TESTING CERT #3478.01

SAR TEST REPORT

EUT Description	**Smartphone**
Brand Name	**Intel**
Model Name	**EP110**
Serial Number	**INV141401442 / INV141400948**
FCC/IC ID	**FCC ID: O2Z-EP110 / IC: 1000W-EP110**
Hardware/Software Version	**HW: PR2** **FW: main-engineering - 53181 / flash-V1_7260_PR2_CERTIF_REG.xml**
Date of Sample Receipt	**2014-07-23**
Date of Test	**2014-10-02**
Features	**2G: GSM/GPRS/EDGE 850 / 1900** **3G: WCDMA/HSPA/DC-HSDPA FDD II / IV / V** **4G: LTE-FDD 25(2) / 4 / 26(5) / 7 / 13 / 17 / 29; CA 2+4/5/17/29 - 4+5/13/17/29** **WiFi: 802.11 a/b/g/n/ac 2.4/5.2/5.3/5.6/5.8 GHz** **Bluetooth: BDR/EDR v2.1, Bluetooth LE v4.0** (see section 5)

Applicant	**Intel Corporation**
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Contact Person	**Marianne Gutierrez**
Telephone/Fax/Email	**marianne.l.gutierrez@intel.com**

Reference Standards	**FCC 47 CFR Part §2.1093** **RSS-102, Issue 4** (see section 1)	
RF Exposure Environment	**Portable devices - General population/uncontrolled exposure**	
	SAR Result	SAR Limit
Maximum SAR Result & Limit	**1.438 W/kg (1g)**	**1.6 W/kg (1g)**

Test Report number	**14072401.TR02**
Revision Control	**Rev. 01**

The test results relate only to the samples tested.
The test report shall not be reproduced in full, without written approval of the laboratory.

Reviewed by	Approved by
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1. Standards, reference documents and applicable test methods

1. FCC 47 CFR Part §2.1093 - Radiofrequency radiation exposure evaluation: portable devices.
2. FCC OET KDB 248827 D01 – Measurement Procedures for 802.11 a/b/g Transmitters.
3. FCC OET KDB 447498 D01 – Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.
4. FCC OET KDB 648474 D04 – SAR Evaluation Considerations for Wireless Handsets.
5. FCC OET KDB 865664 D01 – SAR Measurement Requirements for 100 MHz to 6 GHz.
6. FCC OET KDB 865664 D02 – RF Exposure Compliance Reporting and Documentation Considerations.
7. FCC OET KDB 941225 D01 – SAR Measurement Procedures for 3G Devices.
8. FCC OET KDB 941225 D02 – SAR Guidance for HSPA, HSPA+, DC-HSDPA and 1x-Advanced.
9. FCC OET KDB 941225 D03 – Recommended SAR Test Reduction Procedures for GSM/GPRS/EDGE.
10. FCC OET KDB 941225 D05 – SAR Evaluation Considerations for LTE Devices.
11. FCC OET KDB 941225 D05A – Rel. 10 LTE SAR Test Guidance and KDB Inquiries.
12. FCC OET KDB 941225 D06 – SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities.
13. IC RSS 102, Issue 4 – Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands).
14. IC Notice 2012-DRS0529 – SAR correction for measured conductivity and relative permittivity based on IEC 62209-2 standard.
15. IC Notice 2012-DRS1203 – Applicability of latest FCC RF Exposure KDB procedures (publication date October 24, 2012) and other procedures.
16. IC Notice 2013-DRS0911 – Latest publication of IEEE 1528-2013 and power exemption limits.
17. IEEE Std 1528-2003 - IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.
18. IEEE Std 1528-2013 – IEEE Recommended Practice Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communication Devices: Measurement Techniques.
19. R&S Application note 1CM95 – WCDMA RF Measurements with the R&S®CMW500 according to 3GPP TS 34.121.
20. R&S Application note 1CM96 – HSDPA RF Measurements with the R&S®CMW500 in line with 3GPP TS 34.121.
21. R&S Application note 1CM97 – HSUPA RF Measurements with the R&S®CMW500 in line with 3GPP TS 34.121.

2. General conditions, competences and guarantees

- ✓ Intel Mobile Communications Wireless RF Lab (Intel WRF Lab) is a testing laboratory accredited by the American Association for Laboratory Accreditation (A2LA).
- ✓ Intel WRF Lab only provides testing services and is committed to providing reliable, unbiased test results and interpretations.
- ✓ Intel WRF Lab is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.
- ✓ Intel WRF Lab has developed calibration and proficiency programs for its measurement equipment to ensure correlated and reliable results to its customers.
- ✓ This report is only referred to the item that has undergone the test.
- ✓ This report does not imply an approval of the product by the Certification Bodies or competent Authorities.
- ✓ Complete or partial reproduction of the report cannot be made without written permission of Intel WRF Lab.

3. Environmental Conditions

✓ All tests were performed in a laboratory with an environment which avoids influence on SAR measurements by ambient EM sources and any reflection from the environment itself, and the following limits were not exceeded during the tests:

Temperature	23ºC ± 2ºC
Humidity	60% ± 10%

✓ The liquid temperature was measure before and after each test using a Digital thermometer DTM 3000 special. The following limits were not exceeded during the tests:

Liquid Temperature	23ºC ± 2ºC

4. Test samples

Sample	Test Item #	Description	Model	Serial #	Date of reception
#01	14072401.S04	Smartphone Pre-production	EP110	INV141401442	2014-07-23
#02	14072401.S02	Smartphone Pre-production	EP110	INV141400948	2014-07-23

✓ Sample #01 has undergone all the test(s) requested by the applicant, following the standards specified in section 1, except the conducted power testing.
✓ Sample #02 has undergone all the conducted power tests requested by the applicant, following the standards specified in section 1.

5. Remarks and comments

1. All power measurements for 3G modes (WCDMA, HSDPA, HSUPA and DC-HSDPA) were performed using a R&S CMW500, properly configured according to FCC OET KDB 941225 D01, FCC OET KDB 941225 D02, and the corresponding R&S application notes detailed in *1. Standards, reference documents and applicable test methods*.
2. Only the plots for the test positions with the highest measured SAR per band/mode are included in *Annex C. Test System Plots*, as required per FCC OET KDB 865664 D02, paragraph 2.3.8.
3. As per FCC OET KDB 648474 D04, paragraph 1.4, when the separation distance required for body-worn accessory testing is larger than or equal to that tested for hotspot mode, using the same wireless mode test configuration for voice and data, such as WCDMA, LTE and Wi-Fi, and for the same surface of the phone, the hotspot mode SAR data may be used to support body-worn accessory SAR compliance for that particular configuration (surface).
4. The SAR to peak location separation ratio when evaluating 3 transmitters was calculated taking as R_i the shorter of both R_i(Cellular to WiFi) and R_i(Cellular to BT).

6. Document Revision History

Revision #	Date	Details
Rev. 01	2014-12-12	Final document split in several files as requested by the Applicant
Rev. 00	2014-11-27	First Issue

7. Equipment Under Test

Brand Name	Intel
Model Name	EP110
FCC/IC ID	FCC ID: O2Z-EP110 / IC: 1000W-EP110
Hardware Version	PR2
Software Version	main-engineering-53181/flash-V1_7260_PR2_CERTIF_REG.xml
Prototype / Production	Pre-Production
Dimensions	138 x 68 x 10 mm
Operational Conditions	Voltage: 3.6 V_{DC} to 4.35 V_{DC}. Rechargeable Li-ion Polymer Battery. Temperature: -10ºC to +55ºC
Exposure Conditions	Held next to the ear Body worn Personal Wireless Router (hotspot)
Supported Radios	GSM / GPRS / EDGE, MS Class 33, Power Class 4/1, Mobile Class B WCDMA / HSPA+ / DC-HSDPA, Power Class 3, DL Rel-8 Cat. 24, UL Rel-6 Cat. 6 LTE FDD, Rel-10 Category 4 LTE Carrier Aggregation (DL only) 802.11a/b/g/n/ac BDR/EDR v2.1 - Bluetooth LE v4.0 GPS
Antenna Information	**Main Cellular:** Internal Monopole. GSM, WCDMA and LTE **Secondary Cellular:** Internal Monopole, only Rx. WCDMA and LTE **WLAN Antenna:** Internal Monopole. 802.11 and Bluetooth **GPS Antenna:** Internal Monopole, only Rx. See Annex F: Photographs for more information about the location of each antenna within the device.
Simultaneous Transmission Configurations	**Head and Body worn exposure conditions:** Cellular + WLAN 2.4GHz Cellular + WLAN 5GHz Cellular + Bluetooth Cellular + WLAN 5GHz + Bluetooth WLAN 5GHz + Bluetooth **Personal wireless Router (hotspot) exposure conditions:** Cellular + WLAN 2.4GHz Cellular + WLAN 5.8GHz Cellular + WLAN 5.8GHz + Bluetooth
Additional Info	The DUT supports VoLTE, so Head Exposure is also considered for LTE modes. Maximum Power Reduction (MPR) is implemented according to 3GPP TS 36.101, paragraph 6.2.3, and it is a permanent feature, built-in by design:

Modulation	Channel bandwidth / #RB						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

Supported Radios

Mode	Duty Cycle		Modulation	Band	UL Freq Range (MHz)	Measured Max. Conducted Power (dBm)
GSM	12.5%		GMSK	GSM850	824-849	32.89
				PCS1900	1850-1910	29.38
(E)GPRS	1slot	12.5%	GMSK 8PSK	GSM850	824-849	32.89
	2slot	25%				
	3slot	37.5%		PCS1900	1850-1910	29.36
	4slot	50%				
WCDMA HSPA+ DC-HSPA	100%		QPSK 16QAM	FDD II	1850-1910	23.82
				FDD IV	1710-1755	23.72
				FDD V	824-849	23.22
LTE FDD	100%		QPSK 16QAM	Band 2	1850-1910	22.91
				Band 4	1710-1755	22.93
				Band 5	824-849	22.39
				Band 7	2500-2570	23.12
				Band 13	777-787	22.82
				Band 17	704-716	23.20
				Band 25	1850-1915	22.89
				Band 26	814-849	22.62
				Band 29	DL Only	N/A
BDR/EDR v2.1	72.5%		GFSK π/4 DQPSK 8DPSK	2.4GHz	2400-2483.5	6.95
Bluetooth LE v4.0	62%		GFSK	2.4GHz	2400-2483.5	4.17
802.11b/g/n	100%		BPSK QPSK 16QAM 64QAM	2.4GHz	2400-2483.5	15.88
802.11a/n/ac	100%		BPSK QPSK 16QAM 64QAM 256QAM	5.2GHz	5150-5250	12.00
				5.3GHz	5250-5350	11.94
				5.6GHz	5475-5725	11.97
				5.8GHz	5725-5850	11.72
GPS	N/A		N/A	L1	N/A	N/A

LTE Supported BW per band

	BW (MHz)					
E-UTRA Band	1.4	3	5	10	15	20
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes		
7			Yes	Yes	Yes	Yes
13			Yes	Yes		
17			Yes	Yes		
25	Yes	Yes	Yes	Yes	Yes	Yes
26	Yes	Yes	Yes	Yes	Yes	

LTE CA modes

E-UTRA CA config	E-UTRA Band	BW (MHz)						Max Aggregated BW (MHz)
		1.4	3	5	10	15	20	
CA_2A_4A	2	Yes	Yes	Yes	Yes	Yes	Yes	40
	4			Yes	Yes	Yes	Yes	
	2			Yes	Yes			20
	4			Yes	Yes			
CA_2A_5A	2			Yes	Yes	Yes	Yes	30
	5			Yes	Yes			
CA_2A_13A	2			Yes	Yes	Yes	Yes	30
	13				Yes			
	2			Yes	Yes			20
	13				Yes			
CA_2A_17A	2			Yes	Yes			20
	17			Yes	Yes			
CA_2A_29A	2			Yes	Yes			20
	29		Yes	Yes	Yes			
	2			Yes	Yes			20
	29			Yes	Yes			
	2			Yes	Yes	Yes	Yes	30
	29			Yes	Yes			
CA_4A_4A	4			Yes	Yes	Yes	Yes	40
	4			Yes	Yes	Yes	Yes	
CA_4A_5A	4			Yes	Yes			20
	5			Yes	Yes			
	4			Yes	Yes	Yes	Yes	30
	5			Yes	Yes			
CA_4A_13A	4			Yes	Yes	Yes	Yes	30
	13				Yes			
	4			Yes	Yes			20
	13				Yes			
CA_4A_17A	4			Yes	Yes			20
	17			Yes	Yes			
CA_4A_29A	4			Yes	Yes			20
	29		Yes	Yes	Yes			
	4			Yes	Yes			20
	29			Yes	Yes			
	4			Yes	Yes	Yes	Yes	30
	29			Yes	Yes			

8. Test Verdicts summary

Mode	Band	Highest Reported SAR (1g) (W/kg)		Verdict
		Head	Body	
GSM / GPRS / EDGE	GSM 850	0.330	0.553	P
	PCS 1900	0.262	0.032	P
WCDMA / HSPA / DC-HSDPA	FDD II	0.611	0.610	P
	FDD IV	0.933	0.967	P
	FDD V	0.408	0.550	P
LTE FDD	Band 2	0.513	0.431	P
	Band 4	0.493	0.497	P
	Band 5	0.285	0.451	P
	Band 7	0.269	1.438	P
	Band 13	0.298	0.397	P
	Band 17	0.205	0.243	P
	Band 25	0.437	0.459	P
	Band 26	0.214	0.399	P
802.11b/g/n	2.4GHz	1.156	0.163	P
802.11a/n/ac	5.2GHz	0.645	0.133	P
	5.3GHz	0.742	0.164	P
	5.6GHz	1.019	0.184	P
	5.8GHz	0.898	0.175	P
Bluetooth	2.4GHz	0.281	0.052	P

P: Pass
F: Fail
NM: Not Measured
NA: Not Applicable

According to the FCC OET KDB 690783 D01, this is the summary of the values for the Grant Listing:

Highest Reported SAR (1g) (W/kg)				
Exposure Condition	Equipment Class			
	PCE	DTS	DSS	NII
Head	0.93	1.16	0.28	1.02
Body Worn	0.97	0.16	<0.1	0.18
Personal Wireless Router	1.44	0.17	<0.1	0.16
Simultaneous Tx	Sum-SAR: 1.44	Sum-SAR: 1.44	Sum-SAR: 1.44	Sum-SAR: 1.44

Considering the results of the performed test according to FCC 47CFR Part 2.1093 and IC RSS 102, Issue 4 the item under test is IN COMPLIANCE with the requested specifications specified in *1. Standards, reference documents and applicable test methods.*

Annex A. Test & System Description

A.1 SAR Definition

Specific Absorption rate is defined as the time derivative of the incremental energy (dW) absorbed by (dissipated in) and incremental mass (dm) contained in a volume element (dV) of a given density (ρ).

$$SAR = \frac{d}{dt} \cdot \left(\frac{dW}{dm}\right) = \frac{d}{dt} \cdot \left(\frac{dW}{\rho \cdot dV}\right)$$

SAR is expressed in units of watts per kilogram (W/kg). SAR can be related to the electric field at a point by

$$SAR = \frac{\sigma |E|^2}{\rho}$$

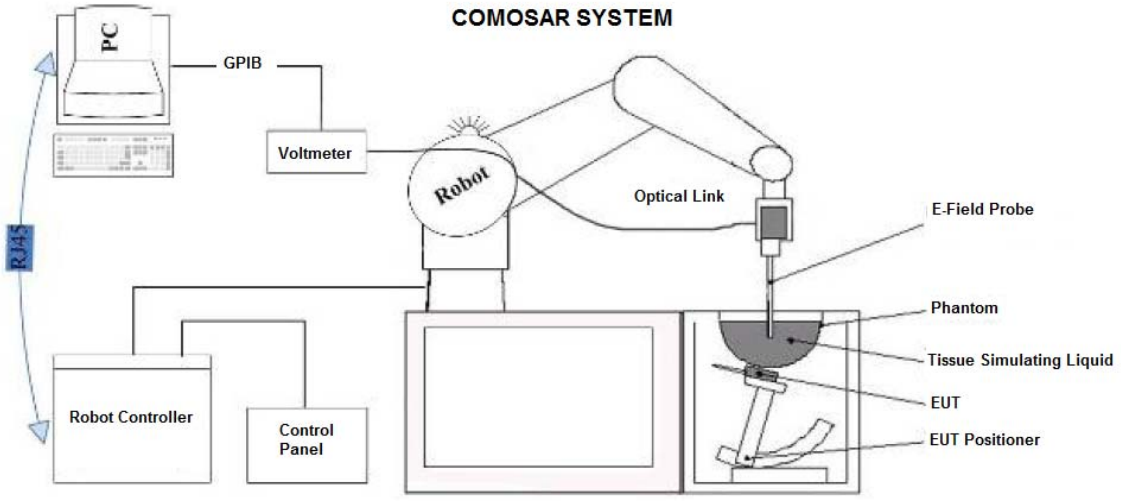
Where:

σ = Conductivity of the tissue (S/m)
ρ = Mass density of the tissue (kg/m3)
E = RMS electric field strength (V/m)

A.2 SATIMO SAR Measurement System

A.2.1 SAR Measurement Setup

The measurements were performed with the automated near-field scanning system OPENSAR by SATIMO. The system is based on a high precision robot (working range: 850mm), that positions the probe with a precision of ±0.02mm. Special E-Field probe has been designed in the classical triangular section configuration for measurement using a Schottky diode and connected via high resistive lines to the data acquisition unit. The probe has been calibrated in accordance to the IEEE 1528 and IEC 62209 standards.

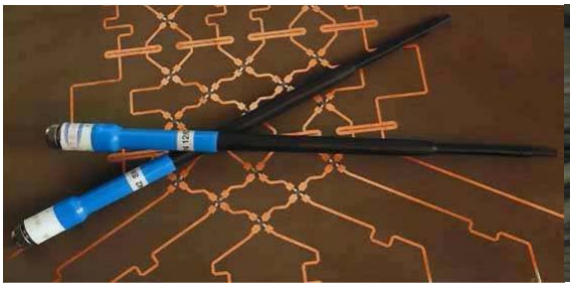


The COMOSAR system for performing SAR tests consist on the following items:

- ✓ Standard high precision 6-axis robot brand KUKA with controller and software.
- ✓ KUKA Robot Controlled with a computer operating windows XP Operating system.
- ✓ KUKA Control Panel for robot manual control.
- ✓ Isotropic E-Field probe optimized and calibrated for usage in tissue simulating liquid.
- ✓ A Voltmeter that reads the voltage measured by the probe.
- ✓ A scan card for data acquisition.
- ✓ OpenSAR software for data interpretation and calculation.
- ✓ SAM and Flat phantom for body and head SAR testing.
- ✓ EUT positioner.
- ✓ Tissue simulating liquid.
- ✓ System Validation dipoles.
- ✓ Network emulator or RF test tool

A.2.2 E-Field Measurement Probe

The E-Field detection probe is composed of three orthogonal dipoles. The probe allows the measurement of electric fields in liquids such as the one defined in the IEEE and CENELEC standards. These uncoupled dipoles perform isotropic and wide-band measurements necessary to assess the SAR.




The probe's characteristics are:

Frequency Range	30MHz – 3GHz
Length	330 mm
Dipole Length	4.5 mm
Maximum External diameter	8 mm
Probe tip external diameter	5 mm
Distance between dipoles and the probe tip	<2.7 mm
Dipole resistance	1MΩ to 2MΩ
Axial Isotropy (in human-equivalent liquids)	±0.25 dB
Hemispherical Isotropy (in human-equivalent liquids)	±0.5 dB
Linearity	±0.25 dB
Maximum operating SAR	100 W/kg
Lower SAR detection threshold	0.001 W/kg

A.2.3 SAM / Flat Phantom

The SAM and flat phantom is used to measure the SAR relative people exposed to electro-magnetic field radiated by radio devices.

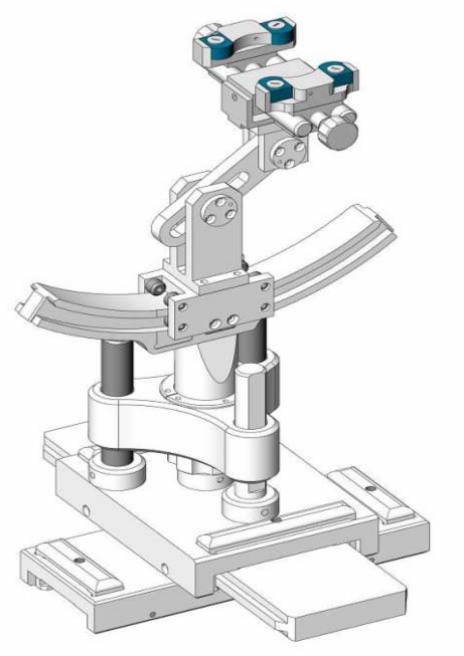
The shape of the SAM phantom and thickness of the ear spacer are in accordance with the specifications in the IEEE 1528-2003 CAD files.

The phantom's characteristics are:

Shell thickness	2 mm ± 0.2 mm
Shell thickness at ERP	6 ± 0.2 mm
Filling volume	27 Liters
Dimensions	1000 mm (length); 500 mm (Width); 200 mm (Height)
4 molded plastic points for high precision reference	

A.2.4 Device Positioner

The SAR value is approximately inversely proportional to the square of the distance between the source and the internal surface of the phantom. For a source at 5mm distance, a positioning uncertainty of ±0.5mm would produce a SAR uncertainty of ±20%. An accurate device positioning is therefore essential for accurate and repeatable measurement.



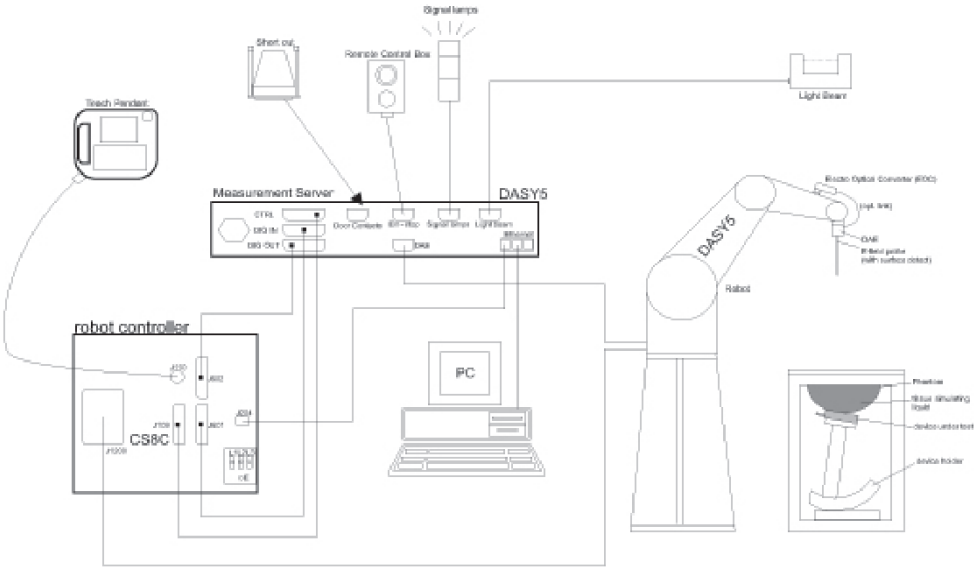
The positioning system allows the translation of the mobile phone along the X, Y and Z axis, as well as the required rotation around the phantom ear, for the 2 positions defined by standards (0° 'Cheek' position and 15° 'Tilt' position).

Totally metal-free design
Rotation point on ear opening
Translation to lock the device under test under the flat part or under the left or right ear
High repeatability with rotation point external adjustment
Easy and accurate position according to all standards
Compliance with mobile phone or PDA dimensions
X Translation = 700mm Y Translation = 250mm Z Translation = 100mm

A.3 SPEAG SAR Measurement System

A.3.1 SAR Measurement Setup

The DASY5 system for performing compliance tests consists of the following items:



- ✓ A standard high precision 6-axis robot (Staübli TX/RX family) with controller, teach pendant and software. It includes an arm extension for accommodating the data acquisition electronics (DAE)
- ✓ An isotropic field probe optimized and calibrated for the targeted measurements.
- ✓ A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- ✓ The Electro-optical Converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. The EOC signal is transmitted to the measurement server.
- ✓ The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movements interrupts.
- ✓ The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- ✓ A computer running Win7 professional operating system and the DASY5 software.
- ✓ Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- ✓ The phantom, the device holder and other accessories according to the targeted measurement.
- ✓ Tissue simulating liquid.
- ✓ System Validation dipoles.
- ✓ Network emulator or RF test tool

A.3.2 E-Field Measurement Probe

The probe is constructed using three orthogonal dipole sensors arranged on an interlocking, triangular prism core. The probe has built-in shielding against static charges and is contained within a PEEK cylindrical enclosure material at the tip.

The probe's characteristics are:

Frequency Range	30MHz – 6GHz
Length	337 mm
Probe tip external diameter	2.5 mm
Typical distance between dipoles and the probe tip	1 mm
Axial Isotropy (in human-equivalent liquids)	±0.3 dB
Hemispherical Isotropy (in human-equivalent liquids)	±0.5 dB
Linearity	±0.2 dB
Maximum operating SAR	100 W/kg
Lower SAR detection threshold	0.001 W/kg

A.3.3 SAM Phantom

The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.

The phantom's characteristics are:

Material	Vinylester, glass fiber reinforced (VE-GF)
Shell thickness	2 mm ± 0.2 mm
Shell thickness at ERP	6 ± 0.2 mm
Filling volume	25 Liters
Dimensions	Length: 1000mm / Width: 500mm

A.3.4 Flat Phantom

Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.

The phantom's characteristics are:

Material	Vinylester, glass fiber reinforced (VE-GF)
Shell thickness	2 mm ± 0.2 mm
Filling volume	30 Liters approx.
Dimensions	Major axis: 600mm / Minor axis: 400mm

A.3.5 Device Positioner

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5 mm distance, a positioning uncertainty of 0.5 mm would produce a SAR uncertainty of 20%. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

The DASY device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

The DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity ε=3 and loss tangent δ=0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

A.4 System Validation Status

According to FCC OET KDB 865664 D01, the system needs to be performed once a SAR measurement system has been established and allows an evaluation of the system accuracy with all components used together with the specified system. It has to be repeated at least once a year or when new system components are used (DAE, probe, phantom, dipole, liquid type).
In addition to the procedure used during system check a system validation also includes checks of probe isotropy, probe modulation factor and RF signal.
The following table lists the system validations relevant for this test report:

				Validation Date	
Frequency	Test System	Probe	Calibrated Signal Type	Head TSL	Body TSL
750 MHz	SATIMO	SSE2 17/14 EP224	CW, OFDM	2014/09/17	2014/09/24
835 MHz	SATIMO	SSE2 17/14 EP224	CW, Pulsed, OFDM	2014/09/16	2014/09/25
1800 MHz	SATIMO	SSE2 27/13 EP184	CW, Pulsed, OFDM	2014/07/28	-
	SATIMO	SSE2 17/14 EP224	CW, Pulsed, OFDM	-	2014/09/19
1900 MHz	SATIMO	SSE2 27/13 EP184	CW, Pulsed, OFDM	2014/07/28	-
	SATIMO	SSE2 17/14 EP224	CW, Pulsed, OFDM	-	2014/09/22
2450 MHz	SPEAG	EX3DV4 SN3978	CW, OFDM	2014/07/24	2014/07/24
2600 MHz	SATIMO	SSE2 17/14 EP224	CW, OFDM	2014/09/18	2014/09/26
5200 MHz	SPEAG	EX3DV4 SN3978	CW, OFDM	2014/07/24	2014/07/24
5600 MHz	SPEAG	EX3DV4 SN3978	CW, OFDM	2014/07/24	2014/07/24
5800 MHz	SPEAG	EX3DV4 SN3978	CW, OFDM	2014/07/24	2014/07/24

A.5 Data Evaluation

- **Power Reference measurement**

The robot measures the E field in a specified reference position that can be either the selected section's grid reference point or a user point in this section at 4mm of the inner surface of the phantom, 2mm for frequencies above 3GHz.

- **Area Scan**

Measurement procedures for evaluating SAR from wireless handsets typically start with a coarse measurement grid to determine the approximate location of the local peak SAR values. This is known as the area-scan procedure. The SAR distribution is scanned along the inside surface of one side of the phantom head, at least for an area larger than the projection of the handset and antenna. An example grid is shown in Figure 11. The distance between the measured points and phantom surface should be less than 8 mm, and should remain constant (with variation less than ± 1 mm) during the entire scan in order to determine the locations of the local peak SAR with sufficient accuracy. The angle between the probe axis and the surface normal line is recommended but not required to be less than 30°. If this angle is larger than 30° and the closest point on the probe-tip housing to the phantom surface is closer than a probe diameter, the boundary effect may become larger and polarization dependent. This additional uncertainty needs to be analyzed and accounted for. To achieve this, modified test procedures and additional uncertainty analyses not described in this recommended practice may be required. The measurement and interpolation point spacing should be chosen such as to allow identification of the local peak locations to within one-half of the linear dimension of a side of the zoom-scan volume. Because a local peak having specific amplitude and steep gradients may produce a lower peak spatial-average SAR compared to peaks with slightly lower amplitude and less steep gradients, it is necessary to evaluate these other peaks as well. However, since the spatial gradients of local SAR peaks are a function of the wavelength inside the tissue-equivalent liquid and the incident magnetic field strength, it is not necessary to evaluate local peaks that are less than 2 dB or more below the global maximum peak. Two-dimensional spline algorithms (Brishoual et al. 2001; Press et al., 1996) are typically used to determine the peaks and gradients within the scanned area. If a peak is found at a distance from the scan border of less than one-half the edge dimension of the desired 1 g or 10 g cube, the measurement area should be enlarged if possible.

- **Zoom Scan**

To evaluate the peak spatial-average SAR values for 1 g or 10 g cubes, fine resolution volume scans, called zoom scans, are performed at the peak SAR locations identified during the area scan. The minimum zoom scan volume size should extend at least 1.5 times the edge dimension of a 1 g cube in all directions from the center of the scan volume, for both 1 g and 10 g peak spatial-average SAR evaluations. Along the phantom curved surfaces, the front face of the volume facing the tissue/liquid interface conforms to the curved boundary, to ensure that all SAR peaks are captured. The back face should be equally distorted to maintain the correct averaging mass. The flatness and orientation of the four side faces are unchanged from that of a cube whose orientation is within ± 30° of the line normal to the phantom at the center of the cube face next to the phantom surface. The peak local SAR locations that were determined in the area scan (interpolated values) should be used for the centers of the zoom scans. If a scan volume cannot be centered due to proximity of a phantom shape feature, the probe should be tilted to allow scan volume enlargement. If probe tilt is not feasible, the zoom-scan origin may be shifted, but not by more than half of the 1 g or 10 g cube edge dimension.

After the zoom-scan measurement, extrapolations from the closest measured points to the surface, for example along lines parallel to the zoom-scan centerline, and interpolations to a finer resolution between all measured and extrapolated points are performed. Extrapolation algorithm considerations are described in 6.5.3, and 3-D spline methods (Brishoual et al., 2001; Kreyszig, 1983; Press et al., 1996) can be used for interpolation. The peak spatial-average SAR is finally determined by a numerical averaging of the local SAR values in the interpolation grid, using for example a trapezoidal algorithm for the integration (averaging).

In some areas of the phantom, such as the jaw and upper head regions, the angle of the probe with respect to the line normal to the surface may be relatively large, e.g., greater than ± 30º, which could increase the boundary effect error to a larger level. In these cases, during the zoom scan a change in the orientation of the probe, the phantom, or both is recommended but not required for the duration of

the zoom scan, so that the angle between the probe axis and the line normal to the surface is within 30º for all measurement points.

- **Power Drift measurement**

The robot re-measures the E-Field in the same reference location measured at the Power Reference. The drift measurement gives the field difference in dB from the first to the last reference reading. This allows a user to monitor the power drift of the device under test that must remain within a maximum variation of ±5%.

- **Post-processing**

The procedure for spatial peak SAR evaluation has been implemented according to the IEEE1528 and IEC 62209-1/2 standards. It can be conducted for 1g and 10g.

The software allows evaluations that combine measured data and robot positions, such as:

- ✓ Maximum search
- ✓ Extrapolation
- ✓ Boundary correction
- ✓ Peak search for averaged SAR

Interpolation between the measured points is performed when the resolution of the grid is not fine enough to compute the average SAR over a given mass.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation.

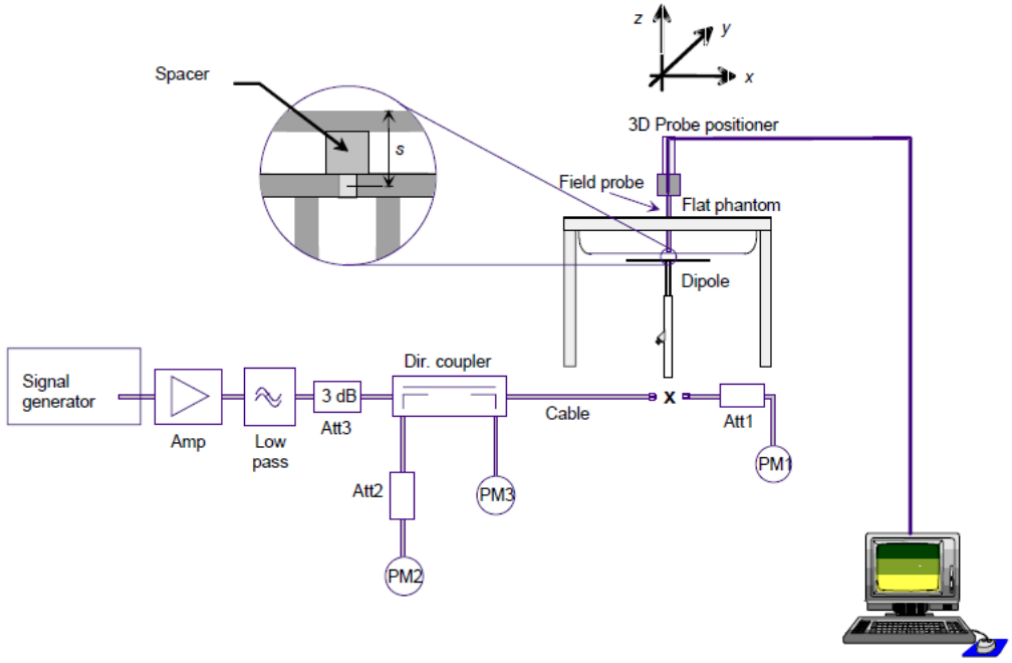
A.6 System and Liquid Check

A.6.1 System Check

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results.

The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

In the simplified setup for system check, the EUT is replaced by a calibrated dipole and the power source is replaced by a controlled continuous wave generated by a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the phantom at the correct distance.



The equipment setup is shown below:

- ✓ Signal Generator
- ✓ Amplifier
- ✓ Directional coupler
- ✓ Power meter
- ✓ Calibrated dipole

The output power on dipole port must be set to 20dBm (100mW) and SAR results are normalized to a forward power of 1W to compare the values with the calibration reports results as described at IEEE 1528 and IEC 62209 standards.

A.6.2 Liquid Check

The dielectric parameters check is done prior to the use of the tissue simulating liquid. The verification is made by comparing the relative permittivity and conductivity to the values recommended by the applicable standards.

The liquid verification was performed using the following test setup:

- ✓ VNA (Vector Network Analyzer)
- ✓ Open-Short-Load calibration kit
- ✓ RF Cable
- ✓ Open-Ended Coaxial probe
- ✓ OpenSAR/DAK software tool
- ✓ SAR Liquid
- ✓ De-ionized water
- ✓ Thermometer

These are the target dielectric properties of the tissue-equivalent liquid material as defined in FCC OET KDB 865664 D01.

Frequency	Head SAR		Body SAR	
(MHz)	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
1450	40.5	1.20	54.0	1.30
1800-2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

(ε_r = relative permittivity, σ = conductivity and ρ = 1000 kg/m3)

Both measurement systems implement a SAR error compensation algorithm as documented in IEEE Std 1528-2013 (equivalent to draft standard IEEE P1528-2011) to automatically compensate the measured SAR results for deviations between the measured and required tissue dielectric parameters (applied to only scale up the measured SAR, and not downward) so, according to FCC OET KDB 865664 D01, the tolerance for ε_r and σ may be relaxed to ± 10%.

A.7 Test Equipment List

SATIMO SAR System

Device	Type/Model	Serial Number	Manufacturer	Calibration Date	Calibration Due
SAR E-Field Probe	SSE2	27/13 EP184	SATIMO	2013-09-10	2014-09-10
SAR E-Field Probe	SSE2	17/14 EP224	SATIMO	2014-09-15	2015-09-15
Millivoltmeter	2000	4009301	KEITHLEY	2013-06-17	2015-06-17
6 Axis Robot	KR5 SIXX R850	948455	KUKA	NA	NA
Robot Control Panel	KCP	18729	KUKA	NA	NA
Robot Control Cabinet	KRC2	857	KUKA	NA	NA
Mobile Phone Positioning System	N/A	47/12 MSH79	SATIMO	NA	NA
SAM Phantom	N/A	47/12 SAM96	SATIMO	NA	NA
Video Positioning System	N/A	04/13 VPS 35	SATIMO	NA	NA
IEEE REF Dipole 750 MHz	SID750	14/13 DIP 0G750-229	SATIMO	2013-03-04	2015-03-04
IEEE REF Dipole 835 MHz	SID835	47/12 DIP 0G835-210	SATIMO	2013-01-02	2015-01-02
IEEE REF Dipole 1800 MHz	SID1800	47/12 DIP 1G800-212	SATIMO	2013-01-02	2015-01-02
IEEE REF Dipole 1900 MHz	SID2450	47/12 DIP 1G900-213	SATIMO	2013-01-02	2015-01-02
Dielectric Probe	SCLMP	47/12 OCPG50	SATIMO	2013-02-01	2015-02-01
Vector Network Analyzer	MS2025B	1301107	ANRITSU	2013-07-26	2015-07-26
SMA-F Calibration Kit	OSLKF50	1231004	ANRITSU	2013-07-26	2015-07-26

SPEAG SAR System

Device	Type/Model	Serial Number	Manufacturer	Calibration Date	Calibration Due
Dosimetric E-field Probe	EX3DV4	3978	SPEAG	2014-06-24	2015-06-24
Data Acquisition Electronics	DAE4	1429	SPEAG	2014-06-24	2015-06-24
Electro-Optical Converter	EOC60	-	SPEAG	NA	NA
Light Beam Unit	LB5 / 80	-	di-soric	NA	NA
6-axis Robot	TX60 L	F12/5MZ3A1/A/01	STAÜBLI	NA	NA
Robot Controller	CS8C	F12/5MZ3A1/C/01	STAÜBLI	NA	NA
Measurement Server	DASY5 P/N: SE UMS 011 EA	1444	SPEAG	NA	NA
SAM Phantom	Twin SAM v5.0	1838	SPEAG	NA	NA
Oval Flat Phantom	ELI v5.0	1260	SPEAG	NA	NA
Handset Positioner	P/N SD 000 H01 KA	-	SPEAG	NA	NA
Dielectric Probe Kit	DAKS-3.5	1037	SPEAG	2014-06-24	2016-06-24
Vector Reflectometer	PLANAR R140	0131013	Copper Mountain Technologies	2014-06-13	2016-06-13
2450MHz System Validation Dipole	D2450V2	937	SPEAG	2014-06-24	2016-06-24
5GHz System Validation Dipole	D5GHzv2	1164	SPEAG	2013-10-29	2015-10-29

Shared Instrumentation

Device	Type/Model	Serial Number	Manufacturer	Calibration Date	Calibration Due
USB Power Sensor	NRP-Z81	102278	R&S	2013-07-17	2015-07-17
USB Power Sensor	NRP-Z81	102279	R&S	2013-07-17	2015-07-17
Vector Signal Generator	ESG E4438C	MY45092885	Agilent	NA	NA
Power Amplifier	-	MODU-023-B-0001	SATIMO	NA	NA
Communication Tester	CMW500	129337	R&S	2013-07-11	2015-07-11
Coupler	CD0.5-8-20-30	1251-002	Amd-group	NA	NA

Tissue Simulant Liquids

TSL	Manufacturer / Model	Freq Range (MHz)	Main Ingredients
Head 750	SATIMO HL750	700-800	1-2 Propanediol, H_2O, NaCl
Head 835	SATIMO HL835	800-900	1-2 Propanediol, H_2O, NaCl
Head 1800	SATIMO HL1800	1700-1800	Triton X-100, H_2O, NaCl, DGBE
Head 1900	SATIMO HL1900	1800-1900	Triton X-100, H_2O, NaCl, DGBE
Head 2450	SATIMO HL2450	2400-2700	Triton X-100, H_2O, NaCl, DGBE
Head 2450	SPEAG HSL2450V2	2400-2700	H_2O, NaCl, DGBE
Head 5GHz	SPEAG HBBL3500-5800v5	5000-6000	Mineral Oil, Emulsifiers, H_2O, NaCl
Body 750	SATIMO BL750	700-800	1-2 Propanediol, H_2O, NaCl
Body 835	SATIMO BL835	800-900	1-2 Propanediol, H_2O, NaCl
Body 1800	SATIMO BL1800	1700-1800	Triton X-100, H_2O, NaCl, DGBE
Body 1900	SATIMO BL1900	1800-1900	Triton X-100, H_2O, NaCl, DGBE
Body 2450	SATIMO BL2450	2400-2700	Triton X-100, H_2O, NaCl, DGBE
Body 2450	SPEAG MSL2450V2	2400-2700	H_2O, NaCl, DGBE
Body 5GHz	SPEAG MBBL3500-5800v5	5000-6000	Mineral Oil, Emulsifiers, H_2O, NaCl

A.8 Measurement Uncertainty Evaluation

As per FCC OET KDB 865664 D01 SAR measurement uncertainty analysis is required in SAR reports only when the highest measured SAR in a frequency band is ≥ 1.5 W/kg for 1-g SAR, so the system uncertainty evaluation presented below is included only as required by IC RSS 102, Issue 4:

Uncertainty Component	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System								
Probe calibration	5.8	N	1	1	1	5.80	5.80	∝
Axial Isotropy	3.5	R	√3	0.7	0.7	1.43	1.43	∝
Hemispherical Isotropy	5.9	R	√3	0.7	0.7	2.41	2.41	∝
Boundary effect	1.0	R	√3	1	1	0.58	0.58	∝
Linearity	4.7	R	√3	1	1	2.71	2.71	∝
System detection limits	1.0	R	√3	1	1	0.58	0.58	∝
Modulation response	3.00	N	1	1	1	3.00	3.00	∝
Readout Electronics	0.50	N	1	1	1	0.50	0.50	∝
Reponse Time	0.0	R	√3	1	1	0.00	0.00	∝
Integration Time	1.4	R	√3	1	1	0.81	0.81	∝
RF ambient Conditions - Noise	3.0	R	√3	1	1	1.73	1.73	∝
RF ambient Conditions - Reflections	3.0	R	√3	1	1	1.73	1.73	∝
Probe positioner Mechanical Tolerance	1.4	R	√3	1	1	0.81	0.81	∝
Probe positioning with respect to Phantom Shell	1.40	R	√3	1	1	0.81	0.81	∝
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	2.3	R	√3	1	1	1.33	1.33	∝
Test sample Related								
Test sample positioning	2.60	N	1	1	1	2.60	2.60	11
Device Holder Uncertainty	3.00	N	1	1	1	3.00	3.00	7
Output power Variation - SAR drift measurement	5.00	R	√3	1	1	2.89	2.89	∝
SAR scaling	2.00	R	√3	1	1	1.15	1.15	
Phantom and Tissue Parameters								
Phantom Uncertainty (Shape and thickness tolerances)	4.00	R	√3	1	1	2.31	2.31	∝
Uncertainty in SAR correction for deviation (in permittivity and conductivity)	2.00	N	1	1	1	2.00	1.68	∝
Liquid conductivity (temperature uncertainty)	2.50	N	1	0.78	0.71	1.95	1.77	5
Liquid conductivity - measurement uncertainty	4.00	N	1	0.23	0.26	0.92	1.04	5
Liquid permittivity (temperature uncertainty)	2.50	N	1	0.78	0.71	1.95	1.77	∝
Liquid permittivity - measurement uncertainty	5.00	N	1	0.23	0.26	1.15	1.30	∝
Combined Standard Uncertainty		RSS				10.63	10.54	
Expanded Uncertainty (95% Confidence interval)		k				20.73	20.56	

SATIMO System Uncertainty budget (IEEE 1528-2011 & IEC 62209-1:2011)

Uncertainty Component	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System								
Probe calibration	5.8	N	1	1	1	5.80	5.80	∝
Axial Isotropy	3.5	R	√3	0.7	0.7	1.43	1.43	∝
Hemispherical Isotropy	5.9	R	√3	0.7	0.7	2.41	2.41	∝
Boundary effect	1.0	R	√3	1	1	0.58	0.58	∝
Linearity	4.7	R	√3	1	1	2.71	2.71	∝
System detection limits	1.0	R	√3	1	1	0.58	0.58	∝
Modulation response	3.00	N	1	1	1	3.00	3.00	∝
Readout Electronics	0.50	N	1	1	1	0.50	0.50	∝
Reponse Time	0.0	R	√3	1	1	0.00	0.00	∝
Integration Time	1.4	R	√3	1	1	0.81	0.81	∝
RF ambient Conditions - Noise	3.0	R	√3	1	1	1.73	1.73	∝
RF ambient Conditions - Reflections	3.0	R	√3	1	1	1.73	1.73	∝
Probe positioner Mechanical Tolerance	1.4	R	√3	1	1	0.81	0.81	∝
Probe positioning with respect to Phantom Shell	1.40	R	√3	1	1	0.81	0.81	∝
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	2.3	R	√3	1	1	1.33	1.33	∝
Test sample Related								
Test sample positioning	2.60	N	1	1	1	2.60	2.60	11
Device Holder Uncertainty	3.00	N	1	1	1	3.00	3.00	7
Output power Variation - SAR drift measurement	5.00	R	√3	1	1	2.89	2.89	∝
SAR scaling	2.00	R	√3	1	1	1.15	1.15	
Phantom and Tissue Parameters								
Phantom Uncertainty (Shape and thickness tolerances)	4.00	R	√3	1	1	2.31	2.31	∝
Uncertainty in SAR correction for deviation (in permittivity and conductivity)	2.00	N	1	1	1	2.00	1.68	∝
Liquid conductivity (temperature uncertainty)	2.50	N	1	0.78	0.71	1.95	1.77	5
Liquid conductivity - measurement uncertainty	4.00	N	1	0.23	0.26	0.92	1.04	5
Liquid permittivity (temperature uncertainty)	2.50	N	1	0.78	0.71	1.95	1.77	∝
Liquid permittivity - measurement uncertainty	5.00	N	1	0.23	0.26	1.15	1.30	∝
Combined Standard Uncertainty		RSS				10.63	10.54	
Expanded Uncertainty (95% Confidence interval)		k				20.73	20.56	

SATIMO System Uncertainty budget (IEC 62209-2:2010)

DASY5 Uncertainty Budget
According to IEEE 1528/2011 and IEC 62209-1/2011

Error Description	Uncert. value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v_i) v_{eff}
Measurement System								
Probe Calibration	±6.55 %	N	1	1	1	±6.55 %	±6.55 %	∞
Axial Isotropy	±4.7 %	R	$\sqrt{3}$	0.7	0.7	±1.9 %	±1.9 %	∞
Hemispherical Isotropy	±9.6 %	R	$\sqrt{3}$	0.7	0.7	±3.9 %	±3.9 %	∞
Boundary Effects	±2.0 %	R	$\sqrt{3}$	1	1	±1.2 %	±1.2 %	∞
Linearity	±4.7 %	R	$\sqrt{3}$	1	1	±2.7 %	±2.7 %	∞
System Detection Limits	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Modulation Response^m	±2.4 %	R	$\sqrt{3}$	1	1	±1.4 %	±1.4 %	∞
Readout Electronics	±0.3 %	N	1	1	1	±0.3 %	±0.3 %	∞
Response Time	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Integration Time	±2.6 %	R	$\sqrt{3}$	1	1	±1.5 %	±1.5 %	∞
RF Ambient Noise	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
RF Ambient Reflections	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Probe Positioner	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Probe Positioning	±6.7 %	R	$\sqrt{3}$	1	1	±3.9 %	±3.9 %	∞
Max. SAR Eval.	±4.0 %	R	$\sqrt{3}$	1	1	±2.3 %	±2.3 %	∞
Test Sample Related								
Device Positioning	±2.9 %	N	1	1	1	±2.9 %	±2.9 %	145
Device Holder	±3.6 %	N	1	1	1	±3.6 %	±3.6 %	5
Power Drift	±5.0 %	R	$\sqrt{3}$	1	1	±2.9 %	±2.9 %	∞
Power Scaling^p	±0 %	R	$\sqrt{3}$	1	1	±0.0 %	±0.0 %	∞
Phantom and Setup								
Phantom Uncertainty	±6.6 %	R	$\sqrt{3}$	1	1	±3.8 %	±3.8 %	∞
SAR correction	±1.9 %	R	$\sqrt{3}$	1	0.84	±1.1 %	±0.9 %	∞
Liquid Conductivity (mea.)^{DAK}	±2.5 %	R	$\sqrt{3}$	0.78	0.71	±1.1 %	±1.0 %	∞
Liquid Permittivity (mea.) ^{DAK}	±2.5 %	R	$\sqrt{3}$	0.26	0.26	±0.3 %	±0.4 %	∞
Temp. unc. - Conductivity ^{BB}	±3.4 %	R	$\sqrt{3}$	0.78	0.71	±1.5 %	±1.4 %	∞
Temp. unc. - Permittivity ^{BB}	±0.4 %	R	$\sqrt{3}$	0.23	0.26	±0.1 %	±0.1 %	∞
Combined Std. Uncertainty						±12.3 %	±12.2 %	748
Expanded STD Uncertainty						**±24.6 %**	**±24.5 %**	

SPEAG System Uncertainty budget (IEEE 1528-2011 & IEC 62209-1:2011)

DASY5 Uncertainty Budget
According to IEC 62209-2/2010

Error Description	Uncert. value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v_i) v_{eff}
Measurement System								
Probe Calibration	±6.55 %	N	1	1	1	±6.55 %	±6.55 %	∞
Axial Isotropy	±4.7 %	R	$\sqrt{3}$	0.7	0.7	±1.9 %	±1.9 %	∞
Hemispherical Isotropy	±9.6 %	R	$\sqrt{3}$	0.7	0.7	±3.9 %	±3.9 %	∞
Linearity	±4.7 %	R	$\sqrt{3}$	1	1	±2.7 %	±2.7 %	∞
Modulation Response^m	±2.4 %	R	$\sqrt{3}$	1	1	±1.4 %	±1.4 %	∞
System Detection Limits	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Boundary Effects	±2.0 %	R	$\sqrt{3}$	1	1	±1.2 %	±1.2 %	∞
Readout Electronics	±0.3 %	N	1	1	1	±0.3 %	±0.3 %	∞
Response Time	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Integration Time	±2.6 %	R	$\sqrt{3}$	1	1	±1.5 %	±1.5 %	∞
RF Ambient Noise	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
RF Ambient Reflections	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Probe Positioner	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Probe Positioning	±6.7 %	R	$\sqrt{3}$	1	1	±3.9 %	±3.9 %	∞
Post-processing	±4.0 %	R	$\sqrt{3}$	1	1	±2.3 %	±2.3 %	∞
Test Sample Related								
Device Holder	±3.6 %	N	1	1	1	±3.6 %	±3.6 %	5
Test sample Positioning	±2.9 %	N	1	1	1	±2.9 %	±2.9 %	145
Power Scaling^p	±0 %	R	$\sqrt{3}$	1	1	±0.0 %	±0.0 %	∞
Power Drift	±5.0 %	R	$\sqrt{3}$	1	1	±2.9 %	±2.9 %	∞
Phantom and Setup								
Phantom Uncertainty	±7.9 %	R	$\sqrt{3}$	1	1	±4.6 %	±4.6 %	∞
SAR correction	±1.9 %	R	$\sqrt{3}$	1	0.84	±1.1 %	±0.9 %	∞
Liquid Conductivity (mea.)^{DAK}	±2.5 %	R	$\sqrt{3}$	0.78	0.71	±1.1 %	±1.0 %	∞
Liquid Permittivity (mea.) ^{DAK}	±2.5 %	R	$\sqrt{3}$	0.26	0.26	±0.3 %	±0.4 %	∞
Temp. unc. - Conductivity ^{BB}	±3.4 %	R	$\sqrt{3}$	0.78	0.71	±1.5 %	±1.4 %	∞
Temp. unc. - Permittivity ^{BB}	±0.4 %	R	$\sqrt{3}$	0.23	0.26	±0.1 %	±0.1 %	∞
Combined Std. Uncertainty						±12.5 %	±12.5 %	748
Expanded STD Uncertainty						**±25.1 %**	**±25.0 %**	

SPEAG System Uncertainty budget (IEC 62209-2:2010)

A.9 RF Exposure Limits

SAR assessments have been made in line with the requirements of FCC 47 CFR Part §2.1093 and RSS 102, Issue 4 on the limitation of exposure of the general population / uncontrolled exposure for portable devices.

Exposure Type	General Population / Uncontrolled Environment
Peak spatial-average SAR (averaged over any 1 gram of tissue)	**1.6 W/kg**
Whole body average SAR	**0.08 W/kg**
Peak spatial-average SAR (extremities) (averaged over any 10 grams of tissue)	**4.0 W/kg**

Annex B. Test Results

B.1 Test Conditions

B.1.1 SAR Test positions relative to the phantom

For both voice (GSM, WCDMA, LTE) and only-data modes (GPRS, EDGE, HSPA+, 802.11b/g/n), the EUT was tested for head and body-worn exposure conditions.

For head tests, the EUT was placed in cheek and tilt position on the right/left side of the SAM phantom.

For body worn[1] tests, according to the hotspot mode described in FCC OET KDB 648474 D04 and FCC OET 941225 D06, all surfaces and edges with a transmitting antenna located within 25 mm from that surface or edge was placed against the flat phantom surface using a 10mm separation distance. Considering the antenna location diagrams in *Annex E*, the surfaces/edges to be measured are:

- For the Cellular Main Antenna: Front Face, Back Face, Left Edge, Right Edge and Top Edge.
- For the WLAN Antenna: Front Face, Back Face, Left Edge and Top Edge. Bottom Edge is measured for simultaneous transmission evaluation purposes.

B.1.2 Test signal, Output power and Test Frequencies

For cellular modes, the device was put into operation by using a R&S CMW500 as base station simulator.

For 802.11a/b/g/n/ac modes, the device was put into operation by using a manufacturer proprietary test mode to select the continuous transmission with 100% duty cycle.

The output power of the device was set to transmit at maximum power for all tests.
LTE A-MPR was disabled during all LTE tests.

A fully charged battery was used for every test sequence.

[1] See comment 3 in section *5. Remarks and comments*

B.1.3 Evaluation Exclusion and Test Reductions

Transmission Mode	SAR test exclusion/reduction
802.11g 802.11n 802.11ac	According to FCC OET KDB 248227 D01, SAR evaluation for 802.11g/n/ac modes is not required when the maximum average output power is < ¼ dB higher than that measured on the corresponding 802.11a/b channels.
GPRS EDGE	According to FCC OET KDB 941225 D03 and FCC Public Notice DA 02-1438, SAR evaluation for low-power modes is required only when the SAR produced for the highest power mode is larger 0.8W/kg.
HSDPA	According to FCC OET KDB 941225 D01, SAR evaluation is not required when the maximum average output power is < ¼ dB higher than the measured on the corresponding channels without HSDPA, using 12.2kbps RMC, and the maximum SAR for 12.2kbps RMC is < 1.2 W/kg.
HSUPA	According to FCC OET KDB 941225 D01, SAR evaluation is not required when the maximum average output power is < ¼ dB higher than the measured on the corresponding channels without HSUPA, using 12.2kbps RMC, and the maximum SAR for 12.2kbps RMC is < 1.2 W/kg.
DC+HSDPA	According to FCC OET KDB 941225 D01, SAR evaluation is not required when the maximum average output power is < ¼ dB higher than the measured on the corresponding channels without DC+HSDPA, using 12.2kbps RMC, and the maximum SAR for 12.2kbps RMC is < 1.2 W/kg.
LTE	According to FCC OET KDB 941225 D05, testing of 100% RB allocation, higher order modulations or lower BW is not required when these conditions are met: o For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. o For each modulation besides QPSK, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg. o For lower BW, only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.
LTE Rel-8 Carrier Aggregation	According to FCC OET KDB 941225 D05A, when the carrier aggregation is for downlink only and uplink maximum output power measurement with downlink carrier aggregation active, using the highest output channel measured without downlink carrier aggregation, remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output measured without downlink carrier aggregation active, SAR evaluation of CA modes is not required.
All	According to FCC OET KDB 447498 D01 testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is: o ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz o ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz o ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
All – Hotspot mode	According to FCC OET KDB 941225 D06, SAR must be measured for all sides (edges) and surfaces with a transmitting antenna located at ≤ 25 mm from that surface or edge, for the data modes, wireless technologies and frequency bands supporting hotspot mode.

B.2 Conducted Power Measurements

The Factory Upper Tolerance values were declared by the applicant in the document *EP110 Tune-up Procedure 2014-11-24.docx*.

B.2.1 GSM / GPRS / EDGE

Band	Mode	# UL slots	Channel	Freq. (MHz)	Burst Averaged Power (dBm)	Calculated Time Averaged Power (dBm)	Factory Upper Tolerance (dBm)
GSM850	GSM	1	128	824.2	32.89	23.86	33.00
			190	836.6	32.79	23.76	33.00
			251	848.8	32.78	23.75	33.00
	GPRS GMSK	1	128	824.2	32.89	23.86	33.00
			190	836.6	32.77	23.74	33.00
			251	848.8	32.81	23.78	33.00
		2	128	824.2	29.34	23.32	30.00
			190	836.6	29.26	23.24	30.00
			251	848.8	29.26	23.24	30.00
		3	128	824.2	27.52	23.26	28.00
			190	836.6	27.41	23.15	28.00
			251	848.8	27.48	23.22	28.00
		4	128	824.2	26.35	23.34	27.00
			190	836.6	26.23	23.22	27.00
			251	848.8	26.26	23.25	27.00
	EDGE GMSK	1	128	824.2	32.89	23.86	33.00
			190	836.6	32.76	23.73	33.00
			251	848.8	32.8	23.77	33.00
		2	128	824.2	29.35	23.33	30.00
			190	836.6	29.22	23.20	30.00
			251	848.8	29.25	23.23	30.00
		3	128	824.2	27.54	23.28	28.00
			190	836.6	27.44	23.18	28.00
			251	848.8	27.48	23.22	28.00
		4	128	824.2	26.33	23.32	27.00
			190	836.6	26.2	23.19	27.00
			251	848.8	26.23	23.22	27.00
	EDGE 8PSK	1	128	824.2	27.4	18.37	27.50
			190	836.6	27.35	18.32	27.50
			251	848.8	27.31	18.28	27.50
		2	128	824.2	27.73	21.71	27.80
			190	836.6	27.77	21.75	27.80
			251	848.8	27.74	21.72	27.80
		3	128	824.2	26.91	22.65	27.00
			190	836.6	26.93	22.67	27.00
			251	848.8	26.79	22.53	27.00
		4	128	824.2	25.27	22.26	25.50
			190	836.6	25.21	22.20	25.50
			251	848.8	25.19	22.18	25.50

$$Calculated\ Time\ Averaged\ Power\ = Burst\ Averaged\ Power - 10log\left(\frac{1}{\#UL\ Slots/_8}\right)$$

Band	Mode	# UL slots	Channel	Freq. (MHz)	Burst Averaged Power (dBm)	Calculated Time Averaged Power (dBm)	Factory Upper Tolerance (dBm)
GSM1900	GSM	1	512	1850.2	29.05	20.02	30.00
			661	1880	29.16	20.13	30.00
			810	1909.8	29.38	20.35	30.00
	GPRS GMSK	1	512	1850.2	29.01	19.98	30.00
			661	1880	29.17	20.14	30.00
			810	1909.8	29.33	20.30	30.00
		2	512	1850.2	26.38	20.36	27.00
			661	1880	26.58	20.56	27.00
			810	1909.8	26.75	20.73	27.00
		3	512	1850.2	24.6	20.34	25.20
			661	1880	24.82	20.56	25.20
			810	1909.8	25.01	20.75	25.20
		4	512	1850.2	23.34	20.33	24.00
			661	1880	23.64	20.63	24.00
			810	1909.8	23.87	20.86	24.00
	EDGE GMSK	1	512	1850.2	29.01	19.98	30.00
			661	1880	29.17	20.14	30.00
			810	1909.8	29.36	20.33	30.00
		2	512	1850.2	26.41	20.39	27.00
			661	1880	26.59	20.57	27.00
			810	1909.8	26.82	20.80	27.00
		3	512	1850.2	24.61	20.35	25.20
			661	1880	24.86	20.60	25.20
			810	1909.8	25.05	20.79	25.20
		4	512	1850.2	23.4	20.39	24.00
			661	1880	23.65	20.64	24.00
			810	1909.8	23.86	20.85	24.00
	EDGE 8PSK	1	512	1850.2	26.41	17.38	26.50
			661	1880	26.41	17.38	26.50
			810	1909.8	26.46	17.43	26.50
		2	512	1850.2	26.82	20.80	27.00
			661	1880	26.86	20.84	27.00
			810	1909.8	26.91	20.89	27.00
		3	512	1850.2	26.09	21.83	26.20
			661	1880	26.09	21.83	26.20
			810	1909.8	26.19	21.93	26.20
		4	512	1850.2	24.32	21.31	24.60
			661	1880	24.29	21.28	24.60
			810	1909.8	24.45	21.44	24.60

$$Calculated\ Time\ Averaged\ Power\ = Burst\ Averaged\ Power - 10log\left(\frac{1}{\#UL\ Slots/_8}\right)$$

B.2.2 WCDMA / HSPA / DC-HSDPA [2]

Mode	Band	Channel	Frequency (MHz)	Averaged Power (dBm)		Factory Upper Tolerance (dBm)
				12.2kbps AMR 3.4kbps SRB	12.2kbps RMC	
WCDMA	FDD II	9262	1852.4	23.24	23.22	24
		9400	1880	23.61	23.51	24
		9538	1907.6	23.82	23.73	24
	FDD IV	1312	1712.4	23.68	23.7	24
		1413	1732.6	23.67	23.72	24
		1513	1752.6	23.65	23.71	24
	FDD V	4132	826.4	23.14	23.14	24
		4175	835	23.17	23.08	24
		4233	846.6	23.22	23.13	24

Mode	Band	Channel	Freq. (MHz)	Averaged Power (dBm)			
				Subtest 1	Subtest 2	Subtest 3	Subtest 4
HSDPA	FDD II	9262	1852.4	23.12	23.25	23.23	23.05
		9400	1880	23.75	23.61	23.57	23.39
		9538	1907.6	23.6	23.8	23.74	23.57
	FDD IV	1312	1712.4	23.52	23.7	23.66	23.47
		1413	1732.6	23.5	23.72	23.66	23.47
		1513	1752.6	23.52	23.69	23.58	23.42
	FDD V	4132	826.4	22.95	23.04	23.04	22.92
		4175	835	22.95	23.09	23.06	22.91
		4233	846.6	23.04	23.22	23.17	22.92

Mode	Band	Channel	Freq. (MHz)	Averaged Power (dBm)				
				Subtest 1	Subtest 2	Subtest 3	Subtest 4	Subtest 5
HSUPA	FDD II	9262	1852.4	22.29	20.54	21.52	20.76	22.71
		9400	1880	22.69	20.85	21.86	21.14	22.99
		9538	1907.6	22.95	21.15	22.09	21.39	23.28
	FDD IV	1312	1712.4	22.85	21.04	21.93	21.26	23.2
		1413	1732.6	22.83	21.04	22.06	21.33	23.17
		1513	1752.6	22.79	20.97	22.01	21.28	23.13
	FDD V	4132	826.4	22.24	20.43	21.43	20.68	22.57
		4175	835	22.18	20.44	21.41	20.67	22.58
		4233	846.6	22.28	20.48	21.45	20.7	22.66

Mode	Band	Channel	Freq. (MHz)	Averaged Power (dBm)			
				Subtest 1	Subtest 2	Subtest 3	Subtest 4
DC-HSDPA	FDD II	9262	1852.4	23.08	23.21	23.15	22.95
		9400	1880	23.53	23.58	23.53	23.34
		9538	1907.6	23.68	23.81	23.74	23.54
	FDD IV	1312	1712.4	23.54	23.63	23.62	23.34
		1413	1732.6	23.57	23.62	23.56	23.36
		1513	1752.6	23.56	23.55	23.52	23.35
	FDD V	4132	826.4	22.88	23.03	22.97	22.74
		4175	835	22.98	23.12	23.05	22.79
		4233	846.6	23.02	23.16	23.11	22.86

[2] See comment 1 in section *5. Remarks and comments*

B.2.3 LTE – QPSK

				Averaged Power (dBm)						
Band	BW	Channel	Freq (MHz)	1RB Low	1RB Mid	1RB High	50% Low	50% Mid	50% High	100%
LTE Band 2	20MHz	18700	1860.0	22.46	22.37	22.13	21.49	21.39	21.35	21.38
		18900	1880.0	22.57	22.37	22.24	21.45	21.35	21.28	21.38
		19100	1900.0	22.56	22.27	22.04	21.45	21.32	21.24	21.28
		Factory Upper Tolerance		23.50			22.50			22.50
	15MHz	18675	1857.5	22.91	22.33	22.62	21.44	21.26	21.37	21.36
		18900	1880.0	22.89	22.24	22.61	21.52	21.20	21.39	21.40
		19125	1902.5	22.77	22.13	22.52	21.33	21.12	21.21	21.22
		Factory Upper Tolerance		23.50			22.50			22.50
	10MHz	18650	1855.0	22.60	22.59	22.49	21.47	21.44	21.43	21.46
		18900	1880.0	22.57	22.49	22.40	21.44	21.40	21.37	21.43
		19150	1905.0	22.41	22.38	22.27	21.38	21.36	21.30	21.38
		Factory Upper Tolerance		23.50			22.50			22.50
	5MHz	18625	1852.5	22.78	22.44	22.61	21.52	21.38	21.51	21.49
		18900	1880.0	22.74	22.35	22.67	21.40	21.35	21.38	21.38
		19175	1907.5	22.67	22.32	22.52	21.44	21.30	21.43	21.44
		Factory Upper Tolerance		23.50			22.50			22.50
	3MHz	18615	1851.5	22.55	22.55	22.54	21.57	21.52	21.57	21.55
		18900	1880.0	22.52	22.52	22.47	21.54	21.46	21.52	21.50
		19185	1908.5	22.42	22.39	22.39	21.45	21.40	21.43	21.45
		Factory Upper Tolerance		23.50			22.50			22.50
	1.4MHz	18607	1850.7	22.68	22.67	22.62	22.62	22.58	22.63	21.63
		18900	1880.0	22.58	22.59	22.59	22.55	22.54	22.54	21.56
		19193	1909.3	22.53	22.50	22.53	22.51	22.47	22.49	21.48
		Factory Upper Tolerance		23.50			23.50			22.50

				Averaged Power (dBm)						
Band	BW	Channel	Freq (MHz)	1RB Low	1RB Mid	1RB High	50% Low	50% Mid	50% High	100%
LTE Band 4	20MHz	20050	1720.0	22.40	22.38	22.23	21.54	21.46	21.49	21.54
		20175	1732.5	22.36	22.21	22.21	21.57	21.31	21.52	21.59
		20300	1745.0	22.59	22.56	22.24	21.60	21.29	21.46	21.74
		Factory Upper Tolerance			23.50			22.50		22.50
	15MHz	20025	1717.5	22.76	22.30	22.66	21.62	21.14	21.47	21.53
		20175	1732.5	22.70	22.24	22.69	21.63	21.45	21.59	21.54
		20325	1747.5	22.93	22.26	22.71	21.66	21.43	21.53	21.69
		Factory Upper Tolerance			23.50			22.50		22.50
	10MHz	20000	1715.0	22.68	22.38	22.44	21.45	21.51	21.24	21.57
		20175	1732.5	22.68	22.67	22.58	21.27	21.63	21.54	21.66
		20350	1750.0	22.47	22.46	22.32	21.69	21.65	21.60	21.62
		Factory Upper Tolerance			23.50			22.50		22.50
	5MHz	19975	1712.5	22.89	22.58	22.72	21.58	21.46	21.58	21.55
		20175	1732.5	22.69	22.49	22.70	21.69	21.53	21.67	21.63
		20375	1752.5	22.58	22.48	22.53	21.56	21.50	21.54	21.52
		Factory Upper Tolerance			23.50			22.50		22.50
	3MHz	19965	1711.5	22.60	22.66	22.55	21.62	21.59	21.56	21.54
		20175	1732.5	22.65	22.62	22.59	21.62	21.58	21.66	21.66
		20385	1753.5	22.59	22.56	22.54	21.64	21.62	21.61	21.66
		Factory Upper Tolerance			23.50			22.50		22.50
	1.4MHz	19957	1710.7	22.61	22.63	22.61	22.63	22.61	22.58	21.67
		20175	1732.5	22.64	22.64	22.66	22.69	22.68	22.67	21.66
		20393	1754.3	22.87	22.85	22.73	22.77	22.84	22.79	21.71
		Factory Upper Tolerance			23.50			23.50		22.50
LTE Band 5	10MHz	20450	829.0	22.27	22.17	22.12	21.24	21.08	21.17	21.16
		20525	836.5	22.07	22.08	21.96	21.14	21.12	21.09	21.13
		20600	844.0	22.12	22.07	21.95	21.12	21.01	20.96	21.04
		Factory Upper Tolerance			23.50			22.50		22.50
	5MHz	20425	826.5	22.39	22.04	22.34	21.17	21.09	21.15	21.16
		20525	836.5	22.00	21.90	21.95	21.13	21.03	21.13	21.14
		20625	846.5	21.92	21.78	21.80	20.85	20.85	20.82	20.91
		Factory Upper Tolerance			23.50			22.50		22.50
	3MHz	20415	825.5	22.21	22.20	22.19	21.16	21.12	21.13	21.17
		20525	836.5	21.98	22.07	21.95	21.14	21.10	21.14	21.18
		20635	847.5	21.85	21.85	21.83	21.06	21.00	21.04	21.02
		Factory Upper Tolerance			23.50			22.50		22.50
	1.4MHz	20407	824.7	22.31	22.31	22.30	22.30	22.30	22.29	21.28
		20525	836.5	22.15	22.14	22.13	22.23	22.24	22.23	21.13
		20643	848.3	21.90	21.88	21.89	21.94	21.92	21.93	20.92
		Factory Upper Tolerance			23.50			23.50		22.50

Band	BW	Channel	Freq (MHz)	Averaged Power (dBm) 1RB Low	1RB Mid	1RB High	50% Low	50% Mid	50% High	100%
LTE Band 7	20MHz	20850	2510.0	22.57	22.51	22.25	21.64	21.58	21.55	21.55
		21100	2535.0	22.45	22.33	22.06	21.71	21.59	21.48	21.60
		21350	2560.0	22.65	22.62	22.34	21.71	21.71	21.64	21.68
		Factory Upper Tolerance			23.50			22.50		22.50
	15MHz	20825	2507.5	23.03	22.37	22.70	21.59	21.38	21.48	21.50
		21100	2535.0	23.08	22.33	22.51	21.64	21.46	21.50	21.54
		21375	2562.5	23.12	22.43	22.78	21.69	21.60	21.57	21.59
		Factory Upper Tolerance			23.50			22.50		22.50
	10MHz	20800	2505.0	22.77	22.67	22.58	21.71	21.66	21.65	21.69
		21100	2535.0	22.67	22.63	22.48	21.58	21.58	21.56	21.65
		21400	2565.0	22.77	22.68	22.58	21.70	21.67	21.60	21.63
		Factory Upper Tolerance			23.50			22.50		22.50
	5MHz	20775	2502.5	22.63	22.52	22.56	21.56	21.50	21.53	21.50
		21100	2535.0	22.58	22.44	22.48	21.53	21.52	21.48	21.45
		21425	2567.5	22.95	22.58	22.81	21.66	21.67	21.62	21.66
		Factory Upper Tolerance			23.50			22.50		22.50
LTE Band 13	10MHz	23230	782.0	22.33	22.38	22.03	21.59	21.52	21.59	21.58
		Factory Upper Tolerance			23.50			22.50		22.50
	5MHz	23205	779.5	22.82	22.45	22.50	21.64	21.44	21.58	21.58
		23230	782.0	22.79	22.38	22.45	21.57	21.40	21.54	21.55
		23255	784.5	22.79	22.43	22.43	21.50	21.36	21.48	21.50
		Factory Upper Tolerance			23.50			22.50		22.50
LTE Band 17	10MHz	23780	709.0	23.03	22.96	22.92	21.93	21.84	21.88	21.90
		23790	710.0	22.98	22.90	22.88	21.91	21.89	21.86	21.90
		23800	711.0	22.97	22.90	22.84	21.89	21.82	21.84	21.87
		Factory Upper Tolerance			23.50			22.50		22.50
	5MHz	23755	706.5	23.20	22.84	23.13	21.93	21.79	21.92	21.92
		23790	710.0	23.15	22.78	23.09	21.91	21.77	21.88	21.89
		23825	713.5	23.18	22.80	23.12	21.90	21.70	21.88	21.88
		Factory Upper Tolerance			23.50			22.50		22.50

Band	BW	Channel	Freq (MHz)	Averaged Power (dBm) 1RB Low	1RB Mid	1RB High	50% Low	50% Mid	50% High	100%
LTE Band 25	20MHz	26140	1860.0	22.37	22.46	22.13	21.49	21.39	21.35	21.38
		26365	1882.5	22.56	22.37	22.24	21.45	21.35	21.28	21.38
		26590	1905.0	22.56	22.27	22.04	21.47	21.32	21.26	21.32
		Factory Upper Tolerance		23.50			22.50			22.50
	15MHz	26115	1857.5	22.85	22.33	22.62	21.44	21.26	21.37	21.36
		26365	1882.5	22.89	22.24	22.61	21.52	21.20	21.39	21.40
		26615	1907.5	22.77	22.13	22.52	21.43	21.21	21.23	21.31
		Factory Upper Tolerance		23.50			22.50			22.50
	10MHz	26090	1855.0	22.59	22.60	22.49	21.47	21.44	21.43	21.46
		26365	1882.5	22.57	22.49	22.40	21.44	21.40	21.37	21.43
		26640	1910.0	22.41	22.38	22.27	21.45	21.30	21.38	21.38
		Factory Upper Tolerance		23.50			22.50			22.50
	5MHz	26065	1852.5	22.78	22.44	22.54	21.52	21.38	21.51	21.49
		26365	1882.5	22.74	22.35	22.67	21.40	21.35	21.38	21.38
		26665	1912.5	22.67	22.32	22.51	21.44	21.34	21.43	21.44
		Factory Upper Tolerance		23.50			22.50			22.50
	3MHz	26055	1851.5	22.55	22.55	22.54	21.57	21.52	21.57	21.55
		26365	1882.5	22.52	22.52	22.47	21.54	21.46	21.52	21.50
		26675	1913.5	22.42	22.39	22.39	21.45	21.37	21.43	21.45
		Factory Upper Tolerance		23.50			22.50			22.50
	1.4MHz	26047	1850.7	22.68	22.67	22.61	22.62	22.58	22.63	21.63
		26365	1882.5	22.55	22.54	22.54	22.58	22.59	22.59	21.56
		26683	1914.3	22.45	22.41	22.46	22.49	22.50	22.50	21.51
		Factory Upper Tolerance		23.50			23.50			22.50
LTE Band 26	15MHz	26765	821.5	22.15	22.03	22.13	20.52	20.84	20.47	20.41
		26865	831.5	22.32	21.84	22.20	21.30	21.14	21.09	21.07
		26965	841.5	22.42	21.87	22.23	21.14	20.95	21.04	21.05
		Factory Upper Tolerance		23.50			22.50			22.50
	10MHz	26740	819.0	22.41	22.29	22.39	21.31	21.23	21.28	20.89
		26865	831.5	22.15	22.09	22.08	21.25	21.21	21.23	21.25
		26990	844.0	21.30	22.16	21.08	20.78	21.05	20.75	20.84
		Factory Upper Tolerance		23.50			22.50			22.50
	5MHz	26715	816.5	22.62	22.29	22.61	21.27	21.14	21.31	21.23
		26865	831.5	22.55	22.17	22.49	21.21	21.15	21.18	21.24
		27015	846.5	22.32	21.91	22.23	21.10	20.93	21.02	21.06
		Factory Upper Tolerance		23.50			22.50			22.50
	3MHz	26705	815.5	22.44	22.42	22.39	21.34	21.27	21.33	21.35
		26865	831.5	22.28	22.24	22.22	21.20	21.17	21.22	21.26
		27025	847.5	22.03	22.05	21.92	21.00	20.96	20.97	21.15
		Factory Upper Tolerance		23.50			22.50			22.50
	1.4MHz	26697	814.7	22.46	22.41	22.41	22.40	22.31	22.28	21.38
		26865	831.5	22.26	22.25	22.24	22.31	22.29	22.27	21.22
		27033	848.3	22.11	22.10	22.07	22.17	22.15	22.14	21.08
		Factory Upper Tolerance		23.50			23.50			22.50

B.2.4 LTE – 16QAM

				Averaged Power (dBm)						
Band	BW	Channel	Freq (MHz)	1RB Low	1RB Mid	1RB High	50% Low	50% Mid	50% High	100%
LTE Band 2	20MHz	18700	1860.0	21.45	21.53	21.18	20.52	20.42	20.38	20.41
		18900	1880.0	21.85	21.67	21.50	20.50	20.40	20.35	20.38
		19100	1900.0	21.36	21.37	21.10	20.49	20.38	20.26	20.35
		Factory Upper Tolerance		22.50			21.50			21.50
	15MHz	18675	1857.5	21.98	21.32	21.76	20.53	20.32	20.44	20.38
		18900	1880.0	21.92	21.45	21.82	20.55	20.26	20.45	20.43
		19125	1902.5	21.87	21.35	21.54	20.39	20.17	20.21	20.23
		Factory Upper Tolerance		22.50			21.50			21.50
	10MHz	18650	1855.0	21.64	21.63	21.54	20.55	20.53	20.50	20.51
		18900	1880.0	21.76	21.70	21.63	20.52	20.47	20.45	20.56
		19150	1905.0	21.58	21.55	21.43	20.42	20.39	20.37	20.46
		Factory Upper Tolerance		22.50			21.50			21.50
	5MHz	18625	1852.5	21.84	21.50	21.81	20.62	20.49	20.60	20.55
		18900	1880.0	21.84	21.47	21.80	20.49	20.49	20.46	20.56
		19175	1907.5	21.75	21.35	21.60	20.51	20.37	20.47	20.53
		Factory Upper Tolerance		22.50			21.50			21.50
	3MHz	18615	1851.5	21.59	21.60	21.57	20.67	20.62	20.66	20.61
		18900	1880.0	21.69	21.71	21.64	20.61	20.52	20.57	20.56
		19185	1908.5	21.54	21.50	21.50	20.49	20.48	20.46	20.48
		Factory Upper Tolerance		22.50			21.50			21.50
	1.4MHz	18607	1850.7	21.71	21.69	21.69	21.77	21.76	21.76	20.76
		18900	1880.0	21.63	21.62	21.60	21.65	21.64	21.64	20.66
		19193	1909.3	21.53	21.52	21.54	21.55	21.55	21.53	20.61
		Factory Upper Tolerance		22.50			22.50			21.50

				Averaged Power (dBm)						
Band	BW	Channel	Freq (MHz)	1RB Low	1RB Mid	1RB High	50% Low	50% Mid	50% High	100%
LTE Band 4	20MHz	20050	1720.0	21.86	21.88	21.43	20.53	20.47	20.41	20.44
		20175	1732.5	21.35	21.74	21.57	20.48	20.62	20.57	20.58
		20300	1745.0	21.60	21.54	21.13	20.55	20.51	20.42	20.58
		Factory Upper Tolerance			22.50			21.50		21.50
	15MHz	20025	1717.5	22.52	21.84	22.28	20.62	20.33	20.40	20.46
		20175	1732.5	22.12	21.51	22.02	20.57	20.45	20.60	20.61
		20325	1747.5	22.25	21.46	21.98	20.64	20.34	20.45	20.61
		Factory Upper Tolerance			22.50			21.50		21.50
	10MHz	20000	1715.0	21.28	21.40	21.26	20.39	20.54	20.22	20.56
		20175	1732.5	21.50	21.59	21.53	20.71	20.71	20.48	20.34
		20350	1750.0	22.21	22.11	21.99	20.78	20.69	20.64	20.65
		Factory Upper Tolerance			22.50			21.50		21.50
	5MHz	19975	1712.5	21.89	21.52	21.81	20.74	20.63	20.69	20.58
		20175	1732.5	21.74	21.39	21.85	20.68	20.58	20.70	20.70
		20375	1752.5	21.93	21.80	21.85	20.65	20.57	20.60	20.51
		Factory Upper Tolerance			22.50			21.50		21.50
	3MHz	19965	1711.5	21.60	21.49	21.49	20.54	20.46	20.50	20.59
		20175	1732.5	21.40	21.46	21.39	20.64	20.64	20.70	20.74
		20385	1753.5	22.16	22.22	22.06	20.69	20.65	20.64	20.72
		Factory Upper Tolerance			22.50			21.50		21.50
	1.4MHz	19957	1710.7	21.31	21.26	21.28	21.86	21.85	21.88	20.69
		20175	1732.5	21.30	21.27	21.30	21.94	21.92	21.92	20.69
		20393	1754.3	21.60	21.60	21.54	22.06	22.07	22.07	20.69
		Factory Upper Tolerance			22.50			22.50		21.50
LTE Band 5	10MHz	20450	829.0	21.30	21.19	21.34	20.26	20.12	20.22	20.19
		20525	836.5	21.27	21.29	21.16	20.25	20.21	20.21	20.17
		20600	844.0	21.15	21.07	20.97	20.24	20.16	20.11	20.04
		Factory Upper Tolerance			22.50			21.50		21.50
	5MHz	20425	826.5	21.47	21.08	21.34	20.34	20.19	20.32	20.18
		20525	836.5	21.10	20.98	21.08	20.24	20.10	20.22	20.22
		20625	846.5	20.97	20.81	20.84	20.18	20.02	20.09	19.98
		Factory Upper Tolerance			22.50			21.50		21.50
	3MHz	20415	825.5	21.23	21.24	21.21	20.14	20.03	20.13	20.14
		20525	836.5	21.14	21.26	21.10	20.16	20.21	20.15	20.27
		20635	847.5	20.96	20.96	20.96	19.98	19.96	19.98	20.05
		Factory Upper Tolerance			22.50			21.50		21.50
	1.4MHz	20407	824.7	21.33	21.32	21.31	21.57	21.52	21.58	20.38
		20525	836.5	21.22	21.20	21.20	21.42	21.40	21.43	20.21
		20643	848.3	21.05	21.03	21.04	21.03	21.04	21.05	19.97
		Factory Upper Tolerance			22.50			22.50		21.50

				Averaged Power (dBm)						
Band	BW	Channel	Freq (MHz)	1RB Low	1RB Mid	1RB High	50% Low	50% Mid	50% High	100%
LTE Band 7	20MHz	20850	2510.0	21.59	21.50	21.29	20.55	20.46	20.42	20.40
		21100	2535.0	21.50	21.49	21.04	20.51	20.42	20.35	20.43
		21350	2560.0	21.64	21.61	21.33	20.54	20.50	20.44	20.49
		Factory Upper Tolerance			22.50			21.50		21.50
	15MHz	20825	2507.5	22.09	21.32	21.84	20.47	20.26	20.36	20.32
		21100	2535.0	22.28	21.50	21.99	20.49	20.22	20.34	20.39
		21375	2562.5	22.20	21.56	22.02	20.63	20.42	20.52	20.44
		Factory Upper Tolerance			22.50			21.50		21.50
	10MHz	20800	2505.0	21.75	21.66	21.51	20.54	20.47	20.45	20.53
		21100	2535.0	21.85	21.86	21.66	20.50	20.48	20.47	20.45
		21400	2565.0	21.79	21.71	21.64	20.39	20.64	20.70	20.53
		Factory Upper Tolerance			22.50			21.50		21.50
	5MHz	20775	2502.5	21.67	21.55	21.62	20.48	20.44	20.51	20.49
		21100	2535.0	21.58	21.46	21.50	20.30	20.30	20.36	20.30
		21425	2567.5	21.97	21.59	21.86	20.71	20.60	20.68	20.49
		Factory Upper Tolerance			22.50			21.50		21.50
LTE Band 13	10MHz	23230	782.0	21.53	21.59	21.14	20.62	20.55	20.56	20.55
		Factory Upper Tolerance			22.50			21.50		21.50
	5MHz	23205	779.5	21.95	21.49	21.77	20.65	20.51	20.62	20.58
		23230	782.0	21.90	21.50	21.86	20.55	20.40	20.52	20.55
		23255	784.5	21.84	21.47	21.76	20.58	20.43	20.55	20.55
		Factory Upper Tolerance			22.50			21.50		21.50
LTE Band 17	10MHz	23780	709.0	22.01	21.92	21.90	20.98	20.96	20.97	20.93
		23790	710.0	22.14	22.05	22.02	20.96	20.96	20.94	20.91
		23800	711.0	22.00	21.93	21.86	21.04	20.99	20.98	20.88
		Factory Upper Tolerance			22.50			21.50		21.50
	5MHz	23755	706.5	22.21	21.82	22.13	21.05	20.91	21.04	20.96
		23790	710.0	22.20	21.83	22.13	20.92	20.80	20.93	20.94
		23825	713.5	22.17	21.78	22.10	20.95	20.81	20.94	20.92
		Factory Upper Tolerance			22.50			21.50		21.50

				Averaged Power (dBm)						
Band	BW	Channel	Freq (MHz)	1RB Low	1RB Mid	1RB High	50% Low	50% Mid	50% High	100%
LTE Band 25	20MHz	26140	1860.0	21.45	21.53	21.18	20.52	20.42	20.38	20.41
		26365	1882.5	21.85	21.67	21.50	20.50	20.40	20.35	20.38
		26590	1905.0	21.36	21.37	21.10	20.45	20.41	20.36	20.35
		Factory Upper Tolerance		22.50			21.50			21.50
	15MHz	26115	1857.5	21.98	21.32	21.76	20.53	20.32	20.44	20.38
		26365	1882.5	21.92	21.45	21.82	20.55	20.26	20.45	20.43
		26615	1907.5	21.87	21.35	21.54	20.43	20.25	20.36	20.33
		Factory Upper Tolerance		22.50			21.50			21.50
	10MHz	26090	1855.0	21.64	21.63	21.54	20.55	20.53	20.50	20.51
		26365	1882.5	21.76	21.70	21.63	20.52	20.47	20.45	20.56
		26640	1910.0	21.58	21.55	21.43	20.49	20.48	20.52	20.46
		Factory Upper Tolerance		22.50			21.50			21.50
	5MHz	26065	1852.5	21.84	21.50	21.81	20.62	20.49	20.60	20.55
		26365	1882.5	21.84	21.47	21.80	20.49	20.49	20.46	20.56
		26665	1912.5	21.75	21.35	21.60	20.50	20.45	20.53	20.53
		Factory Upper Tolerance		22.50			21.50			21.50
	3MHz	26055	1851.5	21.59	21.60	21.57	20.67	20.62	20.66	20.61
		26365	1882.5	21.69	21.71	21.64	20.61	20.52	20.57	20.56
		26675	1913.5	21.54	21.50	21.50	20.49	20.41	20.46	20.48
		Factory Upper Tolerance		22.50			21.50			21.50
	1.4MHz	26047	1850.7	21.71	21.69	21.69	21.77	21.76	21.76	20.76
		26365	1882.5	21.63	21.62	21.60	21.65	21.64	21.64	20.66
		26683	1914.3	21.48	21.41	21.46	21.53	21.53	21.53	20.58
		Factory Upper Tolerance		22.50			22.50			21.50
LTE Band 26	15MHz	26765	821.5	20.96	20.87	21.04	20.24	20.11	19.56	19.51
		26865	831.5	22.07	21.53	21.99	20.21	20.00	19.95	20.25
		26965	841.5	21.63	21.05	21.47	20.15	20.00	20.04	20.07
		Factory Upper Tolerance		22.50			21.50			21.50
	10MHz	26740	819.0	21.15	21.06	21.23	20.36	20.31	20.35	19.89
		26865	831.5	21.85	21.77	21.78	20.37	20.33	20.30	20.26
		26990	844.0	20.31	21.13	20.07	20.00	20.22	19.94	19.88
		Factory Upper Tolerance		22.50			21.50			21.50
	5MHz	26715	816.5	21.60	21.24	21.56	20.42	20.33	20.42	20.32
		26865	831.5	21.50	21.06	21.42	20.24	20.21	20.20	20.37
		27015	846.5	21.77	21.28	21.59	20.26	20.08	20.16	20.09
		Factory Upper Tolerance		22.50			21.50			21.50
	3MHz	26705	815.5	21.31	21.25	21.23	20.62	20.52	20.57	20.36
		26865	831.5	21.03	21.03	21.05	20.30	20.24	20.31	20.32
		27025	847.5	21.66	21.62	21.53	20.40	20.30	20.31	20.26
		Factory Upper Tolerance		22.50			21.50			21.50
	1.4MHz	26697	814.7	21.48	21.44	21.41	21.64	21.69	21.65	20.48
		26865	831.5	21.32	21.30	21.31	21.51	21.48	21.49	20.32
		27033	848.3	21.11	21.15	21.08	21.27	21.28	21.28	20.03
		Factory Upper Tolerance		22.50			22.50			21.50

B.2.5 LTE with active DL Carrier Aggregation

See *Annex E: LTE CA setup description* for more information about the setup used.

CA_2A_4A

							Secondary Component Carrier (SCC)					
							LTE Band 4					
Primary Component Carrier (PCC)	Band	BW	UL Channel	UL Freq (MHz)	RB Config	SCC On/Off	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	LTE Band 2	20 MHz	18900	1880.0	1RB Low	On	22.33	22.31	22.35	22.23		
						Off	22.57					
		15 MHz	18675	1857.5	1RB Low	On	22.51	22.50	22.50	22.50		
						Off	22.91					
		10 MHz	18650	1855.0	1RB Low	On	22.55	22.54	22.45	22.39		
						Off	22.60					
		5 MHz	18625	1852.5	1RB Low	On	22.89	22.78	22.72	22.73		
						Off	22.78					
		3 MHz	18615	1851.5	1RB Low	On	22.31	22.33	22.33	22.32		
						Off	22.55					
		1.4 MHz	18607	1850.7	1RB Low	On	22.36	22.34	22.33	22.34		
						Off	22.68					

CA_2A_5A

							Secondary Component Carrier (SCC)					
							LTE Band 5					
Primary Component Carrier (PCC)	Band	BW	UL Channel	UL Freq (MHz)	RB Config	SCC On/Off	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	LTE Band 2	20 MHz	18900	1880.0	1RB Low	On			22.39	22.41		
						Off			22.57			
		15 MHz	18675	1857.5	1RB Low	On			22.25	22.12		
						Off			22.91			
		10 MHz	18650	1855.0	1RB Low	On			22.48	22.47		
						Off			22.60			
		5 MHz	18625	1852.5	1RB Low	On			22.61	22.75		
						Off			22.78			

CA_2A_13A

							Secondary Component Carrier (SCC)					
							LTE Band 13					
Primary Component Carrier (PCC)	Band	BW	UL Channel	UL Freq (MHz)	RB Config	SCC On/Off	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	LTE Band 2	20 MHz	18900	1880.0	1RB Low	On			22.43			
						Off			22.57			
		15 MHz	18675	1857.5	1RB Low	On			22.21			
						Off			22.91			
		10 MHz	18650	1855.0	1RB Low	On			22.44			
						Off			22.60			
		5 MHz	18625	1852.5	1RB Low	On			22.58			
						Off			22.78			

CA_2A_17A

							Secondary Component Carrier (SCC)					
							LTE Band 17					
Prim. Comp. Carrier (PCC)	Band	BW	UL Channel	UL Freq (MHz)	RB Config	SCC On/Off	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	LTE Band 2	10 MHz	18650	1855.0	1RB Low	On			22.51	22.51		
						Off			22.60			
		5 MHz	18625	1852.5	1RB Low	On			22.54	22.55		
						Off			22.78			

CA_2A_29A

						Secondary Component Carrier (SCC)						
						LTE Band 29						
Prim. Comp. Carrier (PCC)	Band	BW	UL Channel	UL Freq (MHz)	RB Config	SCC On/Off	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	LTE Band 2	10 MHz	18650	1855.0	1RB Low	On			22.50	22.50	22.57	
						Off			22.60			
		5 MHz	18625	1852.5	1RB Low	On			22.52	22.54	22.69	
						Off			22.78			

CA_4A_4A

						Secondary Component Carrier (SCC)						
						LTE Band 4						
Primary Component Carrier (PCC)	Band	BW	UL Channel	UL Freq (MHz)	RB Config	SCC On/Off	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	LTE Band 4	20 MHz	20300	1745.0	1RB Low	On	22.52	22.52	22.51	22.52		
						Off	22.59					
		15 MHz	20325	1747.5	1RB Low	On	22.46	22.23	22.40	22.36		
						Off	22.93					
		10 MHz	20000	1715.0	1RB Low	On	22.52	22.45	22.42	22.57		
						Off	22.68					
		5 MHz	19975	1712.5	1RB Low	On	22.65	22.61	22.61	22.61		
						Off	22.89					

CA_4A_5A

						Secondary Component Carrier (SCC)						
						LTE Band 5						
Prim. Comp. Carrier (PCC)	Band	BW	UL Channel	UL Freq (MHz)	RB Config	SCC On/Off	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	LTE Band 4	10 MHz	20000	1715.0	1RB Low	On			22.57	22.56		
						Off			22.68			
		5 MHz	19975	1712.5	1RB Low	On			22.64	22.66		
						Off			22.89			

CA_4A_13A

						Secondary Component Carrier (SCC)						
						LTE Band 13						
Primary Component Carrier (PCC)	Band	BW	UL Channel	UL Freq (MHz)	RB Config	SCC On/Off	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	LTE Band 4	20 MHz	20300	1745.0	1RB Low	On			22.56			
						Off			22.59			
		15 MHz	20325	1747.5	1RB Low	On			22.90			
						Off			22.93			
		10 MHz	20000	1715.0	1RB Low	On			22.64			
						Off			22.68			
		5 MHz	19975	1712.5	1RB Low	On			22.66			
						Off			22.89			

CA_4A_17A

						Secondary Component Carrier (SCC)						
						LTE Band 17						
Prim. Comp. Carrier (PCC)	Band	BW	UL Channel	UL Freq (MHz)	RB Config	SCC On/Off	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	LTE Band 4	10 MHz	20000	1715.0	1RB Low	On			22.76	22.74		
						Off			22.68			
		5 MHz	19975	1712.5	1RB Low	On			22.63	22.41		
						Off			22.89			

CA_4A_29A

						Secondary Component Carrier (SCC)						
						LTE Band 29						
Prim. Comp. Carrier (PCC)	Band	BW	UL Channel	UL Freq (MHz)	RB Config	SCC On/Off	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	LTE Band 4	10 MHz	20000	1715.0	1RB Low	On			22.80	22.82	22.80	
						Off			22.68			
		5 MHz	19975	1712.5	1RB Low	On			22.87	22.82	23.03	
						Off			22.89			

B.2.6 802.11 a/b/g/n/ac

Band	Mode	Channel	Frequency (MHz)	Averaged Power (dBm)	Factory Upper Tolerance (dBm)
2.4 GHz	802.11b 1Mbps	1	2412	15.88	16
		6	2437	15.05	
		11	2462	15.52	
	802.11g 6Mbps	1	2412	15.81	
		6	2437	14.99	
		11	2462	15.48	
	802.11n20 MCS0	1	2412	14.24	
		6	2437	13.68	
		11	2462	14.17	
5.2GHz	802.11a 6Mbps	36	5180	11.76	12
		40	5200	11.78	
		44	5220	11.78	
		48	5240	11.79	
	802.11n20 MCS0	36	5180	11.76	
		40	5200	11.80	
		44	5220	11.69	
		48	5240	11.66	
	802.11n40 MCS0	38	5190	11.85	
		46	5230	12.00	
	802.11ac80 VHT0	42	5210	11.65	
5.3GHz	802.11a 6Mbps	52	5260	11.73	12
		56	5280	11.70	
		60	5300	11.82	
		64	5320	11.61	
	802.11n20 MCS0	52	5260	11.77	
		56	5280	11.71	
		60	5300	11.66	
		64	5320	11.70	
	802.11n40 MCS0	54	5270	11.94	
		62	5310	11.90	
	802.11ac80 VHT0	58	5290	11.46	

Band	Mode	Channel	Frequency (MHz)	Averaged Power (dBm)	Factory Upper Tolerance (dBm)
5.6GHz	802.11a6Mbps	100	5500	11.88	12
		104	5520	11.83	
		108	5540	11.90	
		112	5560	11.61	
		116	5580	11.54	
		132	5660	11.68	
		136	5680	11.35	
		140	5700	11.31	
	802.11n20 MCS0	100	5500	11.85	
		104	5520	11.76	
		108	5540	11.68	
		112	5560	11.73	
		116	5580	11.59	
		132	5660	11.39	
		136	5680	11.46	
		140	5700	11.2	
	802.11n40 MCS0	102	5510	11.97	
		110	5550	11.77	
		134	5670	11.54	
	802.11ac80 VHT0	106	5530	11.78	
5.8GHz	802.11a 6Mbps	149	5745	11.69	12
		153	5765	11.58	
		157	5785	11.72	
		161	5805	11.45	
		165	5825	11.31	
	802.11n20 MCS0	149	5745	11.60	
		153	5765	11.57	
		157	5785	11.59	
		161	5805	11.31	
		165	5825	11.37	
	802.11n40 MCS0	151	5755	11.58	
		159	5795	11.35	
	802.11ac80 VHT0	155	5775	11.13	

B.2.7 Bluetooth

Band	Mode	Channel	Frequency (MHz)	Averaged Power (dBm)	Factory Upper Tolerance (dBm)
2.4 GHz	Bluetooth v2.1 Basic rate GFSK	0	2402	6.95	10
		39	2441	6.1	
		78	2480	4.7	
	Bluetooth v2.1 Basic rate π/4 DQPSK	0	2402	6.9	9
		39	2441	6.06	
		78	2480	4.67	
	Bluetooth v2.1 Basic rate 8-DPSK	0	2402	6.87	9
		39	2441	6.07	
		78	2480	4.67	
	Bluetooth v4.0 Low energy GFSK	0	2402	4.17	10
		20	2442	4.17	
		39	2480	4.11	

B.3 Tissue Parameters Measurement

Head TSL

Freq. (MHz)	Target Parameters		Measured TSL Parameters		Deviation (%)		Date
	ε'	σ	ε'	σ	ε'	σ	
750	41.94	0.89	42.33	0.91	0.93	2.25	2014/09/17
835	41.50	0.90	43.13	0.87	3.93	-3.33	2014/09/16
1800	40.00	1.40	37.31	1.39	-6.73	-0.71	2014/08/28
1900	40.00	1.40	38.07	1.50	-4.83	7.14	2014/09/02
2450	39.20	1.80	37.68	1.87	-3.88	3.89	2014/08/27
2600	39.01	1.96	38.35	2.04	-1.69	4.08	2014/09/18
5200	36.00	4.66	36.85	4.29	2.36	-7.94	2014/08/12
5600	35.50	5.07	36.33	4.67	2.34	-7.89	2014/08/19
5800	35.30	5.27	36.88	4.78	4.48	-9.30	2014/08/20

Body TSL

Freq. (MHz)	Target Parameters		Measured TSL Parameters		Deviation (%)		Date
	ε'	σ	ε'	σ	ε'	σ	
750	55.53	0.96	58.30	1.01	4.99	5.21	2014/09/24
835	55.20	0.97	55.76	0.98	1.01	1.03	2014/09/25
1800	53.30	1.52	52.95	1.54	-0.66	1.32	2014/09/19
1900	53.30	1.52	52.51	1.62	-1.48	6.58	2014/09/22
2450	52.70	1.95	50.31	1.92	-4.54	-1.54	2014/08/27
2600	52.51	2.16	51.36	2.17	-2.19	0.46	2014/09/26
5200	49.01	5.30	48.50	5.39	-1.04	1.70	2014/08/21
5600	48.47	5.77	47.91	5.95	-1.16	3.12	2014/08/22
5800	48.20	6.00	47.56	6.10	-1.33	1.67	2014/08/25

B.4 System Check Measurements

Head Measurements

Frequency (MHz)	Average	Target SAR (W/g)	Measured SAR (W/g)	Drift (%)	Limit (%)	Date
750	1g	8.49	8.79	3.56	10	2014/09/17
	10g	5.55	5.74	3.34		
835	1g	9.60	8.89	-7.35		2014/09/16
	10g	6.22	5.91	-4.99		
1800	1g	38.40	38.26	-0.36		2014/08/28
	10g	20.10	20.39	1.46		
1900	1g	39.70	37.92	-4.49		2014/09/02
	10g	20.50	19.39	-5.44		
2450	1g	52.80	51.39	-2.67		2014/08/27
	10g	24.80	23.65	-4.64		
2600	1g	55.30	49.87	-9.83		2014/09/18
	10g	24.60	22.41	-8.92		
5200	1g	76.00	75.90	-0.14		2014/08/12
	10g	21.80	21.98	0.84		
5600	1g	79.50	76.16	-4.20		2014/08/19
	10g	22.60	21.90	-3.09		
5800	1g	75.60	70.63	-6.57		2014/08/20
	10g	21.50	19.71	-8.33		

Body Measurements

Frequency (MHz)	Average	Target SAR (W/g)	Measured SAR (W/g)	Drift (%)	Limit (%)	Date
750	1g	8.49	8.52	0.35	10	2014/09/24
	10g	5.55	5.61	1.07		
835	1g	9.56	9.32	-2.50		2014/09/25
	10g	6.22	6.20	-0.26		
1800	1g	38.40	37.12	-3.34		2014/09/19
	10g	20.10	20.30	1.01		
1900	1g	39.70	37.40	-5.79		2014/09/22
	10g	20.50	19.74	-3.71		
2450	1g	51.00	46.29	-9.24		2014/08/27
	10g	24.00	21.75	-9.39		
2600	1g	55.65	50.43	-9.38		2014/09/26
	10g	24.61	23.52	-4.44		
5200	1g	74.90	75.50	0.80		2014/08/21
	10g	20.90	21.39	2.33		
5600	1g	82.00	79.41	-3.16		2014/08/22
	10g	22.80	22.26	-2.36		
5800	1g	74.90	75.50	0.80		2014/08/25
	10g	20.90	21.39	2.33		

B.5 Cellular SAR Test Results [PCE]

B.5.1 GSM / GPRS / EDGE – GSM 850

Head

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
GSM / Voice 1UL	128	824.2	Left Tilt	0.193	0.198	
			Left Touch	0.316	0.324	
			Right Tilt	0.214	0.219	
			Right Touch	0.322	0.330	1

Body

Mode	Channel	Frequency (MHz)	Position	Distance (mm)	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
GSM / Voice 1UL	128	824.2	Front face	10	0.446	0.457	
			Back face		0.539	0.553	2
			Left edge		0.355	0.364	
			Right edge		0.415	0.426	
			Bottom edge		0.042	0.043	

B.5.2 GSM / GPRS / EDGE – PCS 1900

Head

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
GSM / Voice 1UL	810	1909.8	Left Tilt	0.108	0.125	
			Left Touch	0.227	0.262	3
			Right Tilt	0.105	0.121	
			Right Touch	0.202	0.233	

Body

Mode	Channel	Frequency (MHz)	Position	Distance (mm)	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
GSM / Voice 1UL	810	1909.8	Front face	10	0.028	0.032	4
			Back face		0.028	0.032	
			Left edge		0.017	0.020	
			Right edge		0.014	0.016	
			Bottom edge		0.01	0.012	

B.5.3 WCDMA / HSPA / DC-HSDPA – FDD II

Head

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
12.2kbps RMC	9538	1907.6	Left Tilt	0.244	0.260	
			Left Touch	0.574	0.611	5
			Right Tilt	0.247	0.263	
			Right Touch	0.472	0.502	

Body

Mode	Channel	Frequency (MHz)	Position	Distance (mm)	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
12.2kbps RMC	9538	1907.6	Front face	10	0.573	0.610	6
			Back face		0.489	0.520	
			Left edge		0.365	0.388	
			Right edge		0.291	0.310	
			Bottom edge		0.171	0.182	

B.5.4 WCDMA / HSPA / DC-HSDPA – FDD IV

Head

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
12.2kbps RMC	1312	1712.4	Left Touch	0.772	0.827	
	1413	1732.6	Left Tilt	0.458	0.489	
			Left Touch	0.875	0.933	7
			Right Tilt	0.385	0.411	
			Right Touch	0.787	0.839	
	1513	1752.6	Left Touch	0.672	0.718	

Body

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
12.2kbps RMC	1312	1712.4	Back face	0.902	0.967	8
	1413	1732.6	Front face	0.755	0.805	
			Back face	0.799	0.852	
			Left edge	0.427	0.455	
			Right edge	0.334	0.356	
			Bottom edge	0.445	0.475	
	1513	1752.6	Back face	0.765	0.818	

B.5.5 WCDMA / HSPA / DC-HSDPA – FDD V

Head

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
12.2kbps RMC	4233	846.6	Left Tilt	0.063	0.077	
			Left Touch	0.137	0.167	
			Right Tilt	0.209	0.255	
			Right Touch	0.334	0.408	9

Body

Mode	Channel	Frequency (MHz)	Position	Distance (mm)	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
12.2kbps RMC	4233	846.6	Front face	10	0.182	0.170	
			Back face		0.45	0.550	10
			Left edge		0.148	0.181	
			Right edge		0.198	0.242	
			Bottom edge		0.017	0.021	

B.5.6 LTE FDD – Band 2

Head

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
1RB Low @ QPSK - 20MHz	18900	1880	Left Tilt	0.217	0.269	
			Left Touch	0.414	0.513	11
			Right Tilt	0.183	0.227	
			Right Touch	0.309	0.383	
50% RB Low @ QPSK - 20MHz	18700	1860	Left Tilt	0.156	0.199	
			Left Touch	0.342	0.436	
			Right Tilt	0.129	0.164	
			Right Touch	0.24	0.306	

Body

Mode	Channel	Frequency (MHz)	Position	Distance (mm)	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
1RB Low @ QPSK - 20MHz	18900	1880	Front face	10	0.348	0.431	12
			Back face		0.32	0.396	
			Left edge		0.205	0.254	
			Right edge		0.176	0.218	
			Bottom edge		0.153	0.190	
50% RB Low @ QPSK - 20MHz	18700	1860	Front face	10	0.322	0.410	
			Back face		0.275	0.350	
			Left edge		0.17	0.216	
			Right edge		0.123	0.157	
			Bottom edge		0.122	0.155	

B.5.7 LTE FDD – Band 4

Head

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
1RB Low @ QPSK - 20MHz	20300	1745	Left Tilt	0.213	0.263	
			Left Touch	0.381	0.470	
			Right Tilt	0.153	0.189	
			Right Touch	0.4	0.493	13
50% RB Low @ QPSK - 20MHz	20300	1745	Left Tilt	0.188	0.231	
			Left Touch	0.375	0.461	
			Right Tilt	0.13	0.160	
			Right Touch	0.323	0.397	

Body

Mode	Channel	Frequency (MHz)	Position	Distance (mm)	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
1RB Low @ QPSK - 20MHz	20300	1745	Front face	10	0.403	0.497	14
			Back face		0.365	0.450	
			Left edge		0.207	0.255	
			Right edge		0.158	0.195	
			Bottom edge		0.224	0.276	
50% RB Low @ QPSK - 20MHz	20300	1745	Front face	10	0.268	0.330	
			Back face		0.317	0.390	
			Left edge		0.169	0.208	
			Right edge		0.128	0.157	
			Bottom edge		0.181	0.223	

B.5.8 LTE FDD – Band 5

Head

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
1RB Low @ QPSK - 10MHz	20450	829	Left Tilt	0.148	0.196	
			Left Touch	0.213	0.283	
			Right Tilt	0.143	0.190	
			Right Touch	0.215	0.285	15
50% RB Low @ QPSK - 10MHz	20450	829	Left Tilt	0.118	0.158	
			Left Touch	0.176	0.235	
			Right Tilt	0.117	0.156	
			Right Touch	0.178	0.238	

Body

Mode	Channel	Frequency (MHz)	Position	Distance (mm)	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
1RB Low @ QPSK - 10MHz	20450	829	Front face	10	0.28	0.372	
			Back face		0.34	0.451	16
			Left edge		0.238	0.316	
			Right edge		0.274	0.364	
			Bottom edge		0.03	0.040	
50% RB Low @ QPSK - 10MHz	20450	829	Front face	10	0.143	0.191	
			Back face		0.138	0.184	
			Left edge		0.115	0.154	
			Right edge		0.142	0.190	
			Bottom edge		0.014	0.019	

B.5.9 LTE FDD – Band 7

Head

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
1RB Low @ QPSK - 20MHz	21350	2560	Left Tilt	0.082	0.100	
			Left Touch	0.089	0.108	
			Right Tilt	0.04	0.049	
			Right Touch	0.221	0.269	17
50% RB Low @ QPSK - 20MHz	21350	2560	Left Tilt	0.061	0.073	
			Left Touch	0.074	0.089	
			Right Tilt	0.039	0.047	
			Right Touch	0.195	0.234	

Body

Mode	Channel	Frequency (MHz)	Position	Distance (mm)	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
1RB Low @ QPSK - 20MHz	21350	2560	Front face	10	0.761	0.926	
			Back face		0.705	0.857	
			Left edge		0.054	0.066	
			Right edge		0.142	0.173	
			Bottom edge		1.182	1.438	18
1RB Low @ QPSK - 20MHz	20850	2510	Bottom edge	10	0.782	0.996	
1RB Low @ QPSK - 20MHz	21100	2535	Bottom edge	10	1.01	1.251	
50% RB Low @ QPSK - 20MHz	21350	2560	Front face	10	0.555	0.666	
			Back face		0.587	0.704	
			Left edge		0.041	0.049	
			Right edge		0.103	0.124	
			Bottom edge		0.927	1.112	
50% RB Low @ QPSK - 20MHz	21350	2560	Bottom edge	10	0.72	0.864	
50% RB Low @ QPSK - 20MHz	21100	2535	Bottom edge	10	0.864	1.053	
100% RB Low @ QPSK - 20MHz	21350	2560	Bottom edge	10	0.869	1.050	

B.5.10 LTE FDD – Band 13

Head

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
1RB Low @ QPSK - 10MHz	23230	782	Left Tilt	0.165	0.214	
			Left Touch	0.229	0.296	
			Right Tilt	0.161	0.208	
			Right Touch	0.23	0.298	19
50% RB Low @ QPSK - 10MHz	23230	782	Left Tilt	0.138	0.170	
			Left Touch	0.194	0.239	
			Right Tilt	0.128	0.158	
			Right Touch	0.191	0.236	

Body

Mode	Channel	Frequency (MHz)	Position	Distance (mm)	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
1RB Low @ QPSK - 10MHz	23230	782	Front face	10	0.241	0.312	
			Back face		0.307	0.397	20
			Left edge		0.23	0.298	
			Right edge		0.264	0.342	
			Bottom edge		0.025	0.032	
50% RB Low @ QPSK - 10MHz	23230	782	Front face	10	0.211	0.260	
			Back face		0.263	0.324	
			Left edge		0.185	0.228	
			Right edge		0.217	0.268	
			Bottom edge		0.02	0.025	

B.5.11 LTE FDD – Band 17

Head

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
1RB Low @ QPSK - 10MHz	23780	709	Left Tilt	0.11	0.124	
			Left Touch	0.168	0.187	
			Right Tilt	0.121	0.135	
			Right Touch	0.184	0.205	21
50% RB Low @ QPSK - 10MHz	23780	709	Left Tilt	0.087	0.099	
			Left Touch	0.132	0.151	
			Right Tilt	0.101	0.115	
			Right Touch	0.148	0.169	

Body

Mode	Channel	Frequency (MHz)	Position	Distance (mm)	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
1RB Low @ QPSK - 10MHz	23780	709	Front face	10	0.185	0.206	
			Back face		0.218	0.243	22
			Left edge		0.125	0.139	
			Right edge		0.149	0.166	
			Bottom edge		0.02	0.022	
50% RB Low @ QPSK - 10MHz	23780	709	Front face	10	0.177	0.202	
			Back face		0.205	0.234	
			Left edge		0.132	0.151	
			Right edge		0.155	0.177	
			Bottom edge		0.02	0.023	

B.5.12 LTE FDD – Band 25

Head

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
1RB Low @ QPSK - 20MHz	26365	1882.5	Left Tilt	0.143	0.178	
			Left Touch	0.352	0.437	23
			Right Tilt	0.157	0.195	
			Right Touch	0.293	0.364	
50% RB Low @ QPSK - 20MHz	26140	1860	Left Tilt	0.128	0.162	
			Left Touch	0.332	0.419	
			Right Tilt	0.154	0.194	
			Right Touch	0.265	0.334	

Body

Mode	Channel	Frequency (MHz)	Position	Distance (mm)	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
1RB Low @ QPSK - 20MHz	26365	1882.5	Back face	10	0.355	0.441	
			Front face		0.37	0.459	24
			Left edge		0.22	0.273	
			Right edge		0.231	0.287	
			Bottom edge		0.15	0.186	
50% RB Low @ QPSK - 20MHz	26140	1860	Back face	10	0.271	0.342	
			Front face		0.3	0.379	
			Left edge		0.169	0.213	
			Right edge		0.13	0.164	
			Bottom edge		0.123	0.155	

B.5.13 LTE FDD – Band 26

Head

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
1RB Low @ QPSK - 15MHz	26965	841.5	Left Tilt	0.108	0.138	
			Left Touch	0.167	0.214	25
			Right Tilt	0.121	0.155	
			Right Touch	0.163	0.209	
50% RB Low @ QPSK - 15MHz	26865	831.5	Left Tilt	0.091	0.120	
			Left Touch	0.13	0.171	
			Right Tilt	0.092	0.121	
			Right Touch	0.129	0.170	

Body

Mode	Channel	Frequency (MHz)	Position	Distance (mm)	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
1RB Low @ QPSK - 15MHz	26965	841.5	Front face	10	0.271	0.348	
			Back face		0.311	0.399	26
			Left edge		0.231	0.296	
			Right edge		0.282	0.362	
			Bottom edge		0.029	0.037	
50% RB Low @ QPSK - 15MHz	26865	831.5	Front face	10	0.217	0.287	
			Back face		0.259	0.343	
			Left edge		0.178	0.236	
			Right edge		0.213	0.282	
			Bottom edge		0.021	0.028	

B.6 WiFi SAR Test Results [DTS]

B.6.1 802.11b/g/n – 2.4GHz

Head

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
802.11b 1Mbps	1	2412	Left Tilt	0.316	0.325	
			Left Touch	0.402	0.413	
			Right Tilt	0.681	0.700	
			Right Touch	0.92	0.946	
	6	2437	Right Touch	0.929	1.156	
	11	2462	Right Touch	0.955	1.067	27

Body

Mode	Channel	Frequency (MHz)	Position	Distance (mm)	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
802.11b 1Mbps	1	2412	Front face	10	0.159	0.163	28
			Back face		0.141	0.145	
			Left edge		0.0933	0.096	
			Top edge		0.0123	0.013	
			Bottom edge		0.0198	0.020	

B.6.2 802.11a/n – 5.8 GHz

Head

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
802.11a 6Mbps	149	5745	Right Tilt	0.572	0.614	
	153	5765	Right Tilt	0.787	0.867	
	157	5785	Left Tilt	0.374	0.399	
			Left Touch	0.318	0.339	
			Right Tilt	0.833	0.888	35
			Right Touch	0.709	0.756	
	161	5805	Right Tilt	0.791	0.898	
	165	5825	Right Tilt	0.760	0.891	

Body

Mode	Channel	Frequency (MHz)	Position	Distance (mm)	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
802.11a 6Mbps	157	5785	Front face	10	0.091	0.097	
			Back face		0.160	0.171	
			Left edge		0.140	0.149	
			Top edge		0.164	0.175	36
			Bottom edge		0.055	0.059	

B.7 WiFi SAR Test Results [UNII]

B.7.1 802.11a/n/ac – 5.2 GHz

Head

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
802.11a 6Mbps	36	5180	Right Tilt	0.541	0.572	
	40	5200	Right Tilt	0.542	0.570	
	44	5220	Right Tilt	0.588	0.619	
	48	5240	Left Tilt	0.294	0.309	
			Left Touch	0.235	0.247	
			Right Tilt	0.615	0.645	29
			Right Touch	0.531	0.557	

Body

Mode	Channel	Frequency (MHz)	Position	Distance (mm)	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
802.11a 6Mbps	48	5240	Front face	10	0.057	0.060	
			Back face		0.095	0.099	
			Left edge		0.100	0.105	
			Top edge		0.127	0.133	30
			Bottom edge		0.033	0.035	

B.7.2 802.11a/n/ac – 5.3 GHz

Head

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
802.11a 6Mbps	52	5260	Right Tilt	0.633	0.674	
	56	5280	Right Tilt	0.635	0.680	
	60	5300	Left Tilt	0.310	0.323	
			Left Touch	0.231	0.241	
			Right Tilt	0.655	0.683	
			Right Touch	0.511	0.533	
	64	5320	Right Tilt	0.678	0.742	31

Body

Mode	Channel	Frequency (MHz)	Position	Distance (mm)	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
802.11a 6Mbps	60	5300	Front face	10	0.064	0.064	
			Back face		0.113	0.118	
			Left edge		0.127	0.132	
			Top edge		0.157	0.164	32
			Bottom edge		0.013	0.013	

B.7.3 802.11a/n/ac – 5.6 GHz

Head

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
802.11a 6Mbps	100	5500	Right Tilt	0.859	0.883	
	104	5520	Right Tilt	0.834	0.867	
	108	5540	Left Tilt	0.392	0.401	
			Left Touch	0.330	0.338	
			Right Tilt	0.895	0.916	
			Right Touch	0.734	0.751	
	112	5560	Right Tilt	0.867	0.948	
	116	5580	Right Tilt	0.912	1.014	33
	132	5660	Right Tilt	0.887	0.955	
	136	5680	Right Tilt	0.877	1.019	
	140	5700	Right Tilt	0.848	0.994	

Body

Mode	Channel	Frequency (MHz)	Position	Distance (mm)	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
802.11a 6Mbps	108	5540	Front face	10	0.107	0.109	
			Back face		0.180	0.184	
			Left edge		0.130	0.133	
			Top edge		0.174	0.178	34
			Bottom edge		0.066	0.067	

B.7.4 802.11n40/ac80 – 5.8 GHz

Head

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
802.11n40 MCS0	151	5755	Left Tilt	0.413	0.455	
			Left Touch	0.328	0.361	
			Right Tilt	0.729	0.803	
			Right Touch	0.607	0.669	
	159	5795	Right Tilt	0.762	0.885	37

Body

Mode	Channel	Frequency (MHz)	Position	Distance (mm)	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
802.11n40 MCS0	151	5755	Front face	10	0.088	0.096	
			Back face		0.144	0.159	
			Left edge		0.129	0.142	
			Top edge		0.144	0.159	38
			Bottom edge		0.000	0.000	

B.8 BT SAR Test Results [DSS]

B.8.1 BDR/EDR v2.1 / Bluetooth LE v4.0 – 2.4GHz

Head

Mode	Channel	Frequency (MHz)	Position	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
GFSK DH5	0	2402	Left Tilt	0.0484	0.098	
			Left Touch	0.0523	0.106	
			Right Tilt	0.104	0.210	39
			Right Touch	0.139	0.281	

Body

Mode	Channel	Frequency (MHz)	Position	Distance (mm)	SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Plot#
GFSK DH5	0	2402	Front face	10	0.0259	0.052	40
			Back face		0.0228	0.046	
			Left edge		0.0131	0.026	
			Top edge		0.00761	0.015	
			Bottom edge		0.0055	0.011	

B.9 SAR Measurement Variability

According to FCC OET KDB 865664, SAR Measurement variability is assessed when the maximum initial measured SAR is >0.8 W/kg for a certain band/mode. If the measured SAR value of the initial repeated measurement is <1.45 W/kg with <20% variation, only one repeated measurement is required to confirm that the results are not expected to have substantial variations.
A second repeated measurement is required only if the measured results for the initial repeated measurement are within 10% of the SAR limit or vary by more than 20%.

Band / Mode	Position	Channel	Freq. (MHz)	Measured SAR 1g (W/kg)	Repeated SAR 1g (W/Kg)	Ratio
2.4GHz / 802.11a 6Mbps	Head Right Touch	11	2462	0.955	0.93	1.0268
5.6GHz / 802.11a 6Mbps	Head Right Tilt	116	5580	0.912	0.945	1.0361
5.8GHz / 802.11a 6Mbps	Head Left Tilt	157	5785	0.833	0.818	1.0183
WCDMA FDD IV / 12.2kbps RMC	Head / Left Touch	1413	1732.6	0.875	0.856	1.0221
WCDMA FDD IV / 12.2kbps RMC	Body / Back Face	1312	1712.4	0.902	0.804	1.1218
LTE B7 / 1RB Low @ QPSK - 20MHz	Body / Bottom Edge	21449	2570	1.182	1.093	1.0814

B.10 Simultaneous Transmission SAR Evaluation

According to FCC OET KDB 447498 D01, when the sum of 1g SAR for all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit, SAR test exclusion applies to that simultaneous transmission configuration.

Position		Highest Reported SAR 1g (W/kg)				
		Cellular [PCE]	WLAN 2.4GHz [DTS]	WLAN 5.8GHz [DTS]	WLAN 5GHz [UNII]	Bluetooth [DSS]
HEAD	Left Tilt	0.489	0.325	0.399	0.455	0.098
	Left Touch	0.933	0.413	0.339	0.361	0.106
	Right Tilt	0.411	0.700	0.898	1.019	0.210
	Right Touch	0.839	1.156	0.756	0.751	0.281
BODY	Front Face	0.926	0.163	0.097	0.109	0.052
	Back Face	0.967	0.145	0.171	0.184	0.046

Simultaneous Tx Antenna Combination	Σ SAR 1g (W/Kg)					
	HEAD				BODY	
	Left Tilt	Left Touch	Right Tilt	Right Touch	Front Face	Back Face
Cellular + WLAN 2.4GHz	0.814	1.346	1.111	**1.995**	1.089	1.112
Cellular + WLAN 5.8GHz [DTS]	0.888	1.272	1.309	1.595	1.023	1.138
Cellular + WLAN 5GHz [UNII]	0.944	1.294	1.430	1.590	1.035	1.151
Cellular + BT	0.587	1.039	0.621	1.120	0.978	1.013
Cellular + WLAN 5.8GHz [DTS] + BT	0.986	1.378	1.519	**1.876**	1.075	1.184
Cellular + WLAN 5GHz [UNII] + BT	1.042	1.400	**1.640**	**1.871**	1.087	1.197
WLAN 5.8GHz [DTS] + BT	0.497	0.445	1.108	1.037	0.149	0.217
WLAN 5GHz [UNII] + BT	0.553	0.467	1.229	1.032	0.161	0.230

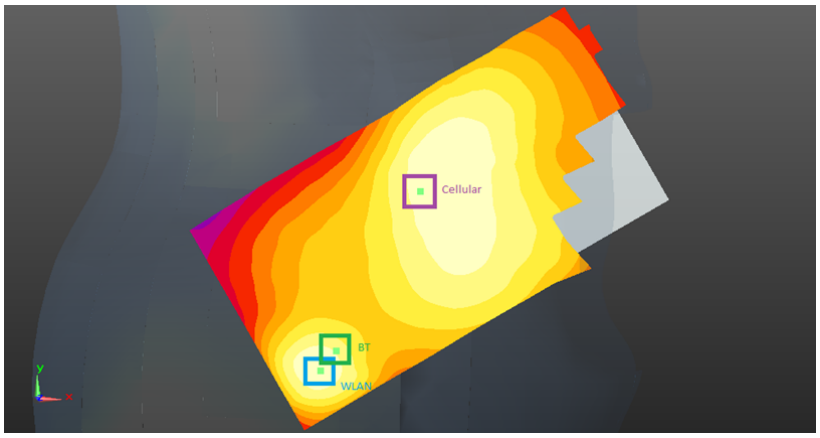
Position		Highest Reported SAR 1g (W/kg)				
		Cellular [PCE]	WLAN 2.4GHz [DTS]	WLAN 5.8GHz [DTS]	WLAN 5.8GHz [UNII]	Bluetooth [DSS]
HOTSPOT	Front Face	0.926	0.163	0.097	0.096	0.052
	Back Face	0.967	0.145	0.171	0.159	0.046
	Left edge	0.455	0.096	0.149	0.142	0.026
	Right edge	0.426	-	-		-
	Top edge	-	0.013	0.175	0.159	0.015
	Bottom edge	1.438	0.020	0.059	0.000	0.011

Simultaneous Tx Antenna Combination	Σ SAR 1g (W/Kg)			
	HOTSPOT			
	Front Face	Back Face	Left Edge	Bottom Edge
Cellular + WLAN 2.4GHz	1.089	1.112	0.551	1.458
Cellular + WLAN 5.8GHz [DTS]	1.023	1.138	0.604	1.497
Cellular + WLAN 5.8GHz [UNII]	1.022	1.126	0.597	1.438
Cellular + WLAN 5.8GHz [DTS] + BT	1.075	1.184	0.630	1.508
Cellular + WLAN 5.8GHz [UNII] + BT	1.074	1.172	0.623	1.449

In case the sum of SAR is larger than the limit, SAR test exclusion is determined by the SAR to peak location separation ratio[3] :

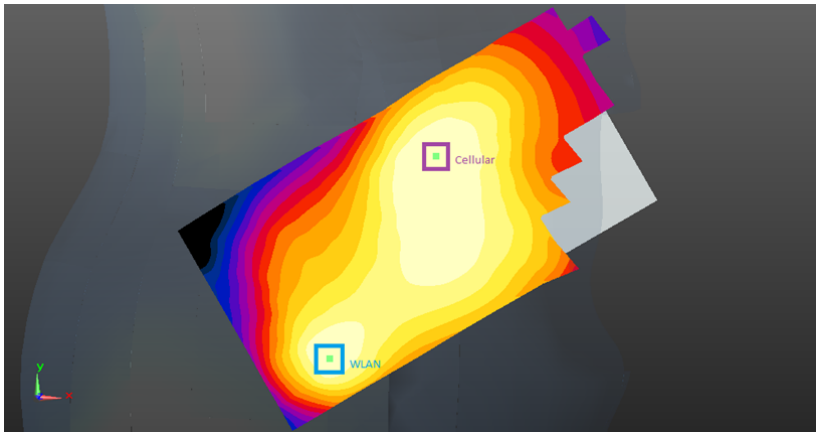
Right Tilt / Cellular + WLAN 5GHz [UNII] + BT

Antenna	Reported SAR 1g (W/kg)	Σ SAR 1g (W/Kg)	R_i (mm)	SAR to peak location separation ratio	Limit
Cellular [PCE]	0.411	1.640	58.65	0.036	0.04
WLAN 5GHz [UNII]	1.019				
Bluetooth [DSS]	0.210				



Right Touch / Cellular + WLAN 2.4GHz

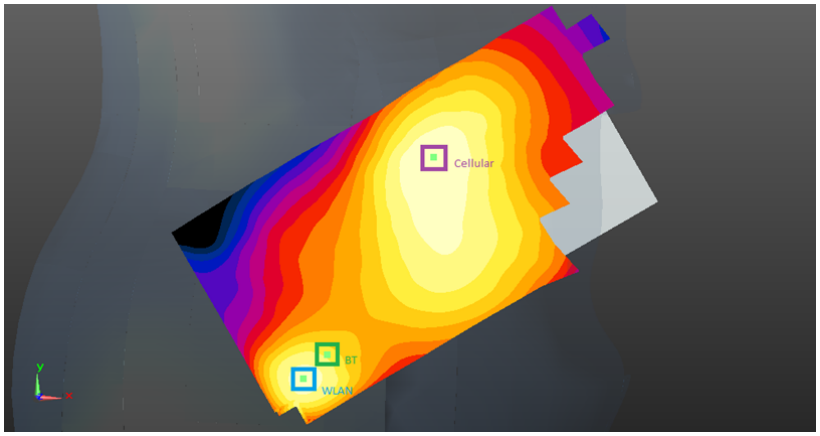
Antenna	Reported SAR 1g (W/kg)	Σ SAR 1g (W/Kg)	R_i (mm)	SAR to peak location separation ratio	Limit
Cellular [PCE]	0.839	1.995	80.92	0.035	0.04
WLAN 2.4GHz [DTS]	1.156				



[3] See comment 4 in section *5. Remarks and comments*

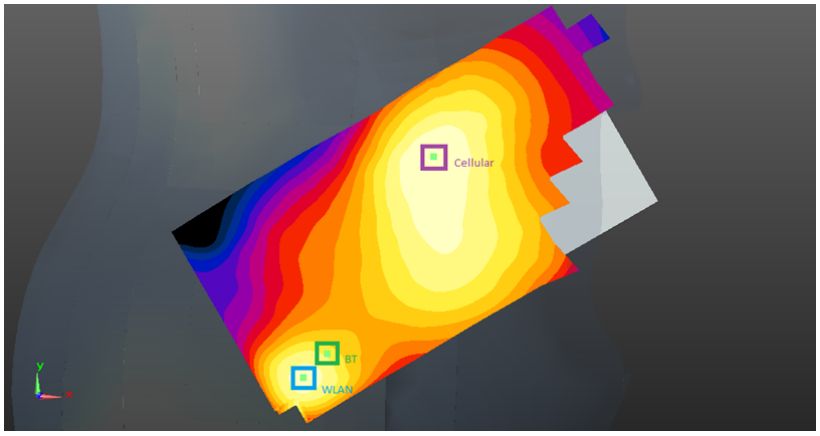
Right Touch / Cellular + WLAN 5.8GHz [DTS] + BT

Antenna	Reported SAR 1g (W/kg)	Σ SAR 1g (W/Kg)	R_i (mm)	SAR to peak location separation ratio	Limit
Cellular [PCE]	0.839	1.876	78.12	0.033	0.04
WLAN 5.8GHz [DTS]	0.756				
Bluetooth [DSS]	0.281				



Right Touch / Cellular + WLAN 5GHz [UNII] + BT

Antenna	Reported SAR 1g (W/kg)	Σ SAR 1g (W/Kg)	R_i (mm)	SAR to peak location separation ratio	Limit
Cellular [PCE]	0.839	1.871	78.12	0.033	0.04
WLAN 5GHz [UNII]	0.751				
Bluetooth [DSS]	0.281				



Considering the results described above and according to the simultaneous transmission evaluation exclusions described in FCC OET KDB 447498 D01, no enlarged zoom scan measurements are required.