SAR TEST REPORT

Test item	:	Mobile Router
Model No.	:	IML-C4300W
Order No.	:	DTNC1502-00483
Date of receipt	:	2015-02-02
Test duration	:	2015-02-24 ~ 2015-04-02
Date of issue	:	2015-04-03
Use of report	:	FCC Original Grant

Applicant : Infomark Co., Ltd.
3rd Floor, Humaxvillage, 216, Hwangsaeul-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, 463-875, KOREA

Test laboratory : DT&C Co., Ltd.
42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935

Test rule part	:	CFR §2.1093
Test environment	:	See appended test report
Test result	:	☒ Pass ☐ Fail

Tested by:	Witnessed by:	Reviewed by:
Engineer ChangWon, Lee	Engineer N/A	Technical Director Harvey Sung

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Test Report Version

Test Report No.	Date	Description
DRRFCC1503-0032	Mar. 26. 2015	Final version for approval
DRRFCC1503-0032(1)	Apr. 03. 2015	LTE Band 26 Re-test

1. DESCRIPTION OF DEVICE

Environmental evaluation measurements of specific absorption rate (SAR) distributions in emulated human head and body tissues exposed to radio frequency (RF) radiation from wireless portable devices for compliance with the rules and regulations of the U.S. Federal Communications Commission (FCC).

General Information:

EUT type	Mobile Router		
FCC ID	YCO-IML-C4300W		
Equipment model name	IML-C4300W		
Equipment add model name	N/A		
Equipment serial no.	Identical prototype		
Mode(s) of Operation	LTE Band 25, LTE Band 26, LTE Band 41 2.4 G W-LAN (802.11b/g/n HT20, HT40),5 G W-LAN (802.11a/n HT20, HT40),		
TX Frequency Range	1850.7 ~ 1914.3 MHz (LTE Band 25) / 814.7 ~ 848.3 MHz (LTE Band 26) 2498.5~ 2687.5 MHz (LTE Band 41) / 2412 ~ 2462 MHz (802.11b/g/n HT20) 2422 ~ 2452 MHz (802.11n HT40) / 5180 ~ 5240 MHz (802.11a/n HT20) 5190 ~ 5230 MHz (802.11n HT40) / 5745 ~ 5825 MHz (802.11a/n HT20) 5755 ~ 5795 MHz (802.11n HT40)		
RX Frequency Range	1930.7 ~ 1994.3 MHz (LTE Band 25) / 859.7 ~ 893.3 MHz (LTE Band 26) 2498.5 ~ 2687.5 MHz (LTE Band 41) / 2412 ~ 2462 MHz (802.11b/g/n HT20) 2422 ~ 2452 MHz (802.11n HT40) / 5180 ~ 5240 MHz (802.11a/n HT20) 5190 ~ 5230 MHz (802.11n HT40) / 5745 ~ 5825 MHz (802.11a/n HT20) 5755 ~ 5795 MHz (802.11n HT40)		
Equipment Class	**Band**	**Measured Conducted Power [dBm]**	**Reported SAR**
			1g SAR (W/kg)
			Hotspot
PCE	LTE Band 25	22.94	1.353
PCE	LTE Band 26	22.89	1.036
PCE	LTE Band 41	22.74	0.878
DTS	2.4 GHz W-LAN	16.42	0.121
NII	5 GHz W-LAN	15.87	0.163
Simultaneous SAR per KDB 690783 D01v01r03			1.516
FCC Equipment Class	PCS Licensed Transmitter (PCB)		
Date(s) of Tests	2015-02-24 ~ 2015-04-02		
Antenna Type	Internal Type Antenna		
Functions	● Simultaneous transmission between LTE & WLAN ● W-LAN(2.4GHz 802.11b/g/n HT20, HT40), W-LAN(5GHz 802.11a/n HT20, HT40) supported No simultaneous transmission between W-LAN(2.4GHz)& W-LAN(5GHz) ● Hotspot supported. ● 802.11b/g/a modes only were operated by ANT.2 and 802.11n HT20/HT40 modes only were operated by MIMO.		

1.1 Guidance Applied

- IEEE 1528-2003
- FCC KDB Publication 941225 D05 SAR for LTE Devices v02r03
- FCC KDB Publication 941225 D06 Hot Spot v02
- FCC KDB Publication 248227 D01v01r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01v05r02 (General SAR Guidance)
- FCC KDB Publication 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r03
- FCC KDB Publication 865664 D02 RF Exposure Reporting v01r01
- April 2013 TCB Workshop Notes (LTE TDD)

1.2Device Overview

Band & Mode	Operating Modes	Tx Frequency
LTE Band 25	Data	1850.7 ~ 1914.3 MHz
LTE Band 26	Data	814.7 ~ 843.3 MHz
LTE Band 41	Data	2498.5 ~ 2687.5 MHz
2.4 GHz WLAN	Data	2412 ~ 2462 MHz
5.2 GHz WLAN	Data	5180 ~ 5240 MHz
5.8 GHz WLAN	Data	5745 ~ 5825 MHz

1.3 Nominal and Maximum Output Power Specifications

This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v05r02.

Band & Mode		Modulated Average [dBm]
LTE Band 25	Maximum	24.0
	Nominal	23.0
LTE Band 26	Maximum	23.0
	Nominal	22.0
LTE Band 41	Maximum	24.0
	Nominal	23.0

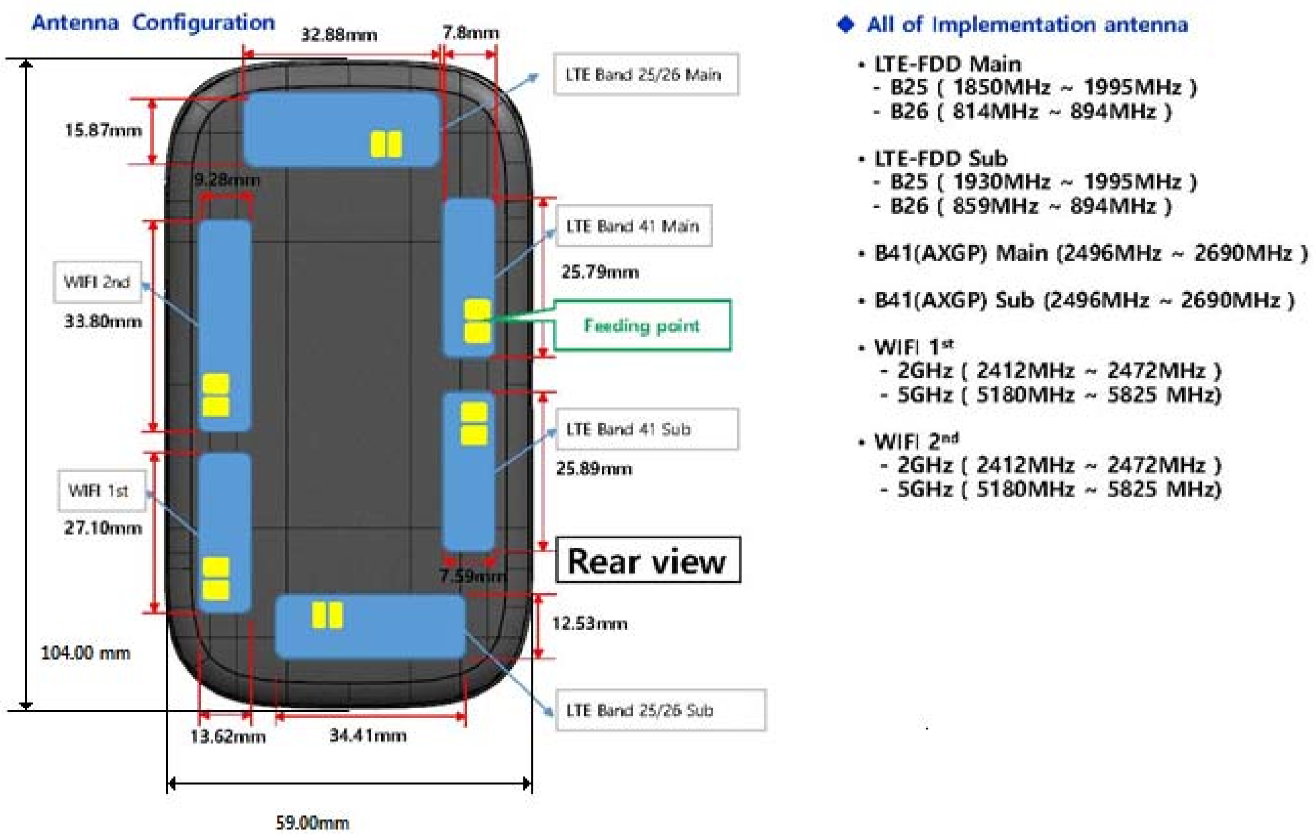
SISO W-LAN ANT.2

Band & Mode		Modulated Average [dBm]
IEEE 802.11b/g (2.4 GHz)	Maximum	14.0
	Nominal	13.0
IEEE 802.11a (5 GHz)	Maximum	14.0
	Nominal	13.0

MIMO W-LAN

Band & Mode		Modulated Average [dBm]
IEEE 802.11n HT20/HT40 (2.4 GHz)	Maximum	17.0
	Nominal	16.0
IEEE 802.11n HT20/HT40 (5 GHz)	Maximum	17.0
	Nominal	16.0

1.4 DUT Antenna Locations



Note 1: Exact antenna dimensions and separation distances are shown in the “Antenna Location_YCO-IML-C4300W” in the FCC Filing.
Note 2: The overall length and width of the device is > 9 cm x 5 cm.The SAR test separation distance for hotspot mode is determined according to device form factor. When the overall length and width of a device is > 9 cm x 5 cm (~3.5” x 2”), a test separation distance of 10 mm is required for hotspot mode SAR measurements.

Mode	Hotspot Sides for SAR Testing					
	Top	Bottom	Front	Rear	Right	Left
LTE Band 25	O	O	O	O	O	X
LTE Band 26	O	O	O	O	O	X
LTE Band 41	O	X	O	O	O	X
2.4G W-LAN_Ant.2	X	O	O	O	X	X
5G W-LAN_Ant.2	X	O	O	O	X	X
2.4G W-LAN_MIMO	X	O	O	O	X	O
5G W-LAN_MIMO	X	O	O	O	X	O

Table 1.1 Hotspot Sides for SAR Testing

Note:

1. Particular DUT edges were not required to be evaluated for Wireless Router SAR if the edges weregreater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06v02 guidance, page 2. The antenna document shows the distances between the transmit antennas and theedges of the device.

1.5 SAR Test Exclusions Applied

(A) WIFI

Since Wireless Router operations of this device are only allowed using 2.4 GHz, 5 GHz WIFI tests and combinations are considered for SAR with respect to Wireless Router configurations according to FCC KDB 941225 D06v02.
Per FCC KDB 447498 D01v05r02, the SAR exclusion threshold for distances < 50 mm is defined by the following equation:

$$\frac{Max\ Power\ of\ Channel\ (mW)}{Test\ Separation\ Dist\ (mm)} * \sqrt{Frequency(GHz)} \leq 3.0$$

Test Mode	Max power of Channel (mW)	Test Separation Distance (mm)	Frequency (GHz)	Equation Result	Test Exclusions Applied (Y/N)
2.4 GHz(802.11b)_Ant.2	25	10mm	2.462	3.9	N
2.4 GHz(802.11n HT20)_MIMO	50	10mm	2.462	7.9	N
2.4 GHz(802.11n HT40)_MIMO	50	10mm	2.452	7.8	N
5.2 GHz(802.11a)_Ant.2	25	10mm	5.240	5.7	N
5.2 GHz(802.11n HT20)_MIMO	50	10mm	5.240	11.5	N
5.2 GHz(802.11n HT40)_MIMO	50	10mm	5.230	11.5	N
5.8 GHz(802.11a)_Ant.2	25	10mm	5.825	6.1	N
5.8 GHz(802.11n HT20)_MIMO	50	10mm	5.825	12.1	N
5.8 GHz(802.11n HT40)_MIMO	50	10mm	5.795	12.1	N

Per KDBPublication 447498 D01v05r02, the maximum power of the channel was rounded to the nearest mWbefore calculation.

1.6 Power Reduction for SAR

There is no power reduction used for any band/mode implemented in this device for SAR purposes.

1.7 Device Serial Numbers

Band & Mode	Head Serial Number	Body-Worn Serial Number	Hotspot Serial Number
LTE Band 25	FCC #1	FCC #1	FCC #1
LTE Band 26	FCC #1	FCC #1	FCC #1
LTE Band 41	FCC #1	FCC #1	FCC #1
2.4 GHz WLAN	FCC #1	FCC #1	FCC #1
5.2 GHz WLAN	FCC #1	FCC #1	FCC #1
5.8 GHz WLAN	FCC #1	FCC #1	FCC #1

1.8 LTE Information

<table>
<tr><th colspan="6">LTE Information</th></tr>
<tr><td>FCC ID</td><td colspan="5">YCO-IML-C4300W</td></tr>
<tr><td>Form Factor</td><td colspan="5">Wireless Router</td></tr>
<tr><td rowspan="3">Frequency Range of each LTE transmission Band</td><td colspan="5">LTE Band 25 (1850.7 ~ 1914.3 MHz)</td></tr>
<tr><td colspan="5">LTE Band 26 (814.7 ~ 848.3 MHz)</td></tr>
<tr><td colspan="5">LTE Band 41 (2498.5 ~ 2687.5 MHz)</td></tr>
<tr><td rowspan="3">Channel Bandwidths</td><td colspan="5">LTE Band 25: 20 MHz, 15 MHz, 10 MHz, 5 MHz, 3 MHz, 1.4 MHz</td></tr>
<tr><td colspan="5">LTE Band 26: 15 MHz, 10 MHz, 5 MHz, 3 MHz, 1.4 MHz</td></tr>
<tr><td colspan="5">LTE Band 41: 20 MHz, 15 MHz, 10 MHz, 5 MHz</td></tr>
<tr><td>Channel Number and Frequencies (MHz)</td><td colspan="2">Low</td><td colspan="2">Mid</td><td>High</td></tr>
<tr><td>LTE Band 25 : 20 MHz</td><td colspan="2">1860(26140)</td><td colspan="2">1882.5(26365)</td><td>1905(26590)</td></tr>
<tr><td>LTE Band 25 : 15 MHz</td><td colspan="2">1857.5(26115)</td><td colspan="2">1882.5(26365)</td><td>1907.5(26615)</td></tr>
<tr><td>LTE Band 25 : 10 MHz</td><td colspan="2">1855(26090)</td><td colspan="2">1882.5(26365)</td><td>1910(26640)</td></tr>
<tr><td>LTE Band 25 : 5 MHz</td><td colspan="2">1852.5(26065)</td><td colspan="2">1882.5(26365)</td><td>1912.5(26665)</td></tr>
<tr><td>LTE Band 25 : 3 MHz</td><td colspan="2">1851.5(26055)</td><td colspan="2">1882.5(26365)</td><td>1913.5(26675)</td></tr>
<tr><td>LTE Band 25 : 1.4 MHz</td><td colspan="2">1850.7(26047)</td><td colspan="2">1882.5(26365)</td><td>1914.3(26683)</td></tr>
<tr><td>LTE Band 26 : 15 MHz</td><td colspan="2">-</td><td colspan="2">836.5(26915)[Note]</td><td>-</td></tr>
<tr><td>LTE Band 26 : 10 MHz</td><td colspan="2">819(26740)</td><td colspan="2">831.5(26865)</td><td>844(26990)</td></tr>
<tr><td>LTE Band 26 : 5 MHz</td><td colspan="2">816.5(26715)</td><td colspan="2">831.5(26865)</td><td>846.5(27015)</td></tr>
<tr><td>LTE Band 26 : 3 MHz</td><td colspan="2">815.5(26705)</td><td colspan="2">831.5(26865)</td><td>847.5(27025)</td></tr>
<tr><td>LTE Band 26 : 1.4 MHz</td><td colspan="2">814.7(26697)</td><td colspan="2">831.5(26865)</td><td>848.3(27033)</td></tr>
<tr><td>Channel Number and Frequencies (MHz)</td><td>Low</td><td>Low-Mid</td><td>Mid</td><td>Mid-High</td><td>High</td></tr>
<tr><td>LTE Band 41 : 20 MHz</td><td>2506(39750)</td><td>2549.5(40185)</td><td>2593(40620)</td><td>2636.5(41055)</td><td>2680(41490)</td></tr>
<tr><td>LTE Band 41 : 15 MHz</td><td>2503.5(39725)</td><td>2548.3(40173)</td><td>2593(40620)</td><td>2637.8(41068)</td><td>2682.5(41515)</td></tr>
<tr><td>LTE Band 41 : 10 MHz</td><td>2501(39700)</td><td>2547(40160)</td><td>2593(40620)</td><td>2639(41080)</td><td>2685(41540)</td></tr>
<tr><td>LTE Band 41 : 5 MHz</td><td>2498.5(39675)</td><td>2545.8(40148)</td><td>2593(40620)</td><td>2640.3(41093)</td><td>2687.5(41565)</td></tr>
<tr><td>UE Category / Modulations Supported</td><td colspan="5">UE Category 4 / QPSK, 16QAM</td></tr>
<tr><td>LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided)</td><td colspan="5">Yes</td></tr>
<tr><td>A-MPR (Additional MPR) disabled for SAR Testing?</td><td colspan="5">Yes</td></tr>
<tr><td>LTE Carrier Aggregation</td><td colspan="5">This device does not support both UL and DL carrier aggregation.</td></tr>
</table>

Note: LTE Band 26 at 15 MHz bandwidth is only supported for FCC Rule Part 24. There are not three non-overlapping channels within FCC Rule Part 24H. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels Should be selected for testing.

2. INTROCUCTION

The FCC and Industry Canada have adopted the guidelines for evaluating the environmental effects ofradio frequency (RF) radiation in ET Docket 93-62 on Aug. 6, 1996 and Health Canada Safety Code 6 toprotect the public and workers from the potential hazards of RF emissions due to FCC-regulated portabledevices.

The FCC has adopted the guidelines for evaluating the environmental effects of radio frequency radiation in ET Docket 93-62 on Aug. 6, 1996 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices. The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95*.1-2005 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. The measurement procedure described in IEEE/ANSI C95.3-1992 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave is used for guidance in measuring SAR due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields," NCRP Report No. 86 NCRP, 1986, Bethesda, MD 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

SAR Definition

Specific Absorption Rate (SAR) is defined as the time derivative (rate) of the incremental energy (dU)absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ) It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Fig. 2.1)

$$\boxed{SAR = \frac{d}{dt}\left(\frac{dU}{dm}\right) = \frac{d}{dt}\left(\frac{dU}{\rho dv}\right)}$$

Fig. 2.1 SAR Mathematical Equation

SAR is expressed in units of Watts per Kilogram (W/kg).

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

where:

σ = conductivity of the tissue-simulating material (S/m)

ρ = mass density of the tissue-simulating material (kg/m^3)

E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of theincident field in relations to the dimensions and geometry of the irradiated organism, the orientation of theorganism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.

3. DESCRIPTION OF TEST EQUIPMENT

3.1 SAR MEASUREMENT SETUP

Measurements are performed using the DASY4 automated dosimetric assessment system.The DASY4 is made by Schmid& Partner Engineering AG (SPEAG) in Zurich, Switzerlandand consists of high precision robotics system (Staubli), robot controller, desktop computer, near-field probe, probe alignment sensor, and the generic twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Fig. 3.1).

A cell controller system contains the power supply, robot controllerteach pendant (Joystick), and a remote control used to drive the robot motors. The PC consists of the Intel Core i5-3570 3.39 GHz desktop computer with Windows NT system and SAR Measurement Software DASY4,A/D interface card, monitor, mouse, and keyboard. The Staubli Robotis connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit that performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection,collision detection, etc. is connected to the Electro-optical coupler (EOC). TheEOCperforms the conversion from the optical intodigital electric signal of theDAEandtransfers data to the PC plug-in card.

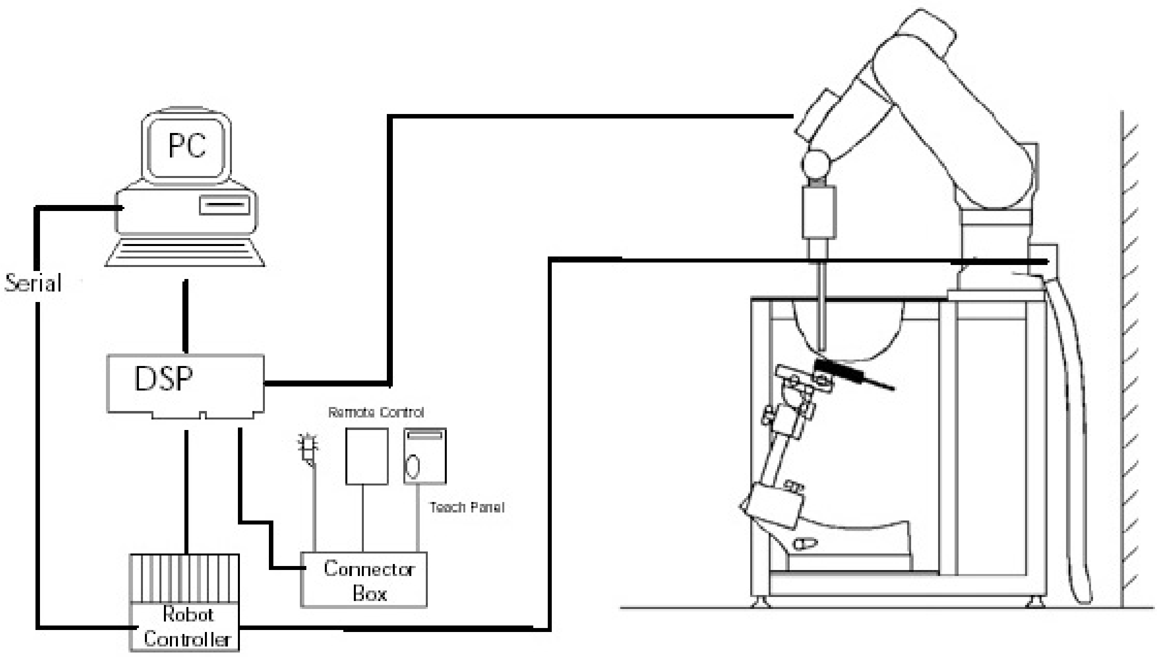


Figure 3.1 SAR Measurement System Setup

The DAE4 consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device include stwo different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer. The system is described in detail.

3.2 EX3DV4Probe Specification

Calibration In air from 10 MHz to 6 GHz
In brain and muscle simulating tissue atFrequencies of
300 MHz, 450 MHz, 600 MHz, 750 MHz, 835 MHz, 900 MHz, 1750 MHz, 1900 MHz, 2300 MHz, 2450 MHz, 2600 MHz, 3500 MHz, 5200 MHz, 5300 MHz, 5500 MHz, 5600 MHz, 5800 MHz

Frequency 10 MHz to 6 GHz

Linearity ± 0.2 dB(30 MHz to 6 GHz)

Dynamic 10 μW/g to > 100 mW/g

Range Linearity : ±0.2dB

Dimensions Overall length : 337 mm

Tip length 20 mm

Body diameter 12 mm

Tip diameter 2.5 mm

Distance from probe tip to sensor center 1.0 mm

Application SAR Dosimetry Testing
Compliance tests of mobile phones

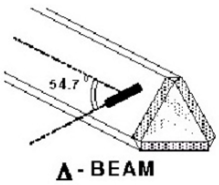
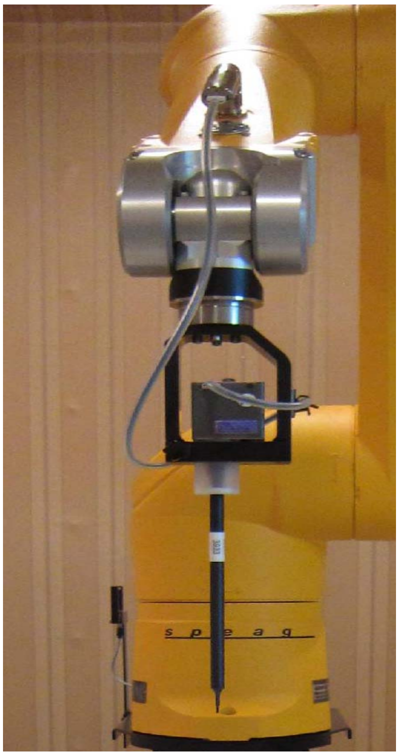


Figure 3.2 Triangular Probe Configurations

Figure 3.3 Probe Thick-Film Technique



DAE System

The SAR measurementswereconducted withthedosimetric probe EX3DV4, designed in the classical triangular configuration(see Fig. 3.2) and optimized fordosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with anopticalmultitier line ending at the front of theprobe tip. It isconnected to the EOC box on the robot arm and provides an automatic detectionof the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting tothe receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. Iftheprobe is flatly touching the surface,thecoupling is zero. The distance of the couplingmaximumto the surface isindependent of the surface reflectivity andlargely independent of the surface toprobe angle. The DASY4 software reads the reflection during a software approach and looks for the maximum using a 2nd order fitting. The approach isstopped at reaching the maximum.

3.3 Probe Calibration Process

3.3.1E-Probe Calibration

Dosimetric Assessment Procedure

Each probe is calibrated according to a dosimetric assessment procedurewithaccuracy better than +/- 10%. The spherical isotropy was evaluated with the procedure and found to be better than +/-0.25dB. The sensitivity parameters (NormX, NormY, NormZ), thediode compression parameter (DCP) and the conversion factor (ConvF) of the probe is tested.

Free Space Assessment

The free space E-field from amplified probe outputs is determined in a test chamber. This isperformed in a TEM cell for frequenciesbelow 1 GHz, and in a waveguide above 1GHz for free space. For the free space calibration, the probe is placed in the volumetric center ofthe cavity at the proper orientation with the field. The probe is then rotated 360 degrees.

Temperature Assessment *

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium, correlates to temperature risein a dielectric medium. For temperature correlation calibration a RF transparent theremitsorbasedtemperature probe is used in conjunction with the E-field probe.

$$\text{SAR} = C\frac{\Delta T}{\Delta t}$$

where:

Δt = exposure time (30 seconds),

C = heat capacity of tissue (brain or muscle),

ΔT = temperature increase due to RF exposure.

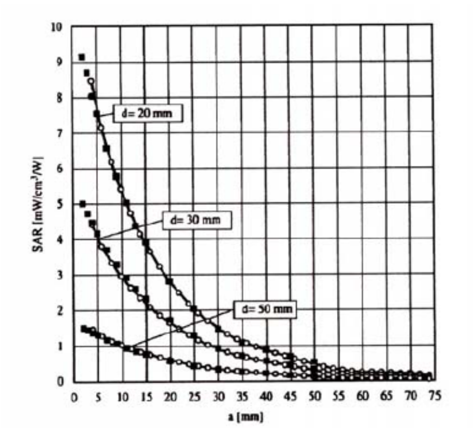
$$\text{SAR} = \frac{|E|^2 \cdot \sigma}{\rho}$$

where:

σ = simulated tissue conductivity,

ρ = Tissue density (1.25 g/cm^3 for brain tissue)

SAR is proportional toΔT / Δt , the initial rate of tissue heating, before thermal diffusion takes place. Now it's possible to quantify the electric field in the simulated tissue by equating the thermally derived SAR to the E- field;



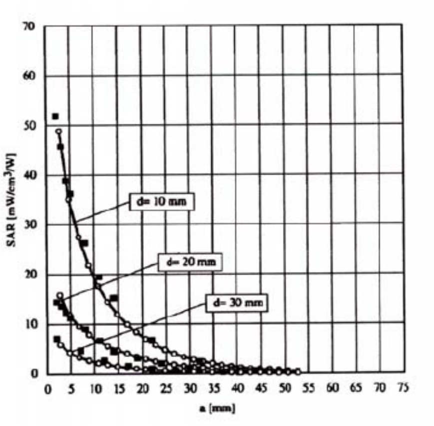


Figure 3.4E-Field and Temperature Measurements at 900MHzMeasurements at 1800MHz

Figure 3.5 E-Field and Temperature

3.4 Data Extrapolation

The DASY5 software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given like below;

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

with V_i = compensated signal of channel i (i=x,y,z)
U_i = input signal of channel i (i=x,y,z)
cf = crest factor of exciting field (DASY parameter)
dcp_i = diode compression point (DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

E-field probes:

$$E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$$

with V_i = compensated signal of channel i (i = x,y,z)
$Norm_i$ = sensor sensitivity of channel i (i = x,y,z) $\mu V/(V/m)^2$ for E-field probes
ConvF = sensitivity of enhancement in solution
E_i = electric field strength of channel i in V/m

The RSS value of the field components gives the total field strength (Hermetian magnitude):

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

The primary field data are used to calculate the derived field units.

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1000}$$

with SAR = local specific absorption rate in W/g
E_{tot} = total field strength in V/m
σ = conductivity in [mho/m] or [Siemens/m]
ρ = equivalent tissue density in g/cm^3

The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = \frac{E_{tot}^2}{3770}$$

with P_{pwe} = equivalent power density of a plane wave in W/cm^2
E_{tot} = total electric field strength in V/m

3.5 SAM TwinPHANTOM

Figure 3.6 SAM Twin Phantom

The SAM Twin Phantom V5.0 is constructed of a fiberglass shell integrated in a woodentable. The shape of the shell is based on data from an anatomical study designed todetermine the maximum exposure in at least 90% of all users. Itenables thedosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover preventstheevaporation of the liquid.

Referencemarkings on thePhantom allow thecomplete setup of all predefined phantom positionsand measurement grids by manually teaching three points in the robot. (see Fig. 3.6)

SAM Twin Phantom Specification:

Construction	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. Twin SAM V5.0 has the same shell geometry and is manufactured from the same material as Twin SAM V4.0, but has reinforced top structure.
Shell Thickness	2 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Length: 1000 mm Width: 500 mm Height: adjustable feet

Specific Anthropomorphic Mannequin (SAM) Specifications:

The phantom for handset SAR assessment testing is a low-loss dielectric shell, with shapeand dimensions derived from theanthropometric data of the 90th percentile adult male head dimensions as tabulated by the US Army. The SAM Twin Phantom shell is bisected alongthemid-sagittal plane into right and left halves (see Fig. 3.7). The perimeter sidewalls of each phantom halves are extended to allow filling withliquid to a depth thatissufficient tominimized reflections from the upper surface. The liquiddepth ismaintained at a minimum depth of 15cm to minimize reflections from the upper surface.

Figure 3.7 Sam Twin Phantom shell

3.6Device Holder for Transmitters

Figure 3.8 Mounting Device

In combination with the Twin SAM Phantom V4.0/V4.0c, V5.0 or ELI4, the Mounting Device enables the rotation of the mounted transmitter device in spherical coordinates. Rotation point is the ear opening point. Transmitter devices can be easily and accurately positioned according to IEC, IEEE, FCC or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat).

Note: A simulating human hand is not used due to the complex anatomical andgeometrical structure of the hand that may produce infinite number of configurations. To produce theworst-case condition (the hand absorbs antenna output power),thehand is omitted during the tests.

3.7 Brain & Muscle Simulation Mixture Characterization

The brain and muscle mixtures consist of a viscous gel using hydrox-ethylcellulose (HEC) gelling agent and saline solution (see Table 3.1). Preservation with a bactericide is added and visual inspection is made to make sure air bubbles are not trapped during the mixing process. Themixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue.The mixture characterizations used for the brain and muscle tissue simulating liquids are according to the data by C. Gabriel and G. Hartsgrove.

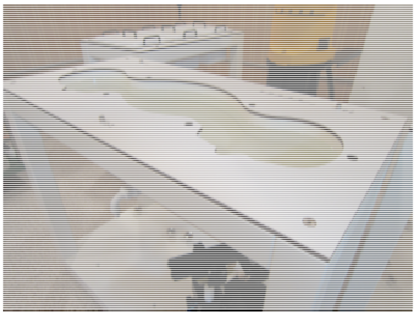


Figure 3.9 SimulatedTissue

Table3.1 Composition of the Tissue Equivalent Matter

Ingredients (% by weight)	**Frequency (MHz)**									
	835		**1900**		**2450**		**2600**		**5200 ~ 5800**	
Tissue Type	**Head**	**Body**	**Head**	**Body**	**Head**	**Body**	**Head**	**Body**	**Head**	**Body**
Water	40.19	50.75	55.24	70.23	71.88	73.40	55.80	69.83	65.52	80.00
Salt (NaCl)	1.480	0.940	0.310	0.290	0.160	0.060	-	-	-	-
Sugar	57.90	48.21	-	-	-	-	-	-	-	-
HEC	0.250	-	-	-	-	-	-	-	-	-
Bactericide	0.180	0.100	-	-	-	-	-	-	-	-
Triton X-100	-	-	-	-	19.97	-	9.900	-	17.24	-
DGBE	-	-	44.45	29.48	7.990	26.54	34.30	30.17	-	-
Diethylene glycol hexyl ether									17.24	-
Polysorbate (Tween)80									-	20.00
Dielectric Constant	41.5	55.2	40.0	53.3	39.2	52.7	39.0	52.5	-	-
Conductivity (S/m)	0.90	0.97	1.40	1.52	1.80	1.95	1.96	2.16	-	-

Salt:	99 % Pure Sodium Chloride	Sugar:	98 % Pure Sucrose
Water:	De-ionized, 16M resistivity	HEC:	Hydroxyethyl Cellulose
DGBE:	99 % Di(ethylene glycol) butyl ether,[2-(2-butoxyethoxy) ethanol]		
Triton X-100(ultra pure):	Polyethylene glycol mono[4-(1,1,3,3-tetramethylbutyl)phenyl] ether		

3.8 SAR TEST EQUIPMENT

Table 3.2 Test Equipment Calibration

	Type	Manufacturer	Model	Cal.Date	Next.Cal.Date	S/N
☒	SEMITEC Engineering	SEMITEC	N/A	N/A	N/A	Shield Room
☒	Robot	SCHMID	RX90BL	N/A	N/A	F02/5Q86A1/A/01
☒	Robot Controller	SCHMID	CS7MB	N/A	N/A	F01/5N19A1/C/01
☒	Joystick	SCHMID	N/A	N/A	N/A	D22134006
☒	Intel Core i5-3570 3.39 GHz Windows XP Professional	N/A	N/A	N/A	N/A	N/A
☒	Probe Alignment Unit LB	N/A	N/A	N/A	N/A	240
☒	Mounting Device	SCHMID	Holder	N/A	N/A	N/A
☒	Twin SAM Phantom	SCHMID	TP1221	N/A	N/A	N/A
☐	2mm Oval Phantom ELI5	SCHMID	QDOVA002AA	N/A	N/A	1166
☒	DataAcquisition Electronics	SCHMID	DAE4	2014-03-27	2015-03-27	1335
☒	DataAcquisition Electronics	SCHMID	DAE4	2014-08-20	2015-08-20	1396
☒	Dosimetric E-Field Probe	SCHMID	EX3DV4	2014-04-24	2015-04-24	3916
☐	Dummy Probe	N/A	N/A	N/A	N/A	N/A
☒	835MHz SAR Dipole	SCHMID	D835V2	2014-11-19	2016-11-19	4d159
☐	1800MHz SAR Dipole	SCHMID	D1800V2	2014-07-18	2016-07-18	2d047
☒	1900MHz SAR Dipole	SCHMID	D1900V2	2014-11-14	2016-11-14	5d176
☒	2450MHz SAR Dipole	SCHMID	D2450V2	2014-11-19	2016-11-19	920
☒	2600 MHz SAR Dipole	SCHMID	D2600V2	2014-05-20	2016-05-20	1016
☒	5000 MHz SAR Dipole	SCHMID	D5GHzV2	2014-03-26	2016-03-26	1103
☒	Network Analyzer	Agilent	E5071C	2014-10-21	2015-10-21	MY46106970
☒	Signal Generator	Agilent	E4438C	2014-09-12	2015-09-12	US41461520
☒	Amplifier	EMPOWER	BBS3Q7ELU	2014-09-12	2015-09-12	1020
☒	High Power RF Amplifier	EMPOWER	BBS3Q8CCJ	2014-10-20	2015-10-20	1005
☒	Power Meter	HP	EPM-442A	2014-02-28 2015-02-26	2015-02-28 2016-02-26	GB37170267
☒	Power Meter	Anritsu	ML2495A	2014-10-07	2015-10-07	1435003
☒	Wide Bandwidth Power Sensor	Anritsu	MA2490A	2014-10-07	2015-10-07	1409034
☒	Power Sensor	HP	8481A	2014-02-28 2015-02-26	2015-02-28 2016-02-26	3318A96566
☒	Power Sensor	HP	8481A	2015-02-06	2016-02-06	2702A65976
☒	Dual Directional Coupler	Agilent	778D-012	2015-01-06	2016-01-06	50228
☒	Directional Coupler	HP	773D	2014-06-27	2015-06-27	2389A00640
☒	Low Pass Filter 1.5GHz	Micro LAB	LA-15N	2015-01-06	2016-01-06	N/A
☒	Low Pass Filter 3.0GHz	Micro LAB	LA-30N	2014-09-11	2015-09-11	N/A
☒	Low Pass Filter 6.0GHz	Micro LAB	LA-60N	2014-02-27 2015-02-25	2015-02-27 2016-02-26	03942
☒	Attenuators(3 dB)	Agilent	8491B	2014-06-27	2015-06-27	MY39260700
☒	Attenuators(10 dB)	WEINSCHEL	23-10-34	2015-01-06	2016-01-06	BP4387
☐	Step Attenuator	HP	8494A	2014-09-11	2015-09-11	3308A33341
☒	Dielectric Probe kit	SCHMID	DAK-3.5	2014-11-11	2015-11-11	1092
☒	Radio Communication Analyzer	Anritsu	MT8820C	2015-01-09	2016-01-09	6201274516

NOTE: The E-field probe was calibrated by SPEAG, by temperature measurement procedure. Dipole Verification measurement is performed by DT&Cbefore each test. The brain and muscle simulating material are calibrated by DT&C using the dielectric probe system and network analyzer to determine the conductivity and permittivity (dielectric constant) of the brain-equivalent material. Each equipment item was used solely within its respective calibration period.

4. TEST SYSTEM SPECIFICATIONS

Automated TEST SYSTEM SPECIFICATIONS:

Positioner

Robot	StäubliUnimation Corp. Robot Model: RX90BL
Repeatability	0.02 mm
No. of axis	6

Data Acquisition Electronic (DAE) System

Cell Controller

Processor	Intel Core i5-3570
Clock Speed	3.39 GHz
Operating System	Windows XP Professional
Data Card	DASY4 PC-Board

Data Converter

Features	Signal, multiplexer, A/D converter. & control logic
Software	DASY4
Connecting Lines	Optical downlink for data and status info Optical uplink for commands and clock

PC Interface Card

Function	24 bit (64 MHz) DSP for real time processing Link to DAE 4 16 bit A/D converter for surface detection system serial link to robot direct emergency stop output for robot

E-Field Probes

Model	EX3DV4 S/N: 3916
Construction	Triangular core fiber optic detection system
Frequency	10 MHz to 6 GHz
Linearity	± 0.2 dB (30 MHz to 6 GHz)

Phantom

Phantom	SAM Twin Phantom (V4.0)
Shell Material	Composite
Thickness	2.0 ± 0.2 mm

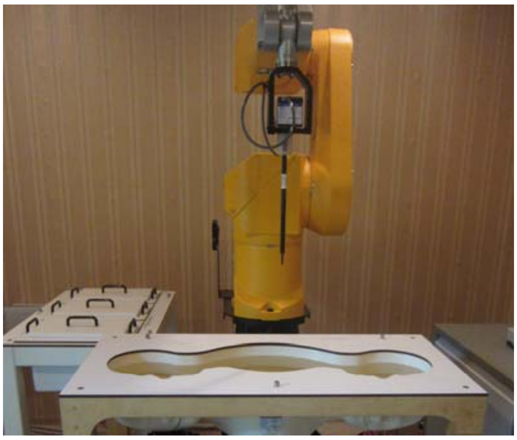


Figure 2.2 DASY4 Test System

5. SAR MEASUREMENT PROCEDURE

5.1 Measurement Procedure

The evaluation was performed using the following procedure compliant to FCC KDB Publication 865664 D01v01r03 and IEEE 1528-2013:

1. The SAR distribution at the exposed side of the head or body wasmeasured at a distance no greater than 5.0 mm from the inner surfaceof the shell. The area covered the entire dimension of the device-headand body interface and the horizontal grid resolution was determinedper FCC KDB Publication 865664 D01v01r03 (See Table 5-1) and IEEE1528-2013.

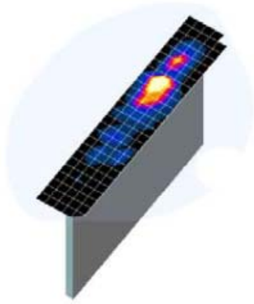


Figure 5.1
Sample SAR Area Scan

2. The point SAR measurement was taken at the maximum SAR regiondetermined from Step 1 to enable the monitoring of SARfluctuations/drifts during the 1g/10g cube evaluation. SAR at this fixedpoint was measured and used as a reference value.

3. Based on the area scan data, the peak of the region with maximum SARwas determined by spline interpolation. Around this point, a volume was assessed according to themeasurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r03 (SeeTable 5-1) and IEEE 1528-2013. On the basis of this data set, the spatial peak SAR value wasevaluated with the following procedure (see references or the DASY manual online for more details):

   a. SAR values at the inner surface of the phantom are extrapolated from the measured valuesalong the line away from the surface with spacing no greater than that in Table 3-1. Theextrapolation was based on a least-squares algorithm. A polynomial of the fourth order wascalculated through the points in the z-axis (normal to the phantom shell).

   b. After the maximum interpolated values were calculated between the points in the cube, theSAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm.The 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x,y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousandpoints (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.

   c. All neighboring volumes were evaluated until no neighboring volume with a higher averagevalue was found.

4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan wascomplete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and driftmeasurements were repeated.

Frequency	Maximum Area Scan Resolution (mm) (Δx_{area}, Δy_{area})	Maximum Zoom Scan Resolution (mm) (Δx_{zoom}, Δy_{zoom})	Maximum Zoom Scan Spatial Resolution (mm)			Minimum Zoom Scan Volume (mm) (x,y,z)
			Uniform Grid	Graded Grid		
			$\Delta z_{zoom}(n)$	$\Delta z_{zoom}(1)$*	$\Delta z_{zoom}(n>1)$*	
≤ 2 GHz	≤ 15	≤ 8	≤ 5	≤ 4	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 30
2-3 GHz	≤ 12	≤ 5	≤ 5	≤ 4	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 30
3-4 GHz	≤ 12	≤ 5	≤ 4	≤ 3	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 28
4-5 GHz	≤ 10	≤ 4	≤ 3	≤ 2.5	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 25
5-6 GHz	≤ 10	≤ 4	≤ 2	≤ 2	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 22

Table 5.1 Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r03*
*Also compliant to IEEE 1528-2013 Table 6

6. RF EXPOSURE LIMITS

Uncontrolled Environment:

UNCONTROLLED ENVIRONMENTS are defined as locations where there is the exposure of individuals whohave no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Controlled Environment:

CONTROLLED ENVIRONMENTS are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Table 8.1.SAR Human Exposure Specified in ANSI/IEEE C95.1-2005

	HUMAN EXPOSURE LIMITS	
	General Public Exposure (W/kg) or (mW/g)	Occupational Exposure (W/kg) or (mW/g)
SPATIAL PEAK SAR * (Brain)	1.60	8.00
SPATIAL AVERAGE SAR ** (Whole Body)	0.08	0.40
SPATIAL PEAK SAR *** (Hands / Feet / Ankle / Wrist)	4.00	20.0

1. The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
2. The Spatial Average value of the SAR averaged over the whole body.
3. The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e.as a result of employment or occupation).

7. FCC MEASUREMENT PROCEDURES

Power measurements were performed using a base station simulator under digital average power.

7.1 Measured and Reported SAR

Per FCC KDB Publication 447498 D01v05r02, When SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as reported SAR. The highest reported SAR results are identified on the grant of equipment authorization according to procedures in KDB 690783 D01v01r03.

7.2 SAR Measurement Conditions for LTE

LTE modes were tested according to FCC KDB 941225 D05v02 publication. Please see notes after the tabulated SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR. The Anritsu MT8820C was used for LTE output power measurement and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

7.2.1Spectrum Plots for RB Configurations

A properly configured base station simulator was used for SAR tests and power measurements. Therefore, spectrum plots for RB configurations were not required to be included in this report.

7.2.2 MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36. 101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

7.2.3 A-MPR

This device does not support A-MPR.
(When a device support A-MPR, A-MPR shall be disabled for all SAR tests by setting NS=01 on the base station simulator.)

7.2.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05v02r03:

a. Per Section 4.2.1, SAR is required for QPSK 1 RB Allocation for the largest bandwidth
   i. The required channel and offset combination with the highest maximum output power is required for SAR.
   ii. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channel is not required. Otherwise, SAR is required for the remaining required test channels using the RB offset configuration with highest output power for that channel.
   iii. When the reported SAR for a required test channel is > 1.45 W/kg, SAR is required for all RB offset configurations for that channel.
b. Per Section 4.2.2, SAR is required for 50% RB allocation using the largest bandwidth following the same procedures outlined in Section 4.2.1.
c. Per Section 4.2.3, QPSK SAR is not required for the 100% allocation when the highest maximum output power for the 100% allocation is less than the highest maximum output power of the 1 RB and 50% RB allocations and the reported SAR for the 1 RB and 50% RB allocations is < 0.8 W/kg.
d. Per Section 4.2.4 and 4.3, SAR tests for higher order modulations and lower bandwidths configurations are not required when the conducted power of the required test configurations determined by Sections 4.2.1 through 4.2.3 is less than or equal to 0.5 dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is < 1.45 W/kg.

7.2.5 TDD LTE Consideration setup for SAR measurement

According to KDB 941225 D05 SAR for LTE Devices v02r03 and the SAR test guidance provided in April 2013 TCB workshop notes,For Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.

SAR was tested with a fixed periodic duty factor according to the highest transmission duty factorimplemented for the device and supported by 3GPP.

a) 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 9.1-1 for uplink-downlinkconfiguration.
b) "special subframe S" contains both uplink and downlink transmissions, it has been taken intoconsideration to determine the transmission duty factor according to the worst case uplink anddownlink cyclic prefix requirements for UpPTS

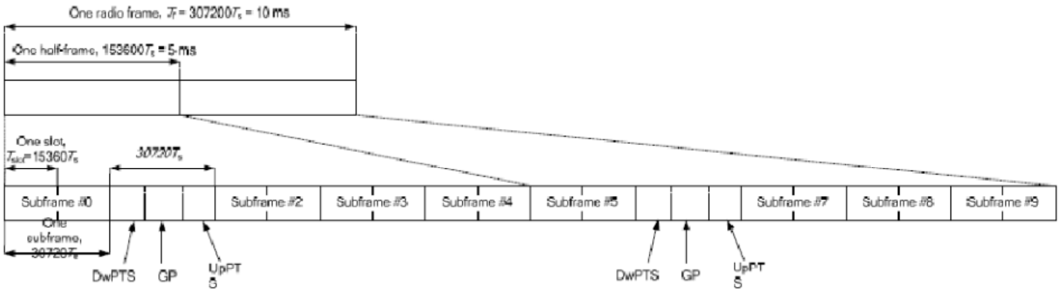


Figure 9.2 Frame structure type 2 (for 5ms switch-point periodicity)

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

Table 9.2-1 Uplink-downlink configurations.

<table>
<tr><th rowspan="3">Special subframe configuration</th><th colspan="3">Normal cyclic prefix in downlink</th><th colspan="3">Extended cyclic prefix in downlink</th></tr>
<tr><th>DwPTS</th><th colspan="2">UpPTS</th><th>DwPTS</th><th colspan="2">UpPTS</th></tr>
<tr><th></th><th>Normal cyclic prefix in uplink</th><th>Extended cyclic prefix in uplink</th><th></th><th>Normal cyclic prefix in uplink</th><th>Extended cyclic prefix in uplink</th></tr>
<tr><td>0</td><td>$6592 \cdot T_s$</td><td rowspan="5">$2192 \cdot T_s$</td><td rowspan="5">$2560 \cdot T_s$</td><td>$7680 \cdot T_s$</td><td rowspan="4">$2192 \cdot T_s$</td><td rowspan="4">$2560 \cdot T_s$</td></tr>
<tr><td>1</td><td>$19760 \cdot T_s$</td><td>$20480 \cdot T_s$</td></tr>
<tr><td>2</td><td>$21952 \cdot T_s$</td><td>$23040 \cdot T_s$</td></tr>
<tr><td>3</td><td>$24144 \cdot T_s$</td><td>$25600 \cdot T_s$</td></tr>
<tr><td>4</td><td>$26336 \cdot T_s$</td><td>$7680 \cdot T_s$</td><td rowspan="4">$4384 \cdot T_s$</td><td rowspan="4">$5120 \cdot T_s$</td></tr>
<tr><td>5</td><td>$6592 \cdot T_s$</td><td rowspan="5">$4384 \cdot T_s$</td><td rowspan="5">$5120 \cdot T_s$</td><td>$20480 \cdot T_s$</td></tr>
<tr><td>6</td><td>$19760 \cdot T_s$</td><td>$23040 \cdot T_s$</td></tr>
<tr><td>7</td><td>$21952 \cdot T_s$</td><td>$12800 \cdot T_s$</td></tr>
<tr><td>8</td><td>$24144 \cdot T_s$</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>9</td><td>$13168 \cdot T_s$</td><td>-</td><td>-</td><td>-</td></tr>
</table>

Table 9.2-2 Configuration of special subframe (lengths of DwPTS/GP/UpPTS)

Special subframe (30720·T_s): Normal cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
Uplink duty factor in one special subframe	0~4	7.13%	8.33%
	5~9	14.3%	16.7%

Special subframe(30720·T_s): Extended cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
Uplink duty factor in one special subframe	0~3	7.13%	8.33%
	4~7	14.3%	16.7%

The highest duty factor is resulted from:

a) uplink-downlink configuration: 0. In a half-frame consisted of 5 subframes, uplink operation is in3 uplink subframes and 1 special subframe.
b) specialsubframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclicprefix in downlink
c) for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frameis: (3+0,167)/5 = 63,3%
d) for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frameis: (3+0.143)/5 = 62,9%

7.3 SAR Testing with 802.11 Transmitters

Normal network operating configurations are not suitable for measuring the SAR of 802.11 b/g/ntransmitters. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduceundesirable variations in SAR results. The SAR for these devices should be measured using chipsetbased test mode software to ensure the results are consistent and reliable. See KDB Publication 248227D01v01r02 for more details.

7.3.1 General Device Setup

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

7.3.2 MIMO and other Multiple Antenna Configurations

SAR for MIMO and similar multiple antenna configurations is measured with all antennas transmitting simultaneously. The antennas should be transmitting at close to 100 % duty factor during the SAR measurement. If the test mode software does not support simultaneous transmission, each antenna is tested independently, one at a time; and the SAR measured for all antennas must be summed spatially, grid by grid, to compute the 1-g SAR. When the sum of individual 1-g SAR for all antennas are less than the SAR limit, grid by grid summing is optional. The 1-g SAR should be scaled to 100 % duty factor to determine compliance.

7.3.3 MIMO and SISO Configurations

The discussions in this document are based on single-input single-output (SISO) 802.11 a/b/g transmitters that do not transmit simultaneously with multiple antennas. However, multiple-input multiple-output (MIMO) devices have been introduced and these early generation MIMO transmitters are already available in some 802.11 wireless LAN products. The rationale in setting up a MIMO device for exposure evaluation should be similar to SISO. When a group of antennas are transmitting simultaneously in a spatial multiplexing MIMO configuration, the SAR distribution and peak SAR locations are expected to spread over an area corresponding to the locations of the radiating antennas. If the antennas are in close proximity to each other; for example, within 3-5 cm, it would be necessary to consider the exposure from all antennas to determine the 1-g averaged SAR within the region. Depending on the test software, if the antennas tested independently, one at a time, the exposure from all antennas must be summed spatially, grid by grid, to compute the 1-g SAR. If the test software allows all antennas to transmit simultaneously and continuously, the resulting SAR distribution may be used to compute the 1-g SAR directly. For many low-power devices, when the peak SAR locations are more than 5 cm apart, the 1-g SAR can usually be treated independently with little or no noticeable impact; therefore, spatial summing could be optional.

7.3.4 Frequency Channel Configurations

802.11 a/b/g/n operating modes are tested independently according to the service requirements in each frequency band. 802.11 b/g/n modes are tested on channels 1, 6 and 11. 802.11 a is tested for UNII operations on channels 36 and 48 in the 5.15-5.25 GHz band; channels 52 and 64 in the 5.25-5.35 GHz band; channels 104, 116 and 136 in the 5.470-5.725 GHz band; and channels 149 and 161 in the 5.8 GHz. When 5.8 GHz §15.247 is also available, channels 149, 157 and 165 should be tested instead of the UNII channels. These are referred to as the “default test channels”. For 2.4 GHz, 802.11g/n modes were evaluated only if the output power was 0.25 dB higher than the 802.11 mode. For 5 GHz, 802.11n modes were evaluated only if the output power was 0.25 dB higher than the 802.11a mode. When the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is < 1.6 W/kg and the 1g averaged SAR is < 0.8 W/kg, SAR testing in other channels is not required. Otherwise, the other default (or corresponding required) test channels were additionally tested using the lowest data rate.

Mode		GHz	Channel	Turbo Channel	“Default Test Channels”			
					§15.247		UNII	
					802.11b	802.11g		
802.11 b/g		2.412	1#		√	∇		
		2.437	6	6	√	∇		
		2.462	11#		√	∇		
802.11a	UNII	5.18	36				√	
		5.20	40	42 (5.21 GHz)				*
		5.22	44					*
		5.24	48	50 (5.25 GHz)			√	
		5.26	52				√	
		5.28	56	58 (5.29 GHz)				*
		5.30	60					*
		5.32	64				√	
		5.500	100	Unknown				*
		5.520	104				√	
		5.540	108					*
		5.560	112					*
		5.580	116				√	
		5.600	120					*
		5.620	124				√	
		5.640	128					*
		5.660	132					*
		5.680	136				√	
		5.700	140					*
	UNII or §15.247	5.745	149		√		√	
		5.765	153	152 (5.76 GHz)		*		*
		5.785	157		√			*
		5.805	161	160 (5.80 GHz)		*	√	
	§15.247	5.825	165		√			

Table 7.1 802.11 Test channels per FCC Requirements

8. RF CONDUCTED POWERS

8.1 LTE Conducted Powers

1) LTE Band 25

Mode	Freq. (MHz)	Channel	LTE Band 25 Conducted Power– 20 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
Low	1860	26140	20	QPSK	1	0	22.67	0	0
	1860	26140	20	QPSK	1	50	22.86	0	0
	1860	26140	20	QPSK	1	99	22.87	0	0
	1860	26140	20	QPSK	50	0	22.06	0-1	1
	1860	26140	20	QPSK	50	25	22.10	0-1	1
	1860	26140	20	QPSK	50	50	22.08	0-1	1
	1860	26140	20	QPSK	100	0	21.93	0-1	1
	1860	26140	20	16QAM	1	0	22.25	0-1	1
	1860	26140	20	16QAM	1	50	22.45	0-1	1
	1860	26140	20	16QAM	1	99	22.36	0-1	1
	1860	26140	20	16QAM	50	0	21.25	0-2	2
	1860	26140	20	16QAM	50	25	21.00	0-2	2
	1860	26140	20	16QAM	50	50	21.11	0-2	2
	1860	26140	20	16QAM	100	0	20.90	0-2	2
Mid	1882.5	26365	20	QPSK	1	0	22.87	0	0
	1882.5	26365	20	QPSK	1	50	**22.94**	0	0
	1882.5	26365	20	QPSK	1	99	22.59	0	0
	1882.5	26365	20	QPSK	50	0	**22.06**	0-1	1
	1882.5	26365	20	QPSK	50	25	22.04	0-1	1
	1882.5	26365	20	QPSK	50	50	21.97	0-1	1
	1882.5	26365	20	QPSK	100	0	21.96	0-1	1
	1882.5	26365	20	16QAM	1	0	22.08	0-1	1
	1882.5	26365	20	16QAM	1	50	22.13	0-1	1
	1882.5	26365	20	16QAM	1	99	22.07	0-1	1
	1882.5	26365	20	16QAM	50	0	21.16	0-2	2
	1882.5	26365	20	16QAM	50	25	21.13	0-2	2
	1882.5	26365	20	16QAM	50	50	21.11	0-2	2
	1882.5	26365	20	16QAM	100	0	21.09	0-2	2

Table 8.1.1 The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 25 Conducted Power– 20 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
High	1905	26590	20	QPSK	1	0	22.37	0	0
	1905	26590	20	QPSK	1	50	22.70	0	0
	1905	26590	20	QPSK	1	99	22.79	0	0
	1905	26590	20	QPSK	50	0	21.67	0-1	1
	1905	26590	20	QPSK	50	25	21.81	0-1	1
	1905	26590	20	QPSK	50	50	21.84	0-1	1
	1905	26590	20	QPSK	100	0	21.60	0-1	1
	1905	26590	20	16QAM	1	0	21.82	0-1	1
	1905	26590	20	16QAM	1	50	22.01	0-1	1
	1905	26590	20	16QAM	1	99	22.31	0-1	1
	1905	26590	20	16QAM	50	0	20.73	0-2	2
	1905	26590	20	16QAM	50	25	20.87	0-2	2
	1905	26590	20	16QAM	50	50	21.34	0-2	2
	1905	26590	20	16QAM	100	0	20.68	0-2	2

Table 8.1.2The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 25 Conducted Power– 15 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
Low	1857.5	26115	15	QPSK	1	0	22.67	0	0
	1857.5	26115	15	QPSK	1	36	22.90	0	0
	1857.5	26115	15	QPSK	1	74	22.46	0	0
	1857.5	26115	15	QPSK	36	0	21.98	0-1	1
	1857.5	26115	15	QPSK	36	18	22.06	0-1	1
	1857.5	26115	15	QPSK	36	37	21.73	0-1	1
	1857.5	26115	15	QPSK	75	0	21.62	0-1	1
	1857.5	26115	15	16QAM	1	0	22.24	0-1	1
	1857.5	26115	15	16QAM	1	36	22.53	0-1	1
	1857.5	26115	15	16QAM	1	74	22.32	0-1	1
	1857.5	26115	15	16QAM	36	0	21.10	0-2	2
	1857.5	26115	15	16QAM	36	18	21.17	0-2	2
	1857.5	26115	15	16QAM	36	37	20.99	0-2	2
	1857.5	26115	15	16QAM	75	0	20.81	0-2	2
Mid	1882.5	26365	15	QPSK	1	0	22.77	0	0
	1882.5	26365	15	QPSK	1	36	22.81	0	0
	1882.5	26365	15	QPSK	1	74	22.74	0	0
	1882.5	26365	15	QPSK	36	0	21.81	0-1	1
	1882.5	26365	15	QPSK	36	18	21.69	0-1	1
	1882.5	26365	15	QPSK	36	37	21.75	0-1	1
	1882.5	26365	15	QPSK	75	0	21.51	0-1	1
	1882.5	26365	15	16QAM	1	0	22.60	0-1	1
	1882.5	26365	15	16QAM	1	36	22.37	0-1	1
	1882.5	26365	15	16QAM	1	74	22.27	0-1	1
	1882.5	26365	15	16QAM	36	0	21.28	0-2	2
	1882.5	26365	15	16QAM	36	18	21.14	0-2	2
	1882.5	26365	15	16QAM	36	37	20.94	0-2	2
	1882.5	26365	15	16QAM	75	0	20.88	0-2	2

Table 8.1.3The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 25 Conducted Power– 15 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
High	1907.5	26615	15	QPSK	1	0	22.58	0	0
	1907.5	26615	15	QPSK	1	36	22.68	0	0
	1907.5	26615	15	QPSK	1	74	22.71	0	0
	1907.5	26615	15	QPSK	36	0	21.72	0-1	1
	1907.5	26615	15	QPSK	36	18	22.04	0-1	1
	1907.5	26615	15	QPSK	36	37	22.06	0-1	1
	1907.5	26615	15	QPSK	75	0	21.87	0-1	1
	1907.5	26615	15	16QAM	1	0	21.91	0-1	1
	1907.5	26615	15	16QAM	1	36	21.89	0-1	1
	1907.5	26615	15	16QAM	1	74	22.48	0-1	1
	1907.5	26615	15	16QAM	36	0	21.22	0-2	2
	1907.5	26615	15	16QAM	36	18	21.49	0-2	2
	1907.5	26615	15	16QAM	36	37	21.50	0-2	2
	1907.5	26615	15	16QAM	75	0	20.88	0-2	2

Table 8.1.4The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 25 Conducted Power– 10 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
Low	1855	26090	10	QPSK	1	0	22.35	1855	0
	1855	26090	10	QPSK	1	25	22.47	1855	0
	1855	26090	10	QPSK	1	49	22.48	1855	0
	1855	26090	10	QPSK	25	0	21.48	1855	1
	1855	26090	10	QPSK	25	12	21.54	1855	1
	1855	26090	10	QPSK	25	25	21.69	1855	1
	1855	26090	10	QPSK	50	0	21.42	1855	1
	1855	26090	10	16QAM	1	0	21.89	1855	1
	1855	26090	10	16QAM	1	25	21.97	1855	1
	1855	26090	10	16QAM	1	49	22.30	1855	1
	1855	26090	10	16QAM	25	0	20.62	1855	2
	1855	26090	10	16QAM	25	12	20.68	1855	2
	1855	26090	10	16QAM	25	25	20.82	1855	2
	1855	26090	10	16QAM	50	0	20.54	1855	2
Mid	1882.5	26365	10	QPSK	1	0	22.65	1882.5	0
	1882.5	26365	10	QPSK	1	25	22.49	1882.5	0
	1882.5	26365	10	QPSK	1	49	22.51	1882.5	0
	1882.5	26365	10	QPSK	25	0	21.34	1882.5	1
	1882.5	26365	10	QPSK	25	12	21.21	1882.5	1
	1882.5	26365	10	QPSK	25	25	21.63	1882.5	1
	1882.5	26365	10	QPSK	50	0	21.14	1882.5	1
	1882.5	26365	10	16QAM	1	0	22.23	1882.5	1
	1882.5	26365	10	16QAM	1	25	22.05	1882.5	1
	1882.5	26365	10	16QAM	1	49	22.19	1882.5	1
	1882.5	26365	10	16QAM	25	0	20.84	1882.5	2
	1882.5	26365	10	16QAM	25	12	20.68	1882.5	2
	1882.5	26365	10	16QAM	25	25	20.91	1882.5	2
	1882.5	26365	10	16QAM	50	0	20.63	1882.5	2

Table 8.1.5The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 25 Conducted Power– 10 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
High	1910	26640	10	QPSK	1	0	22.46	0	0
	1910	26640	10	QPSK	1	25	22.76	0	0
	1910	26640	10	QPSK	1	49	22.37	0	0
	1910	26640	10	QPSK	25	0	21.69	0-1	1
	1910	26640	10	QPSK	25	12	21.62	0-1	1
	1910	26640	10	QPSK	25	25	21.58	0-1	1
	1910	26640	10	QPSK	50	0	21.51	0-1	1
	1910	26640	10	16QAM	1	0	22.35	0-1	1
	1910	26640	10	16QAM	1	25	22.54	0-1	1
	1910	26640	10	16QAM	1	49	22.07	0-1	1
	1910	26640	10	16QAM	25	0	21.18	0-2	2
	1910	26640	10	16QAM	25	12	21.08	0-2	2
	1910	26640	10	16QAM	25	25	21.08	0-2	2
	1910	26640	10	16QAM	50	0	21.02	0-2	2

Table 8.1.6The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 25 Conducted Power– 5 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
Low	1852.5	26065	5	QPSK	1	0	22.46	1852.5	0
	1852.5	26065	5	QPSK	1	12	22.80	1852.5	0
	1852.5	26065	5	QPSK	1	24	22.72	1852.5	0
	1852.5	26065	5	QPSK	12	0	21.66	1852.5	1
	1852.5	26065	5	QPSK	12	6	21.93	1852.5	1
	1852.5	26065	5	QPSK	12	13	21.89	1852.5	1
	1852.5	26065	5	QPSK	25	0	21.61	1852.5	1
	1852.5	26065	5	16QAM	1	0	21.92	1852.5	1
	1852.5	26065	5	16QAM	1	12	22.27	1852.5	1
	1852.5	26065	5	16QAM	1	24	22.50	1852.5	1
	1852.5	26065	5	16QAM	12	0	20.70	1852.5	2
	1852.5	26065	5	16QAM	12	6	21.02	1852.5	2
	1852.5	26065	5	16QAM	12	13	20.99	1852.5	2
	1852.5	26065	5	16QAM	25	0	20.87	1852.5	2
Mid	1882.5	26365	5	QPSK	1	0	22.76	1882.5	0
	1882.5	26365	5	QPSK	1	12	22.78	1882.5	0
	1882.5	26365	5	QPSK	1	24	22.75	1882.5	0
	1882.5	26365	5	QPSK	12	0	21.51	1882.5	1
	1882.5	26365	5	QPSK	12	6	21.64	1882.5	1
	1882.5	26365	5	QPSK	12	13	21.91	1882.5	1
	1882.5	26365	5	QPSK	25	0	21.47	1882.5	1
	1882.5	26365	5	16QAM	1	0	22.06	1882.5	1
	1882.5	26365	5	16QAM	1	12	22.04	1882.5	1
	1882.5	26365	5	16QAM	1	24	22.02	1882.5	1
	1882.5	26365	5	16QAM	12	0	21.50	1882.5	2
	1882.5	26365	5	16QAM	12	6	21.45	1882.5	2
	1882.5	26365	5	16QAM	12	13	21.81	1882.5	2
	1882.5	26365	5	16QAM	25	0	21.22	1882.5	2

Table 8.1.7The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 25 Conducted Power– 5 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
High	1912.5	26665	5	QPSK	1	0	22.64	0	0
	1912.5	26665	5	QPSK	1	12	22.72	0	0
	1912.5	26665	5	QPSK	1	24	22.45	0	0
	1912.5	26665	5	QPSK	12	0	21.91	0-1	1
	1912.5	26665	5	QPSK	12	6	21.80	0-1	1
	1912.5	26665	5	QPSK	12	13	21.65	0-1	1
	1912.5	26665	5	QPSK	25	0	21.50	0-1	1
	1912.5	26665	5	16QAM	1	0	22.22	0-1	1
	1912.5	26665	5	16QAM	1	12	22.20	0-1	1
	1912.5	26665	5	16QAM	1	24	22.21	0-1	1
	1912.5	26665	5	16QAM	12	0	21.85	0-2	2
	1912.5	26665	5	16QAM	12	6	21.77	0-2	2
	1912.5	26665	5	16QAM	12	13	21.50	0-2	2
	1912.5	26665	5	16QAM	25	0	21.43	0-2	2

Table 8.1.8The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 25 Conducted Power– 3 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
Low	1851.5	26055	3	QPSK	1	0	22.71	0	0
	1851.5	26055	3	QPSK	1	7	22.68	0	0
	1851.5	26055	3	QPSK	1	14	22.65	0	0
	1851.5	26055	3	QPSK	8	0	22.08	0-1	1
	1851.5	26055	3	QPSK	8	4	22.07	0-1	1
	1851.5	26055	3	QPSK	8	7	21.99	0-1	1
	1851.5	26055	3	QPSK	15	0	21.73	0-1	1
	1851.5	26055	3	16QAM	1	0	21.88	0-1	1
	1851.5	26055	3	16QAM	1	7	21.85	0-1	1
	1851.5	26055	3	16QAM	1	14	21.83	0-1	1
	1851.5	26055	3	16QAM	8	0	21.55	0-2	2
	1851.5	26055	3	16QAM	8	4	21.52	0-2	2
	1851.5	26055	3	16QAM	8	7	21.45	0-2	2
	1851.5	26055	3	16QAM	15	0	21.41	0-2	2
Mid	1882.5	26365	3	QPSK	1	0	22.77	0	0
	1882.5	26365	3	QPSK	1	7	22.74	0	0
	1882.5	26365	3	QPSK	1	14	22.76	0	0
	1882.5	26365	3	QPSK	8	0	22.18	0-1	1
	1882.5	26365	3	QPSK	8	4	22.11	0-1	1
	1882.5	26365	3	QPSK	8	7	22.14	0-1	1
	1882.5	26365	3	QPSK	15	0	22.05	0-1	1
	1882.5	26365	3	16QAM	1	0	21.91	0-1	1
	1882.5	26365	3	16QAM	1	7	21.84	0-1	1
	1882.5	26365	3	16QAM	1	14	21.88	0-1	1
	1882.5	26365	3	16QAM	8	0	21.63	0-2	2
	1882.5	26365	3	16QAM	8	4	21.58	0-2	2
	1882.5	26365	3	16QAM	8	7	21.61	0-2	2
	1882.5	26365	3	16QAM	15	0	21.55	0-2	2

Table 8.1.9The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 25 Conducted Power– 3 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
High	1913.5	26675	3	QPSK	1	0	22.74	0	0
	1913.5	26675	3	QPSK	1	7	22.68	0	0
	1913.5	26675	3	QPSK	1	14	22.69	0	0
	1913.5	26675	3	QPSK	8	0	22.14	0-1	1
	1913.5	26675	3	QPSK	8	4	22.11	0-1	1
	1913.5	26675	3	QPSK	8	7	22.12	0-1	1
	1913.5	26675	3	QPSK	15	0	22.07	0-1	1
	1913.5	26675	3	16QAM	1	0	21.87	0-1	1
	1913.5	26675	3	16QAM	1	7	21.81	0-1	1
	1913.5	26675	3	16QAM	1	14	21.84	0-1	1
	1913.5	26675	3	16QAM	8	0	21.61	0-2	2
	1913.5	26675	3	16QAM	8	4	21.55	0-2	2
	1913.5	26675	3	16QAM	8	7	21.58	0-2	2
	1913.5	26675	3	16QAM	15	0	21.54	0-2	2

Table 8.1.10The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 25 Conducted Power– 1.4 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
Low	1850.7	26047	1.4	QPSK	1	0	22.79	1850.7	0
	1850.7	26047	1.4	QPSK	1	2	22.76	1850.7	0
	1850.7	26047	1.4	QPSK	1	5	22.73	1850.7	0
	1850.7	26047	1.4	QPSK	3	0	22.16	1850.7	1
	1850.7	26047	1.4	QPSK	3	2	22.15	1850.7	1
	1850.7	26047	1.4	QPSK	3	3	22.07	1850.7	1
	1850.7	26047	1.4	QPSK	6	0	21.81	1850.7	1
	1850.7	26047	1.4	16QAM	1	0	21.96	1850.7	1
	1850.7	26047	1.4	16QAM	1	2	21.93	1850.7	1
	1850.7	26047	1.4	16QAM	1	5	21.91	1850.7	1
	1850.7	26047	1.4	16QAM	3	0	21.63	1850.7	2
	1850.7	26047	1.4	16QAM	3	2	21.60	1850.7	2
	1850.7	26047	1.4	16QAM	3	3	21.53	1850.7	2
	1850.7	26047	1.4	16QAM	6	0	21.49	1850.7	2
Mid	1882.5	26365	1.4	QPSK	1	0	22.82	1882.5	0
	1882.5	26365	1.4	QPSK	1	2	22.85	1882.5	0
	1882.5	26365	1.4	QPSK	1	5	22.87	1882.5	0
	1882.5	26365	1.4	QPSK	3	0	22.29	1882.5	1
	1882.5	26365	1.4	QPSK	3	2	22.22	1882.5	1
	1882.5	26365	1.4	QPSK	3	3	22.25	1882.5	1
	1882.5	26365	1.4	QPSK	6	0	22.16	1882.5	1
	1882.5	26365	1.4	16QAM	1	0	22.02	1882.5	1
	1882.5	26365	1.4	16QAM	1	2	21.95	1882.5	1
	1882.5	26365	1.4	16QAM	1	5	21.99	1882.5	1
	1882.5	26365	1.4	16QAM	3	0	21.74	1882.5	2
	1882.5	26365	1.4	16QAM	3	2	21.69	1882.5	2
	1882.5	26365	1.4	16QAM	3	3	21.72	1882.5	2
	1882.5	26365	1.4	16QAM	6	0	21.66	1882.5	2

Table 8.1.11The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 25 Conducted Power– 1.4 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
High	1914.3	26683	1.4	QPSK	1	0	22.85	0	0
	1914.3	26683	1.4	QPSK	1	2	22.82	0	0
	1914.3	26683	1.4	QPSK	1	5	22.83	0	0
	1914.3	26683	1.4	QPSK	3	0	22.28	0-1	1
	1914.3	26683	1.4	QPSK	3	2	22.25	0-1	1
	1914.3	26683	1.4	QPSK	3	3	22.26	0-1	1
	1914.3	26683	1.4	QPSK	6	0	22.21	0-1	1
	1914.3	26683	1.4	16QAM	1	0	22.01	0-1	1
	1914.3	26683	1.4	16QAM	1	2	21.95	0-1	1
	1914.3	26683	1.4	16QAM	1	5	21.98	0-1	1
	1914.3	26683	1.4	16QAM	3	0	21.75	0-2	2
	1914.3	26683	1.4	16QAM	3	2	21.69	0-2	2
	1914.3	26683	1.4	16QAM	3	3	21.72	0-2	2
	1914.3	26683	1.4	16QAM	6	0	21.68	0-2	2

Table 8.1.12The power was measured by MT8820C

2) LTE Band 26

Mode	Freq. (MHz)	Channel	LTE Band 26 Conducted Power– 15 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
Mid	836.5	26915	15	QPSK	1	0	**22.89**	0	0
	836.5	26915	15	QPSK	1	36	22.77	0	0
	836.5	26915	15	QPSK	1	74	22.74	0	0
	836.5	26915	15	QPSK	36	0	**21.92**	0-1	1
	836.5	26915	15	QPSK	36	18	21.84	0-1	1
	836.5	26915	15	QPSK	36	37	21.79	0-1	1
	836.5	26915	15	QPSK	75	0	21.71	0-1	1
	836.5	26915	15	16QAM	1	0	21.96	0-1	1
	836.5	26915	15	16QAM	1	36	21.88	0-1	1
	836.5	26915	15	16QAM	1	74	21.85	0-1	1
	836.5	26915	15	16QAM	36	0	20.74	0-2	2
	836.5	26915	15	16QAM	36	18	20.71	0-2	2
	836.5	26915	15	16QAM	36	37	20.68	0-2	2
	836.5	26915	15	16QAM	75	0	20.65	0-2	2

Table 8.1.13The power was measured by MT8820C

Note: LTE Band 26 at 15 MHz bandwidth is only supported for FCC Rule Part 24. There are not three non-overlapping channels within FCC Rule Part 24H. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels Should be selected for testing.

Mode	Freq. (MHz)	Channel	LTE Band 26 Conducted Power– 10 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
Low	819	26740	10	QPSK	1	0	22.84	0	0
	819	26740	10	QPSK	1	25	22.72	0	0
	819	26740	10	QPSK	1	49	22.68	0	0
	819	26740	10	QPSK	25	0	21.87	0-1	1
	819	26740	10	QPSK	25	12	21.64	0-1	1
	819	26740	10	QPSK	25	25	21.58	0-1	1
	819	26740	10	QPSK	50	0	21.55	0-1	1
	819	26740	10	16QAM	1	0	21.93	0-1	1
	819	26740	10	16QAM	1	25	21.86	0-1	1
	819	26740	10	16QAM	1	49	21.81	0-1	1
	819	26740	10	16QAM	25	0	20.65	0-2	2
	819	26740	10	16QAM	25	12	20.56	0-2	2
	819	26740	10	16QAM	25	25	20.55	0-2	2
	819	26740	10	16QAM	50	0	20.48	0-2	2
Mid	831.5	26865	10	QPSK	1	0	22.76	0	0
	831.5	26865	10	QPSK	1	25	22.68	0	0
	831.5	26865	10	QPSK	1	49	22.61	0	0
	831.5	26865	10	QPSK	25	0	21.77	0-1	1
	831.5	26865	10	QPSK	25	12	21.75	0-1	1
	831.5	26865	10	QPSK	25	25	21.69	0-1	1
	831.5	26865	10	QPSK	50	0	21.66	0-1	1
	831.5	26865	10	16QAM	1	0	21.86	0-1	1
	831.5	26865	10	16QAM	1	25	21.82	0-1	1
	831.5	26865	10	16QAM	1	49	21.78	0-1	1
	831.5	26865	10	16QAM	25	0	20.61	0-2	2
	831.5	26865	10	16QAM	25	12	20.55	0-2	2
	831.5	26865	10	16QAM	25	25	20.49	0-2	2
	831.5	26865	10	16QAM	50	0	20.45	0-2	2

Table 8.1.14The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 26 Conducted Power– 10 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
High	844	26990	10	QPSK	1	0	22.74	0	0
	844	26990	10	QPSK	1	25	22.71	0	0
	844	26990	10	QPSK	1	49	22.68	0	0
	844	26990	10	QPSK	25	0	21.74	0-1	1
	844	26990	10	QPSK	25	12	21.71	0-1	1
	844	26990	10	QPSK	25	25	21.68	0-1	1
	844	26990	10	QPSK	50	0	21.65	0-1	1
	844	26990	10	16QAM	1	0	21.88	0-1	1
	844	26990	10	16QAM	1	25	21.84	0-1	1
	844	26990	10	16QAM	1	49	21.80	0-1	1
	844	26990	10	16QAM	25	0	20.58	0-2	2
	844	26990	10	16QAM	25	12	20.55	0-2	2
	844	26990	10	16QAM	25	25	20.51	0-2	2
	844	26990	10	16QAM	50	0	20.47	0-2	2

Table 8.1.15The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 26 Conducted Power– 5 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
Low	816.5	26715	5	QPSK	1	0	22.56	0	0
	816.5	26715	5	QPSK	1	12	22.51	0	0
	816.5	26715	5	QPSK	1	24	22.61	0	0
	816.5	26715	5	QPSK	12	0	21.65	0-1	1
	816.5	26715	5	QPSK	12	6	21.64	0-1	1
	816.5	26715	5	QPSK	12	13	21.61	0-1	1
	816.5	26715	5	QPSK	25	0	21.63	0-1	1
	816.5	26715	5	16QAM	1	0	21.89	0-1	1
	816.5	26715	5	16QAM	1	12	21.85	0-1	1
	816.5	26715	5	16QAM	1	24	21.96	0-1	1
	816.5	26715	5	16QAM	12	0	20.87	0-2	2
	816.5	26715	5	16QAM	12	6	20.82	0-2	2
	816.5	26715	5	16QAM	12	13	20.70	0-2	2
	816.5	26715	5	16QAM	25	0	20.69	0-2	2
Mid	831.5	26865	5	QPSK	1	0	22.50	0	0
	831.5	26865	5	QPSK	1	12	22.39	0	0
	831.5	26865	5	QPSK	1	24	22.34	0	0
	831.5	26865	5	QPSK	12	0	21.51	0-1	1
	831.5	26865	5	QPSK	12	6	21.48	0-1	1
	831.5	26865	5	QPSK	12	13	21.43	0-1	1
	831.5	26865	5	QPSK	25	0	21.44	0-1	1
	831.5	26865	5	16QAM	1	0	21.72	0-1	1
	831.5	26865	5	16QAM	1	12	21.76	0-1	1
	831.5	26865	5	16QAM	1	24	21.64	0-1	1
	831.5	26865	5	16QAM	12	0	20.81	0-2	2
	831.5	26865	5	16QAM	12	6	20.80	0-2	2
	831.5	26865	5	16QAM	12	13	20.78	0-2	2
	831.5	26865	5	16QAM	25	0	20.82	0-2	2

Table 8.1.16The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 26 Conducted Power– 5 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
High	846.5	27015	5	QPSK	1	0	22.46	0	0
	846.5	27015	5	QPSK	1	12	22.39	0	0
	846.5	27015	5	QPSK	1	24	22.41	0	0
	846.5	27015	5	QPSK	12	0	21.48	0-1	1
	846.5	27015	5	QPSK	12	6	21.46	0-1	1
	846.5	27015	5	QPSK	12	13	21.46	0-1	1
	846.5	27015	5	QPSK	25	0	21.46	0-1	1
	846.5	27015	5	16QAM	1	0	21.73	0-1	1
	846.5	27015	5	16QAM	1	12	21.72	0-1	1
	846.5	27015	5	16QAM	1	24	21.73	0-1	1
	846.5	27015	5	16QAM	12	0	20.90	0-2	2
	846.5	27015	5	16QAM	12	6	20.89	0-2	2
	846.5	27015	5	16QAM	12	13	20.90	0-2	2
	846.5	27015	5	16QAM	25	0	20.88	0-2	2

Table 8.1.17The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 26 Conducted Power– 3 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
Low	815.5	26705	3	QPSK	1	0	22.50	0	0
	815.5	26705	3	QPSK	1	7	22.50	0	0
	815.5	26705	3	QPSK	1	14	22.42	0	0
	815.5	26705	3	QPSK	8	0	21.55	0-1	1
	815.5	26705	3	QPSK	8	4	21.55	0-1	1
	815.5	26705	3	QPSK	8	7	21.53	0-1	1
	815.5	26705	3	QPSK	15	0	21.53	0-1	1
	815.5	26705	3	16QAM	1	0	21.95	0-1	1
	815.5	26705	3	16QAM	1	7	21.80	0-1	1
	815.5	26705	3	16QAM	1	14	21.90	0-1	1
	815.5	26705	3	16QAM	8	0	20.76	0-2	2
	815.5	26705	3	16QAM	8	4	20.79	0-2	2
	815.5	26705	3	16QAM	8	7	20.81	0-2	2
	815.5	26705	3	16QAM	15	0	20.65	0-2	2
Mid	831.5	26865	3	QPSK	1	0	22.53	0	0
	831.5	26865	3	QPSK	1	7	22.47	0	0
	831.5	26865	3	QPSK	1	14	22.40	0	0
	831.5	26865	3	QPSK	8	0	21.51	0-1	1
	831.5	26865	3	QPSK	8	4	21.50	0-1	1
	831.5	26865	3	QPSK	8	7	21.47	0-1	1
	831.5	26865	3	QPSK	15	0	21.49	0-1	1
	831.5	26865	3	16QAM	1	0	21.95	0-1	1
	831.5	26865	3	16QAM	1	7	21.91	0-1	1
	831.5	26865	3	16QAM	1	14	21.89	0-1	1
	831.5	26865	3	16QAM	8	0	20.85	0-2	2
	831.5	26865	3	16QAM	8	4	20.83	0-2	2
	831.5	26865	3	16QAM	8	7	20.80	0-2	2
	831.5	26865	3	16QAM	15	0	20.84	0-2	2

Table 8.1.18The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 26 Conducted Power– 3 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
High	847.5	27025	3	QPSK	1	0	22.56	0	0
	847.5	27025	3	QPSK	1	7	22.55	0	0
	847.5	27025	3	QPSK	1	14	22.52	0	0
	847.5	27025	3	QPSK	8	0	21.57	0-1	1
	847.5	27025	3	QPSK	8	4	21.57	0-1	1
	847.5	27025	3	QPSK	8	7	21.57	0-1	1
	847.5	27025	3	QPSK	15	0	21.56	0-1	1
	847.5	27025	3	16QAM	1	0	21.90	0-1	1
	847.5	27025	3	16QAM	1	7	21.84	0-1	1
	847.5	27025	3	16QAM	1	14	21.89	0-1	1
	847.5	27025	3	16QAM	8	0	20.92	0-2	2
	847.5	27025	3	16QAM	8	4	20.91	0-2	2
	847.5	27025	3	16QAM	8	7	20.91	0-2	2
	847.5	27025	3	16QAM	15	0	20.93	0-2	2

Table 8.1.19The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 26 Conducted Power–1.4 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
Low	814.7	26697	1.4	QPSK	1	0	22.63	0	0
	814.7	26697	1.4	QPSK	1	2	22.66	0	0
	814.7	26697	1.4	QPSK	1	5	22.55	0	0
	814.7	26697	1.4	QPSK	3	0	21.70	0-1	1
	814.7	26697	1.4	QPSK	3	2	21.71	0-1	1
	814.7	26697	1.4	QPSK	3	3	21.75	0-1	1
	814.7	26697	1.4	QPSK	6	0	21.62	0-1	1
	814.7	26697	1.4	16QAM	1	0	21.95	0-1	1
	814.7	26697	1.4	16QAM	1	2	21.78	0-1	1
	814.7	26697	1.4	16QAM	1	5	21.90	0-1	1
	814.7	26697	1.4	16QAM	3	0	20.80	0-2	2
	814.7	26697	1.4	16QAM	3	2	21.01	0-2	2
	814.7	26697	1.4	16QAM	3	3	20.86	0-2	2
	814.7	26697	1.4	16QAM	6	0	20.78	0-2	2
Mid	831.5	26865	1.4	QPSK	1	0	22.58	0	0
	831.5	26865	1.4	QPSK	1	2	22.55	0	0
	831.5	26865	1.4	QPSK	1	5	22.46	0	0
	831.5	26865	1.4	QPSK	3	0	21.64	0-1	1
	831.5	26865	1.4	QPSK	3	2	21.68	0-1	1
	831.5	26865	1.4	QPSK	3	3	21.70	0-1	1
	831.5	26865	1.4	QPSK	6	0	21.66	0-1	1
	831.5	26865	1.4	16QAM	1	0	21.93	0-1	1
	831.5	26865	1.4	16QAM	1	2	21.94	0-1	1
	831.5	26865	1.4	16QAM	1	5	21.83	0-1	1
	831.5	26865	1.4	16QAM	3	0	20.95	0-2	2
	831.5	26865	1.4	16QAM	3	2	20.93	0-2	2
	831.5	26865	1.4	16QAM	3	3	20.91	0-2	2
	831.5	26865	1.4	16QAM	6	0	20.92	0-2	2

Table 8.1.20The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 26 Conducted Power– 1.4 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
High	848.3	27033	1.4	QPSK	1	0	22.66	0	0
	848.3	27033	1.4	QPSK	1	2	22.66	0	0
	848.3	27033	1.4	QPSK	1	5	22.59	0	0
	848.3	27033	1.4	QPSK	3	0	21.76	0-1	1
	848.3	27033	1.4	QPSK	3	2	21.75	0-1	1
	848.3	27033	1.4	QPSK	3	3	21.72	0-1	1
	848.3	27033	1.4	QPSK	6	0	21.69	0-1	1
	848.3	27033	1.4	16QAM	1	0	21.95	0-1	1
	848.3	27033	1.4	16QAM	1	2	21.86	0-1	1
	848.3	27033	1.4	16QAM	1	5	21.77	0-1	1
	848.3	27033	1.4	16QAM	3	0	21.04	0-2	2
	848.3	27033	1.4	16QAM	3	2	21.01	0-2	2
	848.3	27033	1.4	16QAM	3	3	20.99	0-2	2
	848.3	27033	1.4	16QAM	6	0	20.94	0-2	2

Table 8.1.21The power was measured by MT8820C

3) LTE Band 41

Mode	Freq. (MHz)	Channel	LTE Band 41 Conducted Power– 20 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
Low	2506	39750	20	QPSK	1	0	22.68	0	0
	2506	39750	20	QPSK	1	50	22.74	0	0
	2506	39750	20	QPSK	1	99	22.61	0	0
	2506	39750	20	QPSK	50	0	21.65	0-1	1
	2506	39750	20	QPSK	50	25	21.76	0-1	1
	2506	39750	20	QPSK	50	50	21.63	0-1	1
	2506	39750	20	QPSK	100	0	21.61	0-1	1
	2506	39750	20	16QAM	1	0	21.64	0-1	1
	2506	39750	20	16QAM	1	50	21.75	0-1	1
	2506	39750	20	16QAM	1	99	21.61	0-1	1
	2506	39750	20	16QAM	50	0	20.75	0-2	2
	2506	39750	20	16QAM	50	25	20.81	0-2	2
	2506	39750	20	16QAM	50	50	20.71	0-2	2
	2506	39750	20	16QAM	100	0	20.68	0-2	2
Low Mid	2549.5	40185	20	QPSK	1	0	22.87	0	0
	2549.5	40185	20	QPSK	1	50	22.91	0	0
	2549.5	40185	20	QPSK	1	99	22.82	0	0
	2549.5	40185	20	QPSK	50	0	21.96	0-1	1
	2549.5	40185	20	QPSK	50	25	22.02	0-1	1
	2549.5	40185	20	QPSK	50	50	21.94	0-1	1
	2549.5	40185	20	QPSK	100	0	21.91	0-1	1
	2549.5	40185	20	16QAM	1	0	21.94	0-1	1
	2549.5	40185	20	16QAM	1	50	21.98	0-1	1
	2549.5	40185	20	16QAM	1	99	21.91	0-1	1
	2549.5	40185	20	16QAM	50	0	20.95	0-2	2
	2549.5	40185	20	16QAM	50	25	20.97	0-2	2
	2549.5	40185	20	16QAM	50	50	20.91	0-2	2
	2549.5	40185	20	16QAM	100	0	20.88	0-2	2

Table 8.1.22The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 41 Conducted Power– 20 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
Mid	2593	40620	20	QPSK	1	0	22.43	0	0
	2593	40620	20	QPSK	1	50	22.52	0	0
	2593	40620	20	QPSK	1	99	22.38	0	0
	2593	40620	20	QPSK	50	0	21.45	0-1	0-1
	2593	40620	20	QPSK	50	25	21.57	0-1	0-1
	2593	40620	20	QPSK	50	50	21.41	0-1	0-1
	2593	40620	20	QPSK	100	0	21.39	0-1	0-1
	2593	40620	20	16QAM	1	0	21.51	0-1	0-1
	2593	40620	20	16QAM	1	50	21.63	0-1	0-1
	2593	40620	20	16QAM	1	99	21.48	0-1	0-1
	2593	40620	20	16QAM	50	0	20.64	0-2	0-2
	2593	40620	20	16QAM	50	25	20.71	0-2	0-2
	2593	40620	20	16QAM	50	50	20.61	0-2	0-2
	2593	40620	20	16QAM	100	0	20.58	0-2	0-2
Mid High	2636.5	41055	20	QPSK	1	0	22.46	0	0
	2636.5	41055	20	QPSK	1	50	22.57	0	0
	2636.5	41055	20	QPSK	1	99	22.41	0	0
	2636.5	41055	20	QPSK	50	0	21.52	0-1	0-1
	2636.5	41055	20	QPSK	50	25	21.59	0-1	0-1
	2636.5	41055	20	QPSK	50	50	21.49	0-1	0-1
	2636.5	41055	20	QPSK	100	0	21.47	0-1	0-1
	2636.5	41055	20	16QAM	1	0	21.61	0-1	0-1
	2636.5	41055	20	16QAM	1	50	21.67	0-1	0-1
	2636.5	41055	20	16QAM	1	99	21.58	0-1	0-1
	2636.5	41055	20	16QAM	50	0	20.63	0-2	0-2
	2636.5	41055	20	16QAM	50	25	20.71	0-2	0-2
	2636.5	41055	20	16QAM	50	50	20.61	0-2	0-2
	2636.5	41055	20	16QAM	100	0	20.57	0-2	0-2

Table 8.1.23The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 41 Conducted Power– 20 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
High	2680	41490	20	QPSK	1	0	22.97	0	0
	2680	41490	20	QPSK	1	50	**23.16**	0	0
	2680	41490	20	QPSK	1	99	22.88	0	0
	2680	41490	20	QPSK	50	0	22.00	0-1	0-1
	2680	41490	20	QPSK	50	25	**22.16**	0-1	0-1
	2680	41490	20	QPSK	50	50	21.94	0-1	0-1
	2680	41490	20	QPSK	100	0	21.89	0-1	0-1
	2680	41490	20	16QAM	1	0	22.01	0-1	0-1
	2680	41490	20	16QAM	1	50	22.23	0-1	0-1
	2680	41490	20	16QAM	1	99	21.92	0-1	0-1
	2680	41490	20	16QAM	50	0	21.11	0-2	0-2
	2680	41490	20	16QAM	50	25	21.17	0-2	0-2
	2680	41490	20	16QAM	50	50	21.08	0-2	0-2
	2680	41490	20	16QAM	100	0	21.01	0-2	0-2

Table 8.1.24The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 41 Conducted Power– 15 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
Low	2503.5	39725	15	QPSK	1	0	22.71	0	0
	2503.5	39725	15	QPSK	1	36	22.60	0	0
	2503.5	39725	15	QPSK	1	74	22.71	0	0
	2503.5	39725	15	QPSK	36	0	22.71	0-1	1
	2503.5	39725	15	QPSK	36	18	22.71	0-1	1
	2503.5	39725	15	QPSK	36	37	22.71	0-1	1
	2503.5	39725	15	QPSK	75	0	22.71	0-1	1
	2503.5	39725	15	16QAM	1	0	22.71	0-1	1
	2503.5	39725	15	16QAM	1	36	22.71	0-1	1
	2503.5	39725	15	16QAM	1	74	22.71	0-1	1
	2503.5	39725	15	16QAM	36	0	22.71	0-2	2
	2503.5	39725	15	16QAM	36	18	22.71	0-2	2
	2503.5	39725	15	16QAM	36	37	22.71	0-2	2
	2503.5	39725	15	16QAM	75	0	22.71	0-2	2
Low Mid	2548.3	40173	15	QPSK	1	0	22.85	0	0
	2548.3	40173	15	QPSK	1	36	22.88	0	0
	2548.3	40173	15	QPSK	1	74	22.89	0	0
	2548.3	40173	15	QPSK	36	0	21.96	0-1	1
	2548.3	40173	15	QPSK	36	18	22.00	0-1	1
	2548.3	40173	15	QPSK	36	37	22.01	0-1	1
	2548.3	40173	15	QPSK	75	0	21.98	0-1	1
	2548.3	40173	15	16QAM	1	0	21.97	0-1	1
	2548.3	40173	15	16QAM	1	36	21.96	0-1	1
	2548.3	40173	15	16QAM	1	74	22.03	0-1	1
	2548.3	40173	15	16QAM	36	0	20.49	0-2	2
	2548.3	40173	15	16QAM	36	18	20.55	0-2	2
	2548.3	40173	15	16QAM	36	37	20.56	0-2	2
	2548.3	40173	15	16QAM	75	0	20.54	0-2	2

Table 8.1.25The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 41 Conducted Power– 15 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
Mid	2593	40620	15	QPSK	1	0	22.48	0	0
	2593	40620	15	QPSK	1	36	22.57	0	0
	2593	40620	15	QPSK	1	74	22.60	0	0
	2593	40620	15	QPSK	36	0	21.56	0-1	0-1
	2593	40620	15	QPSK	36	18	21.62	0-1	0-1
	2593	40620	15	QPSK	36	37	21.70	0-1	0-1
	2593	40620	15	QPSK	75	0	21.64	0-1	0-1
	2593	40620	15	16QAM	1	0	21.70	0-1	0-1
	2593	40620	15	16QAM	1	36	21.67	0-1	0-1
	2593	40620	15	16QAM	1	74	21.85	0-1	0-1
	2593	40620	15	16QAM	36	0	20.29	0-2	0-2
	2593	40620	15	16QAM	36	18	20.26	0-2	0-2
	2593	40620	15	16QAM	36	37	20.39	0-2	0-2
	2593	40620	15	16QAM	75	0	20.30	0-2	0-2
Mid High	2637.8	41068	15	QPSK	1	0	22.52	0	0
	2637.8	41068	15	QPSK	1	36	22.56	0	0
	2637.8	41068	15	QPSK	1	74	22.53	0	0
	2637.8	41068	15	QPSK	36	0	21.59	0-1	0-1
	2637.8	41068	15	QPSK	36	18	21.59	0-1	0-1
	2637.8	41068	15	QPSK	36	37	21.58	0-1	0-1
	2637.8	41068	15	QPSK	75	0	21.60	0-1	0-1
	2637.8	41068	15	16QAM	1	0	21.88	0-1	0-1
	2637.8	41068	15	16QAM	1	36	21.89	0-1	0-1
	2637.8	41068	15	16QAM	1	74	22.10	0-1	0-1
	2637.8	41068	15	16QAM	36	0	20.42	0-2	0-2
	2637.8	41068	15	16QAM	36	18	20.40	0-2	0-2
	2637.8	41068	15	16QAM	36	37	20.41	0-2	0-2
	2637.8	41068	15	16QAM	75	0	20.39	0-2	0-2

Table 8.1.26The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 41 Conducted Power– 15 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
High	2682.5	41515	15	QPSK	1	0	23.07	0	0
	2682.5	41515	15	QPSK	1	36	23.19	0	0
	2682.5	41515	15	QPSK	1	74	23.11	0	0
	2682.5	41515	15	QPSK	36	0	22.26	0-1	0-1
	2682.5	41515	15	QPSK	36	18	22.31	0-1	0-1
	2682.5	41515	15	QPSK	36	37	22.29	0-1	0-1
	2682.5	41515	15	QPSK	75	0	22.22	0-1	0-1
	2682.5	41515	15	16QAM	1	0	22.73	0-1	0-1
	2682.5	41515	15	16QAM	1	36	22.81	0-1	0-1
	2682.5	41515	15	16QAM	1	74	22.72	0-1	0-1
	2682.5	41515	15	16QAM	36	0	21.37	0-2	0-2
	2682.5	41515	15	16QAM	36	18	21.38	0-2	0-2
	2682.5	41515	15	16QAM	36	37	21.38	0-2	0-2
	2682.5	41515	15	16QAM	75	0	21.33	0-2	0-2

Table 8.1.27The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 41 Conducted Power– 10 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
Low	2501	39700	10	QPSK	1	0	22.68	0	0
	2501	39700	10	QPSK	1	25	22.68	0	0
	2501	39700	10	QPSK	1	49	22.66	0	0
	2501	39700	10	QPSK	25	0	22.12	0-1	1
	2501	39700	10	QPSK	25	12	21.63	0-1	1
	2501	39700	10	QPSK	25	25	21.59	0-1	1
	2501	39700	10	QPSK	50	0	21.62	0-1	1
	2501	39700	10	16QAM	1	0	22.04	0-1	1
	2501	39700	10	16QAM	1	25	22.05	0-1	1
	2501	39700	10	16QAM	1	49	22.08	0-1	1
	2501	39700	10	16QAM	25	0	20.56	0-2	2
	2501	39700	10	16QAM	25	12	20.55	0-2	2
	2501	39700	10	16QAM	25	25	20.50	0-2	2
	2501	39700	10	16QAM	50	0	20.50	0-2	2
Low Mid	2547	40160	10	QPSK	1	0	22.79	0	0
	2547	40160	10	QPSK	1	25	22.83	0	0
	2547	40160	10	QPSK	1	49	22.80	0	0
	2547	40160	10	QPSK	25	0	21.86	0-1	1
	2547	40160	10	QPSK	25	12	21.86	0-1	1
	2547	40160	10	QPSK	25	25	21.85	0-1	1
	2547	40160	10	QPSK	50	0	21.87	0-1	1
	2547	40160	10	16QAM	1	0	22.15	0-1	1
	2547	40160	10	16QAM	1	25	22.16	0-1	1
	2547	40160	10	16QAM	1	49	22.37	0-1	1
	2547	40160	10	16QAM	25	0	20.69	0-2	2
	2547	40160	10	16QAM	25	12	20.67	0-2	2
	2547	40160	10	16QAM	25	25	20.68	0-2	2
	2547	40160	10	16QAM	50	0	20.66	0-2	2

Table 8.1.28The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 41 Conducted Power– 10 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
Mid	2593	40620	10	QPSK	1	0	22.51	0	0
	2593	40620	10	QPSK	1	25	22.59	0	0
	2593	40620	10	QPSK	1	49	22.52	0	0
	2593	40620	10	QPSK	25	0	21.55	0-1	0-1
	2593	40620	10	QPSK	25	12	21.60	0-1	0-1
	2593	40620	10	QPSK	25	25	21.68	0-1	0-1
	2593	40620	10	QPSK	50	0	21.54	0-1	0-1
	2593	40620	10	16QAM	1	0	21.72	0-1	0-1
	2593	40620	10	16QAM	1	25	21.72	0-1	0-1
	2593	40620	10	16QAM	1	49	21.87	0-1	0-1
	2593	40620	10	16QAM	25	0	20.34	0-2	0-2
	2593	40620	10	16QAM	25	12	20.64	0-2	0-2
	2593	40620	10	16QAM	25	25	20.56	0-2	0-2
	2593	40620	10	16QAM	50	0	20.36	0-2	0-2
Mid High	2639	41080	10	QPSK	1	0	22.52	0	0
	2639	41080	10	QPSK	1	25	22.41	0	0
	2639	41080	10	QPSK	1	49	22.48	0	0
	2639	41080	10	QPSK	25	0	21.47	0-1	0-1
	2639	41080	10	QPSK	25	12	21.55	0-1	0-1
	2639	41080	10	QPSK	25	25	21.63	0-1	0-1
	2639	41080	10	QPSK	50	0	21.47	0-1	0-1
	2639	41080	10	16QAM	1	0	21.66	0-1	0-1
	2639	41080	10	16QAM	1	25	21.68	0-1	0-1
	2639	41080	10	16QAM	1	49	21.79	0-1	0-1
	2639	41080	10	16QAM	25	0	20.28	0-2	0-2
	2639	41080	10	16QAM	25	12	20.26	0-2	0-2
	2639	41080	10	16QAM	25	25	20.31	0-2	0-2
	2639	41080	10	16QAM	50	0	20.24	0-2	0-2

Table 8.1.29The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 41 Conducted Power– 10 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
High	2685	41540	10	QPSK	1	0	22.99	0	0
	2685	41540	10	QPSK	1	25	23.05	0	0
	2685	41540	10	QPSK	1	49	22.98	0	0
	2685	41540	10	QPSK	25	0	22.05	0-1	0-1
	2685	41540	10	QPSK	25	12	22.16	0-1	0-1
	2685	41540	10	QPSK	25	25	22.16	0-1	0-1
	2685	41540	10	QPSK	50	0	22.02	0-1	0-1
	2685	41540	10	16QAM	1	0	22.48	0-1	0-1
	2685	41540	10	16QAM	1	25	22.54	0-1	0-1
	2685	41540	10	16QAM	1	49	22.53	0-1	0-1
	2685	41540	10	16QAM	25	0	21.18	0-2	0-2
	2685	41540	10	16QAM	25	12	21.19	0-2	0-2
	2685	41540	10	16QAM	25	25	21.21	0-2	0-2
	2685	41540	10	16QAM	50	0	21.16	0-2	0-2

Table 8.1.30The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 41 Conducted Power– 5 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
Low	2498.5	39675	5	QPSK	1	0	22.65	0	0
	2498.5	39675	5	QPSK	1	12	22.77	0	0
	2498.5	39675	5	QPSK	1	24	22.69	0	0
	2498.5	39675	5	QPSK	12	0	21.84	0-1	1
	2498.5	39675	5	QPSK	12	6	21.89	0-1	1
	2498.5	39675	5	QPSK	12	13	21.87	0-1	1
	2498.5	39675	5	QPSK	25	0	21.80	0-1	1
	2498.5	39675	5	16QAM	1	0	22.31	0-1	1
	2498.5	39675	5	16QAM	1	12	22.39	0-1	1
	2498.5	39675	5	16QAM	1	24	22.30	0-1	1
	2498.5	39675	5	16QAM	12	0	20.95	0-2	2
	2498.5	39675	5	16QAM	12	6	20.96	0-2	2
	2498.5	39675	5	16QAM	12	13	20.96	0-2	2
	2498.5	39675	5	16QAM	25	0	20.91	0-2	2
Low Mid	2545.8	40148	5	QPSK	1	0	22.78	0	0
	2545.8	40148	5	QPSK	1	12	22.83	0	0
	2545.8	40148	5	QPSK	1	24	22.71	0	0
	2545.8	40148	5	QPSK	12	0	21.89	0-1	1
	2545.8	40148	5	QPSK	12	6	21.90	0-1	1
	2545.8	40148	5	QPSK	12	13	21.89	0-1	1
	2545.8	40148	5	QPSK	25	0	21.82	0-1	1
	2545.8	40148	5	16QAM	1	0	22.36	0-1	1
	2545.8	40148	5	16QAM	1	12	22.35	0-1	1
	2545.8	40148	5	16QAM	1	24	22.32	0-1	1
	2545.8	40148	5	16QAM	12	0	20.95	0-2	2
	2545.8	40148	5	16QAM	12	6	20.97	0-2	2
	2545.8	40148	5	16QAM	12	13	20.97	0-2	2
	2545.8	40148	5	16QAM	25	0	20.91	0-2	2

Table 8.1.31The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 41 Conducted Power– 5 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
Mid	2593	40620	5	QPSK	1	0	22.48	0	0
	2593	40620	5	QPSK	1	12	22.54	0	0
	2593	40620	5	QPSK	1	24	22.47	0	0
	2593	40620	5	QPSK	12	0	21.54	0-1	0-1
	2593	40620	5	QPSK	12	6	21.65	0-1	0-1
	2593	40620	5	QPSK	12	13	21.65	0-1	0-1
	2593	40620	5	QPSK	25	0	21.51	0-1	0-1
	2593	40620	5	16QAM	1	0	21.97	0-1	0-1
	2593	40620	5	16QAM	1	12	22.03	0-1	0-1
	2593	40620	5	16QAM	1	24	22.02	0-1	0-1
	2593	40620	5	16QAM	12	0	20.67	0-2	0-2
	2593	40620	5	16QAM	12	6	20.68	0-2	0-2
	2593	40620	5	16QAM	12	13	20.70	0-2	0-2
	2593	40620	5	16QAM	25	0	20.65	0-2	0-2
Mid High	2640.3	41093	5	QPSK	1	0	22.45	0	0
	2640.3	41093	5	QPSK	1	12	22.54	0	0
	2640.3	41093	5	QPSK	1	24	22.57	0	0
	2640.3	41093	5	QPSK	12	0	21.53	0-1	0-1
	2640.3	41093	5	QPSK	12	6	21.59	0-1	0-1
	2640.3	41093	5	QPSK	12	13	21.67	0-1	0-1
	2640.3	41093	5	QPSK	25	0	21.61	0-1	0-1
	2640.3	41093	5	16QAM	1	0	21.67	0-1	0-1
	2640.3	41093	5	16QAM	1	12	21.64	0-1	0-1
	2640.3	41093	5	16QAM	1	24	21.82	0-1	0-1
	2640.3	41093	5	16QAM	12	0	20.26	0-2	0-2
	2640.3	41093	5	16QAM	12	6	20.23	0-2	0-2
	2640.3	41093	5	16QAM	12	13	20.36	0-2	0-2
	2640.3	41093	5	16QAM	25	0	20.27	0-2	0-2

Table 8.1.32The power was measured by MT8820C

Mode	Freq. (MHz)	Channel	LTE Band 41 Conducted Power– 5 MHz Bandwidth						
			Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Power(dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
High	2687.5	41565	5	QPSK	1	0	23.05	2687.5	0
	2687.5	41565	5	QPSK	1	12	23.09	2687.5	0
	2687.5	41565	5	QPSK	1	24	23.06	2687.5	0
	2687.5	41565	5	QPSK	12	0	22.12	2687.5	0-1
	2687.5	41565	5	QPSK	12	6	22.12	2687.5	0-1
	2687.5	41565	5	QPSK	12	13	22.11	2687.5	0-1
	2687.5	41565	5	QPSK	25	0	22.13	2687.5	0-1
	2687.5	41565	5	16QAM	1	0	22.41	2687.5	0-1
	2687.5	41565	5	16QAM	1	12	22.42	2687.5	0-1
	2687.5	41565	5	16QAM	1	24	22.63	2687.5	0-1
	2687.5	41565	5	16QAM	12	0	20.95	2687.5	0-2
	2687.5	41565	5	16QAM	12	6	20.93	2687.5	0-2
	2687.5	41565	5	16QAM	12	13	20.94	2687.5	0-2
	2687.5	41565	5	16QAM	25	0	20.92	2687.5	0-2

Table 8.1.33 The power was measured by MT8820C

8.2WLAN Conducted Powers

Mode	Freq. (MHz)	Channel	802.11b (2.4 GHz) Conducted Power (dBm) Ant.2 — Data Rate (Mbps) 1	2	5.5	11
802.11b	2412	1	12.87	12.71	12.73	12.76
	2437	6	**13.19**	13.05	13.07	13.11
	2462	11	13.01	12.86	12.77	12.88

Table 8.2.1 IEEE 802.11b Average RF Power Ant.2

Mode	Freq. (MHz)	Channel	802.11g (2.4 GHz) Conducted Power (dBm) Ant.2 — Data Rate (Mbps) 6	9	12	18	24	36	48	54
802.11g	2412	1	12.65	12.52	12.49	12.43	12.40	12.61	12.50	12.59
	2437	6	13.00	12.82	12.85	12.96	12.86	12.84	12.87	12.95
	2462	11	12.93	12.77	12.80	12.75	12.89	12.76	12.65	12.91

Table 8.2.2IEEE 802.11g Average RF Power Ant.2

Mode	Freq. (MHz)	Channel	802.11n HT20 (2.4 GHz) Conducted Power (dBm) MIMO — Data Rate (Mbps) 13	26	39	52	78	104	117	130
802.11n (HT-20)	2412	1	16.04	15.95	15.86	15.97	15.88	16.00	15.90	15.99
	2437	6	**16.42**	16.26	16.30	16.31	16.36	16.25	16.23	16.28
	2462	11	16.28	16.22	16.09	16.15	16.25	16.21	16.26	16.04

Table 8.2.3IEEE 802.11n HT20 Average RF Power MIMO

Mode	Freq. (MHz)	Channel	802.11n HT40 (2.4 GHz) Conducted Power (dBm) MIMO — Data Rate (Mbps) 27	54	81	108	162	216	243	270
802.11n (HT-20)	2422	3	**16.51**	16.45	16.48	16.33	16.38	16.39	16.49	16.32
	2437	6	16.25	16.21	16.19	16.16	16.11	16.22	16.17	16.20
	2452	9	15.84	15.72	15.83	15.68	15.77	15.67	15.80	15.76

Table 8.2.4IEEE 802.11n HT40 Average RF Power MIMO

Mode	Freq. (MHz)	Channel	802.11a (5 GHz) Conducted Power (dBm) Ant.2 — Data Rate (Mbps) 6	9	12	18	24	36	48	54
802.11a (5.2G)	5180	36	**13.87**	13.70	13.75	13.83	13.73	13.82	13.73	13.83
	5200	40	13.85	13.71	13.79	13.68	13.66	13.69	13.73	13.71
	5240	48	13.79	13.63	13.74	13.65	13.65	13.72	13.61	13.54
802.11a (5.8G)	5745	149	**13.14**	12.98	13.07	12.97	13.10	13.02	13.10	13.06
	5785	157	12.97	12.88	12.83	12.94	12.91	12.93	12.91	12.92
	5825	165	12.89	12.77	12.85	12.83	12.73	12.61	12.73	12.76

Table 8.2.5IEEE 802.11a Average RF Power Ant.2

Mode	Freq. (MHz)	Channel	802.11n HT20 (5 GHz) Conducted Power (dBm) MIMO Data Rate (Mbps) 13	26	39	52	78	104	117	130
802.11n HT20 (5.2G)	5180	36	16.86	16.77	16.67	16.70	16.84	16.78	16.69	16.70
	5200	40	16.59	16.45	16.50	16.41	16.54	16.52	16.43	16.55
	5240	48	16.57	16.38	16.41	16.45	16.43	16.43	16.51	16.40
802.11n HT20 (5.8G)	5745	149	16.19	16.17	16.13	16.00	15.95	16.06	16.16	16.12
	5785	157	15.94	15.80	15.87	15.76	15.69	15.78	15.89	15.80
	5825	165	15.73	15.55	15.56	15.64	15.61	15.47	15.66	15.67

Table 8.2.6IEEE 802.11n HT20 Average RF Power MIMO

Mode	Freq. (MHz)	Channel	802.11n HT40 (5 GHz) Conducted Power (dBm) MIMO Data Rate (Mbps) 27	54	81	108	162	216	243	270
802.11n HT40 (5.2G)	5190	38	16.87	16.84	16.81	16.84	16.68	16.69	16.74	16.75
	5230	46	16.68	16.61	16.63	16.61	16.50	16.49	16.42	16.63
802.11n HT40 (5.8G)	5755	151	15.66	15.60	15.62	15.60	15.61	15.57	15.52	15.63
	5795	159	15.87	15.71	15.59	15.71	15.74	15.75	15.83	15.81

Table 8.2.7IEEE 802.11n HT40 Average RF Power MIMO

Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02and October 2012 / April 2013 FCC/TCB Meeting Notes:

- For 2.4 GHz, highest average RF output power channel for the lowest data rate for IEEE 802.11b were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11g/n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
- For5 GHz, highest average RF output power channel for the lowest data rate for IEEE 802.11a were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.
- When the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is <1.6 W/kg and the reported 1g averaged SAR is <0.8 W/kg, SAR testing on other channels is not required. Otherwise, the other default (or corresponding required) test channels were additionally tested using the lowest data rate.
- The underlined data rate and channel above were tested for SAR.

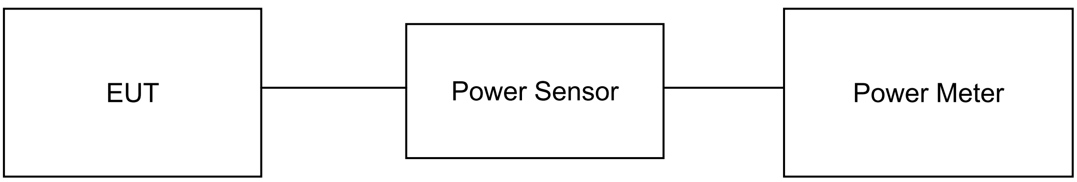


Figure 10.3Average Power Measurement Setup forBandwidths < 50 MHz

9. SYSTEM VERIFICATION

9.1 Tissue Verification

MEASURED TISSUE PARAMETERS										
Date(s)	Tissue Type	Ambient Temp.[°C]	Liquid Temp.[°C]	Measured Frequency [MHz]	Target Dielectric Constant, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, εr	Measured Conductivity, σ (S/m)	ErDeviation [%]	σ Deviation [%]
Apr. 02. 2015	835 Body	22.2	22.7	835.0	55.200	0.970	53.500	1.000	-3.08	3.09
				836.5	55.200	0.971	53.400	1.000	-3.26	2.99
Feb. 24. 2015	1900 Body	21.8	22.3	1860.0	53.300	1.520	52.600	1.520	-1.31	0.00
				1882.5	53.300	1.520	52.600	1.540	-1.31	1.32
				1900.0	53.300	1.520	52.500	1.550	-1.50	1.97
				1905.0	53.300	1.520	52.500	1.560	-1.50	2.63
Feb. 26. 2015	2450 Body	21.3	21.8	2412.0	52.750	1.914	51.400	1.930	-2.56	0.84
				2437.0	52.720	1.938	51.300	1.960	-2.69	1.14
				2450.0	52.700	1.950	51.300	1.970	-2.66	1.03
				2462.0	52.680	1.967	51.300	1.990	-2.62	1.17
Feb. 27. 2015	2450 Body	21.7	22.2	2422.0	52.740	1.923	52.400	1.920	-0.64	-0.16
				2437.0	52.720	1.938	52.400	1.940	-0.61	0.10
				2450.0	52.700	1.950	52.400	1.950	-0.57	0.00
				2452.0	52.700	1.953	52.400	1.960	-0.57	0.36
Mar. 06. 2015	2600 Body	22.0	22.5	2506.0	52.630	2.029	51.100	2.000	-2.91	-1.43
				2549.5	52.570	2.090	51.000	2.050	-2.99	-1.91
				2593.0	52.520	2.153	50.800	2.100	-3.27	-2.46
				2600.0	52.510	2.163	50.800	2.110	-3.26	-2.45
				2636.0	52.460	2.214	50.700	2.150	-3.35	-2.89
				2680.0	52.410	2.276	50.600	2.200	-3.45	-3.34
Mar. 02. 2015	5200 Body	22.1	22.7	5180.0	49.040	5.276	48.600	5.380	-0.90	1.97
				5200.0	49.010	5.299	48.600	5.410	-0.84	2.09
				5240.0	48.960	5.346	48.500	5.480	-0.94	2.51
Mar. 04. 2015	5200 Body	21.9	22.2	5190.0	49.030	5.288	49.700	5.310	1.37	0.42
				5200.0	49.010	5.299	49.600	5.330	1.20	0.59
				5230.0	48.970	5.334	49.600	5.380	1.29	0.86
Mar. 03. 2015	5800 Body	22.3	22.6	5745.0	48.270	5.936	48.600	6.050	0.68	1.92
				5785.0	48.220	5.982	48.100	6.120	-0.25	2.31
				5800.0	48.200	6.000	48.100	6.140	-0.21	2.33
				5825.0	48.200	6.000	48.000	6.180	-0.41	3.00
Mar. 05. 2015	5800 Body	22.2	22.4	5755.0	48.260	5.947	46.800	6.010	-3.03	1.06
				5795.0	48.210	5.994	46.700	6.070	-3.13	1.27
				5800.0	48.200	6.000	46.700	6.070	-3.11	1.17

The above measured tissue parameters were used in the DASY software. The DASY software was usedto perform interpolation to determine the dielectric parameters at the SAR test device frequencies (perKDB 865664 and IEEE 1528-2013 6.6.1.2). The tissue parameters listed in the SAR test plots mayslightly differ from the table above due to significant digit rounding in the software.

Measurement Procedure for Tissue verification:

1) The network analyzer and probe system was configured and calibrated.
2) The probe was immersed in the sample which was placed in a nonmetallic container. Trapped air bubbles beneath the flange were minimized by placing the probe at a slight angle.
3) The complex admittance with respect to the probe aperture was measured
4) The complex relative permittivity , for example from the below equation (Pournaropoulos and Misra):

$$Y = \frac{j2\omega\varepsilon_r\varepsilon_0}{[\ln(b/a)]^2}\int_a^b\int_a^b\int_0^\pi \cos\phi' \frac{\exp\left[-j\omega r(\mu_0\varepsilon_r'\varepsilon_0)^{1/2}\right]}{r} d\phi' d\rho' d\rho$$

where Y is the admittance of the probe in contact with the sample, the primed and unprimed coordinates refer to source and observation points, respectively, $r^2 = \rho^2 + \rho'^2 - 2\rho\rho'\cos\phi'$, ω is the angular frequency, and $j = \sqrt{-1}$.

9.2 Test System Verification

Prior to assessment, the system is verified to the± 10 % of the specifications at 835 MHz, 1900 MHz, 2450 MHz, 2600 MHz, 5GHzby using the SAR Dipole kit(s). (Graphic Plots Attached)

SYSTEM DIPOLE VERIFICATION TARGET & MEASURED												
SAR System #	Freq. [MHz]	SAR Dipole kits	Date(s)	Tissue Type	Ambient Temp.[°C]	Liquid Temp.[°C]	Probe S/N	Input Power (mW)	1 W Target SAR_{1g} (W/kg)	Measured SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	Deviation [%]
B	835	D835V2, SN: 4d159	Apr. 02. 2015	Body	22.2	22.7	3916	250	9.64	2.48	9.92	2.90
B	1900	D1900V2, SN: 5d176	Feb. 24. 2015	Body	21.8	22.3	3916	250	40.00	10.70	42.80	7.00
B	2450	D2450V2, SN: 920	Feb. 26. 2015	Body	21.3	21.8	3916	250	51.40	12.80	51.20	-0.39
B	2450	D2450V2, SN: 920	Feb. 27. 2015	Body	21.7	22.2	3916	250	51.40	12.60	50.40	-1.95
B	2600	D2600V2, SN:1016	Mar. 06. 2015	Body	22.0	22.5	3916	250	56.50	15.10	60.40	6.90
B	5200	D5200V2, SN:1103	Mar. 02. 2015	Body	22.1	22.7	3916	100	75.50	7.12	71.20	-5.70
B	5200	D5200V2, SN:1103	Mar. 04. 2015	Body	21.9	22.2	3916	100	75.50	7.04	70.40	-6.75
B	5800	D5800V2, SN:1103	Mar. 03. 2015	Body	22.3	22.6	3916	100	77.20	7.15	71.50	-7.38
B	5800	D5800V2, SN: 1103	Mar. 05. 2015	Body	22.2	22.4	3916	100	77.20	7.33	73.30	-5.05

Note1 : System Verification were measured with input100mW, 250 mWand normalized to 1W.
Note2 : To confirm the proper SAR liquid depth, the z-axis plotsfrom the system verifications were included since thesystem verifications were performed usingthe same liquid, probe and DAE as the SAR tests in the same time period.
Note3: Full system validation status and results can be found in Attachment 3.

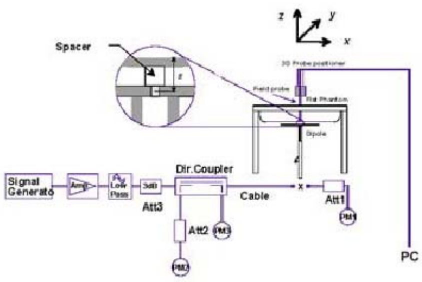


Figure 11.1 Dipole Verification Test Setup Diagram & Photo

10. SAR TEST RESULTS

10.1Standalone Wireless router SAR Results

Table 10.1 LTE Band 25 Hotspot SAR

MEASUREMENT RESULTS																	
FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
1882.5	26365	LTE B25	20	24.00	22.94	0.009	0	10 mm [Top.]	FCC #1	QPSK	1	50	1:1	0.083	1.276	0.106	
1882.5	26365	LTE B25	20	23.00	22.06	0.037	1	10 mm [Top.]	FCC #1	QPSK	50	0	1:1	0.076	1.242	0.094	
1882.5	26365	LTE B25	20	24.00	22.94	-0.047	0	10 mm [Bottom.]	FCC #1	QPSK	1	50	1:1	0.472	1.276	0.602	
1882.5	26365	LTE B25	20	23.00	22.06	0.064	1	10 mm [Bottom.]	FCC #1	QPSK	50	0	1:1	0.444	1.242	0.551	
1860.0	26140	LTE B25	20	24.00	22.86	-0.029	0	10 mm [Front.]	FCC #1	QPSK	1	50	1:1	0.909	1.300	1.182	
1860.0	26140	LTE B25	20	23.00	22.06	-0.149	1	10 mm [Front.]	FCC #1	QPSK	50	0	1:1	0.769	1.242	0.955	
1882.5	26365	LTE B25	20	24.00	22.94	0.176	0	10 mm [Front.]	FCC #1	QPSK	1	50	1:1	1.060	1.276	**1.353**	A1
1882.5	26365	LTE B25	20	23.00	22.06	-0.015	1	10 mm [Front.]	FCC #1	QPSK	50	0	1:1	1.030	1.242	1.279	
1905.0	26590	LTE B25	20	24.00	22.70	-0.015	0	10 mm [Front.]	FCC #1	QPSK	1	50	1:1	0.950	1.349	1.282	
1905.0	26590	LTE B25	20	23.00	21.67	0.027	1	10 mm [Front.]	FCC #1	QPSK	50	0	1:1	0.816	1.358	1.108	
1882.5	26365	LTE B25	20	23.00	21.96	0.075	1	10 mm [Front.]	FCC #1	QPSK	100	0	1:1	0.922	1.271	1.172	
1860.0	26140	LTE B25	20	24.00	22.86	0.059	0	10 mm [Rear.]	FCC #1	QPSK	1	50	1:1	0.760	1.300	0.988	
1860.0	26140	LTE B25	20	23.00	22.06	-0.030	1	10 mm [Rear.]	FCC #1	QPSK	50	0	1:1	0.659	1.242	0.818	
1882.5	26365	LTE B25	20	24.00	22.94	0.002	0	10 mm [Rear.]	FCC #1	QPSK	1	50	1:1	0.909	1.276	1.160	
1882.5	26365	LTE B25	20	23.00	22.06	0.044	1	10 mm [Rear.]	FCC #1	QPSK	50	0	1:1	0.896	1.242	1.113	
1905.0	26590	LTE B25	20	24.00	22.70	-0.022	0	10 mm [Rear.]	FCC #1	QPSK	1	50	1:1	0.694	1.349	0.936	
1905.0	26590	LTE B25	20	23.00	21.67	0.053	1	10 mm [Rear.]	FCC #1	QPSK	50	0	1:1	0.632	1.358	0.858	
1882.5	26365	LTE B25	20	23.00	21.96	0.027	1	10 mm [Rear.]	FCC #1	QPSK	100	0	1:1	0.724	1.271	0.920	
1860.0	26140	LTE B25	20	24.00	22.86	0.016	0	10 mm [Right.]	FCC #1	QPSK	1	50	1:1	0.891	1.300	1.158	
1860.0	26140	LTE B25	20	23.00	22.06	0.013	1	10 mm [Right.]	FCC #1	QPSK	50	0	1:1	0.760	1.242	0.944	
1882.5	26365	LTE B25	20	24.00	22.94	-0.084	0	10 mm [Right.]	FCC #1	QPSK	1	50	1:1	0.876	1.276	1.118	
1882.5	26365	LTE B25	20	23.00	22.06	-0.011	1	10 mm [Right.]	FCC #1	QPSK	50	0	1:1	0.818	1.242	1.016	
1905.0	26590	LTE B25	20	24.00	22.70	-0.034	0	10 mm [Right.]	FCC #1	QPSK	1	50	1:1	0.669	1.349	0.902	
1905.0	26590	LTE B25	20	23.00	21.67	-0.005	1	10 mm [Right.]	FCC #1	QPSK	50	0	1:1	0.611	1.358	0.830	
1882.5	26365	LTE B25	20	23.00	21.96	0.113	1	10 mm [Right.]	FCC #1	QPSK	100	0	1:1	0.731	1.271	0.929	
1882.5	26365	LTE B25	20	24.00	22.94	0.088	0	10 mm [Curve1.]	FCC #1	QPSK	1	50	1:1	0.127	1.276	0.162	
1882.5	26365	LTE B25	20	24.00	22.94	0.052	0	10 mm [Curve2.]	FCC #1	QPSK	1	50	1:1	0.332	1.276	0.424	
1882.5	26365	LTE B25	20	24.00	22.94	0.114	0	10 mm [Front.]	FCC #1	QPSK	1	50	1:1	1.050	1.276	1.340	
ANSI / IEEE C95.1-2005– SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population Exposure**									**Body** **1.6 W/kg (mW/g)** averaged over 1 gram								

Note: 1) Blue entries represent variability measurements.
2) For Curve1 and 2, Please refer to test photo.

Table 10.2 LTE Band 26 Hotspot SAR

MEASUREMENT RESULTS																	
FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
836.5	26915	LTE B26	15	23.00	22.89	-0.005	0	10 mm [Top.]	FCC #1	QPSK	1	0	1:1	0.403	1.026	0.413	
836.5	26915	LTE B26	15	22.00	21.92	0.132	1	10 mm [Top.]	FCC #1	QPSK	36	0	1:1	0.311	1.019	0.317	
836.5	26915	LTE B26	15	23.00	22.89	0.058	0	10 mm [Bottom.]	FCC #1	QPSK	1	0	1:1	0.670	1.026	0.687	
836.5	26915	LTE B26	15	22.00	21.92	0.085	1	10 mm [Bottom.]	FCC #1	QPSK	36	0	1:1	0.513	1.019	0.523	
836.5	26915	LTE B26	15	23.00	22.89	0.064	0	10 mm [Front.]	FCC #1	QPSK	1	0	1:1	1.010	1.026	**1.036**	A2
836.5	26915	LTE B26	15	22.00	21.92	-0.120	1	10 mm [Front.]	FCC #1	QPSK	36	0	1:1	0.742	1.019	0.756	
836.5	26915	LTE B26	15	22.00	21.71	-0.036	1	10 mm [Front.]	FCC #1	QPSK	75	0	1:1	0.880	1.069	0.941	
836.5	26915	LTE B26	15	23.00	22.89	0.058	0	10 mm [Rear.]	FCC #1	QPSK	1	0	1:1	0.828	1.026	0.850	
836.5	26915	LTE B26	15	22.00	21.92	-0.051	1	10 mm [Rear.]	FCC #1	QPSK	36	0	1:1	0.614	1.019	0.626	
836.5	26915	LTE B26	15	22.00	21.71	0.051	1	10 mm [Rear.]	FCC #1	QPSK	75	0	1:1	0.730	1.069	0.780	
836.5	26915	LTE B26	15	23.00	22.89	-0.055	0	10 mm [Right.]	FCC #1	QPSK	1	0	1:1	0.120	1.026	0.123	
836.5	26915	LTE B26	15	22.00	21.92	-0.090	1	10 mm [Right.]	FCC #1	QPSK	36	0	1:1	0.072	1.019	0.073	
836.5	26915	LTE B26	15	23.00	22.89	0.019	0	10 mm [Curve1.]	FCC #1	QPSK	1	0	1:1	0.138	1.026	0.142	
836.5	26915	LTE B26	15	23.00	22.89	-0.002	0	10 mm [Curve2.]	FCC #1	QPSK	1	0	1:1	0.108	1.026	0.111	
836.5	26915	LTE B26	15	23.00	22.89	0.027	0	10 mm [Front.]	FCC #1	QPSK	1	0	1:1	0.993	1.026	1.019	
ANSI / IEEE C95.1-2005– SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population Exposure**									**Body** **1.6 W/kg (mW/g)** averaged over 1 gram								

Note: 1) Blue entries represent variability measurements.
2) For Curve1 and 2, Please refer to test photo.

Table 10.3 LTE Band 41 Hotspot SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch															
2680.0	41490	LTE B41	20	24.00	23.16	0.053	0	10 mm [Top.]	FCC #1	QPSK	1	50	0.458	1.213	0.556	
2680.0	41490	LTE B41	20	23.00	22.16	0.029	1	10 mm [Top.]	FCC #1	QPSK	50	25	0.400	1.213	0.485	
2506.0	39750	LTE B41	20	24.00	22.74	0.129	0	10 mm [Front.]	FCC #1	QPSK	1	50	0.657	1.337	**0.878**	A3
2549.5	40185	LTE B41	20	24.00	22.91	0.138	0	10 mm [Front.]	FCC #1	QPSK	1	50	0.629	1.285	0.808	
2593.0	40620	LTE B41	20	24.00	22.52	0.163	0	10 mm [Front.]	FCC #1	QPSK	1	50	0.623	1.406	0.876	
2636.5	41055	LTE B41	20	24.00	22.57	0.042	0	10 mm [Front.]	FCC #1	QPSK	1	50	0.542	1.390	0.753	
2680.0	41490	LTE B41	20	24.00	23.16	0.116	0	10 mm [Front.]	FCC #1	QPSK	1	50	0.558	1.213	0.677	
2680.0	41490	LTE B41	20	23.00	22.16	-0.011	1	10 mm [Front.]	FCC #1	QPSK	50	25	0.431	1.213	0.523	
2549.5	40185	LTE B41	20	23.00	21.91	0.110	0	10 mm [Front.]	FCC #1	QPSK	100	0	0.533	1.285	0.685	
2680.0	41490	LTE B41	20	24.00	23.16	-0.004	0	10 mm [Rear.]	FCC #1	QPSK	1	50	0.345	1.213	0.418	
2680.0	41490	LTE B41	20	23.00	22.16	0.010	1	10 mm [Rear.]	FCC #1	QPSK	50	25	0.273	1.213	0.331	
2680.0	41490	LTE B41	20	24.00	23.16	-0.066	0	10 mm [Right.]	FCC #1	QPSK	1	50	0.192	1.213	0.233	
2680.0	41490	LTE B41	20	23.00	22.16	-0.046	1	10 mm [Right.]	FCC #1	QPSK	50	25	0.166	1.213	0.201	
ANSI / IEEE C95.1-2005– SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population Exposure**									**Body** **1.6 W/kg (mW/g)** averaged over 1 gram							

Note: 1) 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
(1) ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
(2) ≤ 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
(3) ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
2) The curved surfaces were not tested since the separation distance of curved surface is greater than the separation distance of edge surface from antenna.

Table 10.4 2.4G_W-LAN HotspotSAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/ Band	Ant	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Position	Device Serial Number	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch														
2437	6	802.11b	Ant.2	DSSS	14.0	13.19	0.095	10 mm [Bottom]	FCC #1	1	1:1	0.0046	1.205	0.006	
2412	1	802.11b	Ant.2	DSSS	14.0	12.87	-0.137	10 mm [Front]	FCC #1	1	1:1	0.035	1.297	0.045	
2437	6	802.11b	Ant.2	DSSS	14.0	13.19	-0.109	10 mm [Front]	FCC #1	1	1:1	0.049	1.205	**0.059**	A4
2462	11	802.11b	Ant.2	DSSS	14.0	13.01	0.138	10 mm [Front]	FCC #1	1	1:1	0.045	1.256	0.057	
2437	6	802.11b	Ant.2	DSSS	14.0	13.19	0.076	10 mm [Rear]	FCC #1	1	1:1	0.032	1.205	0.039	
2437	6	802.11n HT20	MIMO	ODFM	17.0	16.42	0.072	10 mm [Bottom]	FCC #1	1	1:1	0.034	1.143	0.039	
2412	1	802.11n HT20	MIMO	ODFM	17.0	16.04	0.184	10 mm [Front]	FCC #1	1	1:1	0.069	1.247	0.086	
2437	6	802.11n HT20	MIMO	ODFM	17.0	16.42	-0.191	10 mm [Front]	FCC #1	1	1:1	0.106	1.143	**0.121**	A5
2462	11	802.11n HT20	MIMO	ODFM	17.0	16.28	0.178	10 mm [Front]	FCC #1	1	1:1	0.090	1.180	0.106	
2437	6	802.11n HT20	MIMO	ODFM	17.0	16.42	-0.057	10 mm [Rear]	FCC #1	1	1:1	0.040	1.143	0.046	
2437	6	802.11n HT20	MIMO	ODFM	17.0	16.42	-0.076	10 mm [Left]	FCC #1	1	1:1	0.011	1.143	0.013	
2437	6	802.11n HT20	MIMO	ODFM	17.0	16.42	-0.065	10 mm [Curve3]	FCC #1	1	1:1	0.0095	1.143	0.011	
2422	3	802.11n HT40	MIMO	ODFM	17.0	16.51	0.129	10 mm [Bottom]	FCC #1	1	1:1	0.039	1.119	0.044	
2422	3	802.11n HT40	MIMO	ODFM	17.0	16.51	-0.163	10 mm [Front]	FCC #1	1	1:1	0.072	1.119	0.081	
2437	6	802.11n HT40	MIMO	ODFM	17.0	16.25	0.157	10 mm [Front]	FCC #1	1	1:1	0.069	1.189	0.082	
2452	9	802.11n HT40	MIMO	ODFM	17.0	15.84	-0.005	10 mm [Front]	FCC #1	1	1:1	0.064	1.306	**0.084**	A6
2422	3	802.11n HT40	MIMO	ODFM	17.0	16.51	-0.078	10 mm [Rear]	FCC #1	1	1:1	0.036	1.119	0.040	
2422	3	802.11n HT40	MIMO	ODFM	17.0	16.51	0.144	10 mm [Left]	FCC #1	1	1:1	0.028	1.119	0.031	
2422	3	802.11n HT40	MIMO	ODFM	17.0	16.51	-0.092	10 mm [Curve3]	FCC #1	1	1:1	0.0042	1.119	0.005	
ANSI / IEEE C95.1-2005– SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population Exposure**									**Body** **1.6 W/kg (mW/g)** averaged over 1 gram						

Note: 1) For Curve3, Please refer to test photo.
2) For Ant.2, The curved surfaces were not tested since the separation distance of curved surface is greater than the separation distance of edge surface from antenna.

Table 10.5 5G_W-LAN Hotspot SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/ Band	Ant	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Position	Device Serial Number	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch														
5180	36	802.11a	Ant.2	OFDM	14.0	13.87	0.165	10 mm [Bottom]	FCC #1	1	1:1	0.042	1.030	0.043	
5180	36	802.11a	Ant.2	OFDM	14.0	13.87	-0.094	10 mm [Front]	FCC #1	1	1:1	0.091	1.030	**0.094**	A7
5180	36	802.11a	Ant.2	OFDM	14.0	13.87	0.158	10 mm [Rear]	FCC #1	1	1:1	0.053	1.030	0.055	
5180	36	802.11n HT20	MIMO	OFDM	17.0	16.86	-0.189	10 mm [Bottom]	FCC #1	1	1:1	0.046	1.033	0.048	
5180	36	802.11n HT20	MIMO	OFDM	17.0	16.86	-0.014	10 mm [Front]	FCC #1	1	1:1	0.102	1.033	**0.105**	A8
5180	36	802.11n HT20	MIMO	OFDM	17.0	16.86	0.027	10 mm [Rear]	FCC #1	1	1:1	0.056	1.033	0.058	
5180	36	802.11n HT20	MIMO	OFDM	17.0	16.86	-0.116	10 mm [Left]	FCC #1	1	1:1	0.021	1.033	0.022	
5180	36	802.11n HT20	MIMO	OFDM	17.0	16.86	-0.183	10 mm [Curve3]	FCC #1	1	1:1	0.036	1.033	0.037	
5190	38	802.11n HT40	MIMO	OFDM	17.0	16.87	0.098	10 mm [Bottom]	FCC #1	1	1:1	0.057	1.030	0.059	
5190	38	802.11n HT40	MIMO	OFDM	17.0	16.87	0.020	10 mm [Front]	FCC #1	1	1:1	0.102	1.030	**0.105**	A9
5130	46	802.11n HT40	MIMO	OFDM	17.0	16.68	-0.127	10 mm [Front]	FCC #1	1	1:1	0.097	1.076	0.104	
5190	38	802.11n HT40	MIMO	OFDM	17.0	16.87	0.123	10 mm [Rear]	FCC #1	1	1:1	0.053	1.030	0.055	
5190	38	802.11n HT40	MIMO	OFDM	17.0	16.87	0.162	10 mm [Left]	FCC #1	1	1:1	0.024	1.030	0.025	
5190	38	802.11n HT40	MIMO	OFDM	17.0	16.87	-0.177	10 mm [Curve3]	FCC #1	1	1:1	0.035	1.030	0.036	
5745	149	802.11a	Ant.2	OFDM	14.0	13.14	-0.055	10 mm [Bottom]	FCC #1	1	1:1	0.053	1.219	0.065	
5745	149	802.11a	Ant.2	OFDM	14.0	13.14	-0.176	10 mm [Front]	FCC #1	1	1:1	0.115	1.219	**0.140**	A10
5745	149	802.11a	Ant.2	OFDM	14.0	13.14	0.055	10 mm [Rear]	FCC #1	1	1:1	0.051	1.219	0.062	
5745	149	802.11n HT20	MIMO	OFDM	17.0	16.19	0.171	10 mm [Bottom]	FCC #1	1	1:1	0.055	1.205	0.066	
5745	149	802.11n HT20	MIMO	OFDM	17.0	16.19	-0.182	10 mm [Front]	FCC #1	1	1:1	0.124	1.205	**0.149**	A11
5745	149	802.11n HT20	MIMO	OFDM	17.0	16.19	0.065	10 mm [Rear]	FCC #1	1	1:1	0.066	1.205	0.080	
5745	149	802.11n HT20	MIMO	OFDM	17.0	16.19	-0.157	10 mm [Left]	FCC #1	1	1:1	0.033	1.205	0.040	
5745	149	802.11n HT20	MIMO	OFDM	17.0	16.19	0.006	10 mm [Curve3]	FCC #1	1	1:1	0.041	1.205	0.049	
5795	159	802.11n HT40	MIMO	OFDM	17.0	15.87	0.126	10 mm [Bottom]	FCC #1	1	1:1	0.048	1.297	0.062	
5755	151	802.11n HT40	MIMO	OFDM	17.0	15.66	0.015	10 mm [Front]	FCC #1	1	1:1	0.117	1.361	0.159	
5795	159	802.11n HT40	MIMO	OFDM	17.0	15.87	0.018	10 mm [Front]	FCC #1	1	1:1	0.126	1.297	**0.163**	A12
5795	159	802.11n HT40	MIMO	OFDM	17.0	15.87	-0.039	10 mm [Rear]	FCC #1	1	1:1	0.084	1.297	0.109	
5795	159	802.11n HT40	MIMO	OFDM	17.0	15.87	0.093	10 mm [Left]	FCC #1	1	1:1	0.032	1.297	0.042	
5795	159	802.11n HT40	MIMO	OFDM	17.0	15.87	-0.164	10 mm [Curve3]	FCC #1	1	1:1	0.029	1.297	0.038	
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure									**Body 1.6 W/kg (mW/g)** averaged over 1 gram						

Note: 1) For Curve3, Please refer to test photo.
2) For Ant.2, The curved surfaces were not tested since the separation distance of curved surface is greater than the separation distance of edge surface from antenna.

10.2SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified inIEEE 1528-2003, and FCC KDB Publication447498 D01v05r02.
2. Batteries are fully charged at the beginning of the SAR measurements. A standard battery wasused for all SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanicaland thermal characteristics and are within operational tolerances expected for production units
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCCKDB Publication 447498 D01v05r02.
6. The SAR test separation distance for hotspot mode is determined according to device form factor. When the overall length and width of a device is > 9 cm x 5 cm (~3.5” x 2”), a test separation distance of 10 mm is required for hotspot mode SAR measurements.
7. 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

   ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   ≤ 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
   ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
8. During SAR Testing for the Wireless Router conditions per FCC KDB Publication 941225 D06v02, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 6.7 for more details).
9. Per FCC KDB 865664 D01v01r03, variability SAR tests were performed when the measured SARresults for a frequency band were greater than 0.8 W/kg. Repeated SAR measurements arehighlighted in the tables above for clarity. Please see Section 14 for variability analysis.

LTE Notes:

1. LTE Considerations: LTE test configurations are determined according to SAR Evaluation Considerations for LTE Devices in FCC KDB Publication 941225 D05v02r03. The general test procedures used for testing can be found in Section 4.1.
2. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is Enabled for this device, according to 3GPP TS36. 101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.
3. Per FCC Guidance, LTE CA SAR was not needed for testing since the data sent by uplink on uplink physical channels does not change between Rel 8 and Rel 10.

WLAN Notes:

1. Justification for reduced test configurations for WIFI channels per KDB Publication 248227D01v01r02 and October 2012 FCC/TCB Meeting Notes for 2.4 GHz WIFI: Highest average RFoutput power channel for the lowest data rate was selected for SAR evaluation in 802.11b. OtherIEEE 802.11 modes (including 802.11g/n) were not investigated since the average output powersover all channels and data rates were not more than 0.25 dB higher than the tested channel inthe lowest data rate of IEEE 802.11b mode.
2. Justification for reduced test configurations for WIFI channels per KDB Publication 248227D01v01r02 and October 2012 FCC/TCB Meeting Notes for 5 GHz WIFI: Highest average RFoutput power channel for the lowest data rate was selected for SAR evaluation in 802.11a. OtherIEEE 802.11 modes (including 802.11n 20MHz and 40MHz bandwidths) were not investigated since the average output powersover all channels and data rates were not more than 0.25 dB higher than the tested channel inthe lowest data rate of IEEE 802.11a mode.
3. WIFI transmission was verified using aspectrum analyzer.
4. Since the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is<1.6 W/kg and the reported 1g averaged SAR is <0.8 W/kg, SAR testing on other defaultchannels was not required.

11. FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

11.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D01v05r02 are applicable to handsets with built-in unlicensed transmitters such as 802.11b/g/n and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

11.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmissionanalysis is required. Per FCC KDB 447498 D01v05r02 IV.C.1.iii and IEEE 1528-2013 Section 6.3.4.1.2,simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all thesimultaneous transmitting antennas in a specific a physical test configuration is $\leq$ 1.6 W/kg. Whenstandalone SAR is not required to be measured, per FCC KDB 447498 D01v05r02 4.3.2 2), the followingequation must be used to estimate the standalone 1g SAR for simultaneous transmission assessmentinvolving that transmitter.

11.3 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D01v05r02, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the DUT are shown in Figure 13.1 and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.

Path 1	Path 2
LTE	WIFI(Ant.2, MIMO)

Figure 13.1 Simultaneous Transmission Paths

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB Publication 447498 D01v05r02.

Table 11.1 Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Hotspot SAR	Note
1	LTE B25 Data(FDD) + WiFi2 2.4 GHz	Yes	FDD Data + WiFi 2.4 GHz SISO
2	LTE B26 Data(FDD) + WiFi2 2.4 GHz	Yes	
3	LTE B25 Data(FDD) + (WiFi2+WiFi1) 2.4 GHz	Yes	FDD Data + WiFi 2.4GHz MIMO
4	LTE B26 Data(FDD) + (WiFi2+WiFi1) 2.4 GHz	Yes	
5	LTE B25 Data(FDD) + WiFi2 5 GHz	Yes	FDD Data + WiFi 5GHz SISO
6	LTE B26 Data(FDD) + WiFi2 5 GHz	Yes	
7	LTE B25 Data(FDD) + (WiFi2+WiFi1) 5 GHz	Yes	FDD Data + WiFi 5GHz MIMO
8	LTE B26 Data(FDD) + (WiFi2+WiFi1) 5 GHz	Yes	
9	LTE B41 Data(TDD) + WiFi2 2.4 GHz	Yes	TDD Data + WiFi 2.4GHz SISO
10	LTE B41 Data(TDD) + (WiFi2+WiFi1) 2.4 GHz	Yes	TDD Data + WiFi 2.4GHz MIMO
11	LTE B41 Data(TDD) + WiFi2 5 GHz	Yes	TDD Data + WiFi 5GHz SISO
12	LTE B41 Data(TDD) + (WiFi2+WiFi1) 5 GHz	Yes	TDD Data + WiFi 5GHz MIMO

Notes:
1. 2.4 GHz WIFI, 5 GHz WIFIaresupported Hotspot.
2. 2.4 GHz WIFI and 5 GHz WIFI cannot transmit simultaneously since they share the same chip.

11.4Hotspot SAR Simultaneous Transmission Analysis

Per FCC KDB Publication 941225 D06v02, the device edges with antennas more than 2.5 cm from edgeare not required to be evaluated for SAR ("-").

Table 11.2 Simultaneous Transmission Scenario for LTE with 2.4GHz W-LAN(802.11b_Ant.2) (Hotspot at 10 mm)

Simult TX	Configuration	LTE Band 25 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	LTE Band 26 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.106	-	0.106	Body SAR	Top	0.413	-	0.413
	Bottom	0.602	0.006	0.608		Bottom	0.687	0.006	0.693
	Front	1.353	0.059	1.412		Front	1.036	0.059	1.095
	Rear	1.160	0.039	1.199		Rear	0.850	0.039	0.889
	Right	1.158	-	1.158		Right	0.123	-	0.123
	Left	-	-	-		Left	-	-	-

Simult TX	Configuration	LTE Band 41 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.556	-	0.556
	Bottom	-	0.006	0.006
	Front	0.878	0.059	0.937
	Rear	0.418	0.039	0.457
	Right	0.233	-	0.233
	Left	-	-	-

Table 11.3 Simultaneous Transmission Scenario for LTE with 2.4GHz W-LAN(802.11n HT20_MIMO) (Hotspot at 10 mm)

Simult TX	Configuration	LTE Band 25 SAR (W/kg)	2.4G W-LAN (802.11nHT20) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	LTE Band 26 SAR (W/kg)	2.4G W-LAN (802.11nHT20) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.106	-	0.106	Body SAR	Top	0.413	-	0.413
	Bottom	0.602	0.039	0.641		Bottom	0.687	0.039	0.726
	Front	1.353	0.121	1.474		Front	1.036	0.121	1.157
	Rear	1.160	0.046	1.206		Rear	0.850	0.046	0.896
	Right	1.158	-	1.158		Right	0.123	-	0.123
	Left	-	0.013	0.013		Left	-	0.013	0.013

Simult TX	Configuration	LTE Band 41 SAR (W/kg)	2.4G W-LAN (802.11nHT20) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.556	-	0.556
	Bottom	-	0.039	0.039
	Front	0.878	0.121	0.999
	Rear	0.418	0.046	0.464
	Right	0.233	-	0.233
	Left	-	0.013	0.013

Table 11.4 Simultaneous Transmission Scenario for LTE with 2.4GHz W-LAN(802.11n HT40_MIMO) (Hotspot at 10 mm)

Simult TX	Configuration	LTE Band 25 SAR (W/kg)	2.4G W-LAN (802.11nHT40) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	LTE Band 26 SAR (W/kg)	2.4G W-LAN (802.11nHT40) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.106	-	0.106	Body SAR	Top	0.413	-	0.413
	Bottom	0.602	0.044	0.646		Bottom	0.687	0.044	0.731
	Front	1.353	0.084	1.437		Front	1.036	0.084	1.120
	Rear	1.160	0.040	1.200		Rear	0.850	0.040	0.890
	Right	1.158	-	1.158		Right	0.123	-	0.123
	Left	-	0.031	0.031		Left	-	0.031	0.031

Simult TX	Configuration	LTE Band 41 SAR (W/kg)	2.4G W-LAN (802.11nHT40) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.556	-	0.556
	Bottom	-	0.044	0.044
	Front	0.878	0.084	0.962
	Rear	0.418	0.040	0.458
	Right	0.233	-	0.233
	Left	-	0.031	0.031

Table 11.5 Simultaneous Transmission Scenario for LTE with 5.2GHz W-LAN(802.11a_Ant.2) (Hotspot at 10 mm)

Simult TX	Configuration	LTE Band 25 SAR (W/kg)	5.2G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	LTE Band 26 SAR (W/kg)	5.2G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.106	-	0.106	Body SAR	Top	0.413	-	0.413
	Bottom	0.602	0.043	0.645		Bottom	0.687	0.043	0.730
	Front	1.353	0.094	1.447		Front	1.036	0.094	1.130
	Rear	1.160	0.044	1.204		Rear	0.850	0.044	0.894
	Right	1.158	-	1.158		Right	0.123	-	0.123
	Left	-	-	-		Left	-	-	-

Simult TX	Configuration	LTE Band 41 SAR (W/kg)	5.2G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.556	-	0.589
	Bottom	-	0.043	0.043
	Front	0.878	0.094	0.972
	Rear	0.418	0.044	0.488
	Right	0.233	-	0.247
	Left	-	-	-

Table 11.6 Simultaneous Transmission Scenario for LTE with 5.2GHz W-LAN(802.11n HT20_MIMO) (Hotspot at 10 mm)

Simult TX	Configuration	LTE Band 25 SAR (W/kg)	5.2G W-LAN (802.11nHT20) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	LTE Band 26 SAR (W/kg)	5.2G W-LAN (802.11nHT20) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.106	-	0.106	Body SAR	Top	0.413	-	0.413
	Bottom	0.602	0.048	0.650		Bottom	0.687	0.048	0.735
	Front	1.353	0.105	1.458		Front	1.036	0.105	1.141
	Rear	1.160	0.058	1.218		Rear	0.850	0.058	0.908
	Right	1.158	-	1.158		Right	0.123	-	0.123
	Left	-	0.022	0.022		Left	-	0.022	0.022

Simult TX	Configuration	LTE Band 41 SAR (W/kg)	5.2G W-LAN (802.11nHT20) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.556	-	0.556
	Bottom	-	0.048	0.048
	Front	0.878	0.105	0.983
	Rear	0.418	0.058	0.476
	Right	0.233	-	0.233
	Left	-	0.022	0.022

Table 11.7 Simultaneous Transmission Scenario for LTE with 5.2GHz W-LAN(802.11n HT40_MIMO) (Hotspot at 10 mm)

Simult TX	Configuration	LTE Band 25 SAR (W/kg)	5.2G W-LAN (802.11nHT40) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	LTE Band 26 SAR (W/kg)	5.2G W-LAN (802.11nHT40) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.106	-	0.106	Body SAR	Top	0.413	-	0.413
	Bottom	0.602	0.059	0.661		Bottom	0.687	0.059	0.746
	Front	1.353	0.105	1.458		Front	1.036	0.105	1.141
	Rear	1.160	0.055	1.215		Rear	0.850	0.055	0.905
	Right	1.158	-	1.158		Right	0.123	-	0.123
	Left	-	0.025	0.025		Left	-	0.025	0.025

Simult TX	Configuration	LTE Band 41 SAR (W/kg)	5.2G W-LAN (802.11nHT40) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.556	-	0.556
	Bottom	-	0.059	0.059
	Front	0.878	0.105	0.983
	Rear	0.418	0.055	0.473
	Right	0.233	-	0.233
	Left	-	0.025	0.025

Table 11.8 Simultaneous Transmission Scenario for LTE with 5.8GHz W-LAN(802.11a_Ant.2) (Hotspot at 10 mm)

Simult TX	Configuration	LTE Band 25 SAR (W/kg)	5.8G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	LTE Band 26 SAR (W/kg)	5.8G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.106	-	0.106	Body SAR	Top	0.413	-	0.413
	Bottom	0.602	0.065	0.667		Bottom	0.687	0.065	0.752
	Front	1.353	0.140	1.493		Front	1.036	0.140	1.176
	Rear	1.160	0.062	1.222		Rear	0.850	0.062	0.912
	Right	1.158	-	1.158		Right	0.123	-	0.123
	Left	-	-	-		Left	-	-	-

Simult TX	Configuration	LTE Band 41 SAR (W/kg)	5.8G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.556	-	0.556
	Bottom	-	0.065	0.065
	Front	0.878	0.140	1.018
	Rear	0.418	0.062	0.480
	Right	0.233	-	0.233
	Left	-	-	-

Table 11.9 Simultaneous Transmission Scenario for LTE with 5.8GHz W-LAN(802.11n HT20_MIMO) (Hotspot at 10 mm)

Simult TX	Configuration	LTE Band 25 SAR (W/kg)	5.8G W-LAN (802.11nHT20) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	LTE Band 26 SAR (W/kg)	5.8G W-LAN (802.11nHT20) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.106	-	0.106	Body SAR	Top	0.413	-	0.413
	Bottom	0.602	0.066	0.668		Bottom	0.687	0.066	0.753
	Front	1.353	0.149	1.502		Front	1.036	0.149	1.185
	Rear	1.160	0.080	1.240		Rear	0.850	0.080	0.930
	Right	1.158	-	1.158		Right	0.123	-	0.123
	Left	-	0.040	0.040		Left	-	0.040	0.040

Simult TX	Configuration	LTE Band 41 SAR (W/kg)	5.8G W-LAN (802.11nHT20) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.556	-	0.556
	Bottom	-	0.066	0.066
	Front	0.878	0.149	1.027
	Rear	0.418	0.080	0.498
	Right	0.233	-	0.233
	Left	-	0.040	0.040

Table 11.10 Simultaneous Transmission Scenario for LTE with 5.8GHz W-LAN(802.11n HT40_MIMO) (Hotspot at 10 mm)

Simult TX	Configuration	LTE Band 25 SAR (W/kg)	5.8G W-LAN (802.11nHT40) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	LTE Band 26 SAR (W/kg)	5.8G W-LAN (802.11nHT40) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.106	-	0.106	Body SAR	Top	0.413	-	0.413
	Bottom	0.602	0.062	0.664		Bottom	0.687	0.062	0.749
	Front	1.353	0.163	**1.516**		Front	1.036	0.163	1.199
	Rear	1.160	0.109	1.269		Rear	0.850	0.109	0.959
	Right	1.158	-	1.158		Right	0.123	-	0.123
	Left	-	0.042	0.042		Left	-	0.042	0.042

Simult TX	Configuration	LTE Band 41 SAR (W/kg)	5.8G W-LAN (802.11nHT40) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.556	-	0.556
	Bottom	-	0.062	0.062
	Front	0.878	0.163	1.041
	Rear	0.418	0.109	0.527
	Right	0.233	-	0.233
	Left	-	0.042	0.042

11.5Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v05r02 and IEEE 1528-2013 Section6.3.4.1.2.

12. SAR MEASUREMENT VARIABILITY

12.1 Measurement Variability

Per FCC KDB Publication 865664 D01v01r03, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:

1. When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
2. A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
3. A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
4. Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

Table 14.1 Body SAR Measurement Variability Results

Frequency		Mode	Service	Spacing [Side]	Measured SAR (1g)	1st Repeated SAR(1g)	Ratio	2nd Repeated SAR(1g)	Ratio	3rd Repeated SAR(1g)	Ratio
MHz	Ch.				(W/kg)	(W/kg)		(W/kg)		(W/kg)	
1882.5	26365	LTE Band 25	QPSK, 1 RB, 50RB Offset	10 mm [Front]	1.060	1.050	1.001	N/A	N/A	N/A	N/A
836.5	26915	LTE Band 26	QPSK, 1 RB, 0 RB Offset	10 mm [Front]	1.010	0.993	1.017	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1-2005– SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population Exposure**						**Body** **1.6 W/kg (mW/g)** averaged over 1 gram					

12.2 Measurement Uncertainty

The measured SAR was <1.5 W/kg for all frequency bands. Therefore, per KDB Publication 865664D01v01r03, the standard measurement uncertainty analysis per IEEE 1528-2003 was not required.

13. IEEE P1528 –MEASUREMENT UNCERTAINTIES

835 MHz Body

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.0	Normal	1	1	± 6.0 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.5	Normal	1	0.64	± 4.5 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.2	Normal	1	0.6	± 4.2 %	∞
CombinedStandard Uncertainty					**± 12.1 %**	330
Expanded Uncertainty (k=2)					**± 24.2 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

1900 MHz Body

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.0	Normal	1	1	± 6.0 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.3	Normal	1	0.64	± 4.3 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.5	Normal	1	0.6	± 4.5 %	∞
CombinedStandard Uncertainty					**± 12.2 %**	330
Expanded Uncertainty (k=2)					**± 24.4 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

2450 MHz Body

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.0	Normal	1	1	± 6.0 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.5	Normal	1	0.64	± 4.5 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.4	Normal	1	0.6	± 4.4 %	∞
CombinedStandard Uncertainty					**± 12.2 %**	330
Expanded Uncertainty (k=2)					**± 24.4 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

2600 MHz Body

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.0	Normal	1	1	± 6.0 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.2	Normal	1	0.64	± 4.2 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.4	Normal	1	0.6	± 4.4 %	∞
CombinedStandard Uncertainty					**± 12.1 %**	330
Expanded Uncertainty (k=2)					**± 24.2 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5200 MHz Body

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.145 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.31 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.2	Normal	1	0.64	± 4.2 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.1	Normal	1	0.6	± 4.1 %	∞
CombinedStandard Uncertainty					**± 12.4 %**	330
Expanded Uncertainty (k=2)					**± 24.8 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5800 MHz Body

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.145 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.31 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.6	Normal	1	0.64	± 4.6 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.5	Normal	1	0.6	± 4.5 %	∞
CombinedStandard Uncertainty					**± 12.5 %**	330
Expanded Uncertainty (k=2)					**± 25.0 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

14.CONCLUSION

Measurement Conclusion

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the FCC. These measurements are taken to simulate the RF effects exposure under the worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The tested device complies with the requirements in respect toall parameters subject to the test. The test results and statements relate only to the item(s)tested.

Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role impossible biological effect are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease).

Because innumerable factors may interact to determine the specific biological outcome ofan exposure to electromagnetic fields, any protection guide shall consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

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Attachment 1. – Probe Calibration Data

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

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

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The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Digital EMC (Dymstec)**

Certificate No: **EX3-3916_Apr14**

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3916
Calibration procedure(s)	QA CAL-01.v9, QA CAL-12.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	April 24, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	03-Apr-14 (No. 217-01911)	Apr-15
Power sensor E4412A	MY41498087	03-Apr-14 (No. 217-01911)	Apr-15
Reference 3 dB Attenuator	SN: S5054 (3c)	03-Apr-14 (No. 217-01915)	Apr-15
Reference 20 dB Attenuator	SN: S5277 (20x)	03-Apr-14 (No. 217-01919)	Apr-15
Reference 30 dB Attenuator	SN: S5129 (30b)	03-Apr-14 (No. 217-01920)	Apr-15
Reference Probe ES3DV2	SN: 3013	30-Dec-13 (No. ES3-3013_Dec13)	Dec-14
DAE4	SN: 660	13-Dec-13 (No. DAE4-660_Dec13)	Dec-14
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

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

Issued: April 24, 2014

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

Certificate No: EX3-3916_Apr14 Page 1 of 11

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

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

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe EX3DV4

SN:3916

Manufactured: December 18, 2012
Calibrated: April 24, 2014

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3916

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.58	0.49	0.53	± 10.1 %
DCP (mV)[B]	99.0	100.0	99.6	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB$\sqrt{\mu V}$	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	149.7	±3.8 %
		Y	0.0	0.0	1.0		142.3	
		Z	0.0	0.0	1.0		140.3	

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

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3916

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
300	45.3	0.87	11.59	11.59	11.59	0.08	1.10	± 13.3 %
450	43.5	0.87	10.80	10.80	10.80	0.18	1.20	± 13.3 %
600	42.7	0.88	10.17	10.17	10.17	0.10	1.10	± 13.3 %
750	41.9	0.89	10.22	10.22	10.22	0.24	1.21	± 12.0 %
835	41.5	0.90	9.79	9.79	9.79	0.42	0.85	± 12.0 %
900	41.5	0.97	9.59	9.59	9.59	0.26	1.08	± 12.0 %
1750	40.1	1.37	8.21	8.21	8.21	0.80	0.59	± 12.0 %
1900	40.0	1.40	7.96	7.96	7.96	0.31	0.88	± 12.0 %
2300	39.5	1.67	7.57	7.57	7.57	0.30	0.87	± 12.0 %
2450	39.2	1.80	7.18	7.18	7.18	0.28	0.99	± 12.0 %
2600	39.0	1.96	6.99	6.99	6.99	0.40	0.79	± 12.0 %
3500	37.9	2.91	7.17	7.17	7.17	0.58	0.86	± 13.1 %
5200	36.0	4.66	5.09	5.09	5.09	0.35	1.80	± 13.1 %
5250	35.9	4.71	4.99	4.99	4.99	0.35	1.80	± 13.1 %
5300	35.9	4.76	4.86	4.86	4.86	0.35	1.80	± 13.1 %
5500	35.6	4.96	4.94	4.94	4.94	0.35	1.80	± 13.1 %
5600	35.5	5.07	4.62	4.62	4.62	0.40	1.80	± 13.1 %
5750	35.4	5.22	4.83	4.83	4.83	0.40	1.80	± 13.1 %
5800	35.3	5.27	4.68	4.68	4.68	0.40	1.80	± 13.1 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3916

Calibration Parameter Determined in Body Tissue Simulating Media

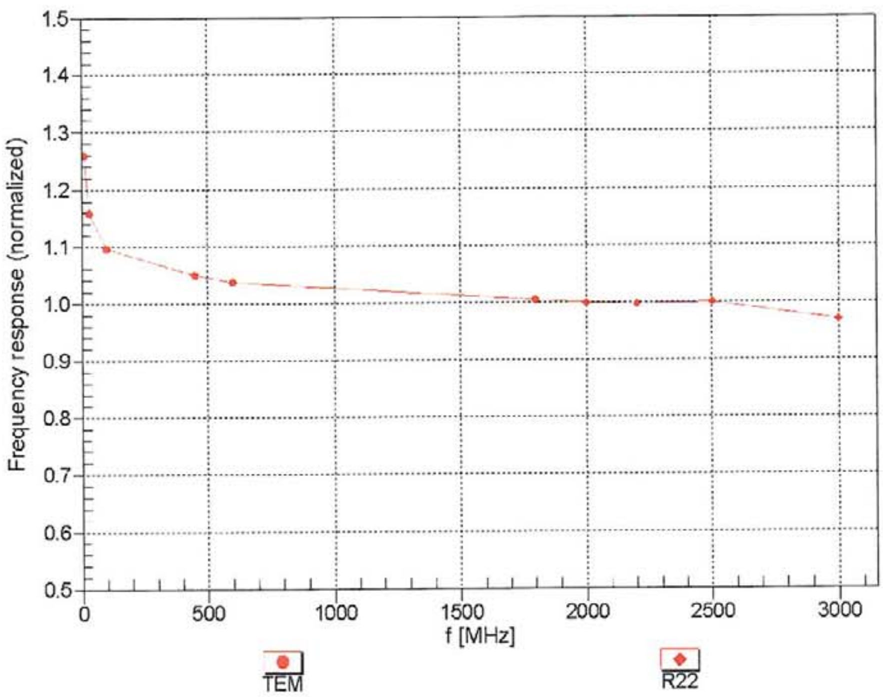
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
300	58.2	0.92	11.72	11.72	11.72	0.08	1.10	± 13.3 %
450	56.7	0.94	11.59	11.59	11.59	0.10	1.10	± 13.3 %
600	56.1	0.95	10.15	10.15	10.15	0.02	1.05	± 13.3 %
750	55.5	0.96	10.04	10.04	10.04	0.40	0.93	± 12.0 %
835	55.2	0.97	9.94	9.94	9.94	0.62	0.71	± 12.0 %
900	55.0	1.05	9.74	9.74	9.74	0.40	0.94	± 12.0 %
1750	53.4	1.49	8.12	8.12	8.12	0.50	0.74	± 12.0 %
1900	53.3	1.52	7.69	7.69	7.69	0.32	0.91	± 12.0 %
2300	52.9	1.81	7.52	7.52	7.52	0.60	0.65	± 12.0 %
2450	52.7	1.95	7.24	7.24	7.24	0.80	0.50	± 12.0 %
2600	52.5	2.16	7.01	7.01	7.01	0.80	0.50	± 12.0 %
3500	51.3	3.31	6.84	6.84	6.84	0.42	1.09	± 13.1 %
5200	49.0	5.30	4.61	4.61	4.61	0.40	1.90	± 13.1 %
5250	48.9	5.36	4.43	4.43	4.43	0.45	1.90	± 13.1 %
5300	48.9	5.42	4.27	4.27	4.27	0.45	1.90	± 13.1 %
5500	48.6	5.65	4.05	4.05	4.05	0.50	1.90	± 13.1 %
5600	48.5	5.77	4.07	4.07	4.07	0.40	1.90	± 13.1 %
5750	48.3	5.94	4.24	4.24	4.24	0.50	1.90	± 13.1 %
5800	48.2	6.00	4.21	4.21	4.21	0.50	1.90	± 13.1 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

EX3DV4– SN:3916 April 24, 2014

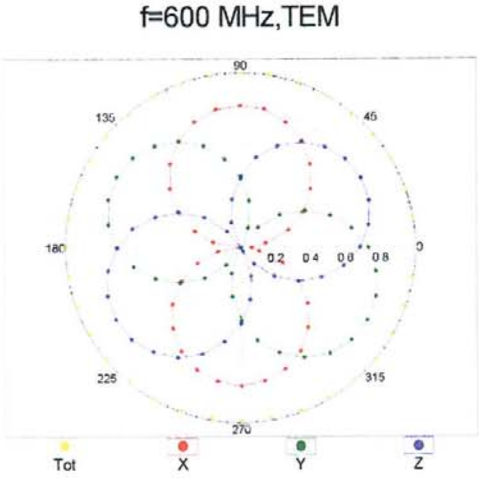
Frequency Response of E-Field

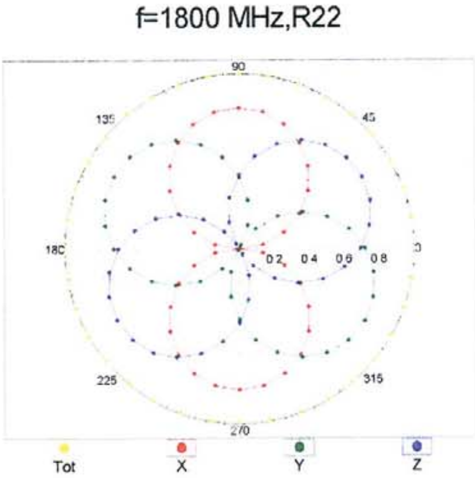
(TEM-Cell:ifi110 EXX, Waveguide: R22)

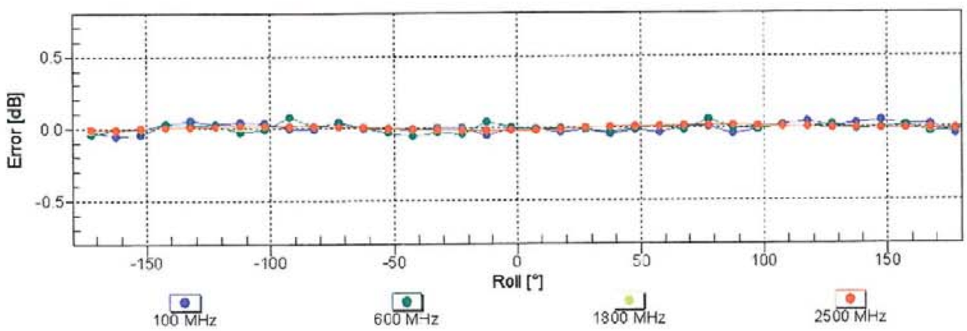


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°





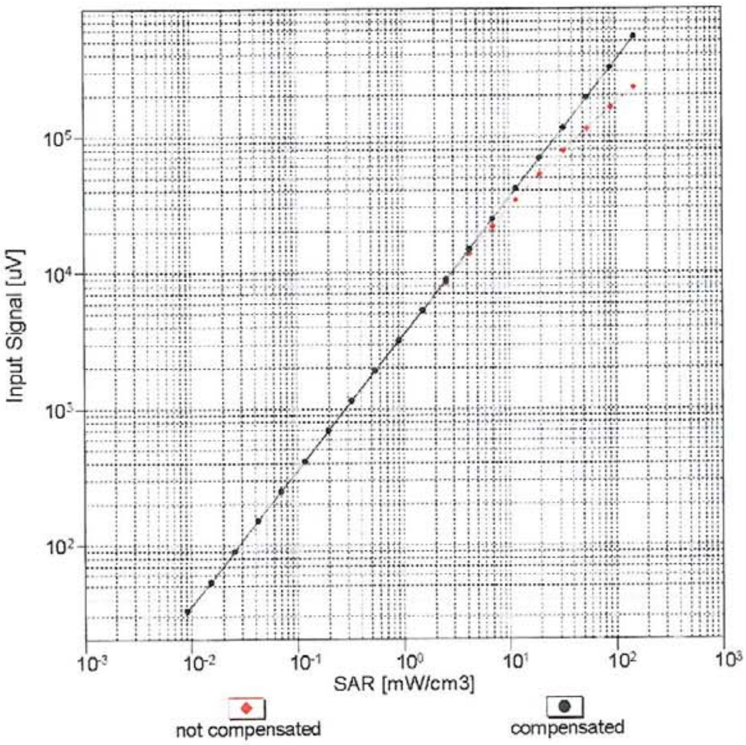


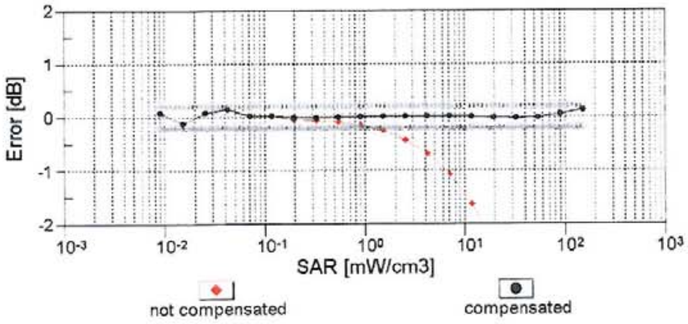
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

EX3DV4– SN:3916 April 24, 2014

Dynamic Range f(SAR_{head})

(TEM cell , f_{eval}= 1900 MHz)



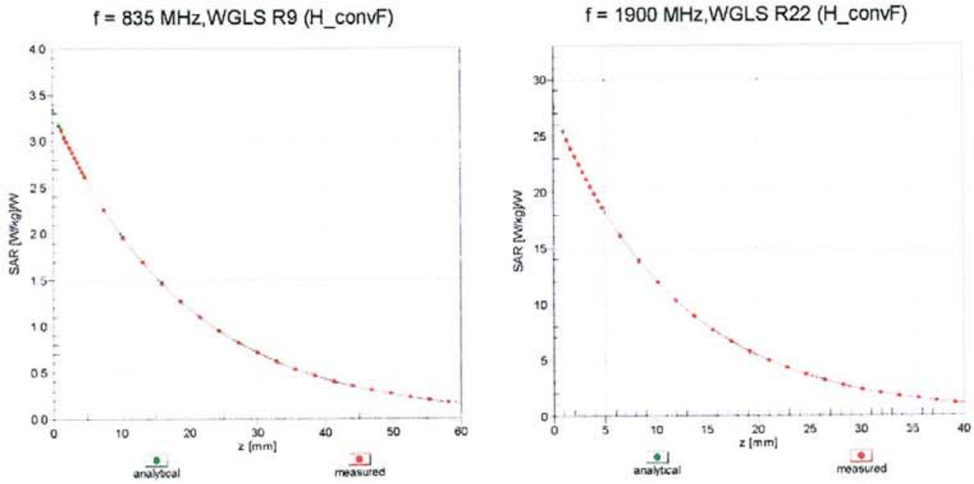


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

EX3DV4– SN:3916

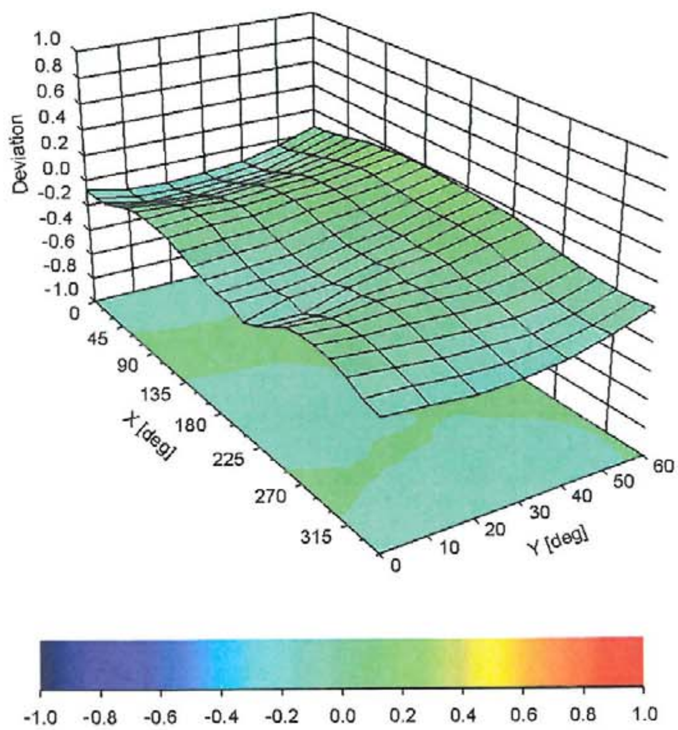
April 24, 2014

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

Certificate No: EX3-3916_Apr14 Page 10 of 11

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3916

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-92.3
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm

Attachment 2. – Dipole Calibration Data

Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: **SCS 108**

Client **DT&C (Dymstec)**

Certificate No: **D835V2-4d159_Nov14**

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d159
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	November 19, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-15

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

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

Issued: November 20, 2014

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

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Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, “IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) KDB 865664, “SAR Measurement Requirements for 100 MHz to 6 GHz”

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.2 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.32 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.19 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.51 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.99 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.5 ± 6 %	1.01 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.49 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.64 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.63 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.35 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.4 Ω - 1.1 jΩ
Return Loss	- 29.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.5 Ω - 4.3 jΩ
Return Loss	- 25.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.440 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 28, 2012

DASY5 Validation Report for Head TSL

Date: 19.11.2014

Test Laboratory: SPEAG, Zurich, Switzerland

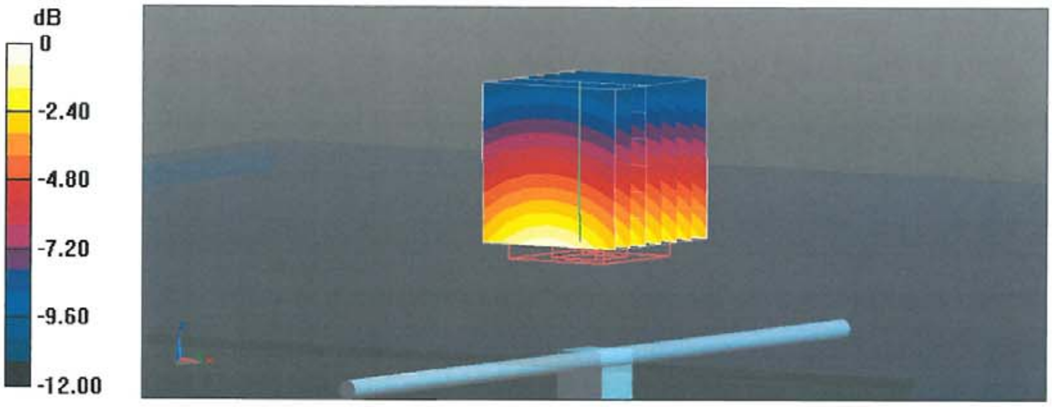
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d159

Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.91 S/m; ε_r = 41.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

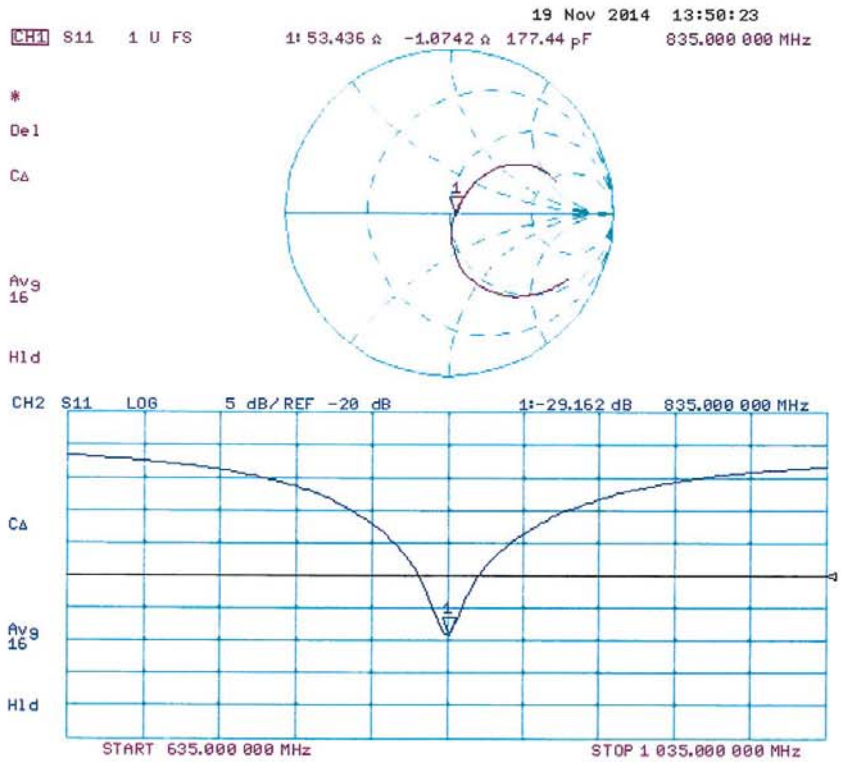
- Probe: ES3DV3 - SN3205; ConvF(6.22, 6.22, 6.22); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.72 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.44 W/kg
SAR(1 g) = 2.32 W/kg; SAR(10 g) = 1.51 W/kg
Maximum value of SAR (measured) = 2.71 W/kg



0 dB = 2.71 W/kg = 4.33 dBW/kg

Impedance Measurement Plot for Head TSL



Certificate No: D835V2-4d159_Nov14 Page 6 of 8

DASY5 Validation Report for Body TSL

Date: 18.11.2014

Test Laboratory: SPEAG, Zurich, Switzerland

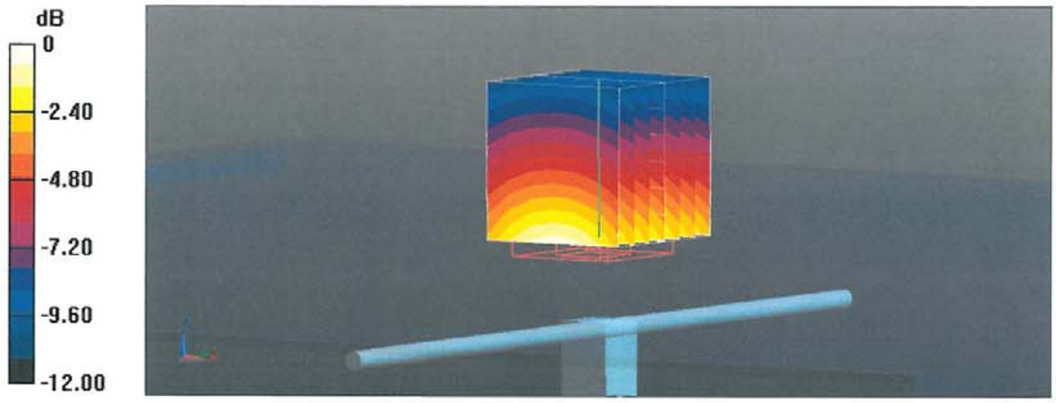
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d159

Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1.01 S/m; ε_r = 54.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.09, 6.09, 6.09); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

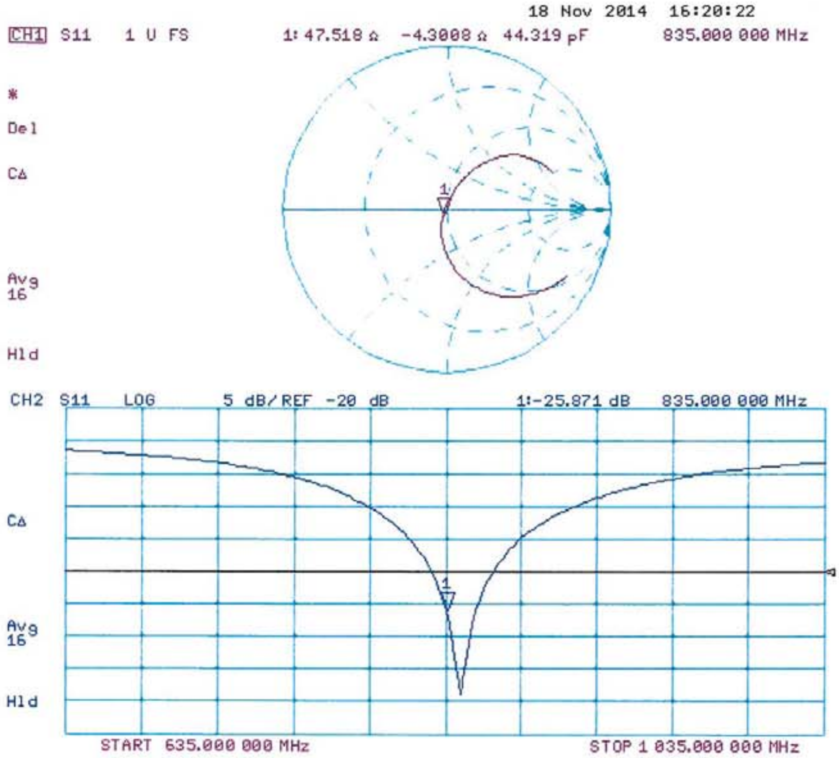
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.34 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.68 W/kg
SAR(1 g) = 2.49 W/kg; SAR(10 g) = 1.63 W/kg
Maximum value of SAR (measured) = 2.91 W/kg



0 dB = 2.91 W/kg = 4.64 dBW/kg

Certificate No: D835V2-4d159_Nov14 Page 7 of 8

Impedance Measurement Plot for Body TSL



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

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Accreditation No.: **SCS 108**

Client **DT&C (Dymstec)**

Certificate No: **D1900V2-5d176_Nov14**

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d176
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	November 14, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-15

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

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

Issued: November 17, 2014

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

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

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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.1 ± 6 %	1.39 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.97 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**40.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.23 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**21.0 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.3 ± 6 %	1.52 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.0 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**40.0 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.31 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.2 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.9 Ω + 4.5 jΩ
Return Loss	- 25.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.0 Ω + 6.0 jΩ
Return Loss	- 23.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.199 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	June 08, 2012

DASY5 Validation Report for Head TSL

Date: 14.11.2014

Test Laboratory: SPEAG, Zurich, Switzerland

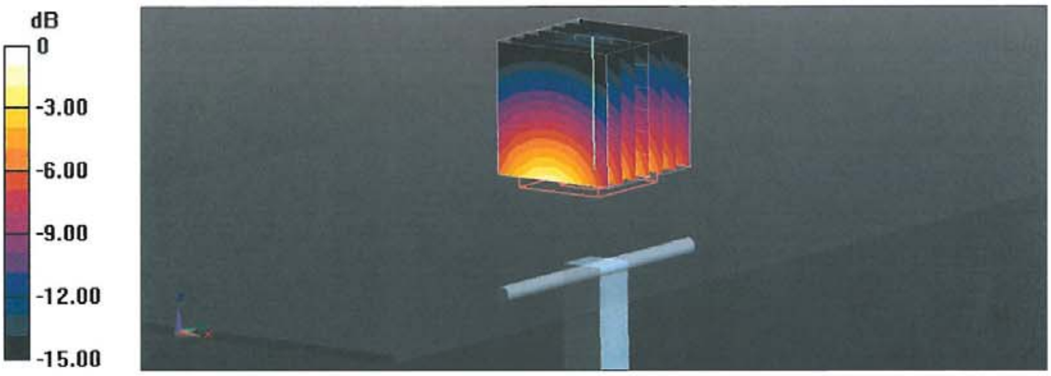
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d176

Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; $\sigma = 1.39$ S/m; $\varepsilon_r = 40.1$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.06, 5.06, 5.06); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

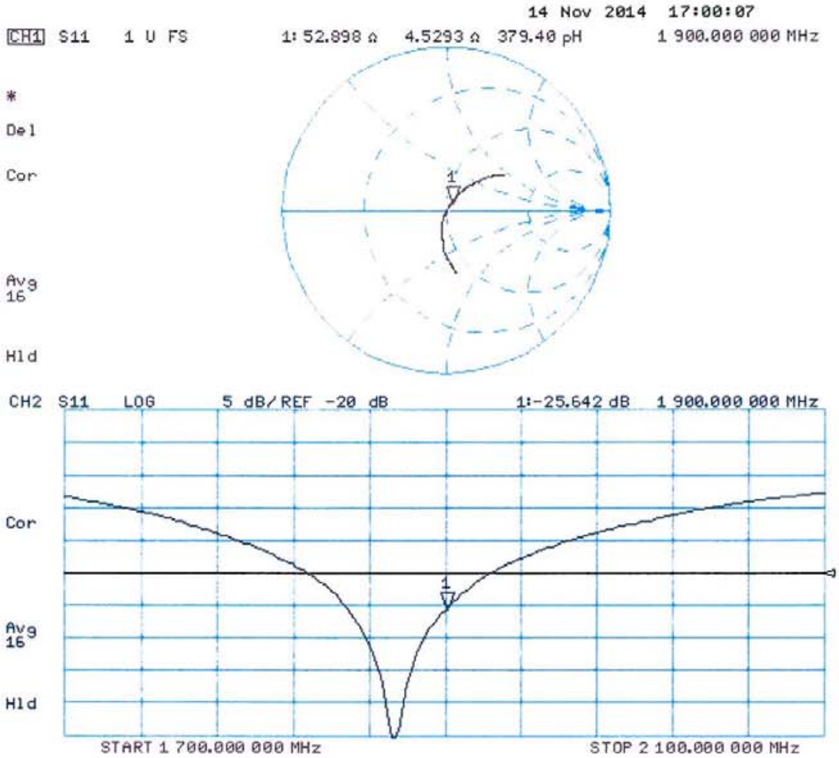
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.61 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 18.3 W/kg
SAR(1 g) = 9.97 W/kg; SAR(10 g) = 5.23 W/kg
Maximum value of SAR (measured) = 12.6 W/kg



0 dB = 12.6 W/kg = 11.00 dBW/kg

Certificate No: D1900V2-5d176_Nov14 Page 5 of 8

Impedance Measurement Plot for Head TSL



Certificate No: D1900V2-5d176_Nov14 Page 6 of 8

DASY5 Validation Report for Body TSL

Date: 14.11.2014

Test Laboratory: SPEAG, Zurich, Switzerland

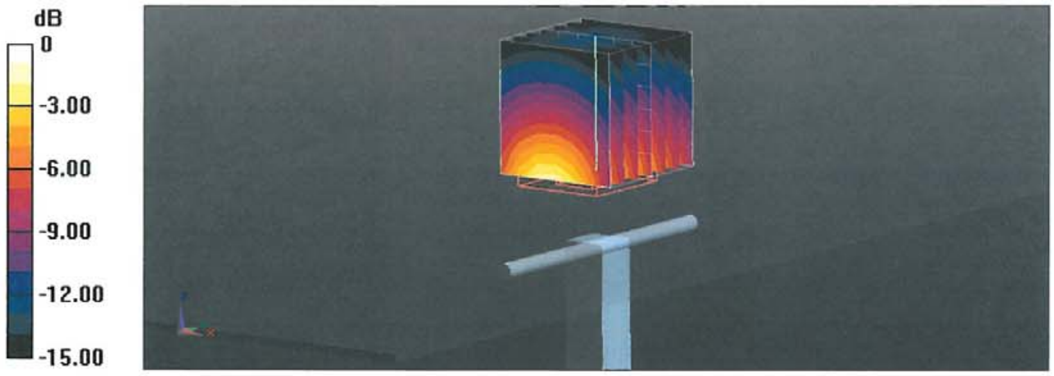
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d176

Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.52 S/m; ε_r = 53.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.76, 4.76, 4.76); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.29 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 17.5 W/kg
SAR(1 g) = 10 W/kg; SAR(10 g) = 5.31 W/kg
Maximum value of SAR (measured) = 12.5 W/kg



0 dB = 12.5 W/kg = 10.97 dBW/kg