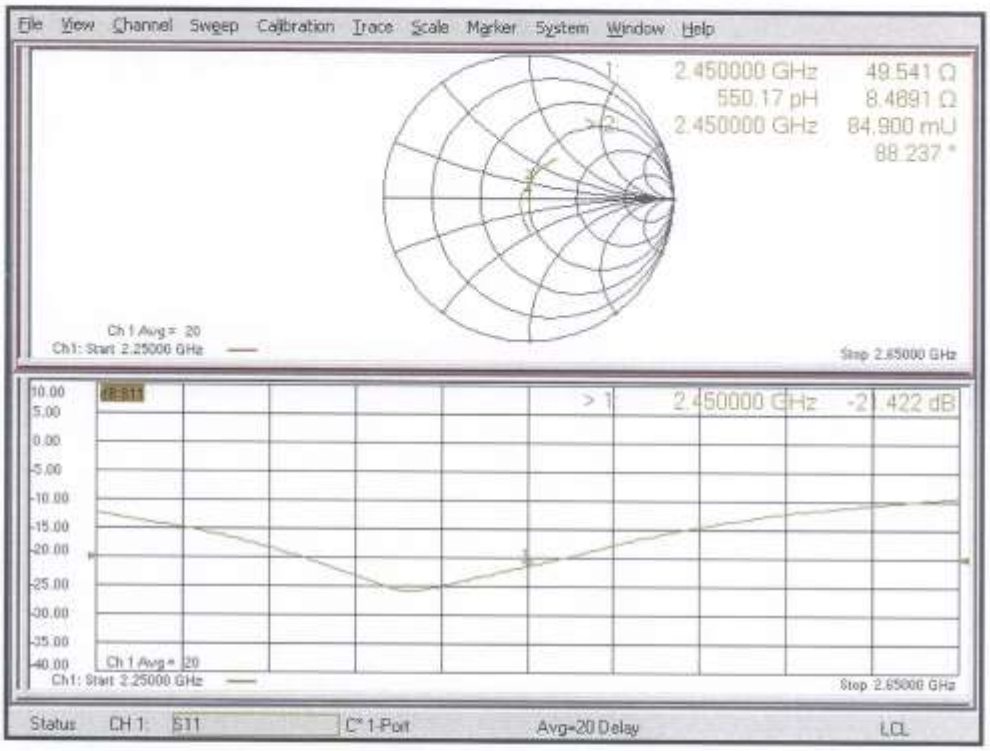
DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.74, 7.74, 7.74) @ 2450 MHz; Calibrated: 29.06.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.12.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

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 = 115.7 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 25.5 W/kg
SAR(1 g) = 13 W/kg; SAR(10 g) = 6.06 W/kg
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 51.3%
Maximum value of SAR (measured) = 21.4 W/kg

0 dB = 21.4 W/kg = 13.30 dBW/kg

Impedance Measurement Plot for Head TSL



Appendix: Transfer Calibration at Four Validation Locations on SAM Head[1]

Evaluation Condition

Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L

SAR result with SAM Head (Top ≅ C0)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	normalized to 1W	54.8 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR for nominal Head TSL parameters	normalized to 1W	25.6 W/kg ± 16.9 % (k=2)

SAR result with SAM Head (Mouth ≅ F90)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	normalized to 1W	55.9 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR for nominal Head TSL parameters	normalized to 1W	26.9 W/kg ± 16.9 % (k=2)

SAR result with SAM Head (Neck ≅ H0)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	normalized to 1W	52.6 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR for nominal Head TSL parameters	normalized to 1W	24.5 W/kg ± 16.9 % (k=2)

SAR result with SAM Head (Ear ≅ D90)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	normalized to 1W	33.7 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR for nominal Head TSL parameters	normalized to 1W	17.1 W/kg ± 16.9 % (k=2)

[1] Additional assessments outside the current scope of SCS 0108

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Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)** Certificate No: **D2600V2-1015_Aug20**

CALIBRATION CERTIFICATE

결	담 당 자	확 인 자
재		
서명일	8.26	8.26
년 월 일	2020 / 10. 6	2020 / 10. 6

Object: D2600V2 - SN:1015

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

Calibration date: August 26, 2020

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	01-Apr-20 (No. 217-03100/03101)	Apr-21
Power sensor NRP-Z91	SN: 103244	01-Apr-20 (No. 217-03100)	Apr-21
Power sensor NRP-Z91	SN: 103245	01-Apr-20 (No. 217-03101)	Apr-21
Reference 20 dB Attenuator	SN: BH9394 (20k)	31-Mar-20 (No. 217-03106)	Apr-21
Type-N mismatch combination	SN: 310982 / 06327	31-Mar-20 (No. 217-03104)	Apr-21
Reference Probe EX3DV4	SN: 7349	29-Jun-20 (No. EX3-7349_Jun20)	Jun-21
DAE4	SN: 601	27-Dec-19 (No. DAE4-601_Dec19)	Dec-20

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

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

Issued: August 27, 2020

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Accreditation No.: **SCS 0108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.3 ± 6 %	2.01 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**56.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.42 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.4 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.1 Ω - 4.0 jΩ
Return Loss	- 27.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.150 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

DASY5 Validation Report for Head TSL

Date: 26.08.2020

Test Laboratory: SPEAG, Zurich, Switzerland

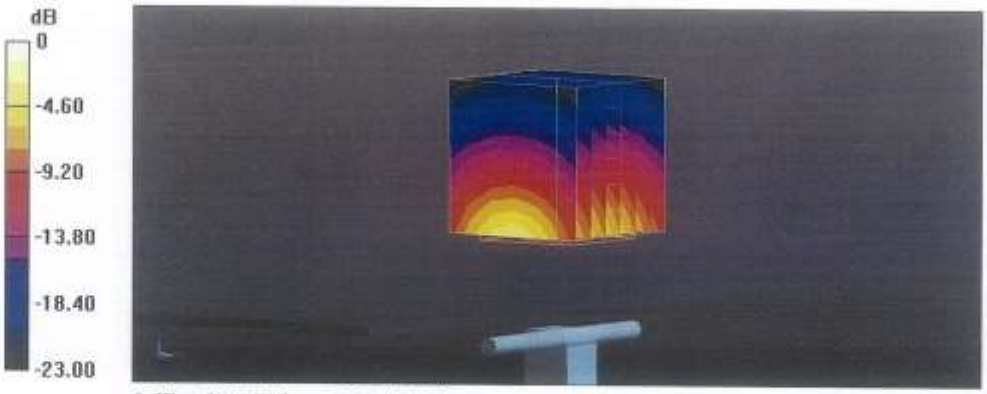
DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN:1015

Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.01 S/m; ε_r = 38.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

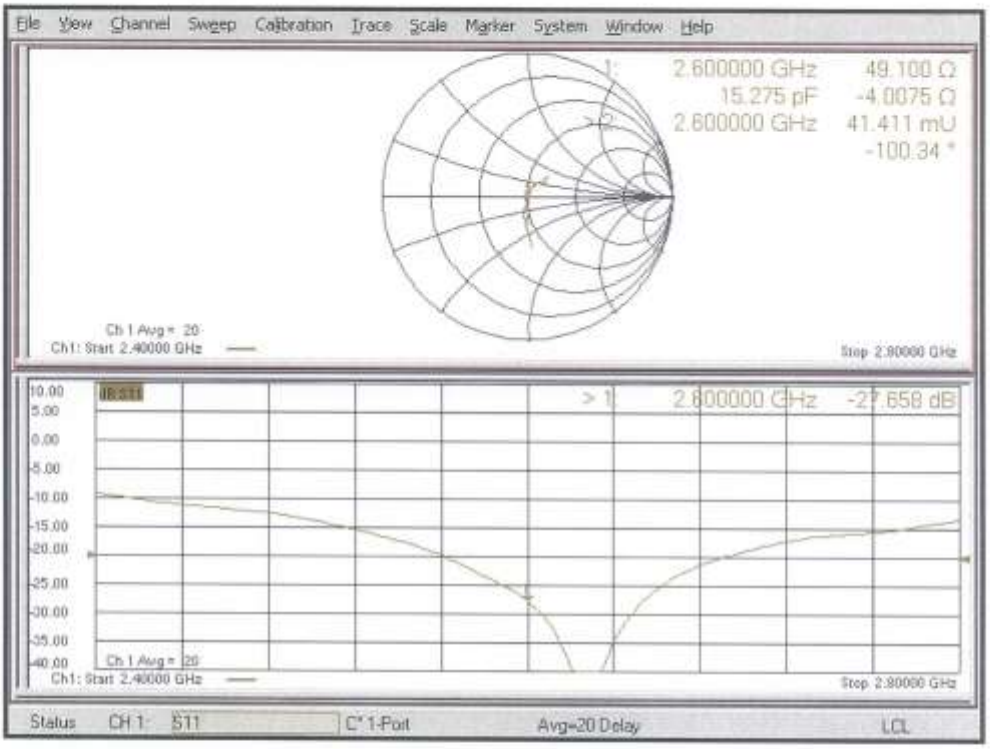
- Probe: EX3DV4 - SN7349; ConvF(7.54, 7.54, 7.54) @ 2600 MHz; Calibrated: 29.06.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.12.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

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 = 117.6 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 28.6 W/kg
SAR(1 g) = 14.4 W/kg; SAR(10 g) = 6.42 W/kg
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 50.2%
Maximum value of SAR (measured) = 24.0 W/kg



0 dB = 24.0 W/kg = 13.8 dBW/kg

Impedance Measurement Plot for Head TSL



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Accreditation No.: **SCS 0108**

Client **UL Korea (Dymstec)** Certificate No: **D3500V2-1075_Apr19**

CALIBRATION CERTIFICATE

Object D3500V2 - SN:1075

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

Calibration date: April 30, 2019

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-19 (No. 217-02894)	Apr-20
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-19 (No. 217-02895)	Apr-20
Reference Probe EX3DV4	SN: 3503	25-Mar-19 (No. EX3-3503_Mar19)	Mar-20
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19
DAE4	SN: 781	09-Jan-19 (No. DAE4-781_Jan19)	Jan-20

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

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

Issued: April 30, 2019

Calibration Laboratory of
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Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
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	3500 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	37.9	2.91 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.4 ± 6 %	2.90 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	6.80 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**67.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.54 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.3 W/kg ± 19.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	51.3	3.31 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	49.9 ± 6 %	3.35 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	6.44 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**63.8 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.39 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**23.7 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.4 Ω - 4.9 jΩ
Return Loss	- 24.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	51.1 Ω - 2.0 jΩ
Return Loss	- 33.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.140 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

DASY5 Validation Report for Head TSL

Date: 29.04.2019

Test Laboratory: SPEAG, Zurich, Switzerland

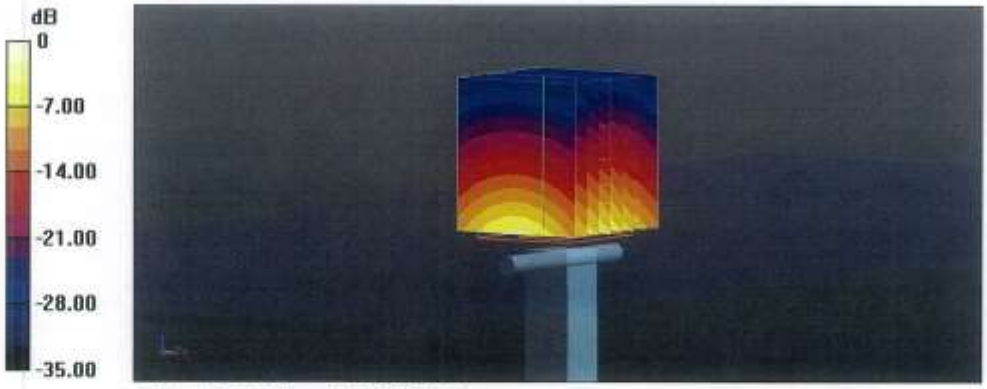
DUT: Dipole 3500 MHz; Type: D3500V2; Serial: D3500V2 - SN:1075

Communication System: UID 0 - CW; Frequency: 3500 MHz
Medium parameters used: f = 3500 MHz; σ = 2.9 S/m; ε_r = 37.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

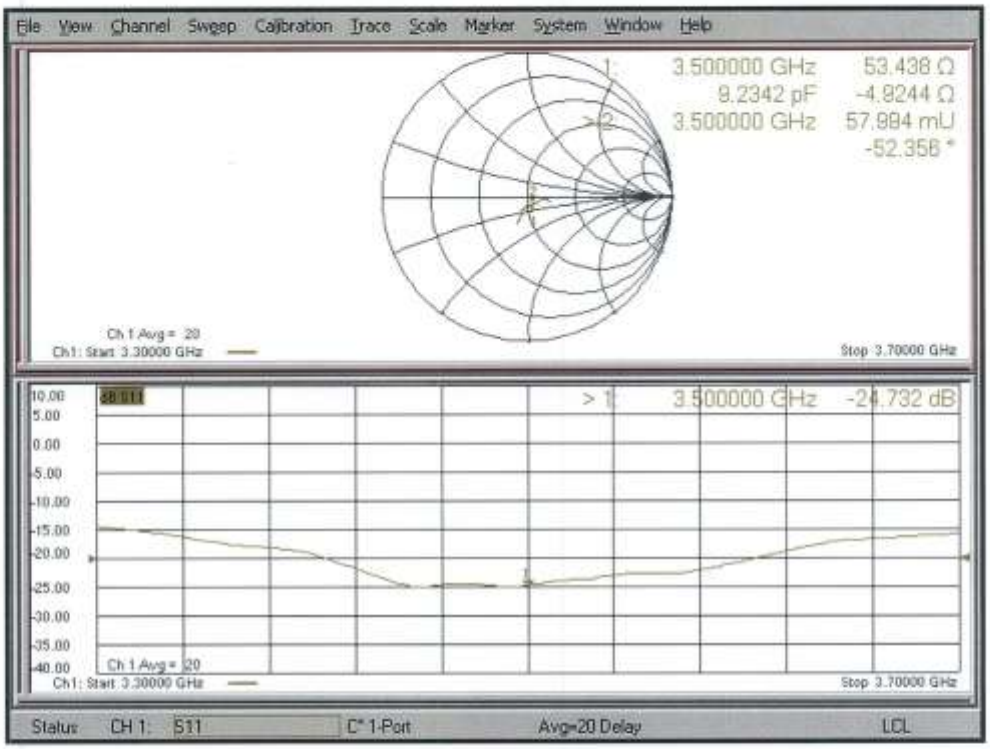
- Probe: EX3DV4 - SN3503; ConvF(7.75, 7.75, 7.75) @ 3500 MHz; Calibrated: 25.03.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Dipole Calibration for Head Tissue/Pin=100 mW, d=10mm/Zoom Scan, dist=1.4mm (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.40 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 18.6 W/kg
SAR(1 g) = 6.8 W/kg; SAR(10 g) = 2.54 W/kg
Maximum value of SAR (measured) = 12.8 W/kg



0 dB = 12.8 W/kg = 11.07 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 30.04.2019

Test Laboratory: SPEAG, Zurich, Switzerland

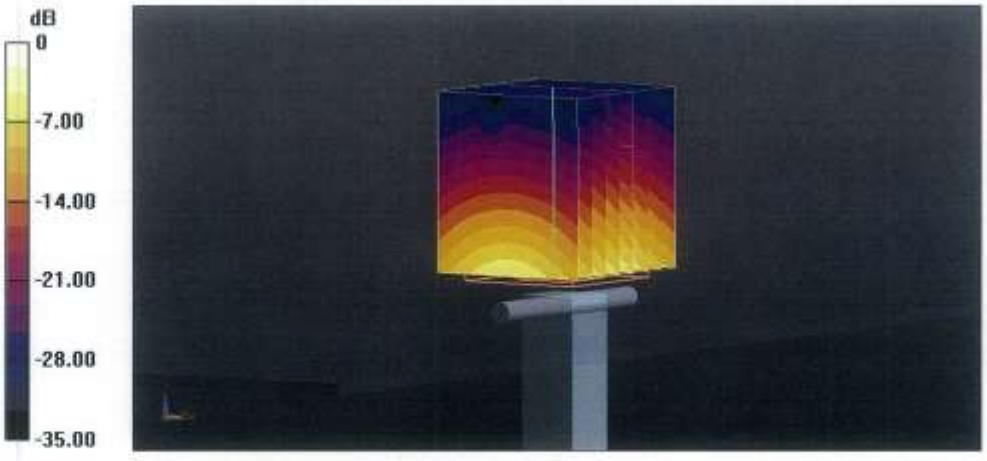
DUT: Dipole 3500 MHz; Type: D3500V2; Serial: D3500V2 - SN:1075

Communication System: UID 0 - CW; Frequency: 3500 MHz
Medium parameters used: f = 3500 MHz; σ = 3.35 S/m; ε_r = 49.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

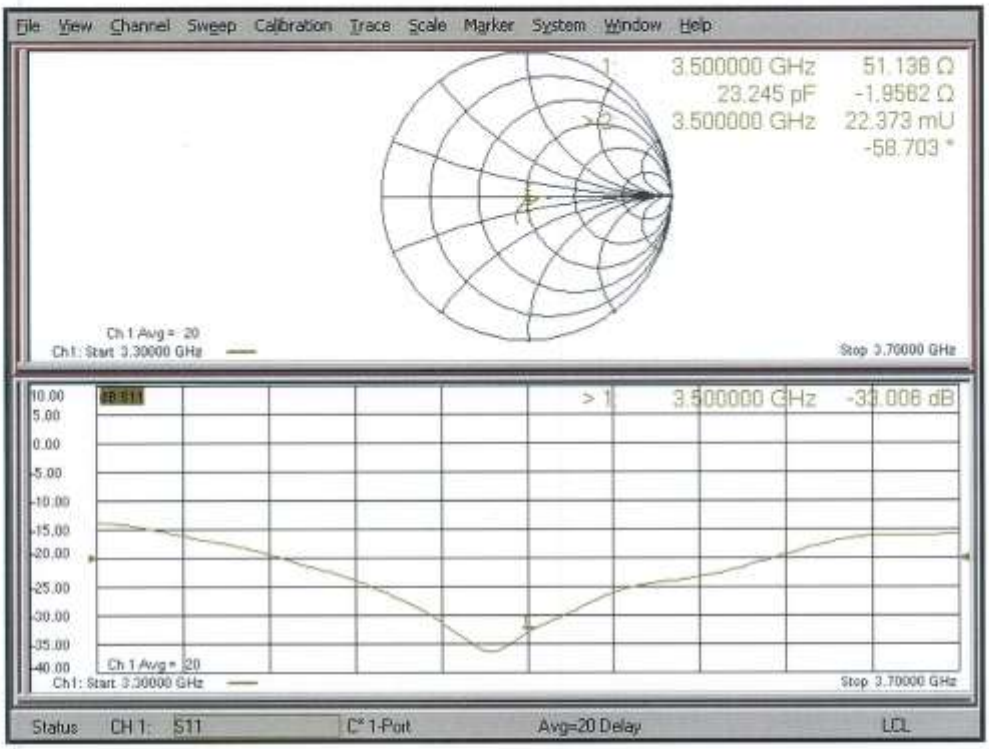
- Probe: EX3DV4 - SN3503; ConvF(7.35, 7.35, 7.35) @ 3500 MHz; Calibrated: 25.03.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn781; Calibrated: 09.01.2019
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Dipole Calibration for Body Tissue/Pin=100 mW, d=10mm/Zoom Scan , dist=1.4mm (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 65.45 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 17.2 W/kg
SAR(1 g) = 6.44 W/kg; SAR(10 g) = 2.39 W/kg
Maximum value of SAR (measured) = 12.1 W/kg



0 dB = 12.1 W/kg = 10.83 dBW/kg

Impedance Measurement Plot for Body TSL



DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

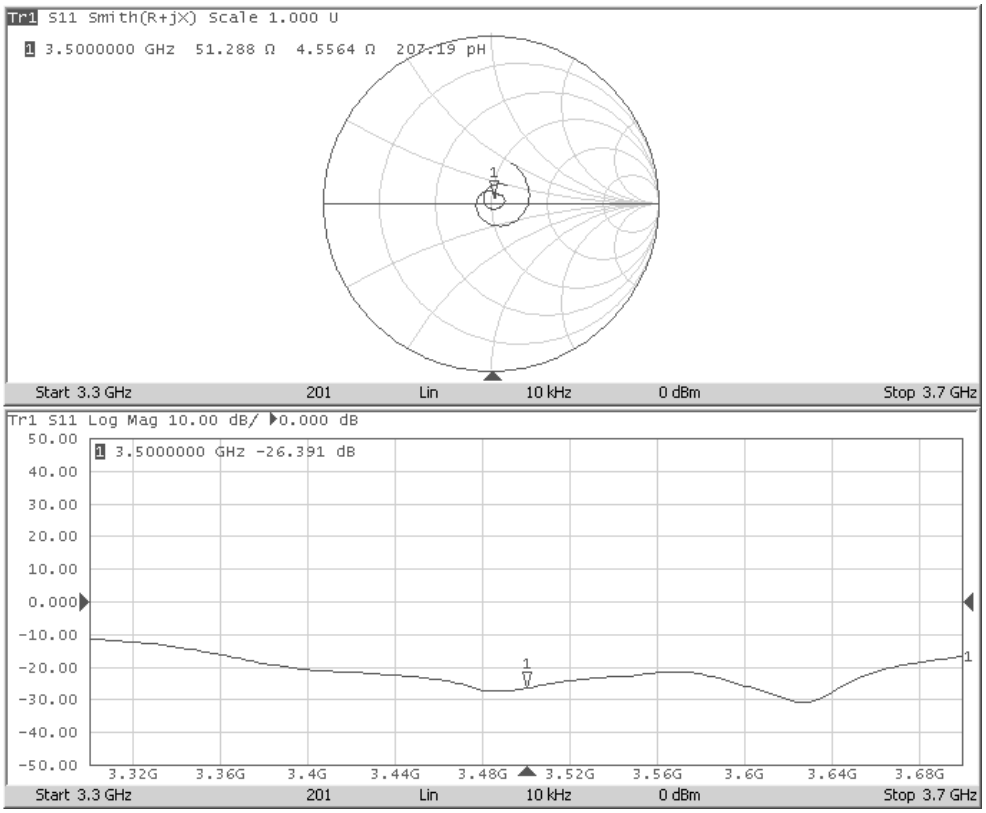
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Certificate Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head(1g) W/kg@ 23.0dBm	Measured Head SAR (1g) W/kg@ 23.0dBm	Deviation 1g(%)	Certificate SAR Target Head(10g) W/kg@ 23.0dBm	Measured Head SAR (10g) W/kg@ 23.0dBm	Deviation 10g(%)	Certificate Impedance Head(Ohm) Real	Measured Impedance Head(Ohm) Real
04/30/2019	04/29/2021	1.140	3.425	3.46	1.022	1.285	1.29	1.004	53.4	51.288

Difference (Ohm)Real	Certificate Impedance Head(Ohm) Imaginary	Measured Impedance Head(Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head(dB)	Measured Return Loss Head(dB)	Deviation (%)	Pass/Fail
2.112	-4.9	-4.6	0.3	-24.7	-26.391	6.85	Pass

Impedance & Return-Loss Measurement Plot for Head TSL



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Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)**

Certificate No: **D3700V2-1066_Nov20**

CALIBRATION CERTIFICATE

결재	담당자	확인자
서명/성명	SW / 박재홍	한 / 최유환
일자	2020 / 12.09	2020 / 12.9

Object: D3700V2 - SN:1066

Calibration procedure(s): QA CAL-22.v5
Calibration Procedure for SAR Validation Sources between 3-10 GHz

Calibration date: November 19, 2020

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	01-Apr-20 (No. 217-03100/03101)	Apr-21
Power sensor NRP-Z91	SN: 103244	01-Apr-20 (No. 217-03100)	Apr-21
Power sensor NRP-Z91	SN: 103245	01-Apr-20 (No. 217-03101)	Apr-21
Reference 20 dB Attenuator	SN: BH9394 (20k)	31-Mar-20 (No. 217-03106)	Apr-21
Type-N mismatch combination	SN: 310982 / 06327	31-Mar-20 (No. 217-03104)	Apr-21
Reference Probe EX3DV4	SN: 3503	31-Dec-19 (No. EX3-3503_Dec19)	Dec-20
DAE4	SN: 601	02-Nov-20 (No. DAE4-601_Nov20)	Nov-21

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: MY41092317	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-21

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M.Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: November 19, 2020

Certificate No: D3700V2-1066_Nov20 Page 1 of 6

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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

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
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	3700 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	37.7	3.12 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.4 ± 6 %	3.09 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	6.61 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**66.4 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.39 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.0 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.0 Ω + 0.4 jΩ
Return Loss	- 33.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.137 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

DASY5 Validation Report for Head TSL

Date: 19.11.2020

Test Laboratory: SPEAG, Zurich, Switzerland

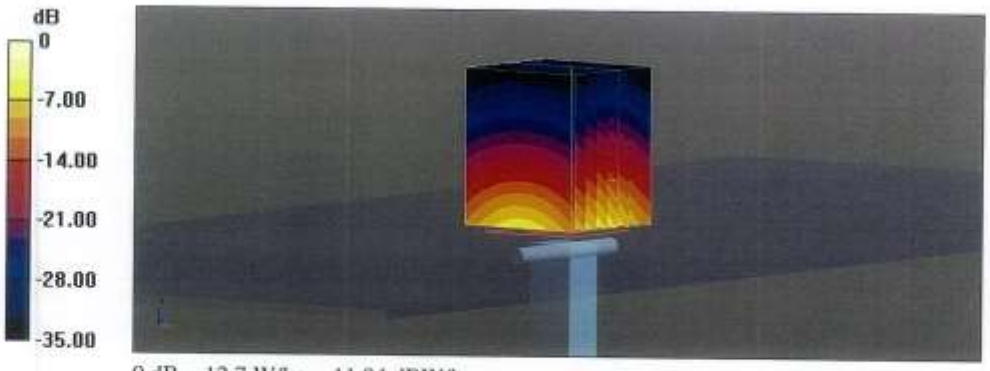
DUT: Dipole 3700 MHz; Type: D3700V2; Serial: D3700V2 - SN:1066

Communication System: UID 0 - CW; Frequency: 3700 MHz
Medium parameters used: f = 3700 MHz; σ = 3.09 S/m; ε_r = 38.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

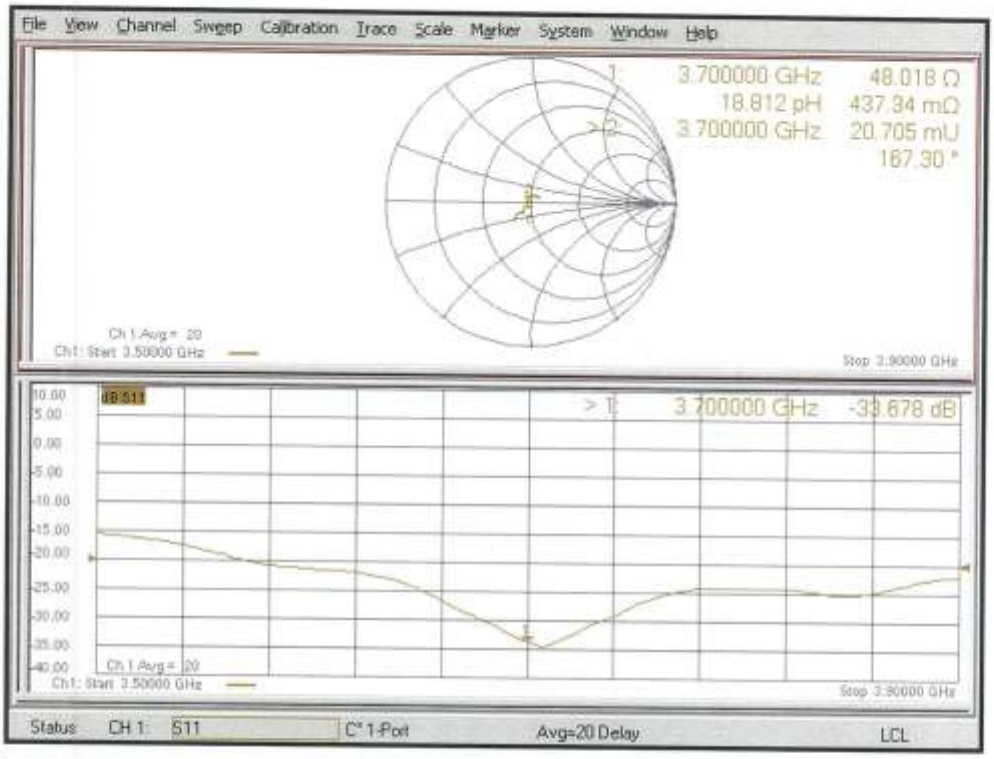
- Probe: EX3DV4 - SN3503; ConvF(7.73, 7.73, 7.73) @ 3700 MHz; Calibrated: 31.12.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.11.2020
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Dipole Calibration for Head Tissue/Pin=100 mW, d=10mm, f=3700MHz/Zoom Scan, dist=1.4mm (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 70.37 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 18.6 W/kg
SAR(1 g) = 6.61 W/kg; SAR(10 g) = 2.39 W/kg
Smallest distance from peaks to all points 3 dB below = 8 mm
Ratio of SAR at M2 to SAR at M1 = 74.2%
Maximum value of SAR (measured) = 12.7 W/kg



0 dB = 12.7 W/kg = 11.04 dBW/kg

Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 0108

Client **HCT (Dymstec)**

Certificate No: D3900V2-1019_May20

CALIBRATION CERTIFICATE

Object	D3900V2 - SN:1019
Calibration procedure(s)	QA CAL-22.v4 Calibration Procedure for SAR Validation Sources between 3-6 GHz
Calibration date:	May 22, 2020

결재	담당자	확인자
직위/성명		
일자		

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	01-Apr-20 (No. 217-03100/03101)	Apr-21
Power sensor NRP-Z91	SN: 103244	01-Apr-20 (No. 217-03100)	Apr-21
Power sensor NRP-Z91	SN: 103245	01-Apr-20 (No. 217-03101)	Apr-21
Reference 20 dB Attenuator	SN: BH9394 (20k)	31-Mar-20 (No. 217-03106)	Apr-21
Type-N mismatch combination	SN: 310982 / 06327	31-Mar-20 (No. 217-03104)	Apr-21
Reference Probe EX3DV4	SN: 3503	31-Dec-19 (No. EX3-3503_Dec19)	Dec-20
DAE4	SN: 601	27-Dec-19 (No. DAE4-601_Dec19)	Dec-20

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

	Name	Function	Signature
Calibrated by:	Jeffrey Katzman	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 22, 2020

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Accreditation No.: **SCS 0108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	3900 MHz ± 1 MHz	

Head TSL parameters at 3900 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	37.5	3.32 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.2 ± 6 %	3.22 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 3900 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.05 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**70.7 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.44 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.4 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 3900 MHz

Impedance, transformed to feed point	49.7 Ω - 6.9 jΩ
Return Loss	- 23.2 dB

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

Manufactured by	SPEAG

DASY5 Validation Report for Head TSL

Date: 22.05.2020

Test Laboratory: SPEAG, Zurich, Switzerland

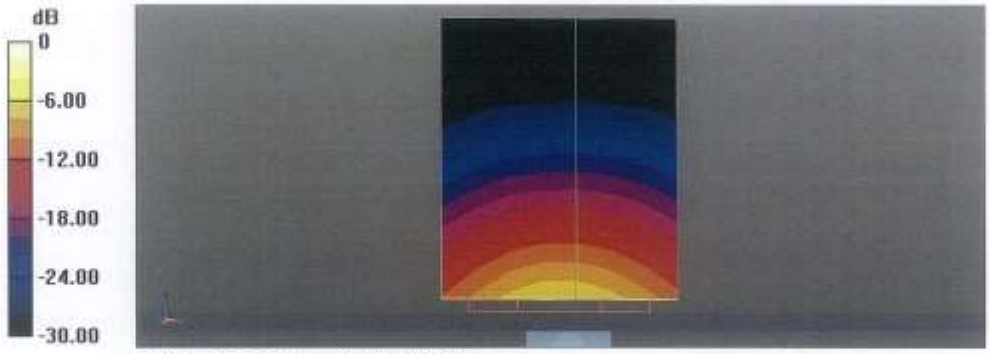
DUT: Dipole 3900 MHz; Type: D3900V2; Serial: D3900V2 - SN:1019

Communication System: UID 0 - CW; Frequency: 3900 MHz
Medium parameters used: f = 3900 MHz; σ = 3.22 S/m; ε_r = 37.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

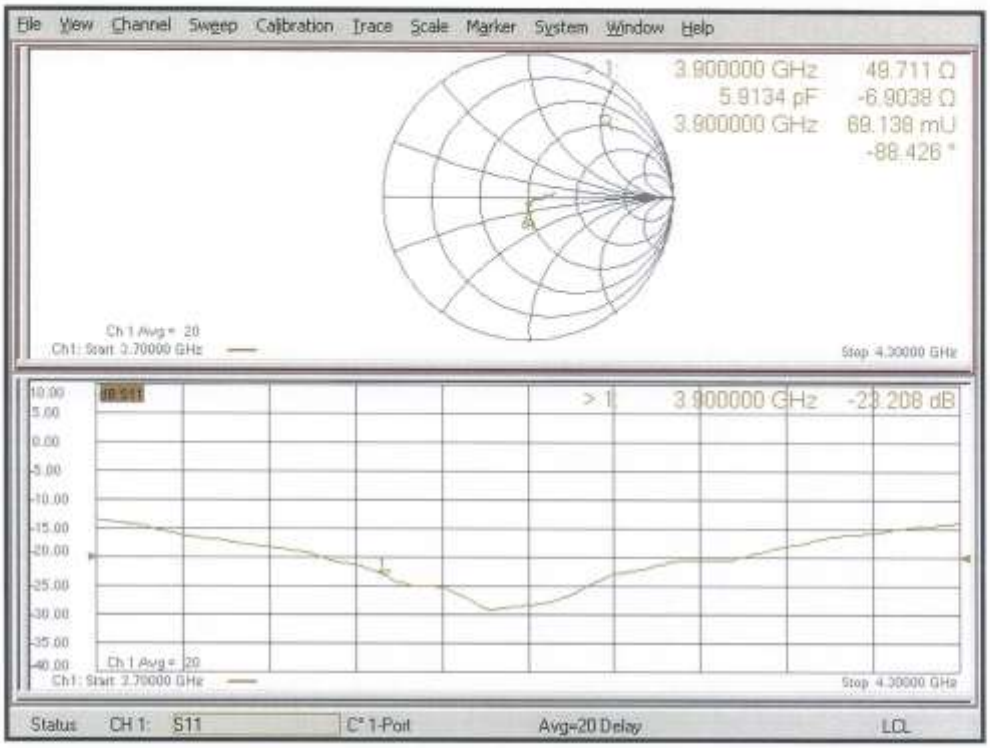
- Probe: EX3DV4 - SN3503; ConvF(7.39, 7.39, 7.39) @ 3900 MHz; Calibrated: 31.12.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.12.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Dipole Calibration for Head Tissue/Pin=100 mW, d=10mm, f=3900MHz/Zoom Scan, dist=1.4mm (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 73.45 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 20.4 W/kg
SAR(1 g) = 7.05 W/kg; SAR(10 g) = 2.44 W/kg
Smallest distance from peaks to all points 3 dB below = 8 mm
Ratio of SAR at M2 to SAR at M1 = 73.3%
Maximum value of SAR (measured) = 13.9 W/kg



0 dB = 13.9 W/kg = 11.43 dBW/kg

Impedance Measurement Plot for Head TSL



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Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)**

Certificate No: **D5GHzV2-1253_Aug20**

CALIBRATION CERTIFICATE

결재	담당자	확인자
	[signature]	[signature]
직위/성명	SW / 박태경	대리 / 박동석
일자	2020 / 10. 6	2020 / 10. 6

Object: D5GHzV2 - SN:1253

Calibration procedure(s): QA CAL-22.v5
Calibration Procedure for SAR Validation Sources between 3-10 GHz

Calibration date: August 31, 2020

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	01-Apr-20 (No. 217-03100/03101)	Apr-21
Power sensor NRP-Z91	SN: 103244	01-Apr-20 (No. 217-03100)	Apr-21
Power sensor NRP-Z91	SN: 103245	01-Apr-20 (No. 217-03101)	Apr-21
Reference 20 dB Attenuator	SN: BH9394 (20k)	31-Mar-20 (No. 217-03106)	Apr-21
Type-N mismatch combination	SN: 310982 / 06327	31-Mar-20 (No. 217-03104)	Apr-21
Reference Probe EX3DV4	SN: 3503	31-Dec-19 (No. EX3-3503_Dec19)	Dec-20
DAE4	SN: 601	27-Dec-19 (No. DAE4-601_Dec19)	Dec-20

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

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	[signature]
Approved by:	Katja Pokovic	Technical Manager	[signature]

Issued: August 31, 2020

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Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 10.0 mm, dz = 10.0 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz	

Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.6 ± 6 %	4.48 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °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	8.04 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**79.7 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.31 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.8 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.2 ± 6 %	4.83 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °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	8.31 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**82.2 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.5 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.0 ± 6 %	4.98 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °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	8.04 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**79.6 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.30 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.7 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	50.2 Ω - 4.4 jΩ
Return Loss	- 27.1 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	52.0 Ω + 1.8 jΩ
Return Loss	- 31.6 dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	55.8 Ω + 2.3 jΩ
Return Loss	- 24.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.195 ns

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

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

Additional EUT Data

Manufactured by	SPEAG

DASY5 Validation Report for Head TSL

Date: 31.08.2020

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1253

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: f = 5250 MHz; σ = 4.48 S/m; ε_r = 34.6; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5600 MHz; σ = 4.83 S/m; ε_r = 34.2; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5750 MHz; σ = 4.98 S/m; ε_r = 34.0; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

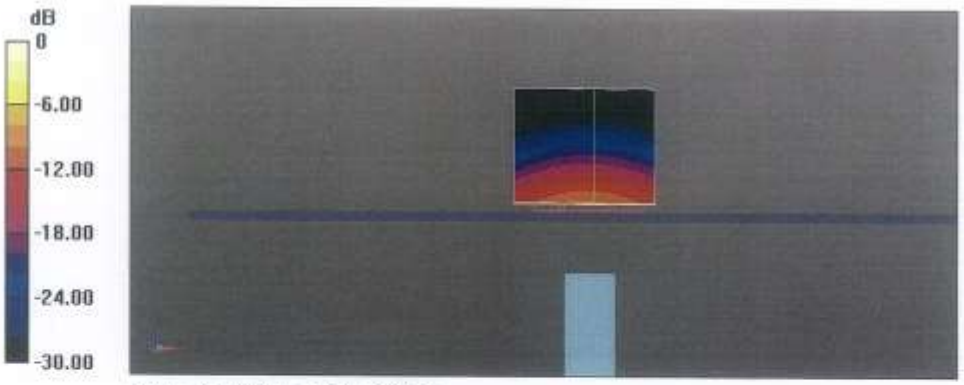
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.5, 5.5, 5.5) @ 5250 MHz,
  ConvF(5.1, 5.1, 5.1) @ 5600 MHz, ConvF(5.08, 5.08, 5.08) @ 5750 MHz; Calibrated: 31.12.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.12.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 77.63 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 27.8 W/kg
SAR(1 g) = 8.04 W/kg; SAR(10 g) = 2.31 W/kg
Smallest distance from peaks to all points 3 dB below = 7.4 mm
Ratio of SAR at M2 to SAR at M1 = 69.8%
Maximum value of SAR (measured) = 18.3 W/kg

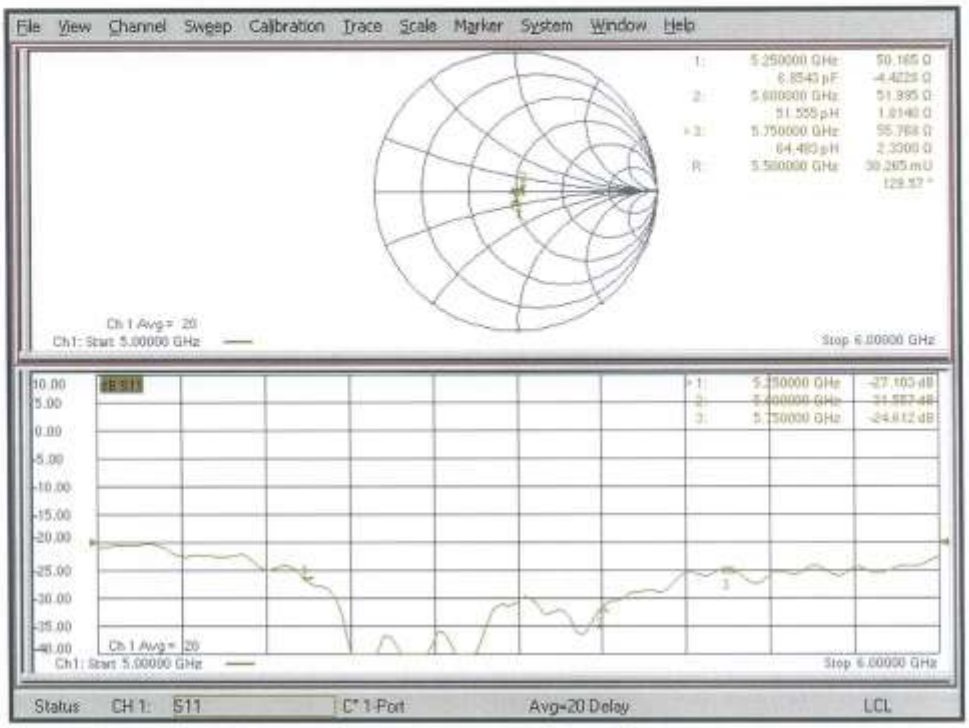
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 77.49 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 31.3 W/kg
SAR(1 g) = 8.31 W/kg; SAR(10 g) = 2.38 W/kg
Smallest distance from peaks to all points 3 dB below = 7.4 mm
Ratio of SAR at M2 to SAR at M1 = 66.9%
Maximum value of SAR (measured) = 19.7 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 75.13 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 31.8 W/kg
SAR(1 g) = 8.04 W/kg; SAR(10 g) = 2.30 W/kg
Smallest distance from peaks to all points 3 dB below = 7.4 mm
Ratio of SAR at M2 to SAR at M1 = 65.3%
Maximum value of SAR (measured) = 19.4 W/kg



0 dB = 19.7 W/kg = 12.94 dBW/kg

Impedance Measurement Plot for Head TSL



Appendix H. – Power reduction verification

Per the May 2017 TCBC Workshop notes, demonstration of proper functioning of the power reduction mechanism is required to support the corresponding SAR Configurations.

The verification process was divided into two parts:

1). Evaluation of output power levels for individual triggering mechanism

2) Evaluation of the triggering distances for proximity-based sensors.

1. Power Reduction Verification for Main Ant

The Power verification was performed according to the following procedure:

1. A base station simulator was used to establish a conducted RF connection and output power was monitored. The Power measurements were conformed to be within expected tolerances for all states before and after a power reduction mechanism was triggered.
2. Step 1 was repeated for all relevant modes and frequency bands for the mechanism being investigated.
3. Step 1 and 2 were repeated for all individual power reduction mechanism and combinations thereof. For the combination cases, one mechanism was switched to a “triggered” state at a time; powers were conformed to be within tolerance after each additional mechanism was activated.

Main Antenna Verification Summary

Mechanism(s)	Mode/Band	Device State Index		
		Un-triggered (Max Power)	Triggered (Reduced Power)	Triggered (Reduced Power)
Grip	GSM/GPRS/EDGE 1900	0	4	
Grip	PCS CDMA/EVDO	0	4	
Grip	UMTS B2	0	4	
Grip	UMTS B4	0	4	
Grip	LTE Band 2	0	4	
Grip	LTE Band 4	0	4	
Grip	LTE Band 7	0	4	
Grip	LTE Band 25	0	4	
Grip	LTE Band 30	0	4	
Grip	LTE Band 66	0	4	
Grip	Sub 6 Band n2	0	4	
Grip	Sub 6 Band n25	0	4	
Grip	Sub 6 Band n66	0	4	
Hotspot On	GSM/GPRS/EDGE 1900	0	2	
Hotspot On	PCS/EVDO BC1	0	2	
Hotspot On	UMTS B2	0	2	
Hotspot On	UMTS B4	0	2	
Hotspot On	LTE Band 2	0	2	
Hotspot On	LTE Band 4	0	2	
Hotspot On	LTE Band 7	0	2	
Hotspot On	LTE Band 25	0	2	
Hotspot On	LTE Band 30	0	2	
Hotspot On	LTE Band 66	0	2	
Hotspot On	Sub 6 Band n2	0	2	
Hotspot On	Sub 6 Band n25	0	2	
Hotspot On	Sub 6 Band n66	0	2	
Hotspot On, Then Grip	GSM/GPRS/EDGE 1900	0	2	2
Hotspot On, Then Grip	PCS/EVDO BC1	0	2	2
Hotspot On, Then Grip	UMTS B2	0	2	2
Hotspot On, Then Grip	UMTS B4	0	2	2
Hotspot On, Then Grip	LTE Band 2	0	2	2
Hotspot On, Then Grip	LTE Band 4	0	2	2
Hotspot On, Then Grip	LTE Band 7	0	2	2
Hotspot On, Then Grip	LTE Band 25	0	2	2
Hotspot On, Then Grip	LTE Band 30	0	2	2
Hotspot On, Then Grip	LTE Band 66	0	2	2
Hotspot On, Then Grip	Sub 6 Band n2	0	2	2
Hotspot On, Then Grip	Sub 6 Band n25	0	2	2
Hotspot On, Then Grip	Sub 6 Band n66	0	2	2
Grip, then Hotspot On	GSM/GPRS/EDGE 1900	0	4	2
Grip, then Hotspot On	PCS CDMA/EVDO	0	4	2
Grip, then Hotspot On	UMTS B2	0	4	2
Grip, then Hotspot On	UMTS B4	0	4	2
Grip, then Hotspot On	LTE Band 2	0	4	2
Grip, then Hotspot On	LTE Band 4	0	4	2

Grip, then Hotspot On	LTE Band 7	0	4	2
Grip, then Hotspot On	LTE Band 25	0	4	2
Grip, then Hotspot On	LTE Band 30	0	4	2
Grip, then Hotspot On	LTE Band 66	0	4	2
Grip, then Hotspot On	Sub 6 Band n2	0	4	2
Grip, then Hotspot On	Sub 6 Band n25	0	4	2
Grip, then Hotspot On	Sub 6 Band n66	0	4	2

* LTE Band 40 supports MCC back off as a top priority

*Note: This device uses different Device State Indices (DSI) to configure different time averaged pow er levels based on certain exposure scenarios. For this device, DSI = 4 represents the case when the grip sensor is active, DSI = 1 represents the case where the device is held to ear, and DSI = 2 represents the case when hotspot mode is active,DSI = 3 represents thecase when ear-jack is inserted and DSI = 0 is configured at max power when the device cannot detect theuse condition .
when Hotspot Mode (DSI=2) Grip sensor (DSI=4) and Ear-jack mode(DSI=3) are triggered at the same time, DSI=2 (Hotspot) takes more higher priority.the Priority for power reduction was given in the order of hotspot (DSI=2) and Grip.(DSI=4), Earjack (DSI=3).

1.1. Distance Verification Procedure

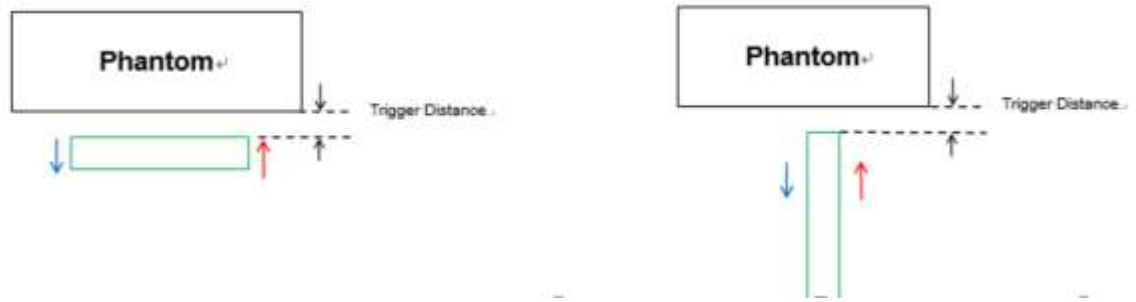
Procedures for determining proximity sensor triggering distances

(KDB 616217D04v01r02§6.2)

The distance verification procedure was performed according to the following procedure:

1. A base station simulator was used to establish an RF connection and to monitor the power levels. The device being tested was placed below the relevant section of the phantom with the relevant side or edge of the device facing toward the phantom.
2. The device was moved toward and away from the phantom to determine the distance at which the mechanism triggers and the output power is reduced, per KDB Publication 616217 D04v01r02 .Each applicable test position was evaluated. The distance were conformed to be the same or larger (more conservative) than the minimum distances provided by the manufacturer.
3. Step 1 and 2 were repeated for the relevant modes, as appropriate
4. Steps1 through 3 were repeated for all distance-based power reduction mechanisms.

For detailed measurement conducted power results, please refer to the Section .11



Proximity Sensor Trigger Distance Assessment KDB 616217 D04§6.2 (Rear / Front / Bottom side)

LEGEND

→ Direction of DUT travel for determination of power reduction triggering point

→ Direction of DUT travel for determination of full power resumption triggering point

Tissue simulating liquid	Trigger distance - Rear		Trigger distance - Front		Trigger distance - Bottom	
	Moving toward phantom [mm]	Moving away from phantom [mm]	Moving toward phantom [mm]	Moving away from phantom [mm]	Moving toward phantom [mm]	Moving away from phantom [mm]
1750MHz Tissue	10	11	6	7	12	13
1900MHz Tissue	10	11	6	7	12	13
2300MHz Tissue	10	11	6	7	12	13
2600 MHz Tissue	10	11	6	7	12	13

Distance Measurement verification for Proximity sensor

Rear side – EUT Moving toward (trigger) to the Phantom

Mode	Distance to DUT Output power (dBm)									
	15[mm]	14[mm]	13[mm]	12[mm]	11[mm]	10[mm]	9[mm]	8[mm]	7[mm]	6[mm]
GSM1900 /Voice	29.56	29.54	29.51	29.62	29.52	28.07	28.06	28.10	28.09	28.03
GSM1900 /GPRS 1Tx	29.57	29.62	29.61	29.48	29.66	28.12	27.92	28.02	27.97	27.98
GSM1900 /GPRS 2Tx	28.31	28.47	28.36	28.36	28.42	26.43	26.42	26.39	26.52	26.42
GSM1900 /GPRS 3Tx	26.02	25.85	25.83	25.84	26.03	24.56	24.46	24.51	24.53	24.58
GSM1900 /GPRS 4Tx	24.35	24.28	24.17	24.22	24.19	22.95	23.01	22.99	23.01	22.85
PCS RC3/SO55	23.89	23.90	24.04	24.07	23.92	22.55	22.45	22.50	22.47	22.56
PCS EVDO Rev.0	23.98	24.05	23.98	23.97	23.90	22.55	22.55	22.52	22.50	22.45
PCS EVDO Rev. A	23.98	23.94	23.83	23.89	23.82	22.44	22.55	22.53	22.52	22.47
UMTS B2	23.47	23.52	23.36	23.38	23.37	22.38	22.34	22.51	22.46	22.50
UMTS B4	23.52	23.48	23.53	23.46	23.50	22.38	22.35	22.46	22.37	22.40
LTE Band 2	24.27	24.16	24.24	24.15	24.19	21.97	22.03	22.02	22.13	22.03
LTE Band 4	24.00	23.98	24.09	24.05	23.95	21.63	21.68	21.54	21.68	21.65
LTE Band 7	23.87	23.92	24.02	23.97	23.98	22.21	22.32	22.30	22.36	22.32
LTE Band 25	24.22	24.20	24.35	24.36	24.17	21.91	21.97	21.96	21.90	21.87
LTE Band 30	24.10	23.94	24.05	24.09	23.96	22.11	22.17	22.17	22.11	22.11
LTE Band 66	24.35	24.31	24.31	24.45	24.37	22.09	22.15	22.08	22.17	22.14
Sub 6 Band n2	23.99	23.91	23.90	23.86	23.90	22.40	22.38	22.48	22.51	22.44
Sub 6 Band n25	24.02	24.01	23.97	24.14	24.01	23.11	23.05	22.99	23.02	23.03
Sub 6 Band n66	25.04	24.94	24.85	25.03	24.95	23.44	23.49	23.47	23.47	23.36

Rear side – EUT Moving away (Release) from the Phantom

Mode	Distance to DUT Output power (dBm)									
	7[mm]	8[mm]	9[mm]	10[mm]	11[mm]	12[mm]	13[mm]	14[mm]	15mm]	16[mm]
GSM1900 /Voice	28.07	28.12	28.01	28.13	28.09	29.53	29.58	29.70	29.50	29.50
GSM1900 /GPRS 1Tx	28.05	28.08	28.12	27.92	28.12	29.51	29.68	29.64	29.63	29.49
GSM1900 /GPRS 2Tx	26.45	26.50	26.48	26.39	26.37	28.39	28.49	28.40	28.41	28.37
GSM1900 /GPRS 3Tx	24.60	24.56	24.61	24.55	24.45	25.98	25.83	25.93	26.02	26.01
GSM1900 /GPRS 4Tx	22.83	23.00	22.85	22.94	22.88	24.34	24.24	24.22	24.32	24.35
PCS RC3/SO55	22.59	22.62	22.61	22.59	22.54	24.03	24.05	24.08	23.89	23.97
PCS EVDO Rev.0	22.54	22.52	22.50	22.43	22.61	23.93	23.90	24.06	24.03	23.91
PCS EVDO Rev. A	22.48	22.39	22.54	22.40	22.55	23.93	23.89	23.85	24.00	23.98
UMTS B2	22.48	22.40	22.39	22.45	22.35	23.49	23.48	23.47	23.51	23.43
UMTS B4	22.41	22.34	22.39	22.35	22.40	23.33	23.45	23.38	23.53	23.50
LTE Band 2	21.97	22.10	22.11	22.01	22.01	24.13	24.25	24.21	24.16	24.16
LTE Band 4	21.65	21.50	21.62	21.63	21.56	24.02	24.07	24.07	24.06	24.04
LTE Band 7	22.34	22.38	22.31	22.34	22.27	23.94	24.06	24.01	23.99	23.95
LTE Band 25	21.96	22.02	22.02	21.99	21.98	24.35	24.30	24.16	24.31	24.35
LTE Band 30	22.07	22.04	22.06	22.18	22.17	24.04	23.95	24.08	23.93	23.98
LTE Band 66	22.09	22.01	22.05	22.04	22.18	24.46	24.27	24.35	24.46	24.29
Sub 6 Band n2	22.41	22.51	22.51	22.38	22.40	23.96	24.06	24.04	24.01	24.02
Sub 6 Band n25	23.05	23.15	22.96	23.01	23.15	24.06	24.13	23.99	24.02	23.99
Sub 6 Band n66	23.36	23.45	23.50	23.33	23.42	24.85	24.84	25.03	24.90	25.00

Based on the most conservative measured triggering distance of 10mm, additional Phablet SAR measurements were required at 9mm from rear side for the above modes

Front side – EUT Moving toward (trigger) to the Phantom

Mode	Distance to DUT Output power (dBm)									
	11[mm]	10[mm]	9[mm]	8[mm]	7[mm]	6[mm]	5[mm]	4[mm]	3[mm]	2[mm]
GSM1900 /Voice	29.61	29.54	29.5	29.54	29.54	27.96	27.99	28.05	28.01	27.96
GSM1900 /GPRS 1Tx	29.67	29.49	29.49	29.59	29.67	28.06	28.08	28.02	28.06	28.12
GSM1900 /GPRS 2Tx	28.41	28.37	28.39	28.4	28.39	26.4	26.47	26.38	26.54	26.41
GSM1900 /GPRS 3Tx	25.9	25.87	25.87	25.94	25.91	24.61	24.51	24.61	24.6	24.58
GSM1900 /GPRS 4Tx	24.28	24.37	24.3	24.21	24.27	22.96	22.84	22.84	22.95	22.84
PCS RC3/SO55	24.00	24.07	23.96	24.03	23.99	22.52	22.61	22.48	22.56	22.51
PCS EVDO Rev.0	24.10	24.05	23.94	24.02	24.04	22.60	22.48	22.52	22.60	22.54
PCS EVDO Rev. A	24.00	24.01	23.91	23.94	23.99	22.40	22.56	22.44	22.39	22.41
UMTS B2	23.42	23.39	23.49	23.39	23.52	22.54	22.50	22.44	22.43	22.34
UMTS B4	23.47	23.46	23.50	23.41	23.51	22.44	22.35	22.43	22.41	22.36
LTE Band 2	24.28	24.23	24.13	24.25	24.18	22.14	21.97	22.03	22.03	22.15
LTE Band 4	24.08	23.92	24.06	24.01	24.05	21.69	21.51	21.65	21.60	21.59
LTE Band 7	23.96	23.99	23.94	24.00	24.06	22.31	22.41	22.36	22.38	22.32
LTE Band 25	24.26	24.31	24.26	24.30	24.20	21.87	21.91	21.94	22.02	21.94
LTE Band 30	24.10	24.04	23.94	24.04	24.05	22.12	22.03	22.05	22.00	22.04
LTE Band 66	24.36	24.37	24.41	24.32	24.47	22.03	22.18	22.10	22.11	22.07
Sub 6 Band n2	23.94	23.97	24.02	23.89	23.96	22.48	22.50	22.42	22.42	22.50
Sub 6 Band n25	23.98	23.98	24.10	23.98	24.04	23.02	22.97	23.13	23.13	22.95
Sub 6 Band n66	25.03	24.95	24.87	24.87	24.87	23.40	23.35	23.41	23.44	23.41

Front side – EUT Moving away (Release) from the Phantom

Mode	Distance to DUT Output power (dBm)									
	3[mm]	4[mm]	5[mm]	6[mm]	7[mm]	8[mm]	9[mm]	10[mm]	11[mm]	12[mm]
GSM1900 /Voice	28.08	28.12	27.99	27.96	27.94	29.70	29.58	29.68	29.59	29.63
GSM1900 /GPRS 1Tx	28.07	27.96	27.92	28.07	28.02	29.65	29.58	29.60	29.62	29.60
GSM1900 /GPRS 2Tx	26.46	26.42	26.55	26.54	26.49	28.49	28.48	28.38	28.42	28.35
GSM1900 /GPRS 3Tx	24.60	24.60	24.58	24.52	24.61	26.02	26.03	25.88	25.90	26.01
GSM1900 /GPRS 4Tx	23.00	22.91	22.91	22.85	22.89	24.35	24.35	24.28	24.28	24.22
PCS RC3/SO55	22.56	22.52	22.55	22.48	22.45	23.88	23.90	24.00	23.95	23.90
PCS EVDO Rev.0	22.50	22.44	22.58	22.53	22.54	24.02	24.09	23.91	24.05	24.02
PCS EVDO Rev. A	22.44	22.48	22.42	22.52	22.36	23.84	23.87	23.98	23.98	23.95
UMTS B2	22.47	22.51	22.35	22.54	22.51	23.44	23.38	23.52	23.41	23.48
UMTS B4	22.34	22.53	22.51	22.53	22.48	23.46	23.40	23.46	23.38	23.45
LTE Band 2	21.97	22.09	22.08	22.07	22.14	24.26	24.25	24.26	24.27	24.10
LTE Band 4	21.68	21.67	21.57	21.57	21.56	24.02	24.00	23.92	24.00	23.99
LTE Band 7	22.36	22.32	22.36	22.34	22.40	24.04	23.90	23.99	23.94	23.91
LTE Band 25	22.04	21.87	21.87	22.00	21.96	24.20	24.18	24.35	24.28	24.24
LTE Band 30	22.10	22.11	22.16	22.02	22.07	23.96	23.94	23.95	24.02	24.03
LTE Band 66	22.13	22.17	22.08	22.14	22.09	24.41	24.47	24.43	24.36	24.40
Sub 6 Band n2	22.51	22.44	22.38	22.45	22.40	23.94	24.03	23.91	24.00	23.99
Sub 6 Band n25	23.07	22.99	23.03	23.05	23.08	23.97	24.05	24.06	24.10	24.02
Sub 6 Band n66	23.52	23.42	23.37	23.52	23.51	25.00	24.89	25.03	25.04	24.84

Based on the most conservative measured triggering distance of 6mm, additional Phablet SAR measurements were required at 5mm from Front side for the above modes

Bottom side – EUT Moving toward (trigger) to the Phantom

Mode	Distance to DUT Output power (dBm)									
	17[mm]	16[mm]	15[mm]	14[mm]	13[mm]	12[mm]	11[mm]	10[mm]	9[mm]	18[mm]
GSM1900 /Voice	29.56	29.64	29.66	29.66	29.55	28.00	28.13	28.08	27.93	28.10
GSM1900 /GPRS 1Tx	29.62	29.59	29.65	29.65	29.62	28.06	28.01	28.05	27.94	28.07
GSM1900 /GPRS 2Tx	28.43	28.40	28.47	28.29	28.30	26.37	26.45	26.40	26.37	26.40
GSM1900 /GPRS 3Tx	25.97	25.90	25.98	25.94	26.00	24.63	24.45	24.63	24.61	24.59
GSM1900 /GPRS 4Tx	24.29	24.27	24.19	24.20	24.18	23.01	22.95	22.97	22.83	22.85
PCS RC3/SO55	23.97	23.99	23.91	23.92	24.00	22.47	22.49	22.51	22.61	22.46
PCS EVDO Rev.0	23.99	23.90	24.05	23.98	24.06	22.55	22.62	22.60	22.62	22.63
PCS EVDO Rev .A	23.86	23.82	23.86	23.91	23.87	22.43	22.40	22.43	22.49	22.53
UMTS B2	23.38	23.45	23.39	23.46	23.32	22.41	22.47	22.41	22.42	22.46
UMTS B4	23.34	23.50	23.49	23.40	23.33	22.44	22.43	22.34	22.35	22.37
LTE Band 2	24.16	24.10	24.23	24.25	24.25	22.02	22.15	22.05	21.95	22.07
LTE Band 4	24.02	23.91	24.02	24.09	24.11	21.68	21.52	21.60	21.63	21.66
LTE Band 7	23.98	24.04	23.98	24.04	23.97	22.38	22.23	22.38	22.26	22.38
LTE Band 25	24.27	24.26	24.31	24.30	24.21	22.02	22.01	22.06	22.03	21.93
LTE Band 30	23.93	24.01	23.92	24.10	23.97	22.19	22.06	22.03	22.06	22.02
LTE Band 66	24.36	24.31	24.35	24.37	24.35	22.09	22.05	22.17	22.04	22.03
Sub 6 Band n2	23.92	24.06	24.05	23.92	23.86	22.39	22.39	22.46	22.45	22.56
Sub 6 Band n25	24.12	24.03	23.96	24.05	24.03	23.06	23.07	23.07	23.15	23.00
Sub 6 Band n66	25.02	24.98	24.96	24.89	24.91	23.49	23.51	23.48	23.36	23.48

Bottom side – EUT Moving away (Release) from the Phantom

Mode	Distance to DUT Output power (dBm)									
	9[mm]	10[mm]	11[mm]	12[mm]	13[mm]	14[mm]	15[mm]	16[mm]	17[mm]	18[mm]
GSM1900 /Voice	27.99	28.13	27.95	28.06	28.08	29.54	29.68	29.57	29.70	29.68
GSM1900 /GPRS 1Tx	28.11	28.06	28.06	28.12	27.99	29.61	29.66	29.48	29.53	29.52
GSM1900 /GPRS 2Tx	26.50	26.42	26.38	26.39	26.43	28.39	28.29	28.29	28.38	28.49
GSM1900 /GPRS 3Tx	24.58	24.52	24.59	24.62	24.65	25.93	25.90	25.96	26.00	25.97
GSM1900 /GPRS 4Tx	22.94	22.97	23.00	22.85	22.90	24.30	24.21	24.27	24.30	24.22
PCS RC3/SO55	22.54	22.42	22.51	22.44	22.57	23.92	24.04	24.05	23.90	24.04
PCS EVDO Rev.0	22.50	22.61	22.55	22.55	22.52	24.01	24.10	24.10	23.95	23.96
PCS EVDO Rev. A	22.55	22.42	22.52	22.50	22.45	23.94	23.94	23.96	23.85	23.92
UMTS B2	22.47	22.34	22.51	22.45	22.53	23.33	23.51	23.42	23.39	23.38
UMTS B4	22.43	22.49	22.47	22.51	22.46	23.48	23.49	23.38	23.40	23.35
LTE Band 2	22.14	22.14	22.15	22.14	22.15	24.09	24.09	24.24	24.21	24.27
LTE Band 4	21.63	21.64	21.53	21.62	21.50	24.09	24.03	23.99	24.09	24.07
LTE Band 7	22.24	22.22	22.29	22.30	22.29	24.07	23.87	23.97	23.91	23.88
LTE Band 25	22.07	22.06	21.91	21.87	21.88	24.33	24.36	24.27	24.33	24.27
LTE Band 30	22.18	22.09	22.20	22.12	22.04	24.08	23.99	23.95	24.01	23.95
LTE Band 66	22.09	22.15	22.20	22.09	22.00	24.43	24.31	24.43	24.29	24.30
Sub 6 Band n2	22.37	22.39	22.39	22.40	22.52	24.01	23.95	23.96	24.04	24.04
Sub 6 Band n25	23.14	22.99	23.09	23.02	22.97	24.13	24.06	24.04	23.94	23.95
Sub 6 Band n66	23.40	23.37	23.48	23.53	23.53	24.87	24.96	24.88	24.99	24.91

Based on the most conservative measured triggering distance of 12mm, additional Phablet SAR measurements were required at 11mm from Bottom side for the above modes

1.2 Proximity Sensor Coverage for SAR measurements

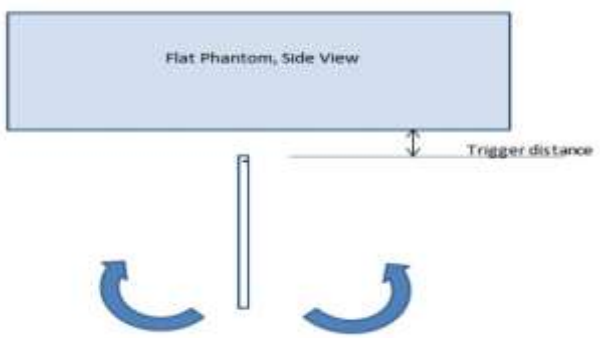
(KDB 616217 D04v01r02§6.3)

As there is no spatial offset between the antenna and the proximity sensor element, proximity sensor coverage did not need to be assessed.

1.3 Proximity Sensor Tilt Angle Assessment

(KDB 616217 D04v01r02 §6.4)

The DUT was positioned directly below the flat phantom at the minimum measured trigger distance with Bottom side parallel to the base of the flat phantom for each band.The EUT was rotated about Bottom side for angles up to ±45°. If the output power increased during the rotation the DUT was moved 1mm toward the phantom and the rotation repeated. This procedure was repeated until the power remained reduced for all angles up±45°.



Proximity sensor tilt angle assessment (Bottom side) KDB 616217 §6.4

Summary of Tablet Tilt Angle influence to Proximity Sensor Triggering (Bottom side)

Tissue	Minimumdistance atwhich power reduction was maintained over-45°	Power reduction status										
		-45°	-40°	-30°	-20°	-10°	0°	10°	20°	30°	40°	45°
1750 MHz Tissue	12 mm	On	On	On	On	On	On	On	On	On	On	On
1900 MHz Tissue	12 mm	On	On	On	On	On	On	On	On	On	On	On
2300 MHz Tissue	12 mm	On	On	On	On	On	On	On	On	On	On	On
2600 MHz Tissue	12 mm	On	On	On	On	On	On	On	On	On	On	On

1.5 Resulting test positions for Phablet SAR measurements

Wireless technologies	Position	§6.2 Triggering Distance [mm]	§6.3 Coverage	§6.4 Tilt Angle	Worst case distance for Phablet SAR [mm]
WWAN (GSM1900 /PCS CDMA /UMTS B2/B4 /LTEB2/B4/B7/B25 /B30/B66 /SUB6 n2/n25/n66)	Rear	10	N/A	N/A	9
	Front	6	N/A	N/A	5
	Bottom	12	N/A	N/A	11

Note:FCC KDB Publication 616217 D04v01r02 Section 6 was used as a guideline for selecting SAR test distances for this device when being used in phablet use conditions

2. Power reduction Verification for Sub2 Ant

This device uses a power reduction mechanism for SAR compliance for operations during voice or VoIP held to ear scenarios.

When a user makes or receives a voice call or VOIP call for Sub2 Ant the audio of the call is sent through the Receiver at the top of the device will trigger the Power reduction for Sub2 Ant (i.e. reducing output power for Head SAR compliance)

Detailed descriptions of the power reduction mechanism are included in the Main operational description document

Condition For Power reduction	Wireless Technologies	Conducted Power[dBm]	
		Un-Triggered (Max Power)	Triggered (Reduced Power)
RCV-on	NR n41 PC3	24.27	22.23
RCV-on	NR n41 PC2	25.08	22.24

3. Power reduction Verification for Sub3 Ant

This device uses a power reduction mechanism for SAR compliance for operations during voice or VoIP held to ear scenarios.

When a user makes or receives a voice call or VOIP call for Sub3 Ant the audio of the call is sent through the Receiver at the top of the device will trigger the Power reduction for Sub3 Ant (i.e. reducing output power for Head SAR compliance)

Detailed descriptions of the power reduction mechanism are included in the Main operational description document

Condition For Power reduction	Wireless Technologies	Conducted Power[dBm]	
		Un-Triggered (Max Power)	Triggered (Reduced Power)
RCV-on	LTE 48	21.81	19.2
RCV-on	NR n77	24.35	21.15

4. Power reduction Verification for WLAN Ant

This device uses a power reduction mechanism for SAR compliance for WLAN operations during voice or VoIP held to ear scenarios.

When a user makes or receives a WLAN voice or WLAN VOIP call for WLAN Ant the audio of the call is sent through the Receiver at the top of the device will trigger the Power reduction for WLAN Ant (i.e. reducing output power for Head SAR compliance)

Detailed descriptions of the power reduction mechanism are included in the Main operational description document

Power Measurement Verification for WLAN

Condition For Power reduction	Wireless Technologies	Conducted Power[dBm]	
		Un-Triggered (Max Power)	Triggered (Reduced Power)
		Ant1	Ant1
RCV-on	2.4GHz 802.11b (Exclude 12/13ch)	20.71	16.78
RCV-on	2.4GHz 802.11g (Exclude 12/13ch))	17.04	16.59
RCV-on	2.4GHz 802.11n (Exclude 12/13ch)	16.90	16.46
RCV-on	5GHz 802.11a (Exclude 100~144ch)	18.15	13.01
RCV-on	5GHz 802.11n 20MHz	17.71	12.85
RCV-on	5GHz 802.11n 40MHz	14.51	13.05
RCV-on	5GHz 802.11ac 20MHz	15.85	12.88
RCV-on	5GHz 802.11ac 40MHz	14.28	12.76

Appendix I. – DL CA Power Measurement

1. LTE Uplink and Down-link Carrier Aggregation Conducted Powers

SAR test exclusion for LTE downlink Carrier Aggregation is determined by power measurements according to the number component carriers(CCs) supported by test product implementation. For those configurations required by April 2018 TCBC Workshop notes, conducted power measurements with LTE Carrier Aggregation(CA) (downlink only) active are made in accordance to KDB Publication 941225 D05Av01r02. The RRC connection is only handled by one cell, the primary component carrier (PCC) for downlink and uplink communications. After making a data connection to the PCC, the UE device adds secondary component carrier(s)(SCC) on the downlink only.

Downlink Carrier aggregation:

1. This device only supports downlink carrier aggregation. For every supported combination of downlink carrier aggregation, power measurements were performed with the downlink carrier aggregation active for the configuration with highest measured maximum conducted power with downlink carrier aggregation inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band.
2. All control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.
3. Per FCC KDB publication 941225 D05A v01r02, Section C)3)b)ii), PCC uplink channel was selected at downlink carrier aggregation combinations. The downlink PCC channel was paired with the selected PCC uplink channel according to normal configurations without carrier aggregation.
4. For continuous intra-band carrier aggregation, the downlink channel spacing between the component carriers was set to multiple of 300kHz less than the nominal channel spacing defined in section 5.4.1A of 3GPP TS 36.521.
5. For non-continuous intra-band carrier aggregation, the downlink channel spacing between the component carriers was set to be larger than the nominal channel spacing and provided maximum separation between the component carriers.
6. All selected downlink channels remained fully within the downlink transmission band of the respective component carrier.

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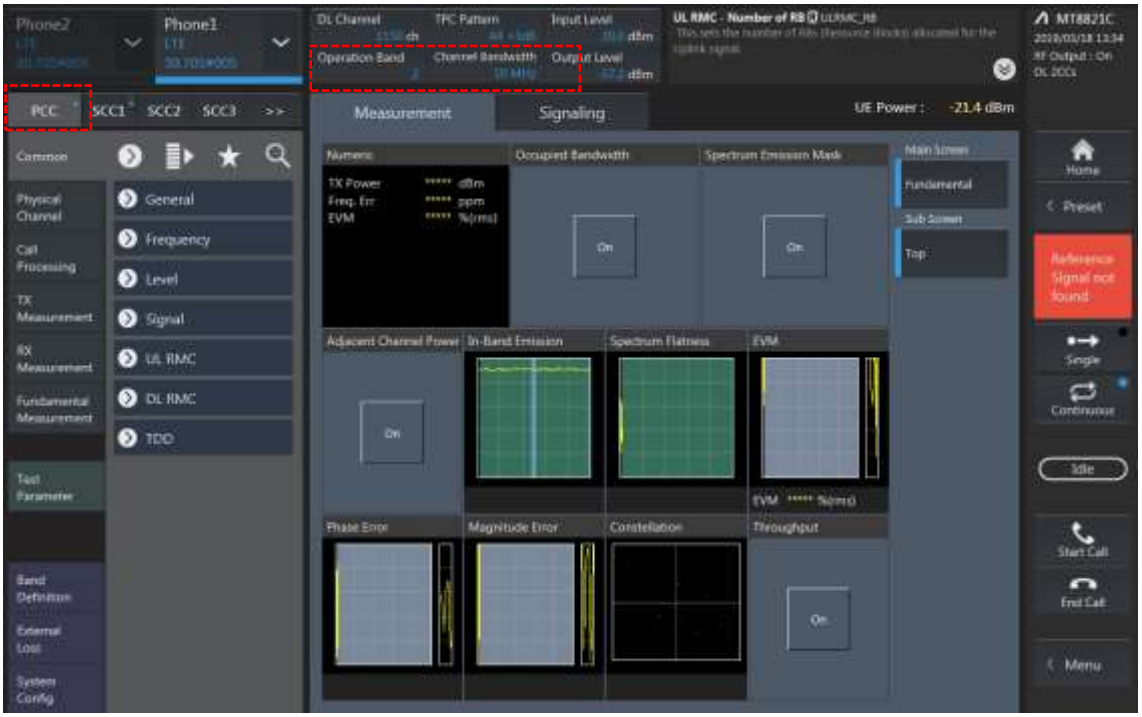
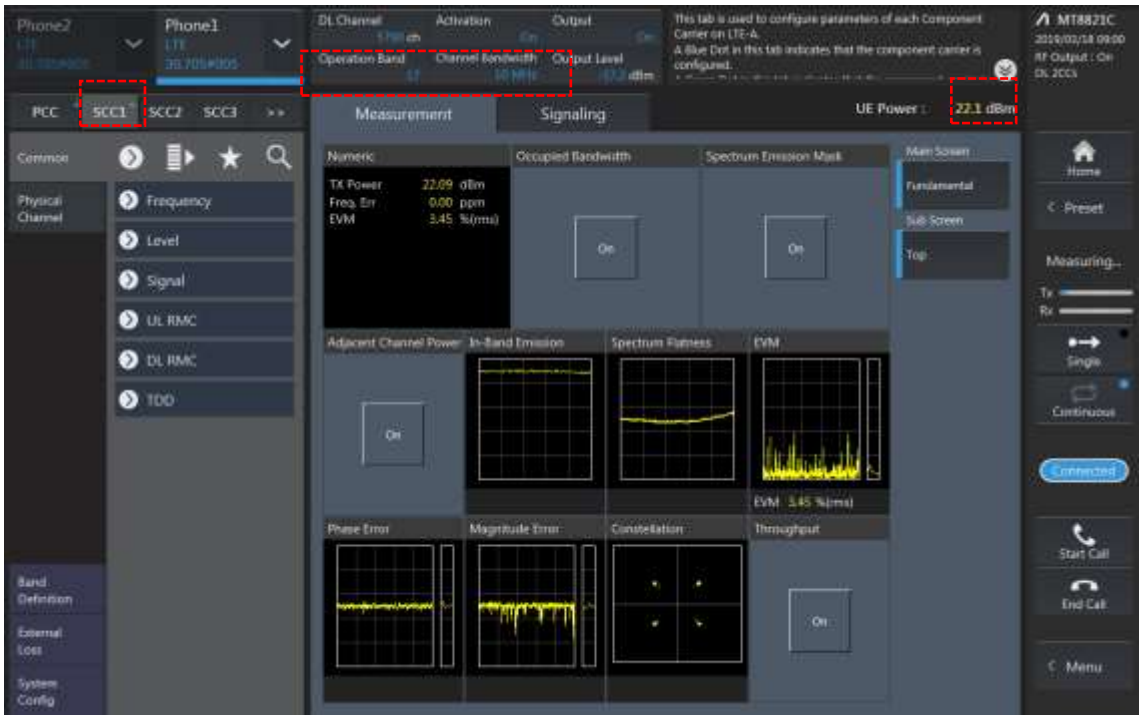
Power Measurement setup

LTE Down Link 2CA Call Setup

PCC Setting : Channel/ RB/ BW/ Modulation



SCC Setting : Channel/ RB/ BW/ Modulation and call Connection

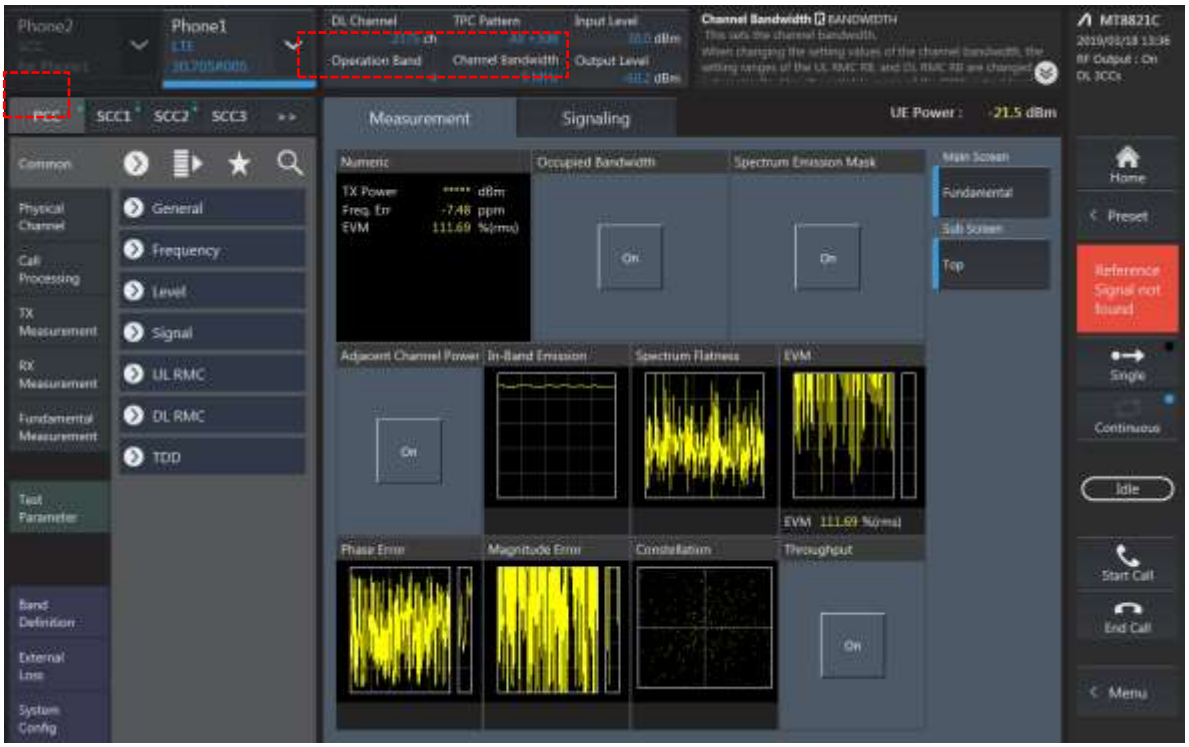


2CA Downlink Carrier aggregation Maximum conducted Powers

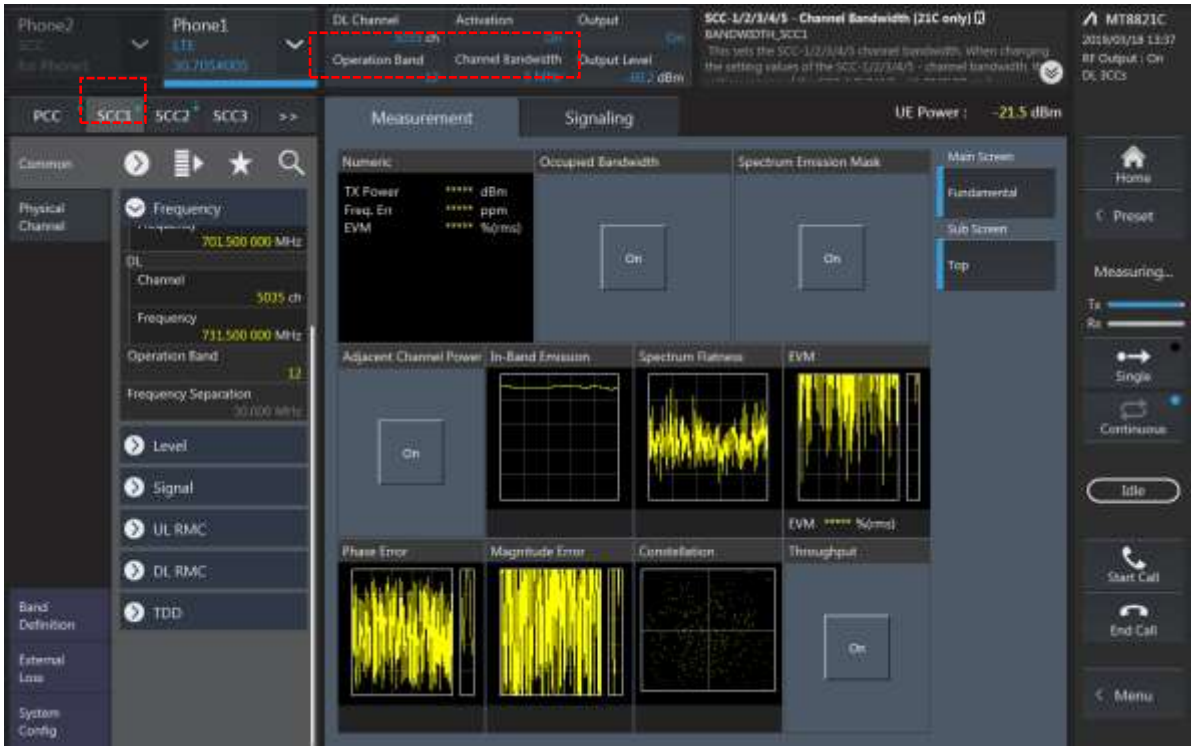
Combination	PCC									SCC				Tx Power		
	Band	BW	PCC UL Channel	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Channel	SCC DL Frequency	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with DL CA Enabled(dBm)	Deviation
4A-13A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	13	10	5230	751	24.45	24.43	-0.02
4A-13A	13	10	23230	782	5230	751	QPSK	1	0	4	20	2175	2132.5	24.26	24.18	-0.08
5A-25A	5	5	20425	826.5	2425	871.5	QPSK	1	12	25	20	8365	1962.5	24.19	24.05	-0.14
5A-25A	25	15	26365	1882.5	8365	1962.5	QPSK	1	36	5	10	2525	881.5	24.45	24.33	-0.12
5A-38A	5	5	20425	826.5	2425	871.5	QPSK	1	12	38	20	38000	2595	24.19	24.09	-0.10
12A-25A	12	5	23155	713.5	5155	743.5	QPSK	1	24	25	20	8365	1962.5	24.45	24.35	-0.10
12A-25A	25	15	26365	1882.5	8365	1962.5	QPSK	1	36	12	10	5095	737.5	24.45	24.32	-0.13

LTE Down Link 3CA Call Setup

1) PCC Setting: Channel /RB/BW/Modulation



2) SCC1 Setting : Channel /RB/BW/Modulation



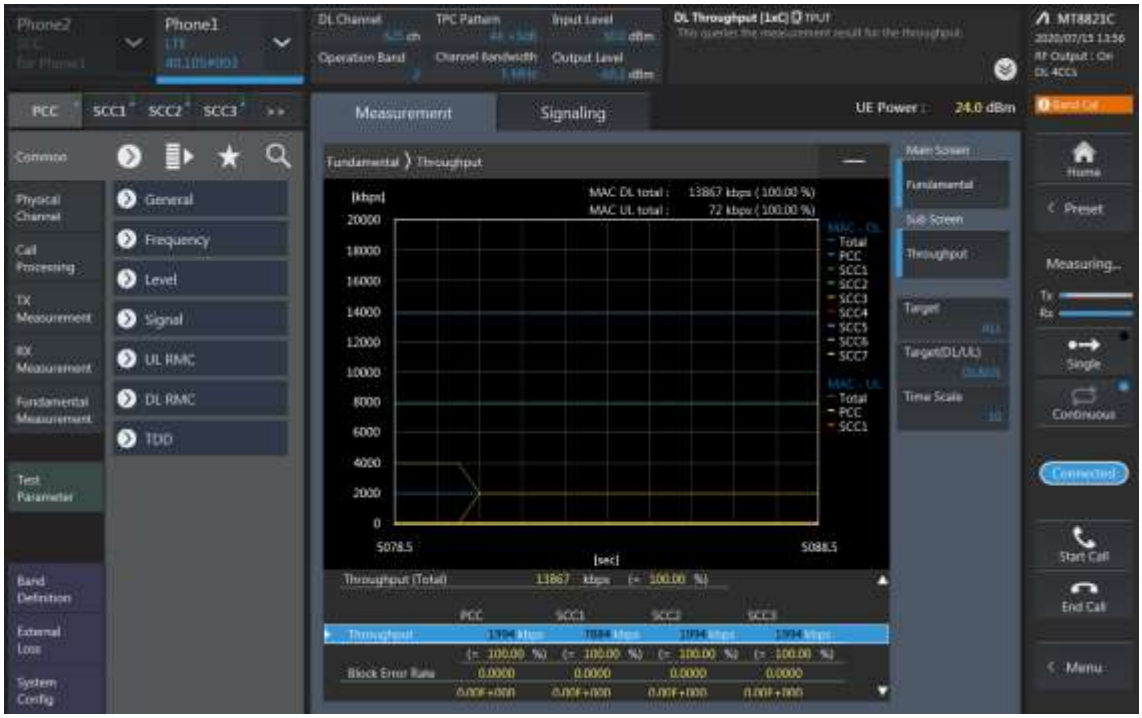
3) SCC2 Setting (Channel /RB/BW/Modulation)and call Connection

3CA Downlink Carrier aggregation Maximum conducted Powers

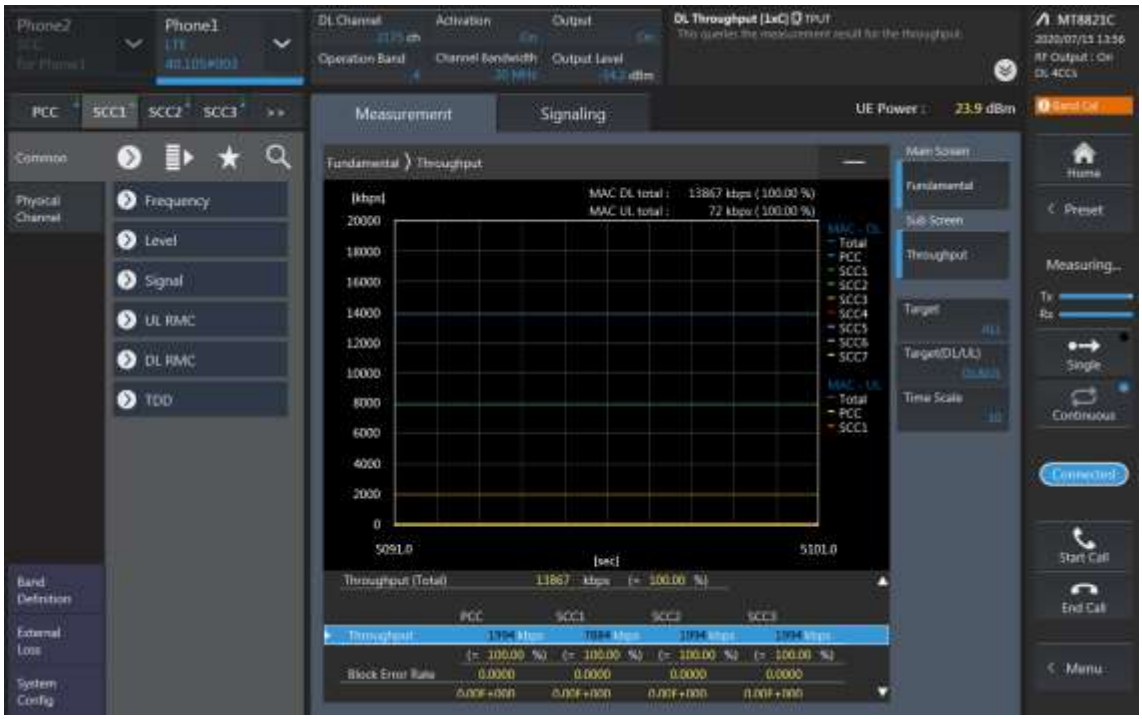
Combination	PCC									SCC				SCC				Tx Power		
	Band	BW	PCC UL Channel	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Channel	SCC DL Frequency	Band	BW	SCC DL Channel	SCC DL Frequency	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with DL CA Enabled(dBm)	Deviation
2A-4A-13A	2	5	18900	1880	900	1960	QPSK	1	12	4	20	2175	2132.5	13	10	5230	751	24.4	24.23	-0.17
2A-4A-13A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	2	20	900	1960	13	10	5230	751	24.42	24.45	0.03
2A-4A-13A	13	10	23230	782	5230	751	QPSK	1	0	2	20	900	1960	4	20	2175	2132.5	24.26	24.37	0.11
4A-4A-13A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	13	10	5230	751	24.42	24.36	-0.06
4A-4A-13A	13	10	23230	782	5230	751	QPSK	1	0	4	20	2175	2132.5	4	10	2000	2115	24.26	24.33	0.07
2A-29A-66A	2	5	18900	1880	900	1960	QPSK	1	12	29	10	9715	722.5	66	20	66786	2145	24.4	24.43	0.03
2A-29A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	29	10	9715	722.5	24.45	24.40	-0.05
4A-4A-71A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	71	20	68761	634.5	24.42	24.39	-0.03
4A-4A-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	4	20	2175	2132.5	4	10	2000	2115	24.22	24.19	-0.03
12A-66C	12	5	23155	713.5	5155	743.5	QPSK	1	24	66	20	66786	2145	66	20	66984	2164.8	24.45	24.35	-0.10
12A-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66903	2156.7	5	10	2525	881.5	24.45	24.25	-0.20
13A-66A-66A	13	10	23230	782	5230	751	QPSK	1	0	66	20	66786	2145	66	20	67236	2190	24.26	24.32	0.06
13A-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	13	10	5230	751	24.45	24.53	0.08
25A-25A-26A	25	15	26365	1882.5	8365	1962.5	QPSK	1	36	25	20	8590	1985	26	5	8865	876.5	24.45	24.35	-0.10
25A-25A-26A	26	5	26715	816.5	8715	861.5	QPSK	1	0	25	20	8365	1962.5	25	20	8590	1985	24.24	24.18	-0.06
48A-48A-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	48	20	55990	3625	48	20	56640	3690	24.22	24.11	-0.11
48C-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	48	20	55990	3625	48	20	56188	3644.8	24.22	24.25	0.03
66A-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66786	2145	66	20	66984	2164.8	24.45	24.52	0.07
66A-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66903	2156.7	66	20	67236	2190	24.45	24.55	0.10
66A-66A-71A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	71	20	68761	634.5	24.45	24.52	0.07
66A-66A-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	66	20	66786	2145	66	20	67236	2190	24.22	24.31	0.09
66C-71A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66903	2156.7	71	20	68761	634.5	24.45	24.35	-0.10
66C-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	66	20	66786	2145	66	20	66984	2164.8	24.22	24.37	0.15

LTE Down Link 4CA Call Setup

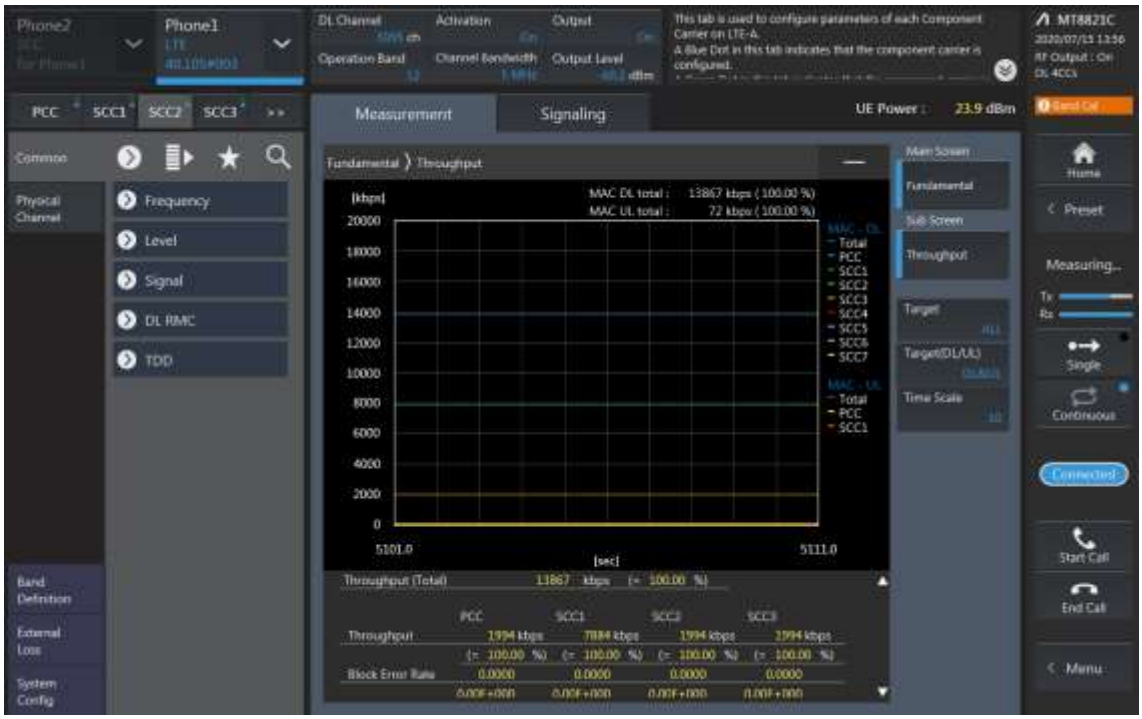
PCC Setting: Channel /RB/BW/Modulation



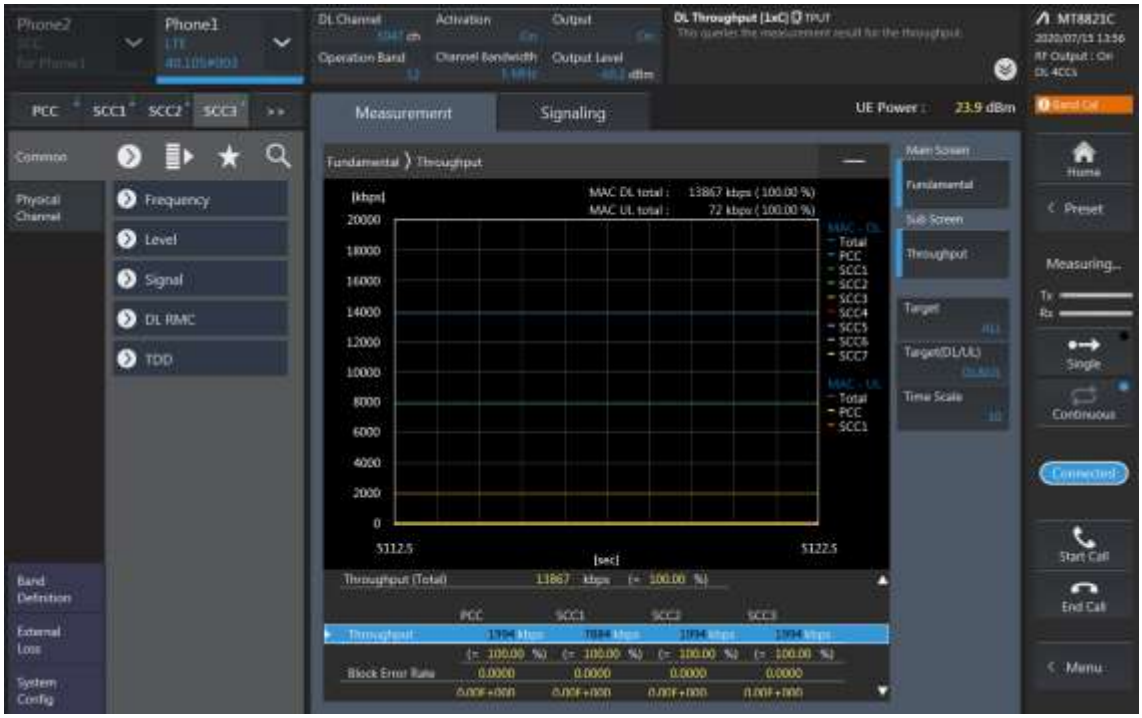
SCC1 Setting (Channel /RB/BW/Modulation)and call Connection



SCC2 Setting (Channel /RB/BW/Modulation)and call Connection



SCC3 Setting (Channel /RB/BW/Modulation)and call Connection



4CA Downlink Carrier aggregation Maximum conducted Powers

Combination	PCC									SCC				SCC				SCC				Tx Power		Deviation
	Band	BW	PCC UL Channel	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Channel	SCC DL Frequency	Band	BW	SCC DL Channel	SCC DL Frequency	Band	BW	SCC DL Channel	SCC DL Frequency	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with DL CA Enabled(dBm)	
2A-2A-4A-4A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	4	20	2175	2132.5	4	10	2000	2115	24.4	24.31	-0.09
2A-2A-4A-4A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	2	20	900	1960	2	20	1100	1980	24.42	24.31	-0.11
2A-2A-4A-5A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	4	20	2175	2132.5	5	10	2525	881.5	24.4	24.34	-0.06
2A-2A-4A-5A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	5	10	2525	881.5	24.42	24.38	-0.04
2A-2A-4A-5A	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	4	20	2175	2132.5	24.19	24.09	-0.1
2A-2A-4A-12A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	4	20	2175	2132.5	12	10	5095	737.5	24.4	24.37	-0.03
2A-2A-4A-12A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	12	10	5095	737.5	24.42	24.29	-0.13
2A-2A-4A-12A	12	5	23155	713.5	5155	743.5	QPSK	1	24	2	20	900	1960	2	20	1100	1980	4	20	2175	2132.5	24.45	24.36	-0.09
2A-2A-4A-71A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	4	20	2175	2132.5	71	20	68761	634.5	24.4	24.28	-0.12
2A-2A-4A-71A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	71	20	68761	634.5	24.42	24.31	-0.11
2A-2A-4A-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	2	20	900	1960	2	20	1100	1980	4	20	2175	2132.5	24.22	24.19	-0.03
2A-2A-5B	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	5	10	2525	881.5	5	5	2453	874.3	24.4	24.41	0.01
2A-2A-5B	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	2	20	900	1960	2	20	1100	1980	24.19	24.31	0.12
2A-2A-5A-30A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	5	10	2525	881.5	30	10	9820	2355	24.4	24.45	0.05
2A-2A-5A-30A	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	30	10	9820	2355	24.19	24.31	0.12
2A-2A-5A-30A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	2	20	900	1960	2	20	1100	1980	5	10	2525	881.5	24.18	24.25	0.07
2A-2A-5A-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	5	10	2525	881.5	66	20	66786	2145	24.4	24.24	-0.16
2A-2A-5A-66A	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	66	20	66786	2145	24.19	24.31	0.12
2A-2A-5A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	5	10	2525	881.5	24.45	24.41	-0.04
2A-2A-12A-30A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	12	10	5095	737.5	30	10	9820	2355	24.4	24.41	0.01
2A-2A-12A-30A	12	5	23155	713.5	5155	743.5	QPSK	1	24	2	20	900	1960	2	20	1100	1980	30	10	9820	2355	24.45	24.37	-0.08
2A-2A-12A-30A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	2	20	900	1960	2	20	1100	1980	12	10	5095	737.5	24.18	24.21	0.03
2A-2A-12A-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	12	10	5095	737.5	66	20	66786	2145	24.4	24.38	-0.02
2A-2A-12A-66A	12	5	23155	713.5	5155	743.5	QPSK	1	24	2	20	900	1960	2	20	1100	1980	66	20	66786	2145	24.45	24.54	0.09
2A-2A-12A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	12	10	5095	737.5	24.45	24.41	-0.04
2A-2A-12B	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	12	5	5095	737.5	12	5	5047	732.7	24.4	24.37	-0.03
2A-2A-12B	12	5	23155	713.5	5155	743.5	QPSK	1	24	12	5	5107	763.3	2	20	900	1960	2	20	1100	1980	24.45	24.38	-0.07
2A-2A-13A-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	13	10	5230	751	66	20	66786	2145	24.4	24.41	0.01
2A-2A-13A-66A	13	10	23230	782	5230	751	QPSK	1	0	2	20	900	1960	2	20	1100	1980	66	20	66786	2145	24.26	24.32	0.06
2A-2A-13A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	13	10	5230	751	24.45	24.32	-0.13
2A-2A-14A-30A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	14	10	5330	763	30	10	9820	2355	24.4	24.12	-0.28
2A-2A-14A-30A	14	10	23330	793	5330	763	QPSK	1	0	2	20	900	1960	2	20	1100	1980	30	10	9820	2355	24.07	24.15	0.08
2A-2A-14A-30A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	2	20	900	1960	2	20	1100	1980	14	10	5330	763	24.18	24.15	-0.03
2A-2A-14A-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	14	10	5330	763	66	20	66786	2145	24.4	24.38	-0.02
2A-2A-14A-66A	14	10	23330	793	5330	763	QPSK	1	0	2	20	900	1960	2	20	1100	1980	66	20	66786	2145	24.07	24.06	-0.01
2A-2A-14A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	14	10	5330	763	24.45	24.31	-0.14
2A-2A-29A-30A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	29	10	9715	722.5	30	10	9820	2355	24.4	24.29	-0.11
2A-2A-29A-30A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	2	20	900	1960	2	20	1100	1980	29	10	9715	722.5	24.18	24.15	-0.03
2A-2A-30A-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	30	10	9820	2355	66	20	66786	2145	24.4	24.42	0.02
2A-2A-30A-66A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	2	20	900	1960	2	20	1100	1980	66	20	66786	2145	24.18	24.31	0.13
2A-2A-30A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	30	10	9820	2355	24.45	24.37	-0.08
2A-2A-46C	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	46	20	50665	5537.5	46	20	50467	5517.7	24.4	24.35	-0.05
2A-2A-66A-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	66	20	66786	2145	66	20	67236	2190	24.4	24.34	-0.06
2A-2A-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	2	20	1100	1980	24.45	24.41	-0.04
2A-2A-66A-71A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	66	20	66786	2145	71	20	68761	634.5	24.4	24.39	-0.01
2A-2A-66A-71A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	71	20	68761	634.5	24.45	24.38	-0.07

Combination	PCC									SCC				SCC				SCC				Tx Power		Deviation
	Band	BW	PCC UL Channel	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Channel	SCC DL Frequency	Band	BW	SCC DL Channel	SCC DL Frequency	Band	BW	SCC DL Channel	SCC DL Frequency	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with DL CA Enabled(dBm)	
2A-2A-66A-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	2	20	900	1960	2	20	1100	1980	66	20	66786	2145	24.22	24.18	-0.04
2A-2A-66B	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	66	15	66786	2145	66	5	66879	2154.3	24.4	24.21	-0.19
2A-2A-66B	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	15	66554	2121.8	2	20	900	1960	2	20	1100	1980	24.45	24.34	-0.11
2A-2A-66C	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	66	20	66786	2145	66	20	66984	2164.8	24.4	24.29	-0.11
2A-2A-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	2	20	900	1960	2	20	1100	1980	24.45	24.32	-0.13
2A-4A-4A-5A	2	5	18900	1880	900	1960	QPSK	1	12	4	20	2175	2132.5	4	10	2000	2115	5	10	2525	881.5	24.4	24.33	-0.07
2A-4A-4A-5A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	2	20	900	1960	5	10	2525	881.5	24.42	24.47	0.05
2A-4A-4A-5A	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	4	20	2175	2132.5	4	10	2000	2115	24.19	24.13	-0.06
2A-4A-4A-12A	2	5	18900	1880	900	1960	QPSK	1	12	4	20	2175	2132.5	4	10	2000	2115	12	10	5095	737.5	24.4	24.32	-0.08
2A-4A-4A-12A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	2	20	900	1960	12	10	5095	737.5	24.42	24.46	0.04
2A-4A-5B	2	5	18900	1880	900	1960	QPSK	1	12	4	20	2175	2132.5	5	10	2525	881.5	5	5	2453	874.3	24.4	24.41	0.01
2A-4A-5B	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	2	20	900	1960	5	10	2525	881.5	5	5	2453	874.3	24.42	24.41	-0.01
2A-4A-5B	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	2	20	900	1960	4	20	2175	2132.5	24.19	24.15	-0.04
2A-4A-12B	2	5	18900	1880	900	1960	QPSK	1	12	4	20	2175	2132.5	12	5	5095	737.5	12	5	5047	732.7	24.4	24.32	-0.08
2A-4A-12B	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	2	20	900	1960	12	5	5095	737.5	12	5	5047	732.7	24.42	24.49	0.07
2A-5B-30A	2	5	18900	1880	900	1960	QPSK	1	12	5	10	2525	881.5	5	5	2453	874.3	30	10	9820	2355	24.4	24.32	-0.08
2A-5B-30A	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	2	20	900	1960	30	10	9820	2355	24.19	24.25	0.06
2A-5B-30A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	2	20	900	1960	5	10	2525	881.5	5	5	2453	874.3	24.18	24.31	0.13
2A-5A-46C	2	5	18900	1880	900	1960	QPSK	1	12	5	10	2525	881.5	46	20	50665	5537.5	46	20	50467	5517.7	24.4	24.12	-0.28
2A-5A-46C	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	46	20	50665	5537.5	46	20	50467	5517.7	24.19	24.21	0.02
2A-5A-48C	2	5	18900	1880	900	1960	QPSK	1	12	5	10	2525	881.5	48	20	55990	3625	48	20	56188	3644.8	24.4	24.35	-0.05
2A-5A-48C	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	48	20	55990	3625	48	20	56188	3644.8	24.19	24.15	-0.04
2A-5A-66A-66A	2	5	18900	1880	900	1960	QPSK	1	12	5	10	2525	881.5	66	20	66786	2145	66	20	67236	2190	24.4	24.34	-0.06
2A-5A-66A-66A	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	66	20	66786	2145	66	20	67236	2190	24.19	24.12	-0.07
2A-5A-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	5	10	2525	881.5	24.45	24.35	-0.1
2A-5A-66B	2	5	18900	1880	900	1960	QPSK	1	12	5	10	2525	881.5	66	15	66693	2145	66	5	66879	2154.3	24.4	24.41	0.01
2A-5A-66B	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	66	15	66693	2145	66	5	66879	2154.3	24.19	24.33	0.14
2A-5A-66B	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	15	66554	2121.8	2	20	900	1960	5	10	2525	881.5	24.45	24.46	0.01
2A-5A-66C	2	5	18900	1880	900	1960	QPSK	1	12	5	10	2525	881.5	66	20	66588	2145	66	20	66984	2164.8	24.4	24.37	-0.03
2A-5A-66C	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	66	20	66588	2145	66	20	66984	2164.8	24.19	24.06	-0.13
2A-5A-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	2	20	900	1960	5	10	2525	881.5	24.45	24.51	0.06
2A-5B-66A	2	5	18900	1880	900	1960	QPSK	1	12	5	10	2525	881.5	5	5	2453	874.3	66	20	66786	2145	24.4	24.38	-0.02
2A-5B-66A	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	2	20	900	1960	66	20	66786	2145	24.19	24.25	0.06
2A-5B-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	5	10	2525	881.5	5	5	2453	874.3	24.45	24.34	-0.11
2A-7A-12B	2	5	18900	1880	900	1960	QPSK	1	12	7	20	3100	2655	12	5	5095	737.5	12	10	5167	744.7	24.4	24.45	0.05
2A-7A-12B	7	10	21400	2565	3400	2685	QPSK	1	0	2	20	900	1960	12	5	5095	737.5	12	10	5167	744.7	24.3	24.32	0.02
2A-7A-12B	12	5	23155	713.5	5155	743.5	QPSK	1	24	12	10	5083	736.3	2	20	900	1960	7	20	3100	2655	24.45	24.51	0.06
2A-7A-46C	2	5	18900	1880	900	1960	QPSK	1	12	7	20	3100	2655	46	20	50690	5540	46	20	50888	5559.8	24.4	24.42	0.02
2A-7A-46C	7	10	21400	2565	3400	2685	QPSK	1	0	2	20	900	1960	46	20	50690	5540	46	20	50888	5559.8	24.3	24.33	0.03
2A-7A-66A-66A	2	5	18900	1880	900	1960	QPSK	1	12	7	20	3100	2655	66	20	66786	2145	66	20	67236	2190	24.4	24.41	0.01
2A-7A-66A-66A	7	10	21400	2565	3400	2685	QPSK	1	0	2	20	900	1960	66	20	66786	2145	66	20	67236	2190	24.3	24.38	0.08
2A-7A-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	7	20	3100	2655	24.45	24.55	0.1
2A-12A-66A-66A	2	5	18900	1880	900	1960	QPSK	1	12	12	10	5095	737.5	66	20	66786	2145	66	20	67236	2190	24.4	24.51	0.11
2A-12A-66A-66A	12	5	23155	713.5	5155	743.5	QPSK	1	24	2	20	900	1960	66	20	66786	2145	66	20	67236	2190	24.45	24.53	0.08
2A-12A-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	12	10	5095	737.5	24.45	24.5	0.05
2A-12A-66C	2	5	18900	1880	900	1960	QPSK	1	12	12	10	5095	737.5	66	20	66786	2145	66	20	66984	2164.8	24.4	24.32	-0.08
2A-12A-66C	12	5	23155	713.5	5155	743.5	QPSK	1	24	2	20	900	1960	66	20	66786	2145	66	20	66984	2164.8	24.45	24.4	-0.05
2A-12A-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	2	20	900	1960	12	10	5095	737.5	24.45	24.37	-0.08

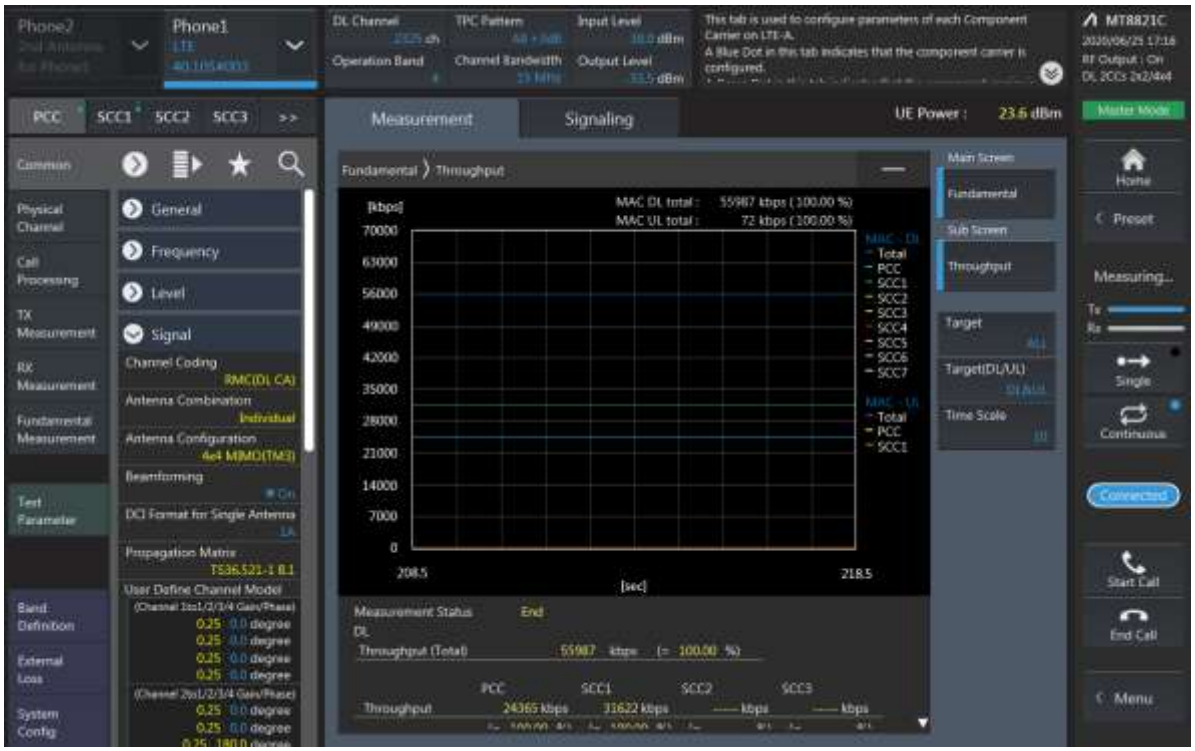
Combination	PCC									SCC				SCC				SCC				Tx Power		Deviation
	Band	BW	PCC UL Channel	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Channel	SCC DL Frequency	Band	BW	SCC DL Channel	SCC DL Frequency	Band	BW	SCC DL Channel	SCC DL Frequency	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with DL CA Enabled(dBm)	
2A-12B-66A	2	5	18900	1880	900	1960	QPSK	1	12	12	5	5095	737.5	12	10	5167	744.7	66	20	66786	2145	24.4	24.51	0.11
2A-12B-66A	12	5	23155	713.5	5155	743.5	QPSK	1	24	12	10	5083	736.3	2	20	900	1960	66	20	66786	2145	24.45	24.6	0.15
2A-12B-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	12	5	5095	737.5	12	10	5167	744.7	24.45	24.55	0.1
2A-13A-46C	2	5	18900	1880	900	1960	QPSK	1	12	13	10	5230	751	46	20	50690	5540	46	20	50888	5559.8	24.4	24.35	-0.05
2A-13A-46C	13	10	23230	782	5230	751	QPSK	1	0	2	20	900	1960	46	20	50690	5540	46	20	50888	5559.8	24.26	24.13	-0.13
2A-13A-48C	2	5	18900	1880	900	1960	QPSK	1	12	13	10	5230	751	48	20	56207	3646.7	48	20	56405	3666.5	24.4	24.35	-0.05
2A-13A-48C	13	10	23230	782	5230	751	QPSK	1	0	2	20	900	1960	48	20	56207	3646.7	48	20	56405	3666.5	24.26	24.21	-0.05
2A-13A-66A-66A	2	5	18900	1880	900	1960	QPSK	1	12	13	10	5230	751	66	20	66786	2145	66	20	67236	2190	24.4	24.38	-0.02
2A-13A-66A-66A	13	10	23230	782	5230	751	QPSK	1	0	2	20	900	1960	66	20	66786	2145	66	20	67236	2190	24.26	24.37	0.11
2A-13A-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	13	10	5230	751	24.45	24.43	-0.02
2A-13A-66B	2	5	18900	1880	900	1960	QPSK	1	12	13	10	5230	751	66	15	66693	2145	66	5	66879	2154.3	24.4	24.32	-0.08
2A-13A-66B	13	10	23230	782	5230	751	QPSK	1	0	2	20	900	1960	66	15	66693	2145	66	5	66879	2154.3	24.26	24.35	0.09
2A-13A-66B	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	15	66554	2121.8	2	20	900	1960	13	10	5230	751	24.45	24.41	-0.04
2A-13A-66C	2	5	18900	1880	900	1960	QPSK	1	12	13	10	5230	751	66	20	66786	2145	66	20	66984	2164.8	24.4	24.28	-0.12
2A-13A-66C	13	10	23230	782	5230	751	QPSK	1	0	2	20	900	1960	66	20	66786	2145	66	20	66984	2164.8	24.26	24.07	-0.19
2A-13A-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	2	20	900	1960	13	10	5230	751	24.45	24.42	-0.03
2A-14A-66A-66A	2	5	18900	1880	900	1960	QPSK	1	12	14	10	5330	763	66	20	66786	2145	66	20	67236	2190	24.4	24.43	0.03
2A-14A-66A-66A	14	10	23330	793	5330	763	QPSK	1	0	2	20	900	1960	66	20	66786	2145	66	20	67236	2190	24.07	24.17	0.1
2A-14A-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	14	10	5330	763	24.45	24.46	0.01
2A-30A-66A-66A	2	5	18900	1880	900	1960	QPSK	1	12	30	10	9820	2355	66	20	66786	2145	66	20	67236	2190	24.4	24.41	0.01
2A-30A-66A-66A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	2	20	900	1960	66	20	66786	2145	66	20	67236	2190	24.18	24.23	0.05
2A-30A-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	30	10	9820	2355	24.45	24.41	-0.04
2A-46A-46C	2	5	18900	1880	900	1960	QPSK	1	12	46	20	50665	5537.5	46	20	50467	5517.7	46	20	53540	5825	24.4	24.25	-0.15
2A-46A-48C	2	5	18900	1880	900	1960	QPSK	1	12	46	20	50690	5540	48	20	56207	3646.7	48	20	56405	3666.5	24.4	24.35	-0.05
2A-46C-48A	2	5	18900	1880	900	1960	QPSK	1	12	46	20	50690	5540	46	20	50888	5559.8	48	20	56207	3646.7	24.4	24.41	0.01
2A-46C-66A	2	5	18900	1880	900	1960	QPSK	1	12	46	20	50690	5540	46	20	50888	5559.8	66	20	66786	2145	24.4	24.45	0.05
2A-46C-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	46	20	50690	5540	46	20	50888	5559.8	24.45	24.37	-0.08
2A-46D	2	5	18900	1880	900	1960	QPSK	1	12	46	20	50665	5537.5	46	20	50467	5517.7	46	20	50863	5557.3	24.4	24.44	0.04
2A-48A-48C	2	5	18900	1880	900	1960	QPSK	1	12	48	20	56207	3646.7	48	20	55340	3560	48	20	55538	3579.8	24.4	24.32	-0.08
2A-48C-66A	2	5	18900	1880	900	1960	QPSK	1	12	48	20	56207	3646.7	48	20	56405	3666.5	66	20	66786	2145	24.4	24.36	-0.04
2A-48C-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	48	20	56207	3646.7	48	20	56405	3666.5	24.45	24.4	-0.05
2A-48D	2	5	18900	1880	900	1960	QPSK	1	12	48	20	56207	3646.7	48	20	56009	3626.9	48	20	56405	3666.5	24.4	24.42	0.02
2A-66A-66A-71A	2	5	18900	1880	900	1960	QPSK	1	12	66	20	66786	2145	66	20	67236	2190	71	20	68761	634.5	24.4	24.33	-0.07
2A-66A-66A-71A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	71	20	68761	634.5	24.45	24.49	0.04
2A-66A-66A-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	2	20	900	1960	66	20	66786	2145	66	20	67236	2190	24.22	24.12	-0.1
2C-66A-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1017	1971.7	66	20	66786	2145	66	20	67236	2190	24.4	24.29	-0.11
2C-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	2	20	1098	1979.8	24.45	24.43	-0.02
2A-66C-71A	2	5	18900	1880	900	1960	QPSK	1	12	66	20	66786	2145	66	20	66984	2164.8	71	20	68761	634.5	24.4	24.34	-0.06
2A-66C-71A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	2	20	900	1960	71	20	68761	634.5	24.45	24.51	0.06
2A-66C-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	2	20	900	1960	66	20	66786	2145	66	20	66984	2164.8	24.22	24.22	0
4A-4A-5B	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	5	10	2525	881.5	5	5	2453	874.3	24.42	24.35	-0.07
4A-4A-5B	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	4	20	2175	2132.5	4	10	2000	2115	24.19	24.1	-0.09
4A-4A-12B	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	12	5	5095	737.5	12	5	5047	732.7	24.42	24.39	-0.03
4A-46A-46C	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	46	20	50665	5537.5	46	20	50467	5517.7	46	20	53540	5825	24.42	24.35	-0.07
4A-46D	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	46	20	50665	5537.5	46	20	50467	5517.7	46	20	50863	5557.3	24.42	24.41	-0.01
4A-48D	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	48	20	55792	3605.2	48	20	55990	3625	48	20	56188	3644.8	24.42	24.48	0.06
5A-5A-66A-66A	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2600	889	66	20	66786	2145	66	20	67236	2190	24.19	24.32	0.13
5A-5A-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	5	10	2525	881.5	5	5	2425	871.5	24.45	24.41	-0.04

Combination	PCC									SCC				SCC				SCC				Tx Power		Deviation
	Band	BW	PCC UL Channel	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Channel	SCC DL Frequency	Band	BW	SCC DL Channel	SCC DL Frequency	Band	BW	SCC DL Channel	SCC DL Frequency	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with DL CA Enabled(dBm)	
5A-5A-66B	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2600	889	66	15	66693	2145	66	5	66879	2154.3	24.19	24.31	0.12
5A-5A-66B	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	15	66554	2121.8	5	10	2525	881.5	5	5	2425	871.5	24.45	24.37	-0.08
5A-5A-66C	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2600	889	66	20	66786	2145	66	20	66984	2164.8	24.19	24.05	-0.14
5A-5A-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	5	10	2525	881.5	5	5	2453	874.3	24.45	24.53	0.08
5A-30A-66A-66A	5	5	20425	826.5	2425	871.5	QPSK	1	12	30	10	9820	2355	66	20	66786	2145	66	20	67236	2190	24.19	24.31	0.12
5A-30A-66A-66A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	5	10	2525	881.5	66	20	66786	2145	66	20	67236	2190	24.18	24.25	0.07
5A-30A-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	5	10	2525	881.5	30	10	9820	2355	24.45	24.37	-0.08
5B-30A-66A	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	30	10	9820	2355	66	20	66786	2145	24.19	24.18	-0.01
5B-30A-66A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	5	10	2525	881.5	5	5	2453	874.3	66	20	66786	2145	24.18	24.22	0.04
5B-30A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	5	10	2525	881.5	5	5	2453	874.3	30	10	9820	2355	24.45	24.51	0.06
5A-46C-66A	5	5	20425	826.5	2425	871.5	QPSK	1	12	46	20	50690	5540	46	20	50888	5559.8	66	20	66786	2145	24.19	24.31	0.12
5A-46C-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	5	10	2525	881.5	46	20	50690	5540	46	20	50888	5559.8	24.45	24.37	-0.08
5B-46C	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	46	20	50690	5540	46	20	50888	5559.8	24.19	24.22	0.03
5A-46D	5	5	20425	826.5	2425	871.5	QPSK	1	12	46	20	50492	5520.2	46	20	50690	5540	46	20	50888	5559.8	24.19	24.18	-0.01
5A-48A-48C	5	5	20425	826.5	2425	871.5	QPSK	1	12	48	20	53340	3560	48	20	56640	3690	48	20	56442	3670.2	24.19	24.05	-0.14
5A-48C-66A	5	5	20425	826.5	2425	871.5	QPSK	1	12	48	20	55990	3625	48	20	56188	3644.8	66	20	66786	2145	24.19	24.2	0.01
5A-48C-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	5	10	2525	881.5	48	20	55990	3625	48	20	56188	3644.8	24.45	24.41	-0.04
5A-48D	5	5	20425	826.5	2425	871.5	QPSK	1	12	48	20	55792	3605.2	48	20	55990	3625	48	20	56188	3644.8	24.19	24.15	-0.04
5B-66A-66A	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	66	20	66786	2145	66	20	67236	2190	24.19	24.18	-0.01
5B-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	5	10	2525	881.5	5	5	2453	874.3	24.45	24.36	-0.09
5B-66B	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	66	15	66693	2145	66	5	66879	2154.3	24.19	24.17	-0.02
5B-66B	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	15	66554	2121.8	5	10	2525	881.5	5	5	2453	874.3	24.45	24.39	-0.06
5B-66C	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	66	20	66786	2145	66	20	66984	2164.8	24.19	24.18	-0.01
5B-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	5	10	2525	881.5	5	5	2453	874.3	24.45	24.46	0.01
12A-30A-66A-66A	12	5	23155	713.5	5155	743.5	QPSK	1	24	30	10	9820	2355	66	20	66786	2145	66	20	67236	2190	24.45	24.61	0.16
12A-30A-66A-66A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	12	10	5095	737.5	66	20	66786	2145	66	20	67236	2190	24.18	24.31	0.13
12A-30A-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	12	10	5095	737.5	30	10	9820	2355	24.45	24.37	-0.08
12A-46D	12	5	23155	713.5	5155	743.5	QPSK	1	24	46	20	50665	5537.5	46	20	50467	5517.7	46	20	50863	5557.3	24.45	24.41	-0.04
12B-66A-66A[IC]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	12	5	5095	737.5	12	5	5047	732.7	24.45	24.47	0.02
13A-46C-66A	13	10	23230	782	5230	751	QPSK	1	0	46	20	50690	5540	46	20	50888	5559.8	66	20	66786	2145	24.26	24.37	0.11
13A-46C-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	13	10	5230	751	46	20	50690	5540	46	20	50888	5559.8	24.45	24.57	0.12
13A-46D	13	10	23230	782	5230	751	QPSK	1	0	46	20	50492	5520.2	46	20	50690	5540	46	20	50888	5559.8	24.26	24.35	0.09
13A-48A-48C	13	10	23230	782	5230	751	QPSK	1	0	48	20	53340	3560	48	20	56640	3690	48	20	56442	3670.2	24.26	24.2	-0.06
13A-48C-66A	13	10	23230	782	5230	751	QPSK	1	0	48	20	55990	3625	48	20	56188	3644.8	66	20	66786	2145	24.26	24.23	-0.03
13A-48C-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	13	10	5230	751	48	20	55990	3625	48	20	56188	3644.8	24.45	24.38	-0.07
13A-48A-66B	13	10	23230	782	5230	751	QPSK	1	0	48	20	55990	3625	66	15	66786	2145	66	5	66879	2154.3	24.26	24.36	0.1
13A-48A-66B	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	15	66554	2121.8	13	10	5230	751	48	20	55990	3625	24.45	24.37	-0.08
13A-48A-66C	13	10	23230	782	5230	751	QPSK	1	0	48	20	55990	3625	66	20	66786	2145	66	20	66984	2164.8	24.26	24.31	0.05
13A-48A-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	13	10	5230	751	48	20	55990	3625	24.45	24.61	0.16
13A-48D	13	10	23230	782	5230	751	QPSK	1	0	48	20	55792	3605.2	48	20	55990	3625	48	20	56188	3644.8	24.26	24.35	0.09
14A-30A-66A-66A	14	10	23330	793	5330	763	QPSK	1	0	30	10	9820	2355	66	20	66786	2145	66	20	67236	2190	24.07	24.17	0.1
14A-30A-66A-66A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	14	10	5330	763	66	20	66786	2145	66	20	67236	2190	24.18	24.16	-0.02
14A-30A-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	14	10	5330	763	30	10	9820	2355	24.45	24.43	-0.02
25A-25A-41C	25	15	26365	1882.5	8365	1962.5	QPSK	1	36	25	20	8590	1985	41	20	40620	2593	41	20	40422	2573.2	24.35	24.3	-0.05
25A-26A-41C	25	15	26365	1882.5	8365	1962.5	QPSK	1	36	26	5	8865	876.5	41	20	40620	2593	41	20	40422	2573.2	24.45	24.19	-0.26
25A-26A-41C	26	5	26715	816.5	8715	861.5	QPSK	1	0	25	20	8365	1962.5	41	20	40620	2593	41	20	40422	2573.2	24.24	24.08	-0.16
25A-41D	25	15	26365	1882.5	8365	1962.5	QPSK	1	36	41	20	40422	2573.2	41	20	40620	2593	41	20	40818	2612.8	25.35	25.42	0.07
25A-46D	25	15	26365	1882.5	8365	1962.5	QPSK	1	36	46	20	50492	5520.2	46	20	50690	5540	46	20	50888	5559.8	24.45	24.35	-0.1

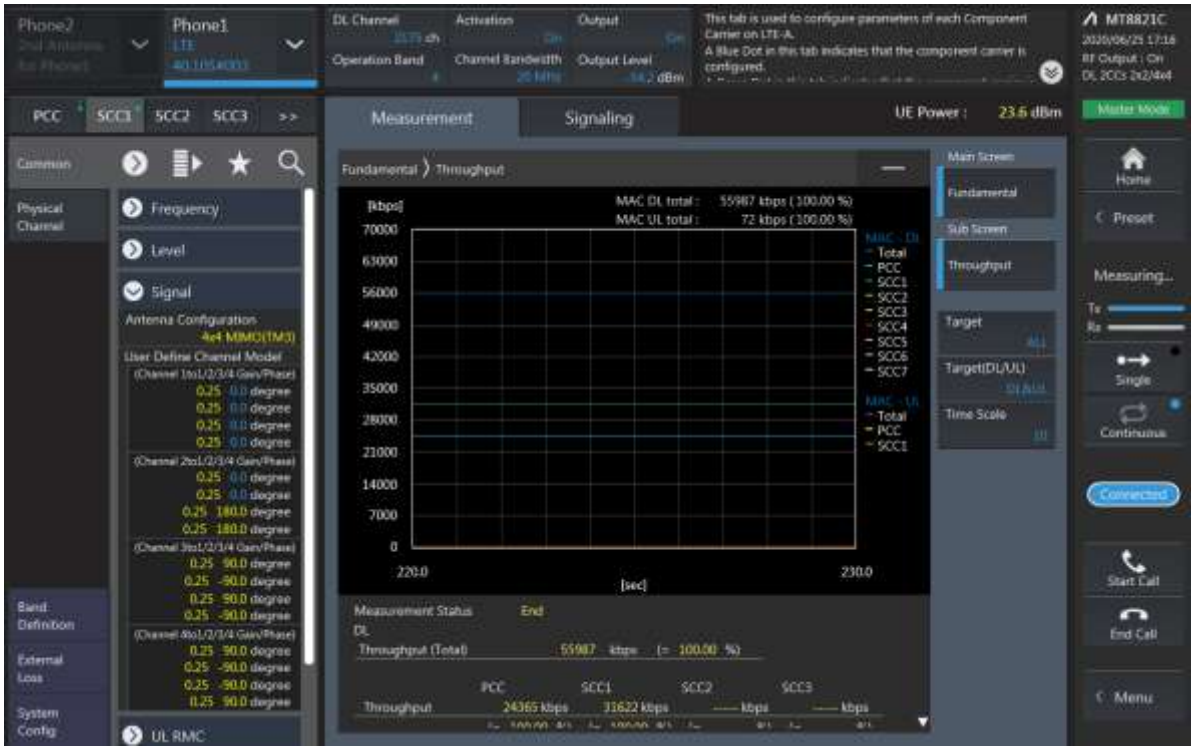
Combination	PCC									SCC				SCC				SCC				Tx Power		Deviation
	Band	BW	PCC UL Channel	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Channel	SCC DL Frequency	Band	BW	SCC DL Channel	SCC DL Frequency	Band	BW	SCC DL Channel	SCC DL Frequency	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with DL CA Enabled(dBm)	
29A-30A-66A-66A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	29	10	9715	722.5	66	20	66786	2145	66	20	67236	2190	24.18	24.09	-0.09
29A-30A-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	29	10	9715	722.5	30	10	9820	2355	24.45	24.38	-0.07
41A-41D[PC3]	41	15	40620	2593	40620	2593	QPSK	1	36	41	20	41094	2640.4	41	20	41292	2660.2	41	20	41490	2680	23.9	24.4	0.5
41A-41D[PC3]	41	15	40620	2593	40620	2593	QPSK	1	36	41	20	40422	2573.2	41	20	40224	2553.4	41	20	41490	2680	23.9	24.41	0.51
41A-41D[PC2]	41	15	40620	2593	40620	2593	QPSK	1	36	41	20	41094	2640.4	41	20	41292	2660.2	41	20	41490	2680	26.31	26.35	0.04
41A-41D[PC2]	41	15	40620	2593	40620	2593	QPSK	1	36	41	20	40422	2573.2	41	20	40224	2553.4	41	20	41490	2680	26.31	26.32	0.01
41C-41C[PC3]	41	15	40620	2593	40620	2593	QPSK	1	36	41	20	40791	2610.1	41	20	41292	2660.2	41	20	41490	2680	23.9	23.79	-0.11
41C-41C[PC2]	41	15	40620	2593	40620	2593	QPSK	1	36	41	20	40791	2610.1	41	20	41292	2660.2	41	20	41490	2680	26.31	26.25	-0.06
41E[PC3]	41	15	40620	2593	40620	2593	QPSK	1	36	41	20	40791	2610.1	41	20	40989	2629.9	41	20	41187	2649.7	23.9	23.72	-0.18
41E[PC2]	41	15	40620	2593	40620	2593	QPSK	1	36	41	20	40791	2610.1	41	20	40989	2629.9	41	20	41187	2649.7	26.31	26.25	-0.06
46A-46C-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	46	20	50665	5537.5	46	20	50467	5517.7	46	20	53540	5825	24.45	24.47	0.02
46A-48C-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	46	20	50690	5540	48	20	55990	3625	48	20	56188	3644.8	24.45	24.39	-0.06
46C-48A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	48	20	55990	3625	46	20	50690	5540	46	20	50888	5559.8	24.45	24.49	0.04
46C-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	46	20	50690	5540	46	20	50888	5559.8	24.45	24.39	-0.06
46D-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	46	20	50492	5520.2	46	20	50690	5540	46	20	50888	5559.8	24.45	24.44	-0.01
48A-48A-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	48	20	55990	3625	48	20	56640	3690	24.45	24.49	0.04
48A-48A-66B	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	48	20	55340	3560	48	20	56640	3690	24.45	24.48	0.03
48A-48A-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	48	20	55340	3560	48	20	56640	3690	24.45	24.51	0.06
48A-48C-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	48	20	53340	3560	48	20	56640	3690	48	20	56442	3670.2	24.45	24.41	-0.04
48A-48D	48	10	56690	3695	56690	3695	QPSK	1	49	48	20	55340	3579.8	48	20	55538	3599.6	48	20	55736	3619.4	21.93	22.1	0.17
48C-48C	48	10	56690	3695	56690	3695	QPSK	1	49	48	20	56546	3680.6	48	20	55340	3560	48	20	55538	3579.8	21.93	21.92	-0.01
48C-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	48	20	55990	3625	48	20	56188	3644.8	24.45	24.49	0.04
48D-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	48	20	55792	3605.2	48	20	55990	3625	48	20	56188	3644.8	24.45	24.41	-0.04
48C-66B	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	15	66554	2121.8	48	20	55990	3625	48	20	56188	3644.8	24.45	24.4	-0.05
48C-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	48	20	55990	3625	48	20	56188	3644.8	24.45	24.38	-0.07
48E	48	10	56690	3695	56690	3695	QPSK	1	49	48	20	56546	3680.6	48	20	56348	3660.8	48	20	56150	3641	21.93	21.99	0.06

LTE Down Link 2CA 4x4 MIMO Call Setup

PCC Setting : Channel/ RB/ BW/ Modulation



SCC Setting : Channel/ RB/ BW/ Modulation and call Connection

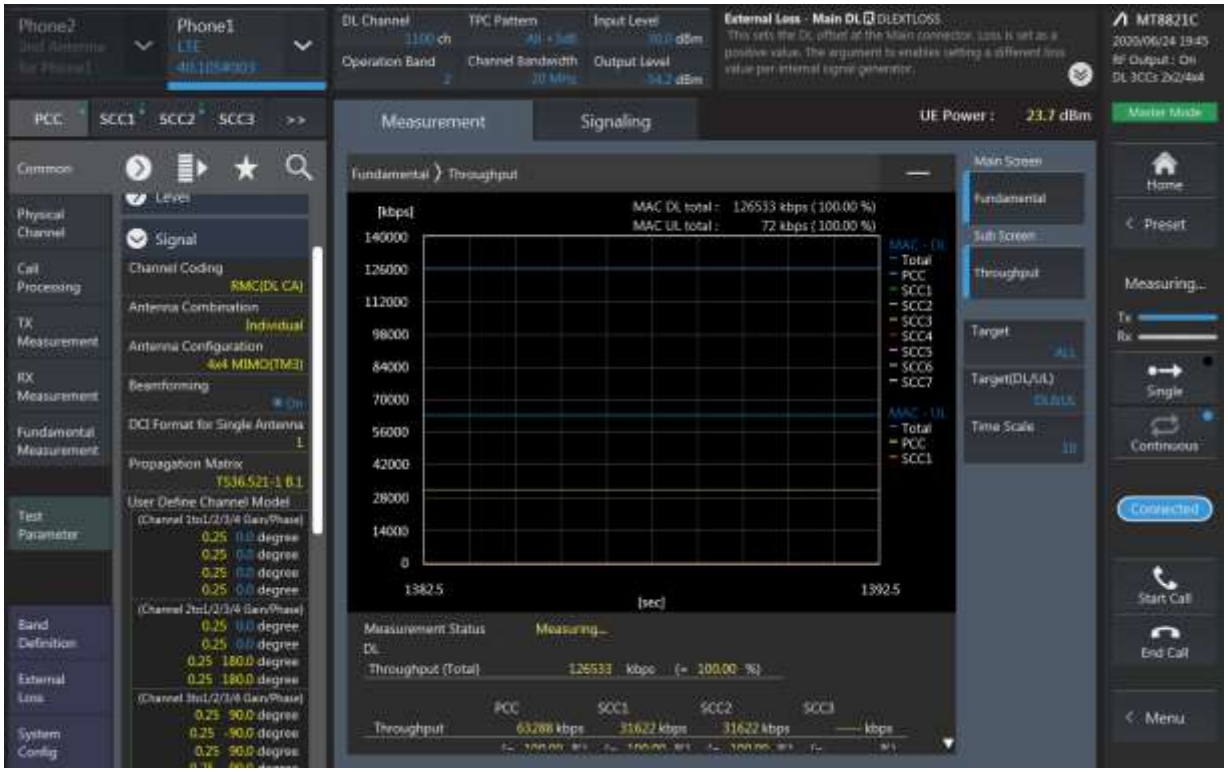


LTE Downlink 2CA 4X4 MIMO Maximum Conducted Power

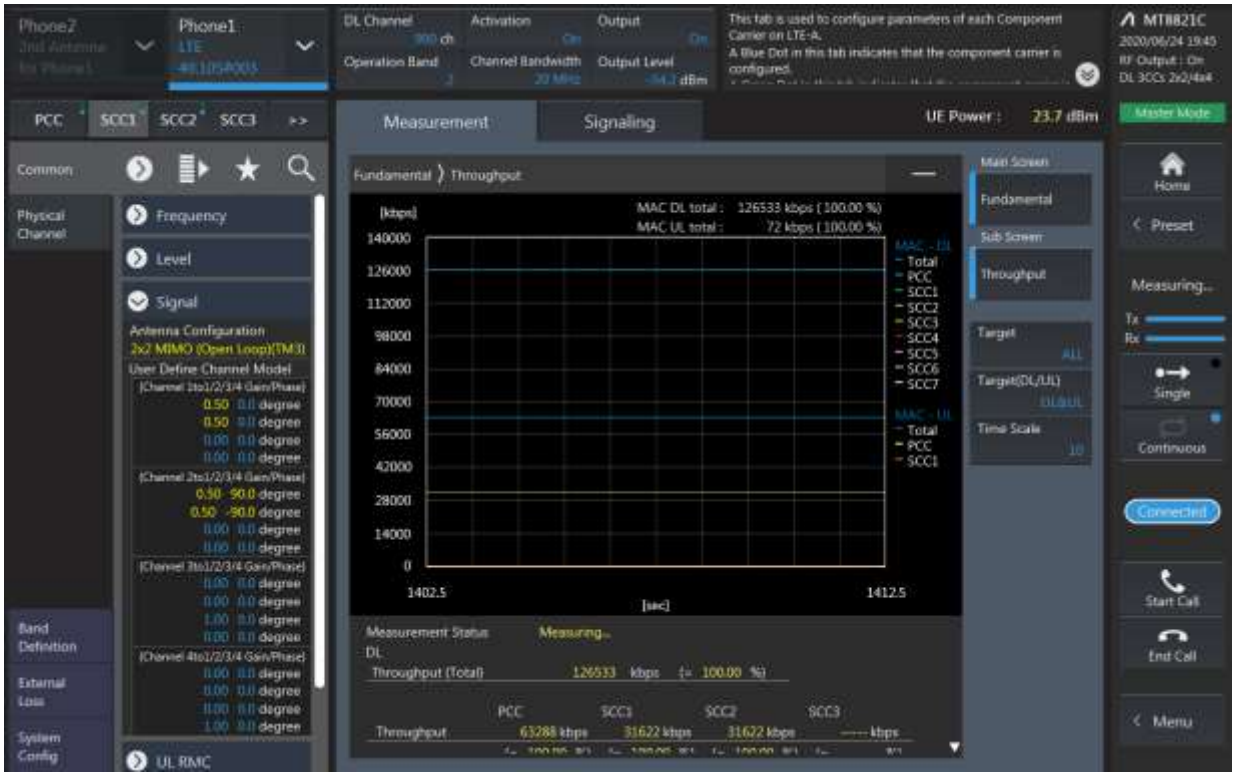
Combination	PCC									SCC				Tx Power		
	Band	BW	PCC UL Channel	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Channel	SCC DL Frequency	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with DL CA Enabled(dBm)	Deviation
[4A]-13A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	13	10	5230	751	24.45	24.38	-0.07
[4A]-13A	13	10	23230	782	5230	751	QPSK	1	0	4	20	2175	2132.5	24.26	24.20	-0.06
5A-[25A]	5	5	20425	826.5	2425	871.5	QPSK	1	12	25	20	8365	1962.5	24.19	24.15	-0.04
5A-[25A]	25	15	26365	1882.5	8365	1962.5	QPSK	1	36	5	10	2525	881.5	24.45	24.37	-0.08

LTE Down Link 3CA 4x4 MIMO Call Setup

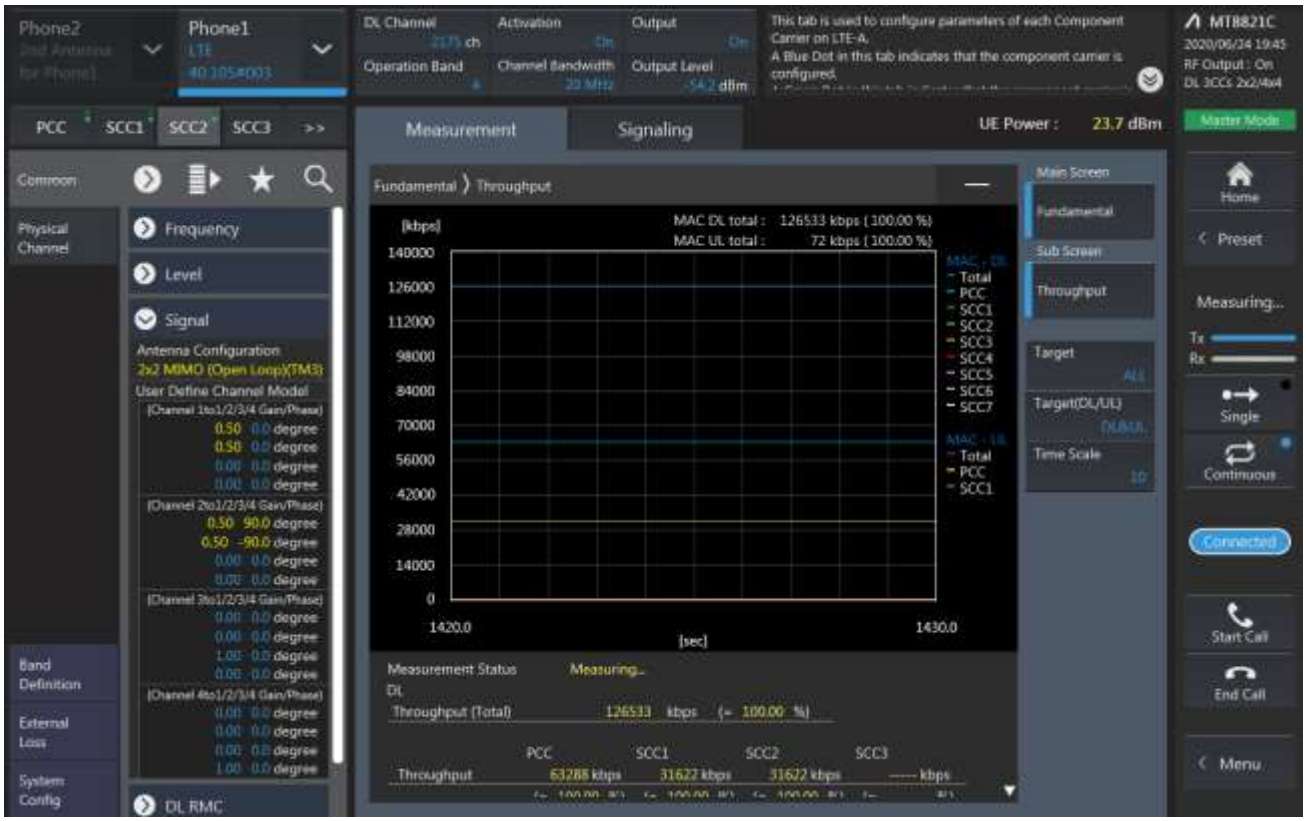
PCC Setting: Channel /RB/BW/Modulation



CC1 Setting : Channel /RB/BW/Modulation



SCC2 Setting (Channel /RB/BW/Modulation)and call Connection

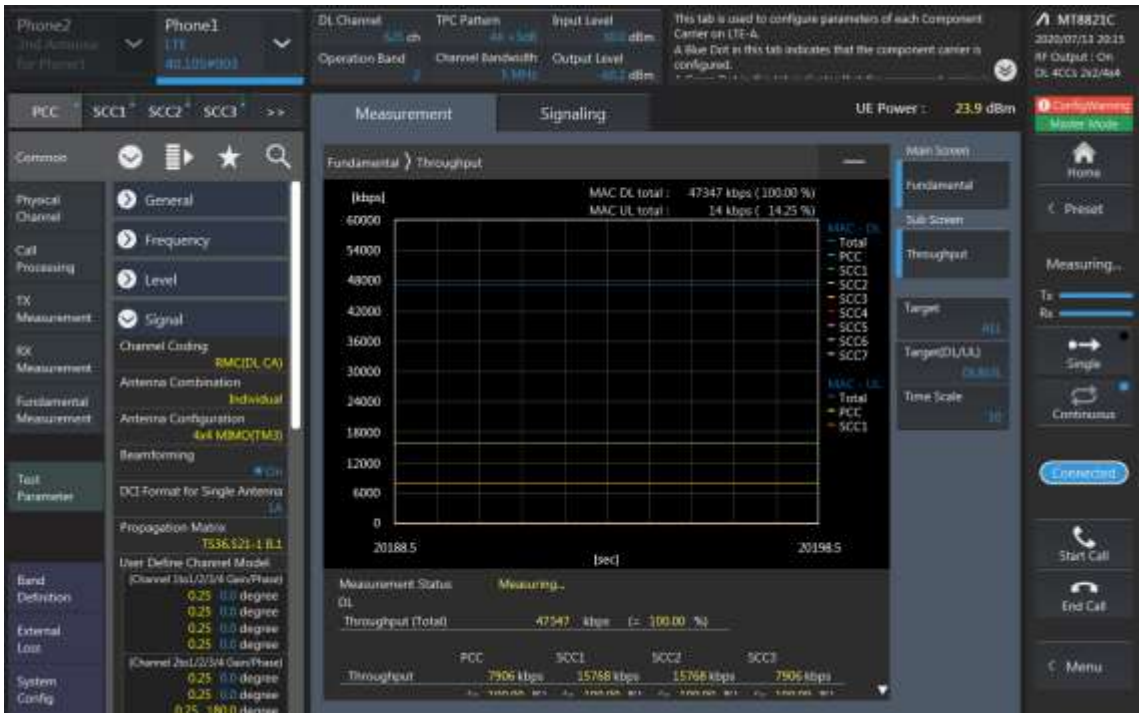


LTE Downlink 3CA 4X4 MIMO Maximum Conducted Power

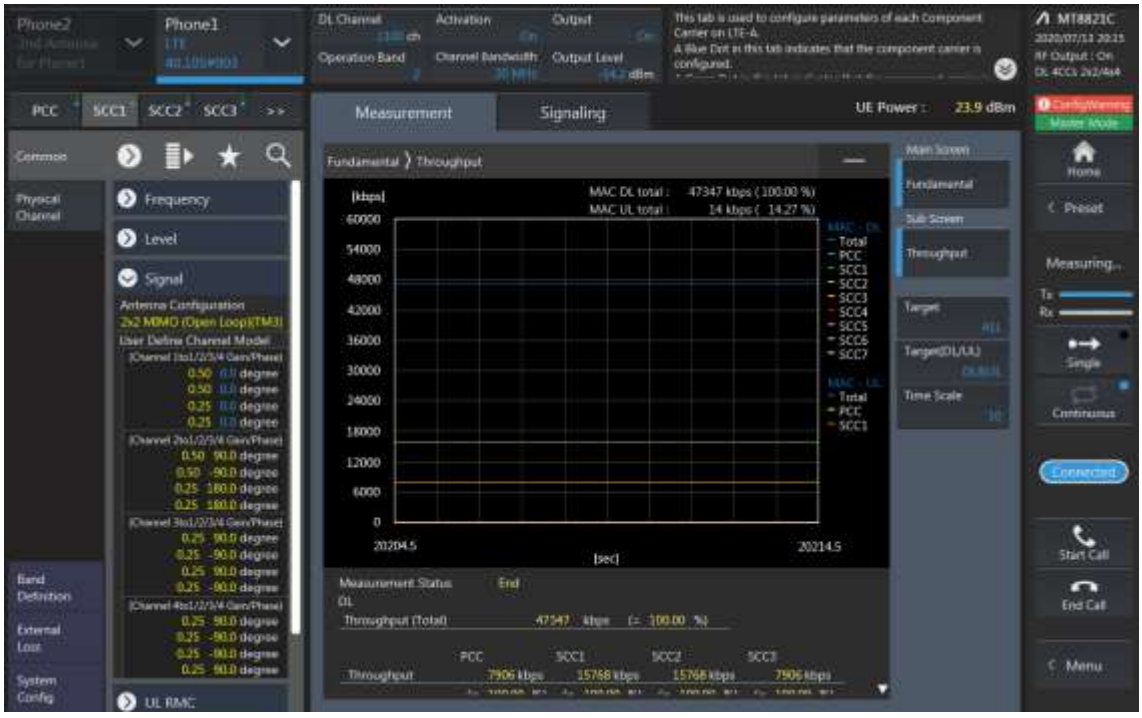
Combination	PCC									SCC				SCC				Tx Power		
	Band	BW	PCC UL Channel	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Channel	SCC DL Frequency	Band	BW	SCC DL Channel	SCC DL Frequency	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with DL CA Enabled(dBm)	Deviation
[2A]-4A-13A	2	5	18900	1880	900	1960	QPSK	1	12	4	20	2175	2132.5	13	10	5230	751	24.4	24.31	-0.09
[2A]-4A-13A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	2	20	900	1960	13	10	5230	751	24.42	24.36	-0.06
[2A]-4A-13A	13	10	23230	782	5230	751	QPSK	1	0	2	20	900	1960	4	20	2175	2132.5	24.26	24.21	-0.05
2A-[4A]-13A	2	5	18900	1880	900	1960	QPSK	1	12	4	20	2175	2132.5	13	10	5230	751	24.4	24.40	0.00
2A-[4A]-13A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	2	20	900	1960	13	10	5230	751	24.42	24.41	-0.01
2A-[4A]-13A	13	10	23230	782	5230	751	QPSK	1	0	2	20	900	1960	4	20	2175	2132.5	24.26	24.17	-0.09
[2A]-[4A]-13A	2	5	18900	1880	900	1960	QPSK	1	12	4	20	2175	2132.5	13	10	5230	751	24.4	24.36	-0.04
[2A]-[4A]-13A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	2	20	900	1960	13	10	5230	751	24.42	24.34	-0.08
[2A]-[4A]-13A	13	10	23230	782	5230	751	QPSK	1	0	2	20	900	1960	4	20	2175	2132.5	24.26	24.23	-0.03
[2A]-29A-66A	2	5	18900	1880	900	1960	QPSK	1	12	29	10	9715	722.5	66	20	66786	2145	24.4	24.30	-0.10
[2A]-29A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	29	10	9715	722.5	24.45	24.36	-0.09
2A-29A-[66A]	2	5	18900	1880	900	1960	QPSK	1	12	29	10	9715	722.5	66	20	66786	2145	24.4	24.35	-0.05
2A-29A-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	29	10	9715	722.5	24.45	24.45	0.00
[2A]-29A-[66A]	2	5	18900	1880	900	1960	QPSK	1	12	29	10	9715	722.5	66	20	66786	2145	24.4	24.30	-0.10
[2A]-29A-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	29	10	9715	722.5	24.45	24.43	-0.02
[4A]-4A-13A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	13	10	5230	751	24.42	24.42	0.00
[4A]-4A-13A	13	10	23230	782	5230	751	QPSK	1	0	4	20	2175	2132.5	4	10	2000	2115	24.26	24.25	-0.01
[4A]-[4A]-13A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	13	10	5230	751	24.42	24.36	-0.06
[4A]-[4A]-13A	13	10	23230	782	5230	751	QPSK	1	0	4	20	2175	2132.5	4	10	2000	2115	24.26	24.21	-0.05
[4A]-4A-71A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	71	20	68761	634.5	24.42	24.36	-0.06
[4A]-4A-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	4	20	2175	2132.5	4	10	2000	2115	24.22	24.22	0.00
[4A]-[4A]-71A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	71	20	68761	634.5	24.42	24.33	-0.09
[4A]-[4A]-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	4	20	2175	2132.5	4	10	2000	2115	24.22	24.14	-0.08
12A-[66C]	12	5	23155	713.5	5155	743.5	QPSK	1	24	66	20	66786	2145	66	20	66984	2164.8	24.45	24.37	-0.08
12A-[66C]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66903	2156.7	5	10	2525	881.5	24.45	24.36	-0.09
13A-[66A]-66A	13	10	23230	782	5230	751	QPSK	1	0	66	20	66786	2145	66	20	67236	2190	24.26	24.26	0.00
13A-[66A]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	13	10	5230	751	24.45	24.40	-0.05
13A-[66A]-[66A]	13	10	23230	782	5230	751	QPSK	1	0	66	20	66786	2145	66	20	67236	2190	24.26	24.25	-0.01
13A-[66A]-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	13	10	5230	751	24.45	24.43	-0.02
[25A]-25A-26A	25	15	26365	1882.5	8365	1962.5	QPSK	1	36	25	20	8590	1985	26	5	8865	876.5	24.45	24.43	-0.02
[25A]-25A-26A	25	15	26365	1882.5	8365	1962.5	QPSK	1	36	25	20	8590	1985	26	5	8865	876.5	24.45	24.36	-0.09
[25A]-[25A]-26A	25	15	26365	1882.5	8365	1962.5	QPSK	1	36	25	20	8590	1985	26	5	8865	876.5	24.45	24.40	-0.05
[25A]-[25A]-26A	25	15	26365	1882.5	8365	1962.5	QPSK	1	36	25	20	8590	1985	26	5	8865	876.5	24.45	24.44	-0.01
[48A]-48A-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	48	20	55990	3625	48	20	56640	3690	24.22	24.13	-0.09
[48A]-[48A]-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	48	20	55990	3625	48	20	56640	3690	24.22	24.12	-0.10
48C-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	48	20	55990	3625	48	20	56188	3644.8	24.22	24.14	-0.08
[66A]-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66786	2145	66	20	66984	2164.8	24.45	24.40	-0.05
[66A]-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66903	2156.7	66	20	67236	2190	24.45	24.45	0.00
66A-[66C]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66786	2145	66	20	66984	2164.8	24.45	24.39	-0.06
66A-[66C]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66903	2156.7	66	20	67236	2190	24.45	24.42	-0.03
[66A]-[66C]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66786	2145	66	20	66984	2164.8	24.45	24.42	-0.03
[66A]-[66C]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66903	2156.7	66	20	67236	2190	24.45	24.36	-0.09
[66A]-66A-71A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	71	20	68761	634.5	24.45	24.35	-0.10
[66A]-66A-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	66	20	66786	2145	66	20	67236	2190	24.22	24.17	-0.05
[66A]-[66A]-71A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	71	20	68761	634.5	24.45	24.36	-0.09
[66A]-[66A]-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	66	20	66786	2145	66	20	67236	2190	24.22	24.16	-0.06
[66C]-71A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66903	2156.7	71	20	68761	634.5	24.45	24.41	-0.04
[66C]-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	66	20	66786	2145	66	20	66984	2164.8	24.22	24.12	-0.10

LTE Down Link 4CA 4x4 MIMO Call Setup

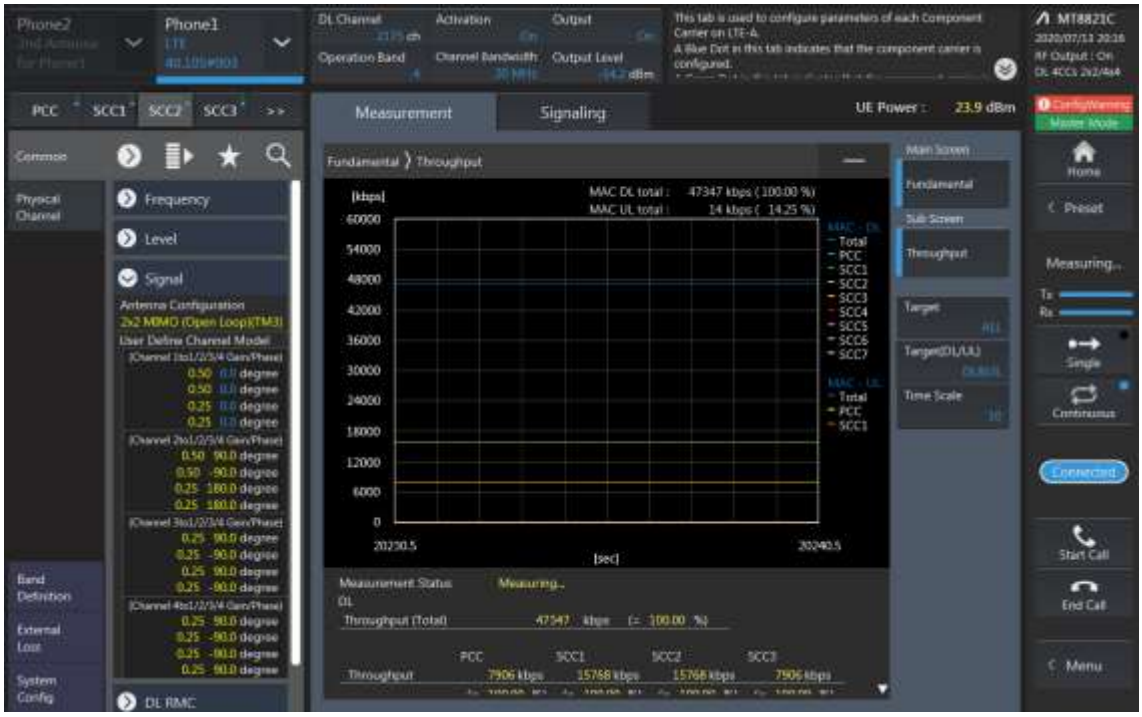
PCC Setting: Channel /RB/BW/Modulation



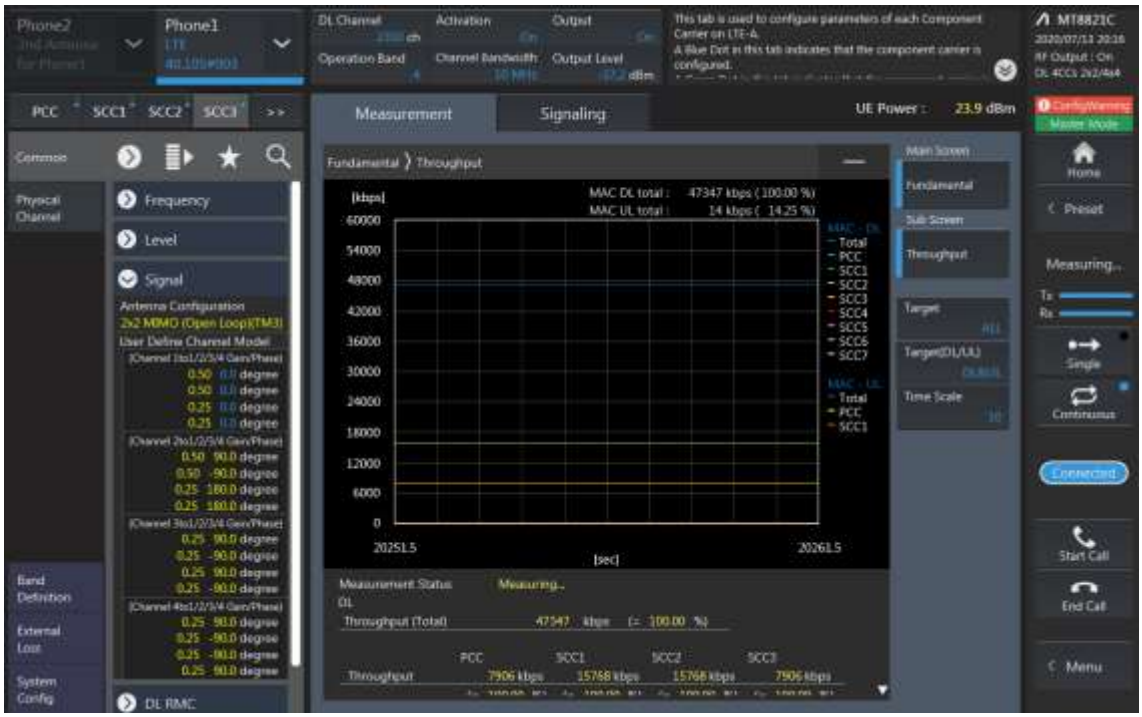
SCC1 Setting : Channel /RB/BW/Modulation



SCC2 Setting (Channel /RB/BW/Modulation) and call Connection



SCC3 Setting (Channel /RB/BW/Modulation) and call Connection



LTE Downlink 4CA 4X4 MIMO Maximum Conducted Power

Combination	PCC									SCC				SCC				SCC				Tx Power		Deviation
	Band	BW	PCC UL Ch.	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Ch.	SCC DL Freq.	Band	BW	SCC DL Ch.	SCC DL Freq.	Band	BW	SCC DL Ch.	SCC DL Freq.	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with DL CA Enabled (dBm)	
[2A]-2A-4A-4A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	4	20	2175	2132.5	4	10	2000	2115	24.4	24.26	-0.14
[2A]-2A-4A-4A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	2	20	900	1960	2	20	1100	1980	24.42	24.35	-0.07
[2A]-[2A]-4A-4A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	4	20	2175	2132.5	4	10	2000	2115	24.4	24.29	-0.11
[2A]-[2A]-4A-4A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	2	20	900	1960	2	20	1100	1980	24.42	24.3	-0.12
[2A]-2A-4A-5A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	4	20	2175	2132.5	5	10	2525	881.5	24.4	24.31	-0.09
[2A]-2A-4A-5A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	5	10	2525	881.5	24.42	24.27	-0.15
[2A]-2A-4A-5A	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	4	20	2175	2132.5	24.19	24.12	-0.07
[2A]-[2A]-4A-5A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	4	20	2175	2132.5	5	10	2525	881.5	24.4	24.36	-0.04
[2A]-[2A]-4A-5A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	5	10	2525	881.5	24.42	24.34	-0.08
[2A]-[2A]-4A-5A	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	4	20	2175	2132.5	24.19	24.06	-0.13
[2A]-2A-4A-12A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	4	20	2175	2132.5	12	10	5095	737.5	24.4	24.29	-0.11
[2A]-2A-4A-12A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	12	10	5095	737.5	24.42	24.33	-0.09
[2A]-2A-4A-12A	12	5	23155	713.5	5155	743.5	QPSK	1	24	2	20	900	1960	2	20	1100	1980	4	20	2175	2132.5	24.45	24.32	-0.13
[2A]-[2A]-4A-12A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	4	20	2175	2132.5	12	10	5095	737.5	24.4	24.28	-0.12
[2A]-[2A]-4A-12A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	12	10	5095	737.5	24.42	24.4	-0.02
[2A]-[2A]-4A-12A	12	5	23155	713.5	5155	743.5	QPSK	1	24	2	20	900	1960	2	20	1100	1980	4	20	2175	2132.5	24.45	24.41	-0.04
[2A]-2A-4A-71A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	4	20	2175	2132.5	71	20	68761	634.5	24.4	24.38	-0.02
[2A]-2A-4A-71A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	71	20	68761	634.5	24.42	24.35	-0.07
[2A]-2A-4A-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	2	20	900	1960	2	20	1100	1980	4	20	2175	2132.5	24.22	24.08	-0.14
[2A]-[2A]-4A-71A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	4	20	2175	2132.5	71	20	68761	634.5	24.4	24.34	-0.06
[2A]-[2A]-4A-71A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	71	20	68761	634.5	24.42	24.39	-0.03
[2A]-[2A]-4A-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	2	20	900	1960	2	20	1100	1980	4	20	2175	2132.5	24.22	24.2	-0.02
[2A]-2A-5B	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	5	10	2525	881.5	5	5	2453	874.3	24.4	24.34	-0.06
[2A]-2A-5B	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	2	20	900	1960	2	20	1100	1980	24.19	24.06	-0.13
[2A]-[2A]-5B	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	5	10	2525	881.5	5	5	2453	874.3	24.4	24.28	-0.12
[2A]-[2A]-5B	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	2	20	900	1960	2	20	1100	1980	24.19	24.16	-0.03
[2A]-2A-5A-30A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	5	10	2525	881.5	30	10	9820	2355	24.4	24.26	-0.14
[2A]-2A-5A-30A	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	30	10	9820	2355	24.19	24.12	-0.07
[2A]-2A-5A-30A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	2	20	900	1960	2	20	1100	1980	5	10	2525	881.5	24.18	24.07	-0.11
[2A]-[2A]-5A-30A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	5	10	2525	881.5	30	10	9820	2355	24.4	24.29	-0.11
[2A]-[2A]-5A-30A	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	30	10	9820	2355	24.19	24.17	-0.02
[2A]-[2A]-5A-30A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	2	20	900	1960	2	20	1100	1980	5	10	2525	881.5	24.18	24.04	-0.14
[2A]-2A-5A-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	5	10	2525	881.5	66	20	66786	2145	24.4	24.36	-0.04
[2A]-2A-5A-66A	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	66	20	66786	2145	24.19	24.12	-0.07
[2A]-2A-5A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	5	10	2525	881.5	24.45	24.32	-0.13
[2A]-[2A]-5A-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	5	10	2525	881.5	66	20	66786	2145	24.4	24.39	-0.01
[2A]-[2A]-5A-66A	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	66	20	66786	2145	24.19	24.13	-0.06
[2A]-[2A]-5A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	5	10	2525	881.5	24.45	24.44	-0.01
[2A]-2A-12A-30A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	12	10	5095	737.5	30	10	9820	2355	24.4	24.39	-0.01
[2A]-2A-12A-30A	12	5	23155	713.5	5155	743.5	QPSK	1	24	2	20	900	1960	2	20	1100	1980	30	10	9820	2355	24.45	24.3	-0.15
[2A]-2A-12A-30A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	2	20	900	1960	2	20	1100	1980	12	10	5095	737.5	24.18	24.06	-0.12
[2A]-[2A]-12A-30A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	12	10	5095	737.5	30	10	9820	2355	24.4	24.35	-0.05
[2A]-[2A]-12A-30A	12	5	23155	713.5	5155	743.5	QPSK	1	24	2	20	900	1960	2	20	1100	1980	30	10	9820	2355	24.45	24.39	-0.06
[2A]-[2A]-12A-30A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	2	20	900	1960	2	20	1100	1980	12	10	5095	737.5	24.18	24.05	-0.13
[2A]-2A-12A-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	12	10	5095	737.5	66	20	66786	2145	24.4	24.3	-0.1
[2A]-2A-12A-66A	12	5	23155	713.5	5155	743.5	QPSK	1	24	2	20	900	1960	2	20	1100	1980	66	20	66786	2145	24.45	24.43	-0.02
[2A]-2A-12A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	12	10	5095	737.5	24.45	24.44	-0.01
[2A]-[2A]-12A-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	12	10	5095	737.5	66	20	66786	2145	24.4	24.33	-0.07
[2A]-[2A]-12A-66A	12	5	23155	713.5	5155	743.5	QPSK	1	24	2	20	900	1960	2	20	1100	1980	66	20	66786	2145	24.45	24.3	-0.15
[2A]-[2A]-12A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	12	10	5095	737.5	24.45	24.44	-0.01
[2A]-2A-12B	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	12	5	5095	737.5	12	5	5047	732.7	24.4	24.28	-0.12
[2A]-2A-12B	12	5	23155	713.5	5155	743.5	QPSK	1	24	12	5	5107	738.7	2	20	900	1960	2	20	1100	1980	24.45	24.4	-0.05
[2A]-[2A]-12B	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	12	5	5095	737.5	12	5	5047	732.7	24.4	24.39	-0.01

Combination	PCC									SCC				SCC				SCC				Tx Power		Deviation
	Band	BW	PCC UL Ch.	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Ch.	SCC DL Freq.	Band	BW	SCC DL Ch.	SCC DL Freq.	Band	BW	SCC DL Ch.	SCC DL Freq.	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with DL CA Enabled (dBm)	
[2A]-[2A]-12B	12	5	23155	713.5	5155	743.5	QPSK	1	24	12	5	5107	738.7	2	20	900	1960	2	20	1100	1980	24.45	24.41	-0.04
[2A]-2A-13A-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	13	10	5230	751	66	20	66786	2145	24.4	24.34	-0.06
[2A]-2A-13A-66A	13	10	23230	782	5230	751	QPSK	1	0	2	20	900	1960	2	20	1100	1980	66	20	66786	2145	24.26	24.23	-0.03
[2A]-2A-13A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	13	10	5230	751	24.45	24.32	-0.13
[2A]-[2A]-13A-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	13	10	5230	751	66	20	66786	2145	24.4	24.39	-0.01
[2A]-[2A]-13A-66A	13	10	23230	782	5230	751	QPSK	1	0	2	20	900	1960	2	20	1100	1980	66	20	66786	2145	24.26	24.25	-0.01
[2A]-[2A]-13A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	13	10	5230	751	24.45	24.31	-0.14
[2A]-2A-14A-30A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	14	10	5330	763	30	10	9820	2355	24.4	24.36	-0.04
[2A]-2A-14A-30A	14	10	23330	793	5330	763	QPSK	1	0	2	20	900	1960	2	20	1100	1980	30	10	9820	2355	24.07	24.06	-0.01
[2A]-2A-14A-30A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	2	20	900	1960	2	20	1100	1980	14	10	5330	763	24.18	24.14	-0.04
[2A]-[2A]-14A-30A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	14	10	5330	763	30	10	9820	2355	24.4	24.32	-0.08
[2A]-[2A]-14A-30A	14	10	23330	793	5330	763	QPSK	1	0	2	20	900	1960	2	20	1100	1980	30	10	9820	2355	24.07	23.92	-0.15
[2A]-[2A]-14A-30A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	2	20	900	1960	2	20	1100	1980	14	10	5330	763	24.18	24.09	-0.09
[2A]-2A-14A-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	14	10	5330	763	66	20	66786	2145	24.4	24.38	-0.02
[2A]-2A-14A-66A	14	10	23330	793	5330	763	QPSK	1	0	2	20	900	1960	2	20	1100	1980	66	20	66786	2145	24.07	24.01	-0.06
[2A]-2A-14A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	14	10	5330	763	24.45	24.34	-0.11
[2A]-[2A]-14A-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	14	10	5330	763	66	20	66786	2145	24.4	24.26	-0.14
[2A]-[2A]-14A-66A	14	10	23330	793	5330	763	QPSK	1	0	2	20	900	1960	2	20	1100	1980	66	20	66786	2145	24.07	23.97	-0.1
[2A]-[2A]-14A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	14	10	5330	763	24.45	24.33	-0.12
[2A]-2A-29A-30A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	29	10	9715	722.5	30	10	9820	2355	24.4	24.26	-0.14
[2A]-2A-29A-30A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	2	20	900	1960	2	20	1100	1980	29	10	9715	722.5	24.18	24.1	-0.08
[2A]-[2A]-29A-30A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	29	10	9715	722.5	30	10	9820	2355	24.4	24.32	-0.08
[2A]-[2A]-29A-30A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	2	20	900	1960	2	20	1100	1980	29	10	9715	722.5	24.18	24.07	-0.11
[2A]-2A-30A-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	30	10	9820	2355	66	20	66786	2145	24.4	24.25	-0.15
[2A]-2A-30A-66A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	2	20	900	1960	2	20	1100	1980	66	20	66786	2145	24.18	24.08	-0.1
[2A]-2A-30A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	30	10	9820	2355	24.45	24.42	-0.03
[2A]-[2A]-30A-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	30	10	9820	2355	66	20	66786	2145	24.4	24.37	-0.03
[2A]-[2A]-30A-66A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	2	20	900	1960	2	20	1100	1980	66	20	66786	2145	24.18	24.12	-0.06
[2A]-[2A]-30A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	30	10	9820	2355	24.45	24.33	-0.12
[2A]-2A-46C	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	46	20	50665	5537.5	46	20	50467	5517.7	24.4	24.26	-0.14
[2A]-[2A]-46C	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	46	20	50665	5537.5	46	20	50467	5517.7	24.4	24.39	-0.01
[2A]-2A-66A-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	66	20	66786	2145	66	20	67236	2190	24.4	24.26	-0.14
[2A]-2A-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	2	20	1100	1980	24.45	24.3	-0.15
2A-2A-[66A]-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	66	20	66786	2145	66	20	67236	2190	24.4	24.27	-0.13
2A-2A-[66A]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	2	20	1100	1980	24.45	24.39	-0.06
2A-2A-[66A]-[66A]	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	66	20	66786	2145	66	20	67236	2190	24.4	24.34	-0.06
2A-2A-[66A]-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	2	20	1100	1980	24.45	24.42	-0.03
[2A]-2A-66A-71A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	66	20	66786	2145	71	20	68761	634.5	24.4	24.3	-0.1
[2A]-2A-66A-71A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	71	20	68761	634.5	24.45	24.31	-0.14
[2A]-2A-66A-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	2	20	900	1960	2	20	1100	1980	66	20	66786	2145	24.22	24.12	-0.1
[2A]-[2A]-[66A]-71A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	66	20	66786	2145	71	20	68761	634.5	24.4	24.33	-0.07
[2A]-[2A]-[66A]-71A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	2	20	1100	1980	71	20	68761	634.5	24.45	24.38	-0.07
[2A]-[2A]-[66A]-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	2	20	900	1960	2	20	1100	1980	66	20	66786	2145	24.22	24.18	-0.04
[2A]-2A-66B	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	66	15	66786	2145	66	5	66879	2154.3	24.4	24.35	-0.05
[2A]-2A-66B	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	15	66554	2121.8	2	20	900	1960	2	20	1100	1980	24.45	24.44	-0.01
2A-2A-[66B]	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	66	15	66786	2145	66	5	66879	2154.3	24.4	24.36	-0.04
2A-2A-[66B]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	15	66554	2121.8	2	20	900	1960	2	20	1100	1980	24.45	24.38	-0.07
[2A]-[2A]-66B	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	66	15	66786	2145	66	5	66879	2154.3	24.4	24.36	-0.04
[2A]-[2A]-66B	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	15	66554	2121.8	2	20	900	1960	2	20	1100	1980	24.45	24.3	-0.15
[2A]-2A-66C	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	66	20	66786	2145	66	20	66984	2164.8	24.4	24.33	-0.07
[2A]-2A-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	2	20	900	1960	2	20	1100	1980	24.45	24.41	-0.04
2A-2A-[66C]	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	66	20	66786	2145	66	20	66984	2164.8	24.4	24.28	-0.12
2A-2A-[66C]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	2	20	900	1960	2	20	1100	1980	24.45	24.34	-0.11
[2A]-[2A]-66C	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1100	1980	66	20	66786	2145	66	20	66984	2164.8	24.4	24.31	-0.09
[2A]-[2A]-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	2	20	900	1960	2	20	1100	1980	24.45	24.38	-0.07

Combination	PCC									SCC				SCC				SCC				Tx Power		Deviation
	Band	BW	PCC UL Ch.	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Ch.	SCC DL Freq.	Band	BW	SCC DL Ch.	SCC DL Freq.	Band	BW	SCC DL Ch.	SCC DL Freq.	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with DL CA Enabled (dBm)	
2A-[4A]-4A-5A	2	5	18900	1880	900	1960	QPSK	1	12	4	20	2175	2132.5	4	10	2000	2115	5	10	2525	881.5	24.4	24.36	-0.04
2A-[4A]-4A-5A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	2	20	900	1960	5	10	2525	881.5	24.42	24.34	-0.08
2A-[4A]-4A-5A	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	4	20	2175	2132.5	4	10	2000	2115	24.19	24.11	-0.08
2A-[4A]-[4A]-5A	2	5	18900	1880	900	1960	QPSK	1	12	4	20	2175	2132.5	4	10	2000	2115	5	10	2525	881.5	24.4	24.28	-0.12
2A-[4A]-[4A]-5A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	2	20	900	1960	5	10	2525	881.5	24.42	24.33	-0.09
2A-[4A]-[4A]-5A	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	4	20	2175	2132.5	4	10	2000	2115	24.19	24.08	-0.11
2A-[4A]-4A-12A	2	5	18900	1880	900	1960	QPSK	1	12	4	20	2175	2132.5	4	10	2000	2115	12	10	5095	737.5	24.4	24.34	-0.06
2A-[4A]-4A-12A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	2	20	900	1960	12	10	5095	737.5	24.42	24.31	-0.11
2A-[4A]-[4A]-12A	2	5	18900	1880	900	1960	QPSK	1	12	4	20	2175	2132.5	4	10	2000	2115	12	10	5095	737.5	24.4	24.34	-0.06
2A-[4A]-[4A]-12A	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	2	20	900	1960	12	10	5095	737.5	24.42	24.28	-0.14
2A-[4A]-5B	2	5	18900	1880	900	1960	QPSK	1	12	4	20	2175	2132.5	5	10	2525	881.5	5	5	2453	874.3	24.4	24.36	-0.04
2A-[4A]-5B	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	2	20	900	1960	5	10	2525	881.5	5	5	2453	874.3	24.42	24.34	-0.08
2A-[4A]-5B	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	2	20	900	1960	4	20	2175	2132.5	24.19	24.06	-0.13
[2A]-[4A]-5B	2	5	18900	1880	900	1960	QPSK	1	12	4	20	2175	2132.5	5	10	2525	881.5	5	5	2453	874.3	24.4	24.34	-0.06
[2A]-[4A]-5B	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	2	20	900	1960	5	10	2525	881.5	5	5	2453	874.3	24.42	24.32	-0.1
[2A]-[4A]-5B	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	2	20	900	1960	4	20	2175	2132.5	24.19	24.18	-0.01
[2A]-4A-12B	2	5	18900	1880	900	1960	QPSK	1	12	4	20	2175	2132.5	12	5	5095	737.5	12	5	5047	732.7	24.4	24.36	-0.04
[2A]-4A-12B	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	2	20	900	1960	12	5	5095	737.5	12	5	5047	732.7	24.42	24.31	-0.11
2A-[4A]-12B	2	5	18900	1880	900	1960	QPSK	1	12	4	20	2175	2132.5	12	5	5095	737.5	12	5	5047	732.7	24.4	24.28	-0.12
2A-[4A]-12B	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	2	20	900	1960	12	5	5095	737.5	12	5	5047	732.7	24.42	24.29	-0.13
[2A]-[4A]-12B	2	5	18900	1880	900	1960	QPSK	1	12	4	20	2175	2132.5	12	5	5095	737.5	12	5	5047	732.7	24.4	24.25	-0.15
[2A]-[4A]-12B	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	2	20	900	1960	12	5	5095	737.5	12	5	5047	732.7	24.42	24.35	-0.07
[2A]-5A-46C	2	5	18900	1880	900	1960	QPSK	1	12	5	10	2525	881.5	46	20	50665	5537.5	46	20	50467	5517.7	24.4	24.38	-0.02
[2A]-5A-46C	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	46	20	50665	5537.5	46	20	50467	5517.7	24.19	24.11	-0.08
[2A]-5A-48C	2	5	18900	1880	900	1960	QPSK	1	12	5	10	2525	881.5	48	20	55990	3625	48	20	56188	3644.8	24.4	24.38	-0.02
[2A]-5A-48C	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	48	20	55990	3625	48	20	56188	3644.8	24.19	24.1	-0.09
2A-5A-[66A]-66A	2	5	18900	1880	900	1960	QPSK	1	12	5	10	2525	881.5	66	20	66786	2145	66	20	67236	2190	24.4	24.26	-0.14
2A-5A-[66A]-66A	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	66	20	66786	2145	66	20	67236	2190	24.19	24.11	-0.08
2A-5A-[66A]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	5	10	2525	881.5	24.45	24.34	-0.11
2A-5A-[66A]-[66A]	2	5	18900	1880	900	1960	QPSK	1	12	5	10	2525	881.5	66	20	66786	2145	66	20	67236	2190	24.4	24.27	-0.13
2A-5A-[66A]-[66A]	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	66	20	66786	2145	66	20	67236	2190	24.19	24.14	-0.05
2A-5A-[66A]-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	5	10	2525	881.5	24.45	24.33	-0.12
[2A]-5A-66B	2	5	18900	1880	900	1960	QPSK	1	12	5	10	2525	881.5	66	15	66786	2145	66	5	66879	2154.3	24.4	24.29	-0.11
[2A]-5A-66B	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	66	15	66786	2145	66	5	66879	2154.3	24.19	24.13	-0.06
[2A]-5A-66B	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	15	66554	2121.8	2	20	900	1960	5	10	2525	881.5	24.45	24.33	-0.12
2A-5A-[66B]	2	5	18900	1880	900	1960	QPSK	1	12	5	10	2525	881.5	66	15	66786	2145	66	5	66879	2154.3	24.4	24.27	-0.13
2A-5A-[66B]	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	66	15	66786	2145	66	5	66879	2154.3	24.19	24.18	-0.01
2A-5A-[66B]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	15	66554	2121.8	2	20	900	1960	5	10	2525	881.5	24.45	24.39	-0.06
[2A]-5A-66C	2	5	18900	1880	900	1960	QPSK	1	12	5	10	2525	881.5	66	20	66786	2145	66	20	66984	2164.8	24.4	24.37	-0.03
[2A]-5A-66C	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	66	20	66786	2145	66	20	66984	2164.8	24.19	24.18	-0.01
[2A]-5A-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	2	20	900	1960	5	10	2525	881.5	24.45	24.42	-0.03
2A-5A-[66C]	2	5	18900	1880	900	1960	QPSK	1	12	5	10	2525	881.5	66	20	66786	2145	66	20	66984	2164.8	24.4	24.32	-0.08
2A-5A-[66C]	5	5	20425	826.5	2425	871.5	QPSK	1	12	2	20	900	1960	66	20	66786	2145	66	20	66984	2164.8	24.19	24.06	-0.13
2A-5A-[66C]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	2	20	900	1960	5	10	2525	881.5	24.45	24.42	-0.03
[2A]-5B-66A	2	5	18900	1880	900	1960	QPSK	1	12	5	10	2525	881.5	5	5	2453	874.3	66	20	66786	2145	24.4	24.37	-0.03
[2A]-5B-66A	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	2	20	900	1960	66	20	66786	2145	24.19	24.04	-0.15
[2A]-5B-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	5	10	2525	881.5	5	5	2453	874.3	24.45	24.33	-0.12
2A-5B-[66A]	2	5	18900	1880	900	1960	QPSK	1	12	5	10	2525	881.5	5	5	2453	874.3	66	20	66786	2145	24.4	24.34	-0.06
2A-5B-[66A]	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	2	20	900	1960	66	20	66786	2145	24.19	24.05	-0.14
2A-5B-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	5	10	2525	881.5	5	5	2453	874.3	24.45	24.3	-0.15
[2A]-5B-[66A]	2	5	18900	1880	900	1960	QPSK	1	12	5	10	2525	881.5	5	5	2453	874.3	66	20	66786	2145	24.4	24.39	-0.01
[2A]-5B-[66A]	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	2	20	900	1960	66	20	66786	2145	24.19	24.09	-0.1
[2A]-5B-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	5	10	2525	881.5	5	5	2453	874.3	24.45	24.32	-0.13
[2A]-7A-12B	2	5	18900	1880	900	1960	QPSK	1	12	7	20	3100	2655	12	5	5095	737.5	12	10	5167	744.7	24.4	24.28	-0.12
[2A]-7A-12B	7	10	21400	2565	3400	2685	QPSK	1	0	2	20	900	1960	12	5	5095	737.5	12	10	5167	744.7	24.3	24.23	-0.07

Combination	PCC									SCC				SCC				SCC				Tx Power		Deviation
	Band	BW	PCC UL Ch.	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Ch.	SCC DL Freq.	Band	BW	SCC DL Ch.	SCC DL Freq.	Band	BW	SCC DL Ch.	SCC DL Freq.	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with DL CA Enabled (dBm)	
[2A]-7A-12B	12	5	23155	713.5	5155	743.5	QPSK	1	24	12	5	5107	738.7	2	20	900	1960	7	20	3100	2655	24.45	24.38	-0.07
[2A]-7A-46C	2	5	18900	1880	900	1960	QPSK	1	12	7	20	3100	2655	46	20	50690	5540	46	20	50888	5559.8	24.4	24.29	-0.11
[2A]-7A-46C	7	10	21400	2565	3400	2685	QPSK	1	0	2	20	900	1960	46	20	50690	5540	46	20	50888	5559.8	24.3	24.19	-0.11
2A-7A-[66A]-66A	2	5	18900	1880	900	1960	QPSK	1	12	7	20	3100	2655	66	20	66786	2145	66	20	67236	2190	24.4	24.31	-0.09
2A-7A-[66A]-66A	7	10	21400	2565	3400	2685	QPSK	1	0	2	20	900	1960	66	20	66786	2145	66	20	67236	2190	24.3	24.27	-0.03
2A-7A-[66A]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	7	20	3100	2655	24.45	24.34	-0.11
2A-12A-[66A]-66A	2	5	18900	1880	900	1960	QPSK	1	12	12	10	5095	737.5	66	20	66786	2145	66	20	67236	2190	24.4	24.32	-0.08
2A-12A-[66A]-66A	12	5	23155	713.5	5155	743.5	QPSK	1	24	2	20	900	1960	66	20	66786	2145	66	20	67236	2190	24.45	24.35	-0.1
2A-12A-[66A]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	12	10	5095	737.5	24.45	24.37	-0.08
2A-12A-[66A]-[66A]	2	5	18900	1880	900	1960	QPSK	1	12	12	10	5095	737.5	66	20	66786	2145	66	20	67236	2190	24.4	24.32	-0.08
2A-12A-[66A]-[66A]	12	5	23155	713.5	5155	743.5	QPSK	1	24	2	20	900	1960	66	20	66786	2145	66	20	67236	2190	24.45	24.3	-0.15
2A-12A-[66A]-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	12	10	5095	737.5	24.45	24.4	-0.05
[2A]-12A-66C	2	5	18900	1880	900	1960	QPSK	1	12	12	10	5095	737.5	66	20	66786	2145	66	20	66984	2164.8	24.4	24.26	-0.14
[2A]-12A-66C	12	5	23155	713.5	5155	743.5	QPSK	1	24	2	20	900	1960	66	20	66786	2145	66	20	66984	2164.8	24.45	24.41	-0.04
[2A]-12A-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	2	20	900	1960	12	10	5095	737.5	24.45	24.41	-0.04
2A-12A-[66C]	2	5	18900	1880	900	1960	QPSK	1	12	12	10	5095	737.5	66	20	66786	2145	66	20	66984	2164.8	24.4	24.3	-0.1
2A-12A-[66C]	12	5	23155	713.5	5155	743.5	QPSK	1	24	2	20	900	1960	66	20	66786	2145	66	20	66984	2164.8	24.45	24.37	-0.08
2A-12A-[66C]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	2	20	900	1960	12	10	5095	737.5	24.45	24.35	-0.1
[2A]-12B-66A	2	5	18900	1880	900	1960	QPSK	1	12	12	5	5095	737.5	12	10	5167	744.7	66	20	66786	2145	24.4	24.28	-0.12
[2A]-12B-66A	12	5	23155	713.5	5155	743.5	QPSK	1	24	12	5	5107	738.7	2	20	900	1960	66	20	66786	2145	24.45	24.43	-0.02
[2A]-12B-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	12	5	5095	737.5	12	10	5167	744.7	24.45	24.33	-0.12
2A-12B-[66A]	2	5	18900	1880	900	1960	QPSK	1	12	12	5	5095	737.5	12	10	5167	744.7	66	20	66786	2145	24.4	24.26	-0.14
2A-12B-[66A]	12	5	23155	713.5	5155	743.5	QPSK	1	24	12	5	5107	738.7	2	20	900	1960	66	20	66786	2145	24.45	24.37	-0.08
2A-12B-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	12	5	5095	737.5	12	10	5167	744.7	24.45	24.4	-0.05
[2A]-13A-46C	2	5	18900	1880	900	1960	QPSK	1	12	13	10	5230	751	46	20	50690	5540	46	20	50888	5559.8	24.4	24.37	-0.03
[2A]-13A-46C	13	10	23230	782	5230	751	QPSK	1	0	2	20	900	1960	46	20	50690	5540	46	20	50888	5559.8	24.26	24.15	-0.11
[2A]-13A-48C	2	5	18900	1880	900	1960	QPSK	1	12	13	10	5230	751	48	20	56207	3646.7	48	20	56405	3666.5	24.4	24.36	-0.04
[2A]-13A-48C	13	10	23230	782	5230	751	QPSK	1	0	2	20	900	1960	48	20	56207	3646.7	48	20	56405	3666.5	24.26	24.21	-0.05
2A-13A-[66A]-66A	2	5	18900	1880	900	1960	QPSK	1	12	13	10	5230	751	66	20	66786	2145	66	20	67236	2190	24.4	24.37	-0.03
2A-13A-[66A]-66A	13	10	23230	782	5230	751	QPSK	1	0	2	20	900	1960	66	20	66786	2145	66	20	67236	2190	24.26	24.24	-0.02
2A-13A-[66A]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	13	10	5230	751	24.45	24.31	-0.14
2A-13A-[66A]-[66A]	2	5	18900	1880	900	1960	QPSK	1	12	13	10	5230	751	66	20	66786	2145	66	20	67236	2190	24.4	24.3	-0.1
2A-13A-[66A]-[66A]	13	10	23230	782	5230	751	QPSK	1	0	2	20	900	1960	66	20	66786	2145	66	20	67236	2190	24.26	24.23	-0.03
2A-13A-[66A]-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	13	10	5230	751	24.45	24.33	-0.12
[2A]-13A-66B	2	5	18900	1880	900	1960	QPSK	1	12	13	10	5230	751	66	15	66786	2145	66	5	66879	2154.3	24.4	24.35	-0.05
[2A]-13A-66B	13	10	23230	782	5230	751	QPSK	1	0	2	20	900	1960	66	15	66786	2145	66	5	66879	2154.3	24.26	24.12	-0.14
[2A]-13A-66B	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	15	66554	2121.8	2	20	900	1960	13	10	5230	751	24.45	24.3	-0.15
2A-13A-[66B]	2	5	18900	1880	900	1960	QPSK	1	12	13	10	5230	751	66	15	66786	2145	66	5	66879	2154.3	24.4	24.39	-0.01
2A-13A-[66B]	13	10	23230	782	5230	751	QPSK	1	0	2	20	900	1960	66	15	66786	2145	66	5	66879	2154.3	24.26	24.17	-0.09
2A-13A-[66B]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	15	66554	2121.8	2	20	900	1960	13	10	5230	751	24.45	24.42	-0.03
[2A]-13A-66C	2	5	18900	1880	900	1960	QPSK	1	12	13	10	5230	751	66	20	66786	2145	66	20	66984	2164.8	24.4	24.26	-0.14
[2A]-13A-66C	13	10	23230	782	5230	751	QPSK	1	0	2	20	900	1960	66	20	66786	2145	66	20	66984	2164.8	24.26	24.16	-0.1
[2A]-13A-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	2	20	900	1960	13	10	5230	751	24.45	24.42	-0.03
2A-13A-[66C]	2	5	18900	1880	900	1960	QPSK	1	12	13	10	5230	751	66	20	66786	2145	66	20	66984	2164.8	24.4	24.39	-0.01
2A-13A-[66C]	13	10	23230	782	5230	751	QPSK	1	0	2	20	900	1960	66	20	66786	2145	66	20	66984	2164.8	24.26	24.18	-0.08
2A-13A-[66C]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	2	20	900	1960	13	10	5230	751	24.45	24.32	-0.13
2A-14A-[66A]-66A	2	5	18900	1880	900	1960	QPSK	1	12	14	10	5330	763	66	20	66786	2145	66	20	67236	2190	24.4	24.39	-0.01
2A-14A-[66A]-66A	14	10	23330	793	5330	763	QPSK	1	0	2	20	900	1960	66	20	66786	2145	66	20	67236	2190	24.07	23.99	-0.08
2A-14A-[66A]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	14	10	5330	763	24.45	24.33	-0.12
2A-14A-[66A]-[66A]	2	5	18900	1880	900	1960	QPSK	1	12	14	10	5330	763	66	20	66786	2145	66	20	67236	2190	24.4	24.39	-0.01
2A-14A-[66A]-[66A]	14	10	23330	793	5330	763	QPSK	1	0	2	20	900	1960	66	20	66786	2145	66	20	67236	2190	24.07	24.05	-0.02
2A-14A-[66A]-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	14	10	5330	763	24.45	24.32	-0.13
2A-30A-[66A]-66A	2	5	18900	1880	900	1960	QPSK	1	12	30	10	9820	2355	66	20	66786	2145	66	20	67236	2190	24.4	24.34	-0.06
2A-30A-[66A]-66A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	2	20	900	1960	66	20	66786	2145	66	20	67236	2190	24.18	24.14	-0.04
2A-30A-[66A]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	30	10	9820	2355	24.45	24.4	-0.05

Combination	PCC									SCC				SCC				SCC				Tx Power		Deviation
	Band	BW	PCC UL Ch.	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Ch.	SCC DL Freq.	Band	BW	SCC DL Ch.	SCC DL Freq.	Band	BW	SCC DL Ch.	SCC DL Freq.	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with DL CA Enabled (dBm)	
2A-30A-[66A]-[66A]	2	5	18900	1880	900	1960	QPSK	1	12	30	10	9820	2355	66	20	66786	2145	66	20	67236	2190	24.4	24.39	-0.01
2A-30A-[66A]-[66A]	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	2	20	900	1960	66	20	66786	2145	66	20	67236	2190	24.18	24.06	-0.12
2A-30A-[66A]-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	30	10	9820	2355	24.45	24.31	-0.14
[2A]-46A-46C	2	5	18900	1880	900	1960	QPSK	1	12	46	20	50665	5537.5	46	20	50467	5517.7	46	20	53540	5825	24.4	24.3	-0.1
[2A]-46A-48C	2	5	18900	1880	900	1960	QPSK	1	12	46	20	50690	5540	48	20	56207	3646.7	48	20	56405	3666.5	24.4	24.36	-0.04
2A-46A-[48C]	2	5	18900	1880	900	1960	QPSK	1	12	46	20	50690	5540	48	20	56207	3646.7	48	20	56405	3666.5	24.4	24.35	-0.05
[2A]-46C-48A	2	5	18900	1880	900	1960	QPSK	1	12	46	20	50690	5540	46	20	50888	5559.8	48	20	56207	3646.7	24.4	24.29	-0.11
2A-46C-[48A]	2	5	18900	1880	900	1960	QPSK	1	12	46	20	50690	5540	46	20	50888	5559.8	48	20	56207	3646.7	24.4	24.3	-0.1
[2A]-46C-[48A]	2	5	18900	1880	900	1960	QPSK	1	12	46	20	50690	5540	46	20	50888	5559.8	48	20	56207	3646.7	24.4	24.35	-0.05
[2A]-46C-66A	2	5	18900	1880	900	1960	QPSK	1	12	46	20	50690	5540	46	20	50888	5559.8	66	20	66786	2145	24.4	24.28	-0.12
[2A]-46C-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	46	20	50690	5540	46	20	50888	5559.8	24.45	24.34	-0.11
2A-46C-[66A]	2	5	18900	1880	900	1960	QPSK	1	12	46	20	50690	5540	46	20	50888	5559.8	66	20	66786	2145	24.4	24.29	-0.11
2A-46C-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	46	20	50690	5540	46	20	50888	5559.8	24.45	24.3	-0.15
[2A]-46C-[66A]	2	5	18900	1880	900	1960	QPSK	1	12	46	20	50690	5540	46	20	50888	5559.8	66	20	66786	2145	24.4	24.32	-0.08
[2A]-46C-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	46	20	50690	5540	46	20	50888	5559.8	24.45	24.4	-0.05
[2A]-46D	2	5	18900	1880	900	1960	QPSK	1	12	46	20	50665	5537.5	46	20	50467	5517.7	46	20	50863	5557.3	24.4	24.33	-0.07
[2A]-48A-48C	2	5	18900	1880	900	1960	QPSK	1	12	48	20	56207	3646.7	48	20	55340	3560	48	20	55538	3579.8	24.4	24.39	-0.01
2A-[48A]-48C	2	5	18900	1880	900	1960	QPSK	1	12	48	20	56207	3646.7	48	20	55340	3560	48	20	55538	3579.8	24.4	24.33	-0.07
2A-48A-[48C]	2	5	18900	1880	900	1960	QPSK	1	12	48	20	56207	3646.7	48	20	55340	3560	48	20	55538	3579.8	24.4	24.31	-0.09
[2A]-[48A]-48C	2	5	18900	1880	900	1960	QPSK	1	12	48	20	56207	3646.7	48	20	55340	3560	48	20	55538	3579.8	24.4	24.31	-0.09
[2A]-48C-66A	2	5	18900	1880	900	1960	QPSK	1	12	48	20	56207	3646.7	48	20	56405	3666.5	66	20	66786	2145	24.4	24.36	-0.04
[2A]-48C-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	48	20	56207	3646.7	48	20	56405	3666.5	24.45	24.34	-0.11
2A-[48C]-66A	2	5	18900	1880	900	1960	QPSK	1	12	48	20	56207	3646.7	48	20	56405	3666.5	66	20	66786	2145	24.4	24.37	-0.03
2A-[48C]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	48	20	56207	3646.7	48	20	56405	3666.5	24.45	24.35	-0.1
2A-48C-[66A]	2	5	18900	1880	900	1960	QPSK	1	12	48	20	56207	3646.7	48	20	56405	3666.5	66	20	66786	2145	24.4	24.26	-0.14
2A-48C-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	48	20	56207	3646.7	48	20	56405	3666.5	24.45	24.32	-0.13
[2A]-48C-[66A]	2	5	18900	1880	900	1960	QPSK	1	12	48	20	56207	3646.7	48	20	56405	3666.5	66	20	66786	2145	24.4	24.31	-0.09
[2A]-48C-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	2	20	900	1960	48	20	56207	3646.7	48	20	56405	3666.5	24.45	24.44	-0.01
[2A]-48D	2	5	18900	1880	900	1960	QPSK	1	12	48	20	56207	3646.7	48	20	56009	3626.9	48	20	56405	3666.5	24.4	24.31	-0.09
2A-[66A]-66A-71A	2	5	18900	1880	900	1960	QPSK	1	12	66	20	66786	2145	66	20	67236	2190	71	20	68761	634.5	24.4	24.35	-0.05
2A-[66A]-66A-71A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	71	20	68761	634.5	24.45	24.36	-0.09
2A-[66A]-66A-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	2	20	900	1960	66	20	66786	2145	66	20	67236	2190	24.22	24.13	-0.09
2A-[66A]-[66A]-71A	2	5	18900	1880	900	1960	QPSK	1	12	66	20	66786	2145	66	20	67236	2190	71	20	68761	634.5	24.4	24.35	-0.05
2A-[66A]-[66A]-71A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	71	20	68761	634.5	24.45	24.39	-0.06
2A-[66A]-[66A]-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	2	20	900	1960	66	20	66786	2145	66	20	67236	2190	24.22	24.08	-0.14
[2C]-66A-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1017	1971.7	66	20	66786	2145	66	20	67236	2190	24.4	24.26	-0.14
[2C]-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	2	20	1098	1979.8	24.45	24.32	-0.13
2C-[66A]-66A	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1017	1971.7	66	20	66786	2145	66	20	67236	2190	24.4	24.25	-0.15
2C-[66A]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	2	20	1098	1979.8	24.45	24.39	-0.06
2C-[66A]-[66A]	2	5	18900	1880	900	1960	QPSK	1	12	2	20	1017	1971.7	66	20	66786	2145	66	20	67236	2190	24.4	24.37	-0.03
2C-[66A]-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	2	20	900	1960	2	20	1098	1979.8	24.45	24.44	-0.01
[2A]-66C-71A	2	5	18900	1880	900	1960	QPSK	1	12	66	20	66786	2145	66	20	66984	2164.8	71	20	68761	634.5	24.4	24.36	-0.04
[2A]-66C-71A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	2	20	900	1960	71	20	68761	634.5	24.45	24.42	-0.03
[2A]-66C-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	2	20	900	1960	66	20	66786	2145	66	20	66984	2164.8	24.22	24.1	-0.12
2A-[66C]-71A	2	5	18900	1880	900	1960	QPSK	1	12	66	20	66786	2145	66	20	66984	2164.8	71	20	68761	634.5	24.4	24.34	-0.06
2A-[66C]-71A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	2	20	900	1960	71	20	68761	634.5	24.45	24.41	-0.04
2A-[66C]-71A	71	10	133297	680.5	68761	634.5	QPSK	1	24	2	20	900	1960	66	20	66786	2145	66	20	66984	2164.8	24.22	24.21	-0.01
[4A]-4A-5B	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	5	10	2525	881.5	5	5	2453	874.3	24.42	24.35	-0.07
[4A]-4A-5B	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	4	20	2175	2132.5	4	10	2000	2115	24.19	24.09	-0.1
[4A]-[4A]-5B	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	5	10	2525	881.5	5	5	2453	874.3	24.42	24.33	-0.09
[4A]-[4A]-5B	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	4	20	2175	2132.5	4	10	2000	2115	24.19	24.08	-0.11
[4A]-4A-12B	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	12	5	5095	737.5	12	5	5047	732.7	24.42	24.4	-0.02
[4A]-[4A]-12B	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	4	20	2300	2145	12	5	5095	737.5	12	5	5047	732.7	24.42	24.32	-0.1
[4A]-46A-46C	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	46	20	50665	5537.5	46	20	50467	5517.7	46	20	53540	5825	24.42	24.3	-0.12
[4A]-46D	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	46	20	50665	5537.5	46	20	50467	5517.7	46	20	50863	5557.3	24.42	24.32	-0.1

Combination	PCC									SCC				SCC				SCC				Tx Power		Deviation
	Band	BW	PCC UL Ch.	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Ch.	SCC DL Freq.	Band	BW	SCC DL Ch.	SCC DL Freq.	Band	BW	SCC DL Ch.	SCC DL Freq.	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with DL CA Enabled (dBm)	
[4A]-48D	4	5	19975	1712.5	1975	2112.5	QPSK	1	12	48	20	55792	3605.2	48	20	55990	3625	48	20	56188	3644.8	24.42	24.4	-0.02
5A-5A-[66A]-66A	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2600	889	66	20	66786	2145	66	20	67236	2190	24.19	24.16	-0.03
5A-5A-[66A]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	5	10	2525	881.5	5	5	2425	871.5	24.45	24.37	-0.08
5A-5A-[66A]-[66A]	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2600	889	66	20	66786	2145	66	20	67236	2190	24.19	24.12	-0.07
5A-5A-[66A]-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	5	10	2525	881.5	5	5	2425	871.5	24.45	24.37	-0.08
5A-5A-[66B]	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2600	889	66	15	66786	2145	66	5	66879	2154.3	24.19	24.05	-0.14
5A-5A-[66B]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	15	66554	2121.8	5	10	2525	881.5	5	5	2425	871.5	24.45	24.41	-0.04
5A-5A-[66C]	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2600	889	66	20	66786	2145	66	20	66984	2164.8	24.19	24.16	-0.03
5A-5A-[66C]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	5	10	2525	881.5	5	5	2453	874.3	24.45	24.37	-0.08
5A-30A-[66A]-66A	5	5	20425	826.5	2425	871.5	QPSK	1	12	30	10	9820	2355	66	20	66786	2145	66	20	67236	2190	24.19	24.16	-0.03
5A-30A-[66A]-66A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	5	10	2525	881.5	66	20	66786	2145	66	20	67236	2190	24.18	24.09	-0.09
5A-30A-[66A]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	5	10	2525	881.5	30	10	9820	2355	24.45	24.32	-0.13
5A-30A-[66A]-[66A]	5	5	20425	826.5	2425	871.5	QPSK	1	12	30	10	9820	2355	66	20	66786	2145	66	20	67236	2190	24.19	24.04	-0.15
5A-30A-[66A]-[66A]	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	5	10	2525	881.5	66	20	66786	2145	66	20	67236	2190	24.18	24.17	-0.01
5A-30A-[66A]-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	5	10	2525	881.5	30	10	9820	2355	24.45	24.35	-0.1
5B-30A-[66A]	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	30	10	9820	2355	66	20	66786	2145	24.19	24.17	-0.02
5B-30A-[66A]	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	5	10	2525	881.5	5	5	2453	874.3	66	20	66786	2145	24.18	24.14	-0.04
5B-30A-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	5	10	2525	881.5	5	5	2453	874.3	30	10	9820	2355	24.45	24.42	-0.03
5A-46C-[66A]	5	5	20425	826.5	2425	871.5	QPSK	1	12	46	20	50690	5540	46	20	50888	5559.8	66	20	66786	2145	24.19	24.16	-0.03
5A-46C-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	5	10	2525	881.5	46	20	50690	5540	46	20	50888	5559.8	24.45	24.33	-0.12
5A-[48A]-48C	5	5	20425	826.5	2425	871.5	QPSK	1	12	48	20	53340	3560	48	20	56640	3690	48	20	56442	3670.2	24.19	24.08	-0.11
5A-48A-[48C]	5	5	20425	826.5	2425	871.5	QPSK	1	12	48	20	53340	3560	48	20	56640	3690	48	20	56442	3670.2	24.19	24.06	-0.13
5A-[48C]-66A	5	5	20425	826.5	2425	871.5	QPSK	1	12	48	20	55990	3625	48	20	56188	3644.8	66	20	66786	2145	24.19	24.04	-0.15
5A-[48C]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	5	10	2525	881.5	48	20	55990	3625	48	20	56188	3644.8	24.45	24.41	-0.04
5A-48C-[66A]	5	5	20425	826.5	2425	871.5	QPSK	1	12	48	20	55990	3625	48	20	56188	3644.8	66	20	66786	2145	24.19	24.08	-0.11
5A-48C-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	5	10	2525	881.5	48	20	55990	3625	48	20	56188	3644.8	24.45	24.36	-0.09
5B-[66A]-66A	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	66	20	66786	2145	66	20	67236	2190	24.19	24.1	-0.09
5B-[66A]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	5	10	2525	881.5	5	5	2453	874.3	24.45	24.43	-0.02
5B-[66A]-[66A]	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	66	20	66786	2145	66	20	67236	2190	24.19	24.04	-0.15
5B-[66A]-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	5	10	2525	881.5	5	5	2453	874.3	24.45	24.34	-0.11
5B-[66B]	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	66	15	66786	2145	66	5	66879	2154.3	24.19	24.05	-0.14
5B-[66B]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	15	66554	2121.8	5	10	2525	881.5	5	5	2453	874.3	24.45	24.33	-0.12
5B-[66C]	5	5	20425	826.5	2425	871.5	QPSK	1	12	5	10	2497	878.7	66	20	66786	2145	66	20	66984	2164.8	24.19	24.05	-0.14
5B-[66C]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	5	10	2525	881.5	5	5	2453	874.3	24.45	24.31	-0.14
12A-30A-[66A]-66A	12	5	23155	713.5	5155	743.5	QPSK	1	24	30	10	9820	2355	66	20	66786	2145	66	20	67236	2190	24.45	24.41	-0.04
12A-30A-[66A]-66A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	12	10	5095	737.5	66	20	66786	2145	66	20	67236	2190	24.18	24.17	-0.01
12A-30A-[66A]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	12	10	5095	737.5	30	10	9820	2355	24.45	24.41	-0.04
12A-30A-[66A]-[66A]	12	5	23155	713.5	5155	743.5	QPSK	1	24	30	10	9820	2355	66	20	66786	2145	66	20	67236	2190	24.45	24.44	-0.01
12A-30A-[66A]-[66A]	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	12	10	5095	737.5	66	20	66786	2145	66	20	67236	2190	24.18	24.12	-0.06
12A-30A-[66A]-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	12	10	5095	737.5	30	10	9820	2355	24.45	24.33	-0.12
13A-46C-[66A]	13	10	23230	782	5230	751	QPSK	1	0	46	20	50690	5540	46	20	50888	5559.8	66	20	66786	2145	24.26	24.12	-0.14
13A-46C-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	13	10	5230	751	46	20	50690	5540	46	20	50888	5559.8	24.45	24.4	-0.05
13A-[48A]-48C	13	10	23230	782	5230	751	QPSK	1	0	48	20	53340	3560	48	20	56640	3690	48	20	56442	3670.2	24.26	24.22	-0.04
13A-48A-[48C]	13	10	23230	782	5230	751	QPSK	1	0	48	20	53340	3560	48	20	56640	3690	48	20	56442	3670.2	24.26	24.21	-0.05
13A-[48C]-66A	13	10	23230	782	5230	751	QPSK	1	0	48	20	55990	3625	48	20	56188	3644.8	66	20	66786	2145	24.26	24.19	-0.07
13A-[48C]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	13	10	5230	751	48	20	55990	3625	48	20	56188	3644.8	24.45	24.39	-0.06
13A-48C-[66A]	13	10	23230	782	5230	751	QPSK	1	0	48	20	55990	3625	48	20	56188	3644.8	66	20	66786	2145	24.26	24.22	-0.04
13A-48C-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	13	10	5230	751	48	20	55990	3625	48	20	56188	3644.8	24.45	24.3	-0.15
13A-[48A]-66B	13	10	23230	782	5230	751	QPSK	1	0	48	20	55990	3625	66	15	66786	2145	66	5	66879	2154.3	24.26	24.17	-0.09
13A-[48A]-66B	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	15	66554	2121.8	13	10	5230	751	48	20	55990	3625	24.45	24.39	-0.06
13A-48A-[66B]	13	10	23230	782	5230	751	QPSK	1	0	48	20	55990	3625	66	15	66786	2145	66	5	66879	2154.3	24.26	24.15	-0.11
13A-48A-[66B]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	15	66554	2121.8	13	10	5230	751	48	20	55990	3625	24.45	24.42	-0.03
13A-[48A]-66C	13	10	23230	782	5230	751	QPSK	1	0	48	20	55990	3625	66	20	66786	2145	66	20	66984	2164.8	24.26	24.2	-0.06
13A-[48A]-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	13	10	5230	751	48	20	55990	3625	24.45	24.35	-0.1
13A-48A-[66C]	13	10	23230	782	5230	751	QPSK	1	0	48	20	55990	3625	66	20	66786	2145	66	20	66984	2164.8	24.26	24.11	-0.15

Combination	PCC									SCC				SCC				SCC				Tx Power		Deviation
	Band	BW	PCC UL Ch.	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Ch.	SCC DL Freq.	Band	BW	SCC DL Ch.	SCC DL Freq.	Band	BW	SCC DL Ch.	SCC DL Freq.	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with DL CA Enabled (dBm)	
13A-48A-[66C]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	13	10	5230	751	48	20	55990	3625	24.45	24.39	-0.06
14A-30A-[66A]-66A	14	10	23330	793	5330	763	QPSK	1	0	30	10	9820	2355	66	20	66786	2145	66	20	67236	2190	24.07	23.98	-0.09
14A-30A-[66A]-66A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	14	10	5330	763	66	20	66786	2145	66	20	67236	2190	24.18	24.05	-0.13
14A-30A-[66A]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	14	10	5330	763	30	10	9820	2355	24.45	24.42	-0.03
14A-30A-[66A]-[66A]	14	10	23330	793	5330	763	QPSK	1	0	30	10	9820	2355	66	20	66786	2145	66	20	67236	2190	24.07	24.05	-0.02
14A-30A-[66A]-[66A]	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	14	10	5330	763	66	20	66786	2145	66	20	67236	2190	24.18	24.07	-0.11
14A-30A-[66A]-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	14	10	5330	763	30	10	9820	2355	24.45	24.37	-0.08
[25A]-25A-41C	25	15	26365	1883	8365	1963	QPSK	1	36	25	20	8590	1985	41	20	40620	2593	41	20	40422	2573.2	24.35	24.22	-0.13
[25A]-25A-41C	25	15	26365	1882.5	8365	1962.5	QPSK	1	36	26	5	8865	876.5	41	20	40620	2593	41	20	40422	2573.2	24.45	24.3	-0.15
[25A]-25A-41C	26	5	26715	816.5	8715	861.5	QPSK	1	0	25	20	8365	1962.5	41	20	40620	2593	41	20	40422	2573.2	24.24	24.23	-0.01
25A-25A-[41C]	25	15	26365	1883	8365	1963	QPSK	1	36	25	20	8590	1985	41	20	40620	2593	41	20	40422	2573.2	24.35	24.26	-0.09
25A-25A-[41C]	25	15	26365	1882.5	8365	1962.5	QPSK	1	36	26	5	8865	876.5	41	20	40620	2593	41	20	40422	2573.2	24.45	24.36	-0.09
25A-25A-[41C]	26	5	26715	816.5	8715	861.5	QPSK	1	0	25	20	8365	1962.5	41	20	40620	2593	41	20	40422	2573.2	24.24	24.17	-0.07
[25A]-[25A]-41C	25	15	26365	1883	8365	1963	QPSK	1	36	25	20	8590	1985	41	20	40620	2593	41	20	40422	2573.2	24.35	24.26	-0.09
[25A]-[25A]-41C	25	15	26365	1882.5	8365	1962.5	QPSK	1	36	26	5	8865	876.5	41	20	40620	2593	41	20	40422	2573.2	24.45	24.43	-0.02
[25A]-[25A]-41C	26	5	26715	816.5	8715	861.5	QPSK	1	0	25	20	8365	1962.5	41	20	40620	2593	41	20	40422	2573.2	24.24	24.21	-0.03
[25A]-41D	25	15	26365	1883	8365	1963	QPSK	1	36	41	20	40422	2573.2	41	20	40620	2593	41	20	40818	2612.8	25.35	25.34	-0.01
25A-[41D]	25	15	26365	1883	8365	1963	QPSK	1	36	41	20	40422	2573.2	41	20	40620	2593	41	20	40818	2612.8	25.35	25.22	-0.13
[25A]-46D	25	15	26365	1882.5	8365	1962.5	QPSK	1	36	46	20	50492	5520.2	46	20	50690	5540	46	20	50888	5559.8	24.45	24.33	-0.12
29A-30A-[66A]-66A	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	29	10	9715	722.5	66	20	66786	2145	66	20	67236	2190	24.18	24.16	-0.02
29A-30A-[66A]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	29	10	9715	722.5	30	10	9820	2355	24.45	24.35	-0.1
29A-30A-[66A]-[66A]	30	5	27685	2307.5	9795	2352.5	QPSK	1	0	29	10	9715	722.5	66	20	66786	2145	66	20	67236	2190	24.18	24.04	-0.14
29A-30A-[66A]-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	29	10	9715	722.5	30	10	9820	2355	24.45	24.36	-0.09
[41A]-41D[PC3]	41	15	40620	2593	40620	2593	QPSK	1	36	41	20	41094	2640.4	41	20	41292	2660.2	41	20	41490	2680	23.9	23.8	-0.1
[41A]-41D[PC3]	41	15	40620	2593	40620	2593	QPSK	1	36	41	20	40422	2573.2	41	20	40224	2553.4	41	20	41490	2680	23.9	23.86	-0.04
[41A]-41D[PC2]	41	15	40620	2593	40620	2593	QPSK	1	36	41	20	41094	2640.4	41	20	41292	2660.2	41	20	41490	2680	26.31	26.17	-0.14
[41A]-41D[PC2]	41	15	40620	2593	40620	2593	QPSK	1	36	41	20	40422	2573.2	41	20	40224	2553.4	41	20	41490	2680	26.31	26.16	-0.15
[41C]-41C[PC3]	41	15	40620	2593	40620	2593	QPSK	1	36	41	20	40422	2573.2	41	20	41292	2660.2	41	20	41490	2680	23.9	23.82	-0.08
[41C]-41C[PC2]	41	15	40620	2593	40620	2593	QPSK	1	36	41	20	40422	2573.2	41	20	41292	2660.2	41	20	41490	2680	26.31	26.21	-0.1
46A-46C-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	46	20	50665	5537.5	46	20	50467	5517.7	46	20	53540	5825	24.45	24.37	-0.08
46A-[48C]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	46	20	50690	5540	48	20	55990	3625	48	20	56188	3644.8	24.45	24.33	-0.12
46A-48C-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	46	20	50690	5540	48	20	55990	3625	48	20	56188	3644.8	24.45	24.35	-0.1
46C-[48A]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	48	20	55990	3625	46	20	50690	5540	46	20	50888	5559.8	24.45	24.44	-0.01
46C-48A-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	48	20	55990	3625	46	20	50690	5540	46	20	50888	5559.8	24.45	24.44	-0.01
46C-[48A]-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	48	20	55990	3625	46	20	50690	5540	46	20	50888	5559.8	24.45	24.42	-0.03
46C-[66A]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	46	20	50690	5540	46	20	50888	5559.8	24.45	24.4	-0.05
46C-[66A]-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	46	20	50690	5540	46	20	50888	5559.8	24.45	24.41	-0.04
46D-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	46	20	50492	5520.2	46	20	50690	5540	46	20	50888	5559.8	24.45	24.37	-0.08
48A-48A-[66A]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	48	20	55990	3625	48	20	56640	3690	24.45	24.33	-0.12
48A-48A-[66A]-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	48	20	55990	3625	48	20	56640	3690	24.45	24.32	-0.13
[48A]-48A-66B	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	48	20	55340	3560	48	20	56640	3690	24.45	24.31	-0.14
48A-48A-[66B]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	48	20	55340	3560	48	20	56640	3690	24.45	24.39	-0.06
[48A]-[48A]-66B	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	48	20	55340	3560	48	20	56640	3690	24.45	24.33	-0.12
[48A]-48A-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	48	20	55340	3560	48	20	56640	3690	24.45	24.3	-0.15
48A-48A-[66C]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	48	20	55340	3560	48	20	56640	3690	24.45	24.38	-0.07
[48A]-[48A]-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	48	20	55340	3560	48	20	56640	3690	24.45	24.42	-0.03
[48A]-48C-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	48	20	53340	3560	48	20	56640	3690	48	20	56442	3670.2	24.45	24.35	-0.1
48A-[48C]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	48	20	53340	3560	48	20	56640	3690	48	20	56442	3670.2	24.45	24.43	-0.02
48A-48C-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	48	20	53340	3560	48	20	56640	3690	48	20	56442	3670.2	24.45	24.44	-0.01
[48A]-48D	48	10	56690	3695	56690	3695	QPSK	1	49	48	20	55340	3579.8	48	20	55538	3599.6	48	20	55736	3619.4	21.93	21.84	-0.09
[48C]-48C	48	10	56690	3695	56690	3695	QPSK	1	49	48	20	56546	3680.6	48	20	55340	3560	48	20	55538	3579.8	21.93	21.92	-0.01
[48C]-66A-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	48	20	55990	3625	48	20	56188	3644.8	24.45	24.35	-0.1
48C-[66A]-66A	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	48	20	55990	3625	48	20	56188	3644.8	24.45	24.39	-0.06
48C-[66A]-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	67236	2190	48	20	55990	3625	48	20	56188	3644.8	24.45	24.4	-0.05
48D-[66A]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	48	20	55792	3605.2	48	20	55990	3625	48	20	56188	3644.8	24.45	24.35	-0.1

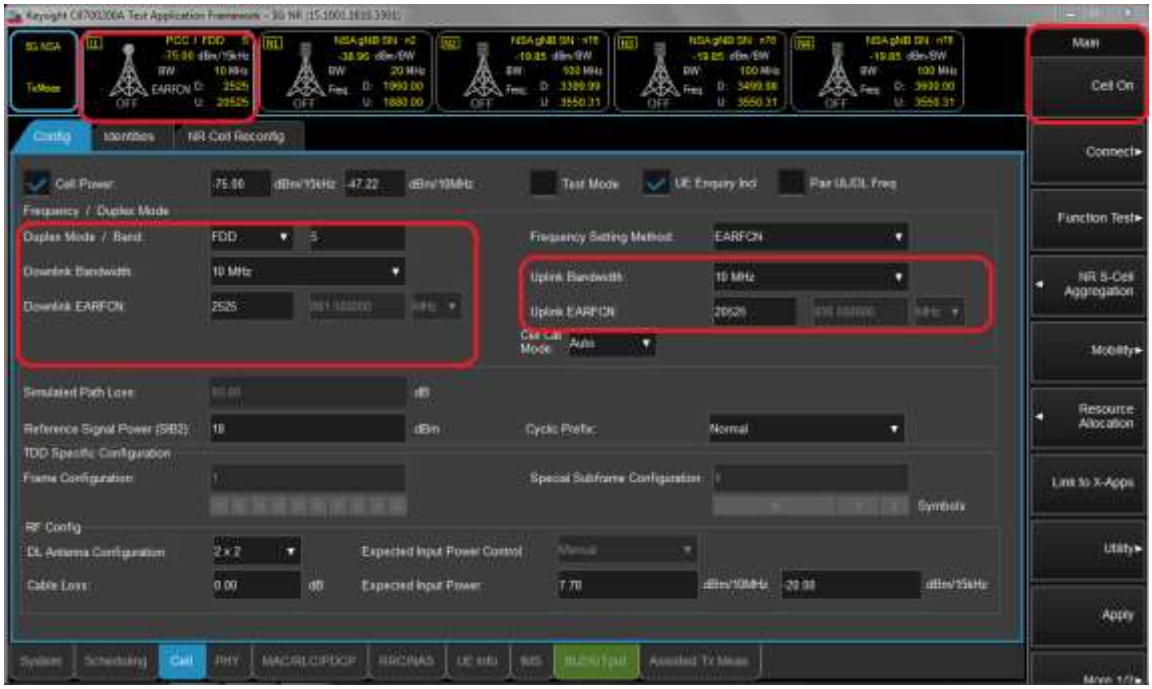
Combination	PCC									SCC				SCC				SCC				Tx Power		Deviation
	Band	BW	PCC UL Ch.	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Ch.	SCC DL Freq.	Band	BW	SCC DL Ch.	SCC DL Freq.	Band	BW	SCC DL Ch.	SCC DL Freq.	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with DL CA Enabled (dBm)	
[48C]-66B	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	15	66554	2121.8	48	20	55990	3625	48	20	56188	3644.8	24.45	24.3	-0.15
48C-[66B]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	15	66554	2121.8	48	20	55990	3625	48	20	56188	3644.8	24.45	24.31	-0.14
[48C]-66C	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	48	20	55990	3625	48	20	56188	3644.8	24.45	24.38	-0.07
48C-[66C]	66	5	131997	1712.5	66461	2112.5	QPSK	1	12	66	20	66578	2124.2	48	20	55990	3625	48	20	56188	3644.8	24.45	24.3	-0.15

2. 5G NR Call Box Setup

Procedure used to establish output Power measurement for NR Bands

Select operating band, BW and Channel.

- Click Cell on button in the right of Test application screen.
- Turn the LTE Cell On using “ON/OFF” Key.

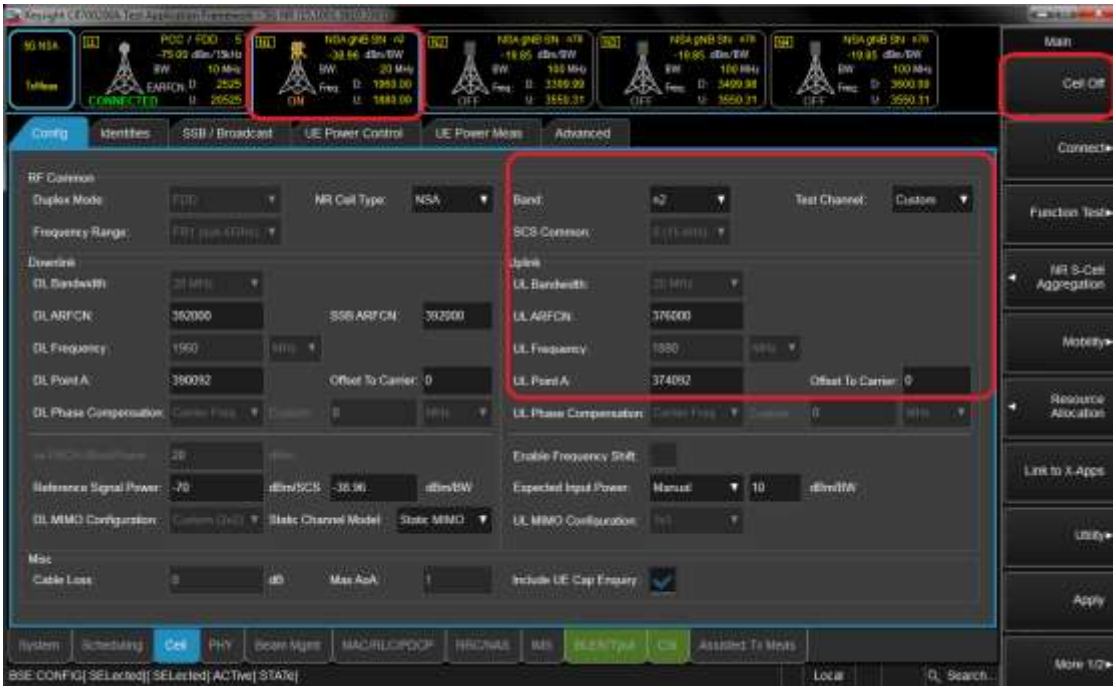


- Turn the Airplane Mode On and then turn the Airplane mode off.
- Select All down bits for UL Power control Mode in LTE.

Setup for NR Band

- Select waveform for Setting NR Band (PHY->PUSCH->Enable Transform Precoder)
  - Enable : DFT-s-OFDM, Disable : CP-OFDM

- Select operating band, BW, SCS and Channel.
- Turn the NR Cell On using “ON/OFF” Key.

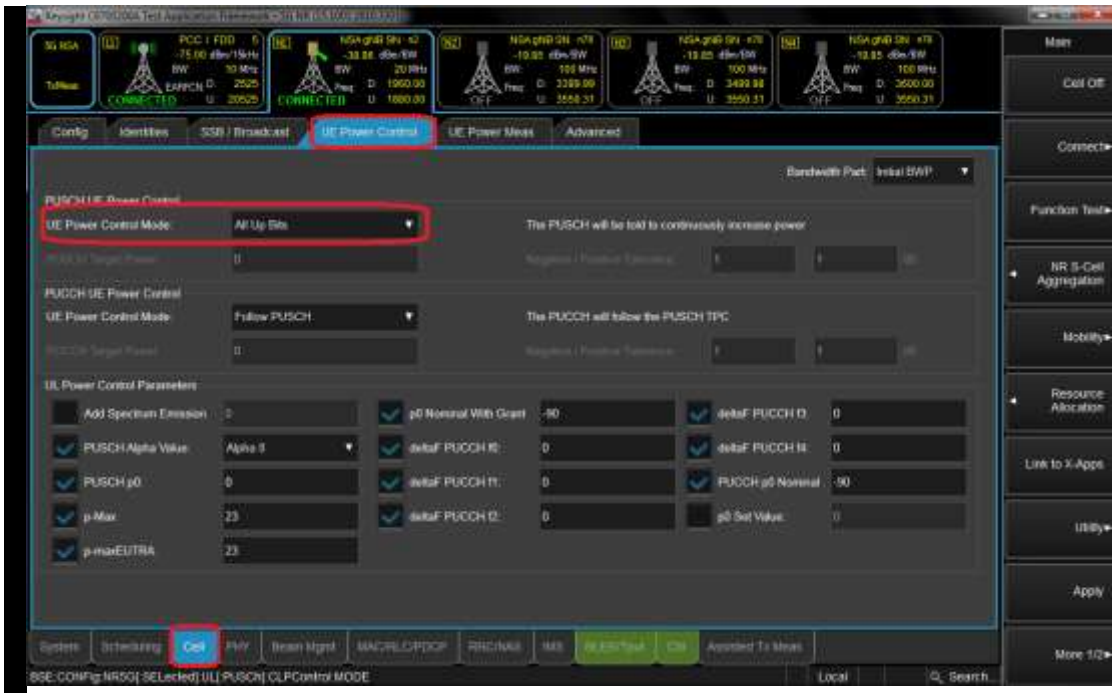


Connect NR S-Cell Aggregation

- Click NR S-Cell Aggregation
- Check the Cell 1's DL and UL box(PCC) and than Click Apply.
- Check the message summary If message shows NR Msg 5, It is connected.

Max Power setting

- Click "Cell in the bottom of screen.
- Click "UE Power control" than change UE Power control mode to All Up bits.



Selecting Start RB/Count/MCS

- Select the each test configurating (Start RB, Count, MCS).

View Tx Power

- Click “Link to X-Apps.”(Please refer to Figure-7)
- Select “Channel Power”.