FCC SAR TEST REPORT

Client Name	:	Shanghai BroadMobi Communication Technology Co., Ltd.
Address	:	15F, Building 9, No.99 Tianzhou Rd., Xuhui District, Shanghai, P.R. China
Product Name	:	Pocket Router
Date	:	Nov. 12, 2020

Shenzhen Anbotek Compliance Laboratory Limited

Contents

TEST REPORT

Applicant	:	Shanghai BroadMobi Communication Technology Co., Ltd.
Manufacturer	:	Shanghai BroadMobi Communication Technology Co., Ltd.
Product Name	:	Pocket Router
Model No.	:	R708
List Model	:	R708A, R708C
Trade Mark	:	Broadmobi
Rating(s)	:	DC 3.7V from battery
Test Standard(s)	:	**IEEE 1528-2013; IEC 62209-2:2010;ANSI/IEEE C95.1:2005; FCC 47 CFR Part 2 (2.1093:2013);**

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the IEEE 1528-2013, IEC 62209-2:2010, FCC 47 CFR Part 2 (2.1093:2013), ANSI/IEEE C95.1:2005requirements.

Thisreportappliestoabovetestedsampleonlyandshallnotbereproducedinpartwithoutwrittenapprovalof ShenzhenAnbotekComplianceLaboratoryLimited.

Date of Test Oct.30, 2020 ~ Nov.3, 2020

Prepared By Bobby Wang
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Anbotek (SZ) Compliance Laboratory Limited Anbotek Product Safety * Approved *

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Version

Version No.	Date	Description
01	Nov.12, 2020	Original

1. Statement of Compliance

ThemaximumresultsofSpecificAbsorptionRate(SAR)foundduringtestingareasfollows.

<Highest SAR Summary>

Frequency Band	Highest Reported 1g-SAR (W/Kg)	SAR Test Limit (W/Kg)
WCDMA II	0.176	1.6
WCDMA IV	0.202	1.6
WCDMA V	0.134	1.6
LTE Band 25	0.197	1.6
LTE Band 2	NA	1.6
LTE Band 66	0.331	1.6
LTE Band 4	NA	1.6
LTE Band 26	0.45	1.6
LTE Band 5	NA	1.6
LTE Band 12	0.189	1.6
LTE Band 17	NA	1.6
LTE Band 13	0.202	1.6
LTE Band 27	0.303	1.6
LTE Band 41	0.45	1.6
LTE Band 71	0.223	1.6
WIFI2.4G Ant0	0.156	1.6
WIFI2.4G Ant1	0.141	1.6
Simultaneous SAR (WWAN+WLAN Ant0 + WLAN Ant1)	0.747	1.6
Test Result	Pass	

Note:

1. According to TCB workshop October,2014 RF Exposure Procedures Update(Overlapping LTE Bands):
   a) This device supports both LTE Band 25 and LTE Band 2. Since the supported frequency span for LTE Band2 falls completely within the supported frequency span for LTE Band 25, LTE Band 2 target power is lessthan or equal to LTE Band 25 target power, and both LTE bands share the same transmission path, SAR was only assessed for LTE Band 25.
   b) This device supports both LTE Band 66 and LTE Band 4. Since the supported frequency span for LTE Band 4 falls completely within the supported frequency span for LTE Band 66, LTE Band 4 target

power is lessthan or equal to LTE Band 66 target power, and both LTE bands share the same transmission path, SAR was only assessed for LTE Band 66.

c) This device supports both LTE Band 26 and LTE Band 5. Since the supported frequency span for LTE Band 5 falls completely within the supported frequency span for LTE Band 26, LTE Band 5 target power is lessthan or equal to LTE Band 26 target power, and both LTE bands share the same transmission path, SAR was only assessed for LTE Band 26.

d) This device supports both LTE Band 12 and LTE Band 17. Since the supported frequency span for LTE Band17 falls completely within the supported frequency span for LTE Band 12, LTE Band 17 target power is lessthan or equal to LTE Band 12 target power, and both LTE bands share the same transmission path, SAR was only assessed for LTE Band 12.

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-2005, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013.

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2. General Information

2.1 Client Information

Applicant:	**Shanghai BroadMobi Communication Technology Co., Ltd.**
Address of Applicant:	15F, Building 9, No.99 Tianzhou Rd., Xuhui District, Shanghai, P.R. China
Manufacture:	**Shanghai BroadMobi Communication Technology Co., Ltd.**
Address of Manufacture:	15F, Building 9, No.99 Tianzhou Rd., Xuhui District, Shanghai, P.R. China

2.2 Testing Laboratory Information

Test Site:	Shenzhen Anbotek Compliance Laboratory Limited
Address:	1/F.,Building1,SECIndustrialPark,No.0409QianhaiRoad,NanshanDistrict,Shenzhen,Guangdong,China

2.3 Description of Equipment Under Test(EUT)

Product Name	Pocket Router
Trade Mark	Broadmobi
Model/Type reference	R708
List Model	R708A, R708C
Model Declaration	PCB board, structure and internal of these model(s) are the same, So no additional models were tested.
Hardware version	V1.00
Software version	V2.0
Power supply:	DC 3.7V by Battery Recharged by DC 5V/1A Adapter
Sample ID	GTS20200903006-1-1#& GTS20200903006-1-2#
3G	
UMTS Operation Frequency Band	UMTS FDD Band 2, 4, 5
WCDMA Release Version	R6

HSDPA Release Version	Release 6
Modulation Type	QPSK for UMTS
Antenna Description	Internal Antenna; -1.5dBi (max.) For WCDMA Band 2, 4,5;
LTE	
LTE Operation Frequency Band	LTE Band 2, 4, 5, 12, 13, 17, 25, 26, 27, 41, 66, 71
LTE Release Version	R9
Type Of Modulation	QPSK/16QAM
Antenna Description	Internal Antenna; -1.5dBi (max.) For LTE Band 2, 4, 5, 12, 13, 17, 25, 26, 27, 41, 66, 71;
WIFI(2.4G Band)	
Frequency Range	2412MHz ~ 2462MHz
Channel Spacing	5MHz
Channel Number	11 Channel for 20MHz bandwidth(2412~2462MHz) 7 channels for 40MHz bandwidth(2422~2452MHz)
Modulation Type	802.11b: DSSS; 802.11g/n: OFDM
Antenna Description	Two Internal Antenna, but WLAN support MIMO technology ANT0 used for WIFI TX/RX, 0dBi(Max.) for 2.4G Band ANT1 used for WIFI TX/RX, 0dBi(Max.) for 2.4G Band

2.4 Device Category and SAR Limits

This device belongs to portable device category because its radiating structure is allowed to be used within 20 centimeters of the body of the user. according to IEEE Std C95.1, 1999:((IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 KHz to 300 GHz).

It specifies the maximum exposure limit of 1.6 W/kg as averaged over any 1 gram of tissue for portable devices bei ng used within 20 cm of the user in the uncontrolled environment.

2.5 Applied Standard

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- IEEE 1528-2013
- FCC 47 CFR Part 2 (2.1093:2013)

- ANSI/IEEE C95.1:2005
- IEC 62209-2:2010
- IEC 62209-2:2010
- KDB 248227 D01
- KDB 447498 D01
- KDB 616217 D04
- KDB 648474 D04
- KDB 865664 D01
- KDB 941225 D01
- KDB 941225 D06
- KDB 941225 D07

2.6 Environment of Test Site

Items	Required	Actual
Temperature (℃)	18-25	22~23
Humidity (%RH)	30-70	55~65

2.7 Test Configuration

The device was controlled by using a base station emulator. Communication between the device and the emulator was established by air link. The distance between the EUT and the antenna of the emulator is larger than 50 cm and the output power radiated from the emulator antenna is at least 30 dB smaller than the output power of EUT. The EUT was set from the emulator to radiate maximum output power during all tests. For WLAN SAR testing, WLAN engineering testing software installed on the EUT can provide continuous transmitting RF signal.

3. Specific Absorption Rate (SAR)

3.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

3.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ).The equation description is as below:

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

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

SAR measurement can be either related to the temperature elevation in tissue by

$$SAR = C\left(\frac{\delta T}{\delta t}\right)$$

Where: C is the specific head capacity, δT is the temperature rise and δtisthe exposure duration, or related to the electrical field in the tissue by

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

Where:σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

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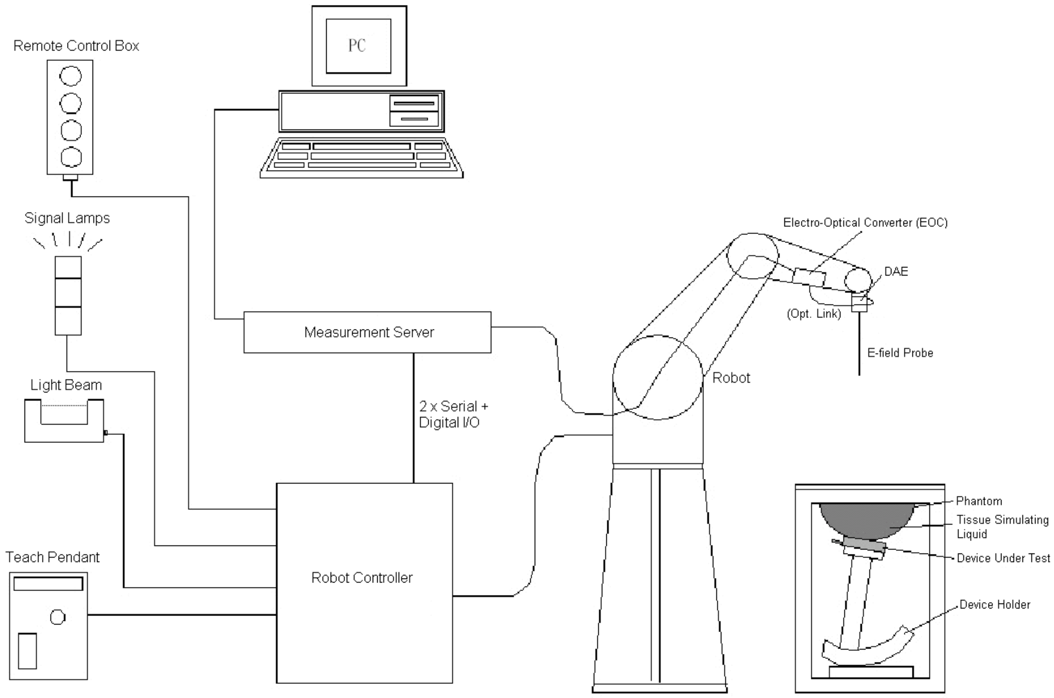
4. SAR Measurement System



DASY System Configurations

The DASY system for performance compliance tests is illustrated above graphically. This system consists of the following items:

- A standard high precision 6-axis robot with controller, a teach pendant and software
- A data acquisition electronic (DAE) attached to the robot arm extension
- A dosimetric probe equipped with an optical surface detector system
- The electro-optical converter (EOC) performs the conversion between optical and electrical signals
- A measurement server performs the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the accuracy of the probe positioning
- A computer operating Windows XP
- DASY software
- Remove control with teach pendant and additional circuitry for robot safety such as warming lamps, etc.
- The SAM twin phantom
- A device holder
- Tissue simulating liquid
- Dipole for evaluating the proper functioning of the system

components are described in details in the following sub-sections.

4.1 E-Field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by SPEAG).The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. This probe has a built in optical surface detection system to prevent from collision with phantom.

➢ **E-Field Probe Specification**

<EX3DV4 Probe>

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Frequency	10 MHz to 6 GHz; Linearity: ± 0.2 dB
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 µW/g to 100 mW/g; Linearity: ± 0.2 dB (noise: typically < 1 µW/g)
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm

Photo of EX3DV4

➢ **E-Field Probe Calibration**

Each probe needs to be calibrated according to a dosimetric assessment procedure with accuracy better than ± 10%. The spherical isotropy shall be evaluated and within ± 0.25dB. The sensitivity parameters (NormX, NormY, and NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested. The calibration data can be referred to appendix C of this report.

4.2 Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE) 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 measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.

The input impedance of the DAE is 200MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80dB.

Photo of DAE

4.3 Robot

The SPEAG DASY system uses the high precision robots (DASY5: TX60XL) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY5: CS8c) from Stäubli is used. The Stäublirobot series have many features that are important for our application:

- High precision (repeatability ±0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

Photo of DASY5

4.4 Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY5: 400 MHz, Intel Celeron), chipdisk (DASY5: 128 MB), RAM (DASY5: 128 MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all the real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operations.

Photo of Server for DASY5

4.5 Phantom

<SAM Twin Phantom>

Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm	
Filling Volume	Approx. 25 liters	
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet	
Measurement Areas	Left Hand, Right Hand, Flat Phantom	**Photo of SAM Phantom**

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

<ELI4 Phantom>

Shell Thickness	2 ± 0.2 mm (sagging: <1%)	
Filling Volume	Approx. 30 liters	
Dimensions	Major ellipse axis: 600 mm Minor axis:400 mm	**Photo of ELI4 Phantom**

The ELI4 phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

4.6 Device Holder

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

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

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

Device Holder

4.7 Data Storage and Evaluation

- Data Storage

The DASY software stores the assessed data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all the necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files. The post-processing software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of erroneous parameter settings. For example, if a measurement has been performed with an incorrect crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be reevaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type (e.g., [V/m], [A/m], [mW/g]). Some of these units are not available in certain situations or give meaningless results, e.g., a SAR-output in a non-lose media, will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

- Data Evaluation

The DASY post-processing software (SEMCAD) automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software：

Probe parameters：	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	dcp_i
Device parameters：	- Frequency	f
	- Crest factor	cf
Media parameters：	- Conductivity	σ
	- Density	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multi-meter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

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 as：

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

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

H-field Probes: $H_i = \sqrt{V_i} \cdot \frac{a_{i0}+a_{i1}f+a_{i2}f^2}{f}$

with V_i = compensated signal of channel i,(i = x, y, z)

$Norm_i$= sensor sensitivity of channel i, (i = x, y, z), μV/(V/m)^2 for E-field Probes

ConvF= sensitivity enhancement in solution

a_{ij}= sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

E_i= electric field strength of channel i in V/m

H_i= magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian 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 mW/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

Note that the density is set to 1, to account for actual head tissue density rather than the density of the tissue simulating liquid.

5. Test Equipment List

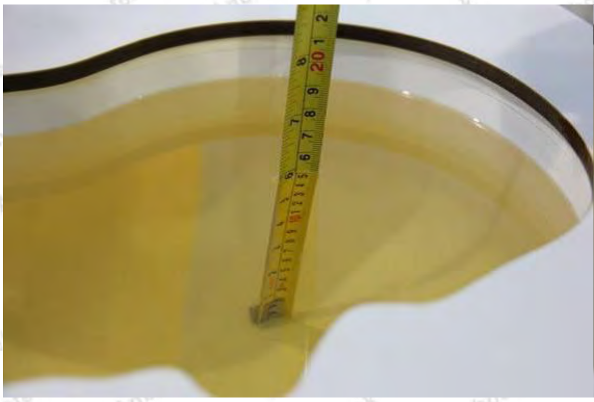
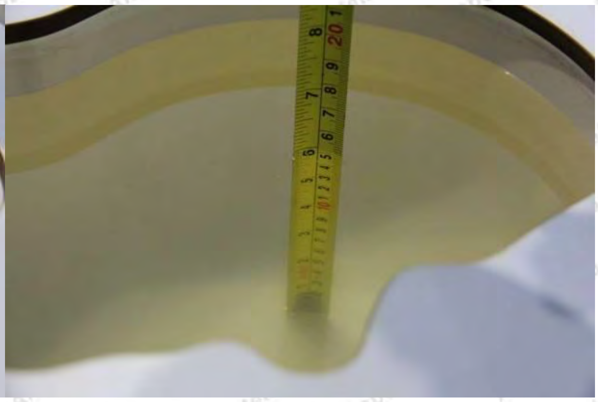
Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	835MHz System Validation Kit	D835V2	4d154	Jun. 16,2018	Jun. 15,2021
SPEAG	1750MHz System Validation Kit	D1750V2	1021	Jul. 03,2019	Jul. 02,2022
SPEAG	1900MHz System Validation Kit	D1900V2	5d175	Jun. 15,2019	Jun. 14, 2022
SPEAG	2450MHz System Validation Kit	D2450V2	910	Jun. 15,2018	Jun. 14,2021
SPEAG	2600MHz System Validation Kit	D2600V2	1058	Jun. 19,2018	Jun. 18,2021
SPEAG	750MHz System Validation Kit	D750V3	1163	Sep. 03,2019	Sep.02,2022
SPEAG	Data Acquisition Electronics	DAE4	387	Sep.06,2020	Sep.05,2021
SPEAG	Dosimetric E-Field Probe	EX3DV4	7396	May.06,2020	May.05,2021
Agilent	ENA Series Network Analyzer	E5071C	MY46317418	Nov.04,2019	Nov.03, 2020
SPEAG	DAK	DAK-3.5	1226	NCR	NCR
SPEAG	ELI Phantom	QDOVA004AA	2058	NCR	NCR
AR	Amplifier	ZHL-42W	QA1118004	NCR	NCR
Agilent	Power Meter	N1914A	MY50001102	Nov.04,2019	Nov.03, 2020
Agilent	Power Sensor	N8481H	MY51240001	Nov.04,2019	Nov.03, 2020
R&S	Spectrum Analyzer	N9020A	MY51170037	Nov.04,2019	Nov.03, 2020
Agilent	Signal Generation	N5182A	MY48180656	Nov.04,2019	Nov.03, 2020
Worken	Directional Coupler	0110A05601O-10	COM5BNW1A2	Nov.04,2019	Nov.03, 2020

Note:

1. The calibration certificate of DASY can be referred to appendix C of this report.
2. The dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
3. The Insertion Loss calibration of Dual Directional Coupler and Attenuator were characterized via the network analyzer and compensated during system check.
4. The dielectric probe kit was calibrated via the network analyzer, with the specified procedure (calibrated in pure water) and calibration kit (standard) short circuit, before the dielectric measurement. The specific procedure and calibration kit are provided by Agilent.
5. In system check we need to monitor the level on the power meter, and adjust the power amplifier level to have precise power level to the dipole; the measured SAR will be normalized to 1W input power according to the ratio of 1W to the input power to the dipole. For system check, the calibration of the power amplifier is deemed not critically required for correct measurement; the power meter is critical and we do have calibration for it

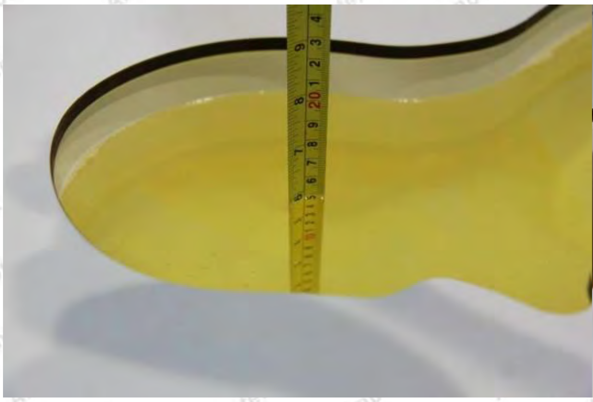
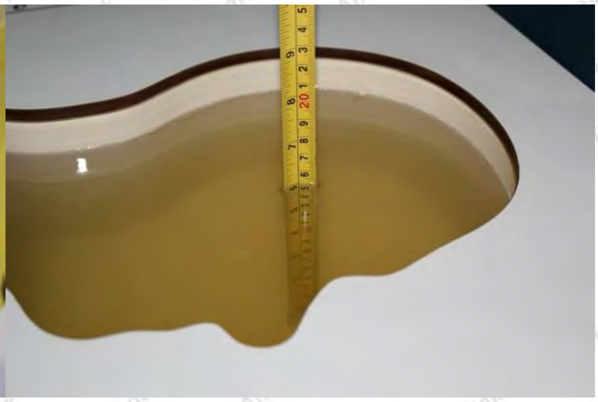
6. Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 6.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown as followed:

Liquid depth in the Head Phantom (750MHz)Liquid depth in the Head Phantom (835MHz)


Liquid depth in the Head Phantom (1750MHz)Liquid depth in the Head Phantom (1900MHz)

Liquid depth in the Head Phantom (2450MHz)Liquid depth in the Head Phantom (2600MHz)

The following table gives the recipes for tissue simulating liquid.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
For Head								
900	40.3	57.9	0.2	1.4	0.2	0	0.97	41.5
1750	55.2	0	0	0.3	0	44.5	1.37	40.1
1800,1900,2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
For Body								
900	50.8	48.2	0	0.9	0.1	0	0.97	55.2
1750	70.2	0	0	0.4	0	29.4	1.49	53.4
1800,1900,2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7

INGREDIENT (% Weight)	2450MHz Body	5250MHz Body	5600MHz Body	5750MHz Body
Water	73.2	75.68	75.68	75.68
Salt	0.04	0.43	0.43	0.43
Sugar	0.00	0.00	0.00	0.00
HEC	0.00	0.00	0.00	0.00
Preventol	0.00	0.00	0.00	0.00
DGBE	26.7	4.42	4.42	4.42
Triton X-100	0.00	19.47	19.47	19.47

The following table shows the measuring results for simulating liquid.

Dielectric Performance of Tissue Simulating Liquid

Tissue Type	Measured Frequency (MHz)	Target Tissue		Measured Tissue				Liquid Temp.	Test Data
		σ	ε_r	σ	Dev. (±5%)	ε_r	Dev. (±5%)		
750H	750	0.89	41.9	0.87	-2.25%	41.87	-0.07%	22.2	10/30/2020
835H	900	0.90	41.5	0.95	5.56%	42.32	1.98%	22.3	10/31/2020
1750H	1750	1.37	40.1	1.39	1.46%	39.84	-0.65%	22.8	11/1/2020
1900H	1900	1.40	40.0	1.35	-3.57%	40.15	0.37%	22.6	11/1/2020
2450H	2450	1.80	39.2	1.76	-2.22%	38.93	-0.69%	22.4	11/3/2020
2600H	2600	1.96	39.0	1.89	-3.57%	38.55	-1.15%	22.3	11/3/2020

7. System Verification Procedures

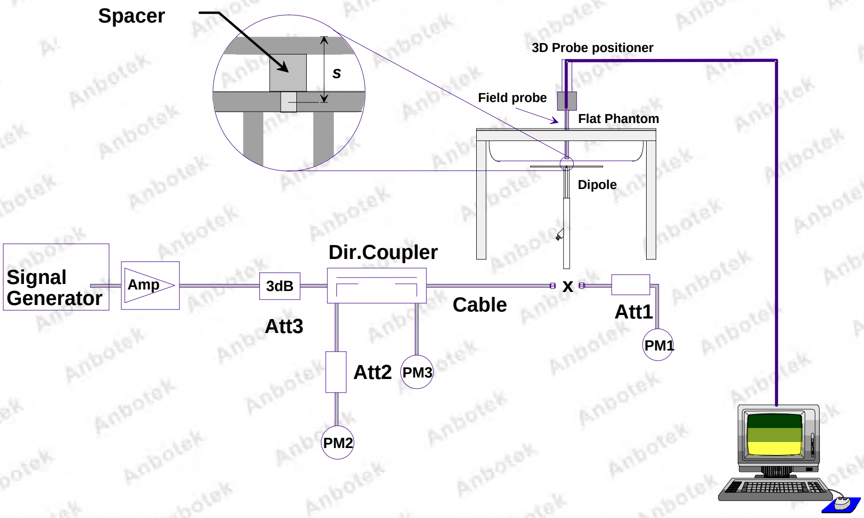
Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

➢ Purpose of System Performance check

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

➢ System Setup

In the simplified setup for system evaluation, the EUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:



System Setup for System Evaluation

➢ **Validation Results**

Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %. The table below shows the target SAR and measured SAR after normalized to 1W input power. It indicates that the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

Frequency (MHz)	Liquid Type	Power fed onto reference dipole (mW)	Targeted SAR (W/kg)	Measured SAR (W/kg)	Normalized SAR (W/kg)	Deviation (%)	Date
750H	Head	250	8.53	2.15	8.60	0.82%	10/30/2020
835H	Head	250	9.24	2.32	9.28	0.43%	10/31/2020
1750H	Head	250	36.9	9.24	36.96	0.16%	11/1/2020
1900H	Head	250	40.4	10.12	40.48	0.20%	11/1/2020
2450H	Head	250	52.4	13.08	52.32	-0.15%	11/3/2020
2600H	Head	250	57.2	14.27	57.08	-0.21%	11/3/2020

Note:

1. The graph results see system check.
2. Target Values used derive from the calibration certificate.

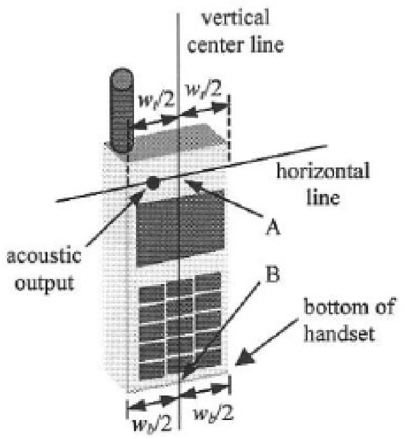
8. EUT Testing Position

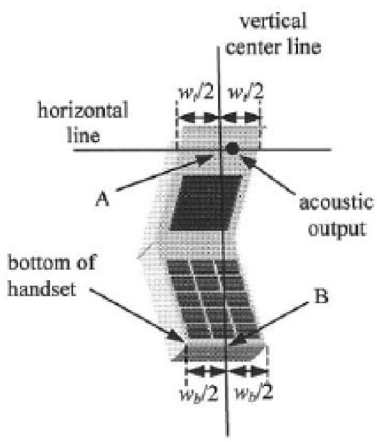
8.1. Define two imaginary lines on the handset

(a) The vertical centerline passes through two points on the front side of the handset - the midpoint of the width w_t of the handset at the level of the acoustic output, and the midpoint of the width w_b of the bottom of the handset.

(b) The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output. The horizontal line is also tangential to the face of the handset at point A.

(c) The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.



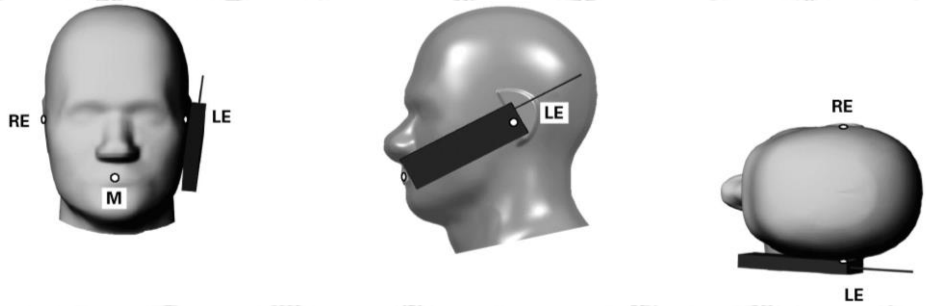


Handset Vertical and Horizontal Reference Lines

8.2. Position for Cheek/Touch

(a) To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M: Mouth, RE: Right Ear, and LE: Left Ear) and align the center of the ear piece with the line RE-LE.

(b) To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost.

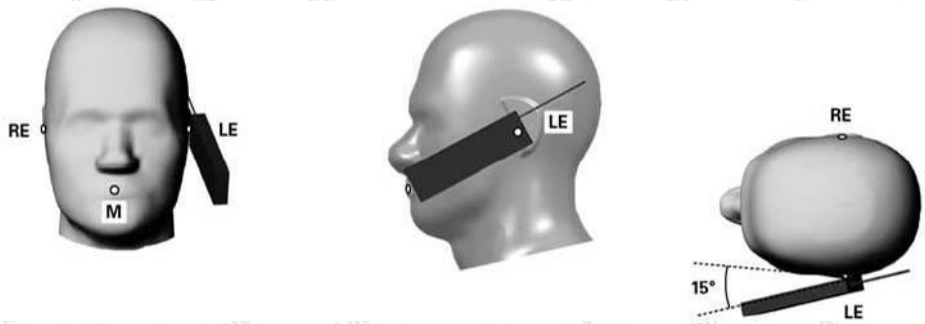


Cheek Position

8.3. Position for Ear / 15° Tilt

(a) To position the device in the "cheek" position described above.

(b) While maintaining the device the reference plane described above and pivoting against the ear, moves it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost (see Fig. 8.3).

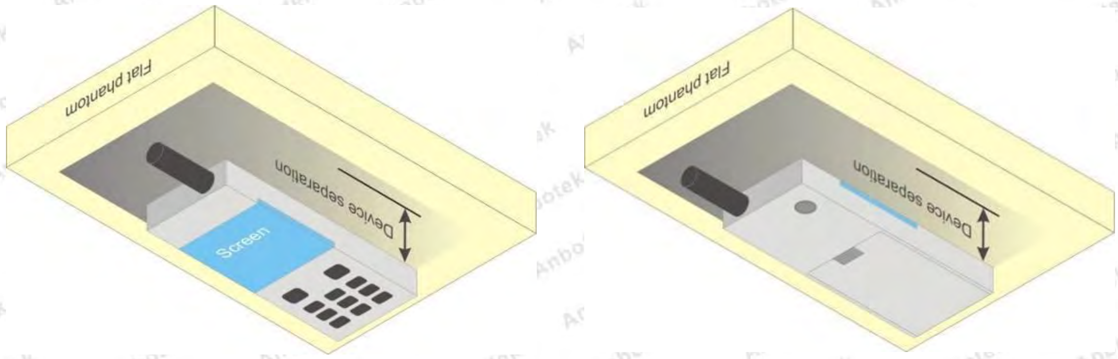


Tilt Position

8.4. Body Worn Position

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. Per KDB 648474 D04, body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB 447498 D01 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for body-worn accessory, measured without a headset connected to the handset is < 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a handset attached to the handset.

Accessories for body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are test with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-chip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.



Body Worn Position

9. Measurement Procedures

The measurement procedures are as follows:

(a) Use base station simulator (if applicable) or engineering software to transmit RF power continuously (continuous Tx) in the middle channel.
(b) Keep EUT to radiate maximum output power or 100% duty factor (if applicable)
(c) Measure output power through RF cable and power meter.
(d) Place the EUT in the positions as setup photos demonstrates.
(e) Set scan area, grid size and other setting on the DASY software.
(f) Measure SAR transmitting at the middle channel for all applicable exposure positions.
(g) Identify the exposure position and device configuration resulting the highest SAR
(h) Measure SAR at the lowest and highest channels at the worst exposure position and device configuration if applicable.

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

(a) Power reference measurement
(b) Area scan
(c) Zoom scan
(d) Power drift measurement

9.1 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

(a) Extraction of the measured data (grid and values) from the Zoom Scan
(b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
(c) Generation of a high-resolution mesh within the measured volume
(d) Interpolation of all measured values form the measurement grid to the high-resolution grid
(e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to

surface

(f) Calculation of the averaged SAR within masses of 1g and 10g

9.2 Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

9.3 Area & Zoom Scan Procedures

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB0 is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the numberof zoom scans has to be increased accordingly.

Area scan parameters extracted from FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz.

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

9.4 Zoom Scan Procedures

Zoom scans are used assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10 gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube shoes base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the zoom scan evaluates the averaged SAR for 1 gram and 10 gram and displays these values next to the job's label.

Zoom scan parameters extracted from FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz.

Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			$\leq$ 2 GHz: $\leq$ 8 mm 2 – 3 GHz: $\leq$ 5 mm*	3 – 4 GHz: $\leq$ 5 mm* 4 – 6 GHz: $\leq$ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		$\leq$ 5 mm	3 – 4 GHz: $\leq$ 4 mm 4 – 5 GHz: $\leq$ 3 mm 5 – 6 GHz: $\leq$ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	$\leq$ 4 mm	3 – 4 GHz: $\leq$ 3 mm 4 – 5 GHz: $\leq$ 2.5 mm 5 – 6 GHz: $\leq$ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		$\geq$ 30 mm	3 – 4 GHz: $\geq$ 28 mm 4 – 5 GHz: $\geq$ 25 mm 5 – 6 GHz: $\geq$ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details. * When zoom scan is required and the <u>reported</u> SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is $\leq$ 1.4 W/kg, $\leq$ 8 mm, $\leq$ 7 mm and $\leq$ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

9.5 Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

9.6 Power Drift Monitoring

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the same settings. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

10.Conducted Power

<WCDMA Conducted power>

Conducted power measurement results (WCDMA Band II/IV/V)

Band	**WCDMA II**		
TX Channel	**CH9262**	**CH9400**	**CH9538**
Frequency (MHz)	**1852.4**	**1880**	**1907.6**
RMC 12.2Kbps	23.57	23.63	23.53
HSDPA Subtest-1	23.47	23.40	23.51
HSDPA Subtest-2	23.49	23.27	23.56
HSDPA Subtest-3	23.53	23.45	23.32
HSDPA Subtest-4	22.68	22.52	22.42
HSUPA Subtest-1	21.56	22.12	21.40
HSUPA Subtest-2	21.03	20.80	21.16
HSUPA Subtest-3	23.36	23.37	23.58
HSUPA Subtest-4	22.18	22.40	22.42
HSUPA Subtest-5	21.54	21.64	21.90
HSPA+	21.69	20.98	21.72

Band	**WCDMA IV**		
TX Channel	CH1312	CH1413	CH1513
Frequency (MHz)	1712.4	1732.6	1752.6
RMC 12.2Kbps	23.55	23.43	23.37
HSDPA Subtest-1	22.65	22.00	22.48
HSDPA Subtest-2	21.43	21.45	21.47
HSDPA Subtest-3	21.37	21.45	21.70
HSDPA Subtest-4	22.17	22.18	22.47
HSUPA Subtest-1	20.97	20.96	21.00
HSUPA Subtest-2	21.65	21.45	21.56
HSUPA Subtest-3	20.39	20.49	20.68
HSUPA Subtest-4	20.90	21.46	21.14
HSUPA Subtest-5	20.93	21.36	20.98
HSPA+	20.85	21.48	20.96

Band	WCDMA V		
TX Channel	CH4132	CH4183	CH4233
Frequency (MHz)	826.4	836.6	846.6
RMC 12.2Kbps	21.45	21.28	21.05
HSDPA Subtest-1	21.65	21.71	21.49
HSDPA Subtest-2	20.67	20.27	20.69
HSDPA Subtest-3	21.24	21.09	21.17
HSDPA Subtest-4	22.16	22.03	22.51
HSUPA Subtest-1	21.42	21.02	21.37
HSUPA Subtest-2	22.07	21.69	21.71
HSUPA Subtest-3	22.14	21.61	21.61
HSUPA Subtest-4	22.19	21.65	21.77
HSUPA Subtest-5	20.62	20.96	20.79
HSPA+	21.21	21.39	20.74

Per KDB 941225 D01 v02, RMC 12.2kbps setting is used to evaluate SAR. If AMR 12.2kbps power is < 0.25dB higher than RMC 12.2kbps, SAR tests with AMR 12.2kbps can be excluded.

<LTE Conducted Power>

Conducted Power Measurement Results (LTE FDD Band 2)

LTE-FDD Band 2				Actual output Power (dBm)		
Band-width	RBallocation	RBoffset	Modulation	Low	Middle	High
1.4 MHz				1850.7MHz	1880MHz	1909.3MHz
	1RB	High	QPSK	23.33	23.37	23.34
			16QAM	22.36	22.39	22.37
		Middle	QPSK	23.32	23.36	23.31
			16QAM	22.37	22.41	22.38
		Low	QPSK	23.34	23.33	23.31
			16QAM	22.39	22.41	22.39
	3RB	High	QPSK	23.21	23.26	23.21
			16QAM	22.13	22.15	22.12
		Middle	QPSK	23.22	23.24	23.22
			16QAM	22.15	22.18	22.13
		Low	QPSK	23.21	23.27	23.24
			16QAM	22.13	22.17	22.14
	6RB	/	QPSK	22.38	22.43	22.37
			16QAM	21.22	21.26	21.23
3 MHz				1851.5MHz	1880MHz	1908.5MHz
	1RB	High	QPSK	23.31	23.34	23.32
			16QAM	22.4	22.42	22.4
		Middle	QPSK	23.29	23.34	23.3
			16QAM	22.41	22.45	22.41
		Low	QPSK	23.31	23.35	23.32
			16QAM	22.39	22.42	22.39
	8RB	High	QPSK	22.66	22.69	22.65
			16QAM	21.51	21.54	21.52
		Middle	QPSK	22.61	22.62	22.62
			16QAM	21.5	21.54	21.5
		Low	QPSK	22.62	22.65	22.63
			16QAM	21.52	21.54	21.54
	15RB	/	QPSK	22.58	22.63	22.6
			16QAM	21.49	21.55	21.48
5 MHz				1852.5MHz	1880MHz	1907.5MHz
	1RB	High	QPSK	23.29	23.32	23.3
			16QAM	22.39	22.42	22.4
		Middle	QPSK	23.31	23.35	23.32
			16QAM	22.41	22.45	22.4

		Low	QPSK	23.3	23.32	23.29
			16QAM	22.39	22.42	22.4
	12RB	High	QPSK	22.67	22.72	22.65
			16QAM	21.56	21.63	21.57
		Middle	QPSK	22.67	22.71	22.68
			16QAM	21.57	21.61	21.56
		Low	QPSK	22.66	22.69	22.67
			16QAM	21.59	21.62	21.6
	25RB		QPSK	22.64	22.68	22.65
			16QAM	21.53	21.56	21.53
10 MHz				1855MHz	1880MHz	1905MHz
	1RB	High	QPSK	23.3	23.33	23.3
			16QAM	22.38	22.41	22.39
		Middle	QPSK	23.31	23.35	23.31
			16QAM	22.4	22.44	22.39
		Low	QPSK	23.31	23.35	23.31
			16QAM	22.4	22.42	22.4
	25RB	High	QPSK	22.63	22.68	22.65
			16QAM	21.56	21.6	21.57
		Middle	QPSK	22.63	22.68	22.65
			16QAM	21.6	21.62	21.59
		Low	QPSK	22.62	22.66	22.63
			16QAM	21.58	21.61	21.59
	50RB	/	QPSK	22.65	22.68	22.64
			16QAM	21.54	21.57	21.53
15 MHz				1857.5MHz	1880MHz	1902.5MHz
	1RB	High	QPSK	23.33	23.36	23.34
			16QAM	22.39	22.42	22.4
		Middle	QPSK	23.3	23.36	23.3
			16QAM	22.4	22.45	22.4
		Low	QPSK	23.32	23.35	23.33
			16QAM	22.41	22.44	22.42
	36RB	High	QPSK	22.65	22.69	22.66
			16QAM	21.56	21.58	21.56
		Middle	QPSK	22.63	22.68	22.62
			16QAM	21.58	21.61	21.57
		Low	QPSK	22.66	22.71	22.68
			16QAM	21.54	21.58	21.55
	75RB	/	QPSK	22.56	22.6	22.57
			16QAM	21.49	21.54	21.5

20 MHz				1860MHz	1880MHz	1900MHz
	1RB	High	QPSK	23.29	23.35	23.3
			16QAM	22.39	22.44	22.41
		Middle	QPSK	23.32	23.36	23.33
			16QAM	22.42	22.44	22.4
		Low	QPSK	23.34	23.37	23.35
			16QAM	22.42	22.45	22.43
	50RB	High	QPSK	22.66	22.72	22.58
			16QAM	21.54	21.6	21.55
		Middle	QPSK	22.65	22.69	22.66
			16QAM	21.6	21.64	21.61
		Low	QPSK	22.66	22.69	22.67
			16QAM	21.61	21.64	21.62
	100RB	/	QPSK	22.59	22.65	22.58
			16QAM	21.48	21.54	21.47

Conducted Power Measurement Results (LTE FDD Band 4)

LTE-FDD Band 4				Actual output Power (dBm)		
Band-width	RBallocation	RBoffset	Modulation	Low	Middle	High
1.4 MHz				1710.7MHz	1732.5MHz	1754.3MHz
	1RB	High	QPSK	23.22	23.28	23.2
			16QAM	21.65	21.7	21.63
		Middle	QPSK	23.21	23.27	23.17
			16QAM	21.66	21.72	21.64
		Low	QPSK	23.23	23.24	23.17
			16QAM	21.68	21.72	21.65
	3RB	High	QPSK	23.1	23.17	23.07
			16QAM	21.42	21.46	21.38
		Middle	QPSK	23.11	23.15	23.08
			16QAM	21.44	21.49	21.39
		Low	QPSK	23.1	23.18	23.1
			16QAM	21.42	21.48	21.4
	6RB	/	QPSK	22.27	22.34	22.23
			16QAM	20.51	20.57	20.49
3 MHz				1711.5MHz	1732.5MHz	1753.5MHz
	1RB	High	QPSK	23.2	23.25	23.18
			16QAM	21.69	21.73	21.66
		Middle	QPSK	23.18	23.25	23.16
			16QAM	21.7	21.76	21.67
		Low	QPSK	23.2	23.26	23.18

			16QAM	21.68	21.73	21.65
	8RB	High	QPSK	22.55	22.6	22.51
			16QAM	20.8	20.85	20.78
		Middle	QPSK	22.5	22.53	22.48
			16QAM	20.79	20.85	20.76
		Low	QPSK	22.51	22.56	22.49
			16QAM	20.81	20.85	20.8
	15RB	/	QPSK	22.47	22.54	22.46
			16QAM	20.78	20.86	20.74
5 MHz				1712.5MHz	1732.5MHz	1752.5MHz
	1RB	High	QPSK	23.18	23.23	23.16
			16QAM	21.68	21.73	21.66
		Middle	QPSK	23.2	23.26	23.18
			16QAM	21.7	21.76	21.66
		Low	QPSK	23.19	23.23	23.15
			16QAM	21.68	21.73	21.66
	12RB	High	QPSK	22.56	22.63	22.51
			16QAM	20.85	20.94	20.83
		Middle	QPSK	22.56	22.62	22.54
			16QAM	20.86	20.92	20.82
		Low	QPSK	22.55	22.6	22.53
			16QAM	20.88	20.93	20.86
	25RB	/	QPSK	22.53	22.59	22.51
			16QAM	20.82	20.87	20.79
10 MHz				1715MHz	1732.5MHz	1750MHz
	1RB	High	QPSK	23.19	23.24	23.16
			16QAM	21.67	21.72	21.65
		Middle	QPSK	23.2	23.26	23.17
			16QAM	21.69	21.75	21.65
		Low	QPSK	23.2	23.26	23.17
			16QAM	21.69	21.73	21.66
	25RB	High	QPSK	22.52	22.59	22.51
			16QAM	20.85	20.91	20.83
		Middle	QPSK	22.52	22.59	22.51
			16QAM	20.89	20.93	20.85
		Low	QPSK	22.51	22.57	22.49
			16QAM	20.87	20.92	20.85
	50RB	/	QPSK	22.54	22.59	22.5
			16QAM	20.83	20.88	20.79
15 MHz				1717.5MHz	1732.5MHz	1747.5MHz

	1RB	High	QPSK	23.22	23.27	23.2
			16QAM	21.68	21.73	21.66
		Middle	QPSK	23.19	23.27	23.16
			16QAM	21.69	21.76	21.66
		Low	QPSK	23.21	23.26	23.19
			16QAM	21.7	21.75	21.68
	36RB	High	QPSK	22.54	22.6	22.52
			16QAM	20.85	20.89	20.82
		Middle	QPSK	22.52	22.59	22.48
			16QAM	20.87	20.92	20.83
		Low	QPSK	22.55	22.62	22.54
			16QAM	20.83	20.89	20.81
	75RB	/	QPSK	22.45	22.51	22.43
			16QAM	20.78	20.85	20.76
20 MHz				1720MHz	1732.5MHz	1745MHz
	1RB	High	QPSK	23.18	23.26	23.16
			16QAM	21.68	21.75	21.67
		Middle	QPSK	23.21	23.27	23.19
			16QAM	21.71	21.75	21.66
		Low	QPSK	23.23	23.28	23.21
			16QAM	21.71	21.76	21.69
	50RB	High	QPSK	22.55	22.63	22.44
			16QAM	20.83	20.91	20.81
		Middle	QPSK	22.54	22.6	22.52
			16QAM	20.89	20.95	20.87
		Low	QPSK	22.55	22.6	22.53
			16QAM	20.9	20.95	20.88
	100RB	/	QPSK	22.48	22.56	22.44
			16QAM	20.77	20.85	20.73

Conducted Power Measurement Results (LTE FDD Band 5)

LTE-FDD Band 5				Actual output Power (dBm)		
Band-width	RBallocation	RBoffset	Modulation	Low	Middle	High
1.4 MHz				824.7MHz	836.5MHz	848.3MHz
	1RB	High	QPSK	23.12	23.15	23.1
			16QAM	22.33	22.35	22.28
		Middle	QPSK	23.14	23.16	23.13
			16QAM	22.33	22.37	22.32
		Low	QPSK	23.11	23.16	23.14
			16QAM	22.32	22.33	22.31
	3RB	High	QPSK	22.95	22.94	22.92

			16QAM	22.02	22.04	22.05
		Middle	QPSK	22.95	22.94	22.92
			16QAM	22.02	22.04	22.05
		Low	QPSK	22.92	22.94	22.93
			16QAM	22.08	22.09	22.04
	6RB	/	QPSK	21.94	21.98	21.94
			16QAM	21.07	21.12	21.05
3 MHz				825.5MHz	836.5MHz	847.5MHz
	1RB	High	QPSK	23.11	23.15	23.1
			16QAM	22.33	22.33	22.32
		Middle	QPSK	23.14	23.18	23.13
			16QAM	22.32	22.34	22.33
		Low	QPSK	23.1	23.17	23.13
			16QAM	22.32	22.36	22.3
	8RB	High	QPSK	21.97	21.96	21.95
			16QAM	21.05	21.06	21.09
		Middle	QPSK	21.95	21.97	21.95
			16QAM	21.09	21.08	21.08
		Low	QPSK	21.94	21.99	21.93
			16QAM	21.03	21.1	21.02
	15RB	/	QPSK	21.96	21.95	21.93
			16QAM	21.05	21.07	21.03
5 MHz				826.5MHz	836.5MHz	846.5MHz
	1RB	High	QPSK	23.07	23.09	23.09
			16QAM	22.31	22.31	22.3
		Middle	QPSK	23.13	23.15	23.1
			16QAM	22.31	22.33	22.34
		Low	QPSK	23.13	23.16	23.14
			16QAM	22.34	22.33	22.34
	12RB	High	QPSK	22.01	21.99	22
			16QAM	21.11	21.08	21.12
		Middle	QPSK	22.02	22.04	21.99
			16QAM	21.06	21.1	21.11
		Low	QPSK	22.05	22.07	22.02
			16QAM	21.1	21.11	21.05
	25RB	/	QPSK	22.01	22	21.95
			16QAM	21.11	21.12	21.08
10 MHz				829MHz	836.5MHz	844MHz
	1RB	High	QPSK	23.15	23.18	23.11
			16QAM	22.36	22.37	22.34
		Middle	QPSK	23.15	23.19	23.15

			16QAM	22.33	22.36	22.31
		Low	QPSK	23.14	23.16	23.13
			16QAM	22.33	22.37	22.32
	25RB	High	QPSK	22.04	22.05	22
			16QAM	21.05	21.07	21.03
		Middle	QPSK	22.02	22.04	22
			16QAM	21.09	21.14	21.09
		Low	QPSK	22.01	22.05	22.01
			16QAM	21.12	21.09	21.07
	50RB	/	QPSK	22.06	22.02	21.95
			16QAM	21.12	21.14	21.09

Conducted Power Measurement Results (LTE FDD Band 12)

LTE-FDD Band 12				Actual output Power (dBm)		
Band-width	RBallocation	RBoffset	Modulation	Low	Middle	High
1.4 MHz				699.7MHz	707.5MHz	715.3MHz
	1RB	High	QPSK	23.18	23.06	23.19
			16QAM	22.34	22.08	22.14
		Middle	QPSK	23.31	23.02	23.36
			16QAM	22.4	22.07	22.27
		Low	QPSK	23.25	23	23.23
			16QAM	22.36	21.98	22.13
	3RB	High	QPSK	23.14	23.1	23.21
			16QAM	21.99	22.2	21.97
		Middle	QPSK	23.3	23.14	23.34
			16QAM	22.08	22.21	22.09
		Low	QPSK	23.29	23.15	23.2
			16QAM	22.01	22.22	22.06
	6RB	/	QPSK	22.1	22.18	22.17
			16QAM	21.22	21.34	21.24
3 MHz				700.5MHz	707.5MHz	714.5MHz
	1RB	High	QPSK	23.08	22.9	23.14
			16QAM	22.03	22.15	22.05
		Middle	QPSK	23.12	23.03	23.16
			16QAM	21.97	22.06	22.13
		Low	QPSK	23.15	23.08	23.23
			16QAM	22.17	22.13	22.24
	8RB	High	QPSK	22.15	22.22	22.09
			16QAM	21.06	21.17	21.33
		Middle	QPSK	22.04	22.09	22.13

			16QAM	21.05	21.1	21.37
		Low	QPSK	21.97	22.08	22.15
			16QAM	21.01	21.2	21.38
	15RB	/	QPSK	22.05	22.09	22.15
			16QAM	21.04	21.07	21.24
5 MHz				701.5MHz	707.5MHz	713.5MHz
	1RB	High	QPSK	23.2	23.16	23.11
			16QAM	22.06	22.19	22.13
		Middle	QPSK	23.09	23.08	23.13
			16QAM	21.85	22.16	22.26
		Low	QPSK	22.96	23.24	23.16
			16QAM	21.9	22.38	22.28
	12RB	High	QPSK	22.16	22.04	22.09
			16QAM	21.15	21	21.17
		Middle	QPSK	22.08	22.23	22.06
			16QAM	21.17	21.11	21.36
		Low	QPSK	22.05	22.09	22.09
			16QAM	21.23	21.16	21.32
	25RB	/	QPSK	22.02	22.13	22.1
			16QAM	21.01	21.18	21.22
10 MHz				704MHz	707.5MHz	711MHz
	1RB	High	QPSK	23.2	23.17	23.13
			16QAM	22.02	22.19	22.13
		Middle	QPSK	23.28	23.11	22.92
			16QAM	22.22	22.35	22.08
		Low	QPSK	23.22	23.02	23.12
			16QAM	22.16	22.18	22.19
	25RB	High	QPSK	22.04	22.09	22.13
			16QAM	21.1	21.19	21.26
		Middle	QPSK	22.19	22.09	22
			16QAM	21.17	21.08	21.18
		Low	QPSK	22.12	22.11	22.08
			16QAM	21.09	21.17	21.23
	50RB	/	QPSK	22.05	21.9	22.12
			16QAM	21.23	20.97	21.18

Conducted Power Measurement Results (LTE FDD Band 13)

LTE-FDD Band 13				Actual output Power (dBm)		
Band-width	RBallocation	RBoffset	Modulation	High	Middle	Low
5 MHz				/	782 MHz	/
	1RB	High	QPSK	/	23.26	/

			16QAM	/	22.35	/
		Middle	QPSK	/	23.24	/
			16QAM	/	22.33	/
		Low	QPSK	/	23.25	/
			16QAM	/	22.33	/
	12RB	High	QPSK	/	22.24	/
			16QAM	/	21.48	/
		Middle	QPSK	/	22.26	/
			16QAM	/	21.46	/
		Low	QPSK	/	22.27	/
			16QAM	/	21.47	/
	25RB	/	QPSK	/	22.22	/
			16QAM	/	21.43	/
10 MHz				/	782 MHz	/
	1RB	High	QPSK	/	23.31	/
			16QAM	/	22.37	/
		Middle	QPSK	/	23.25	/
			16QAM	/	22.35	/
		Low	QPSK	/	23.27	/
			16QAM	/	22.35	/
	25RB	High	QPSK	/	22.36	/
			16QAM	/	21.49	/
		Middle	QPSK	/	22.27	/
			16QAM	/	21.48	/
		Low	QPSK	/	22.26	/
			16QAM	/	21.43	/
	50RB	/	QPSK	/	22.25	/
			16QAM	/	21.46	/

Note: LTE Band 13 at 5/10 MHz bandwidth does not support three non-overlapping channels. 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.

Conducted Power Measurement Results (LTE FDD Band 17)

LTE-FDD Band 17				Actual output Power (dBm)		
Band-width	RBallocation	RBoffset	Modulation	High	Middle	Low
5 MHz				706.5MHz	710MHz	713.5MHz
	1RB	High	QPSK	22.96	22.96	22.94
			16QAM	22.02	22.05	22.01
		Middle	QPSK	22.92	22.94	22.95
			16QAM	21.99	22.03	22.01
		Low	QPSK	22.92	22.95	22.95

			16QAM	22	22.03	21.99
	12RB	High	QPSK	21.96	21.94	21.95
			16QAM	21.17	21.18	21.17
		Middle	QPSK	21.94	21.96	21.94
			16QAM	21.15	21.16	21.14
		Low	QPSK	21.94	21.97	21.94
			16QAM	21.13	21.17	21.16
	25RB	/	QPSK	21.91	21.92	21.91
			16QAM	21.12	21.13	21.12
10 MHz				709MHz	710MHz	711MHz
	1RB	High	QPSK	22.97	23.01	22.94
			16QAM	22.05	22.07	22.04
		Middle	QPSK	22.93	22.95	22.94
			16QAM	22.03	22.05	22.02
		Low	QPSK	22.95	22.97	22.96
			16QAM	22.02	22.05	22.01
	25RB	High	QPSK	22	22.06	22.01
			16QAM	21.18	21.19	21.18
		Middle	QPSK	21.95	21.97	21.96
			16QAM	21.14	21.18	21.19
		Low	QPSK	21.95	21.96	21.96
			16QAM	21.14	21.13	21.17
	50RB	/	QPSK	21.92	21.95	21.95
			16QAM	21.12	21.16	21.17

Conducted Power Measurement Results (LTE FDD Band 25)

LTE-FDD Band 25				Actual output Power (dBm)		
Band-width	RBallocation	RBoffset	Modulation	Low	Middle	High
1.4 MHz				1850.7MHz	1882.5MHz	1914.3MHz
	1RB	High	QPSK	23.34	23.44	23.32
			16QAM	22.37	22.46	22.35
		Middle	QPSK	23.33	23.43	23.29
			16QAM	22.38	22.48	22.36
		Low	QPSK	23.35	23.4	23.29
			16QAM	22.4	22.48	22.37
	3RB	High	QPSK	23.22	23.33	23.19
			16QAM	22.14	22.22	22.1
		Middle	QPSK	23.23	23.31	23.2
			16QAM	22.16	22.25	22.11
		Low	QPSK	23.22	23.34	23.22
			16QAM	22.14	22.24	22.12

	6RB	/	QPSK	22.39	22.5	22.35
			16QAM	21.23	21.33	21.21
3 MHz				1851.5MHz	1882.5MHz	1913.5MHz
	1RB	High	QPSK	23.32	23.41	23.3
			16QAM	22.41	22.49	22.38
		Middle	QPSK	23.3	23.41	23.28
			16QAM	22.42	22.52	22.39
		Low	QPSK	23.32	23.42	23.3
			16QAM	22.4	22.49	22.37
	8RB	High	QPSK	22.39	22.48	22.34
			16QAM	21.24	21.33	21.21
		Middle	QPSK	22.34	22.41	22.31
			16QAM	21.23	21.33	21.19
		Low	QPSK	22.35	22.44	22.32
			16QAM	21.25	21.33	21.23
	15RB	/	QPSK	22.31	22.42	22.29
			16QAM	21.22	21.34	21.17
5 MHz				1852.5MHz	1882.5MHz	1912.5MHz
	1RB	High	QPSK	23.3	23.39	23.28
			16QAM	22.4	22.49	22.38
		Middle	QPSK	23.32	23.42	23.3
			16QAM	22.42	22.52	22.38
		Low	QPSK	23.31	23.39	23.27
			16QAM	22.4	22.49	22.38
	12RB	High	QPSK	22.4	22.51	22.34
			16QAM	21.29	21.42	21.26
		Middle	QPSK	22.4	22.5	22.37
			16QAM	21.3	21.4	21.25
		Low	QPSK	22.39	22.48	22.36
			16QAM	21.32	21.41	21.29
	25RB		QPSK	22.37	22.47	22.34
			16QAM	21.26	21.35	21.22
10 MHz				1855MHz	1882.5MHz	1910MHz
	1RB	High	QPSK	23.31	23.4	23.28
			16QAM	22.39	22.48	22.37
		Middle	QPSK	23.32	23.42	23.29
			16QAM	22.41	22.51	22.37
		Low	QPSK	23.32	23.42	23.29
			16QAM	22.41	22.49	22.38
	25RB	High	QPSK	22.36	22.47	22.34
			16QAM	21.29	21.39	21.26

		Middle	QPSK	22.36	22.47	22.34
			16QAM	21.33	21.41	21.28
		Low	QPSK	22.35	22.45	22.32
			16QAM	21.31	21.4	21.28
	50RB	/	QPSK	22.38	22.47	22.33
			16QAM	21.27	21.36	21.22
15 MHz				1857.5MHz	1882.5MHz	1907.5MHz
	1RB	High	QPSK	23.34	23.43	23.32
			16QAM	22.4	22.49	22.38
		Middle	QPSK	23.31	23.43	23.28
			16QAM	22.41	22.52	22.38
		Low	QPSK	23.33	23.42	23.31
			16QAM	22.42	22.51	22.4
	36RB	High	QPSK	22.38	22.48	22.35
			16QAM	21.29	21.37	21.25
		Middle	QPSK	22.36	22.47	22.31
			16QAM	21.31	21.4	21.26
		Low	QPSK	22.39	22.5	22.37
			16QAM	21.27	21.37	21.24
	75RB	/	QPSK	22.29	22.39	22.26
			16QAM	21.22	21.33	21.19
20 MHz				1860MHz	1882.5MHz	1905MHz
	1RB	High	QPSK	23.37	23.41	23.38
			16QAM	22.4	22.43	22.41
		Middle	QPSK	23.36	23.4	23.35
			16QAM	22.41	22.45	22.42
		Low	QPSK	23.38	23.37	23.35
			16QAM	22.43	22.45	22.43
	50RB	High	QPSK	22.25	22.3	22.25
			16QAM	21.17	21.19	21.16
		Middle	QPSK	22.26	22.28	22.26
			16QAM	21.19	21.22	21.17
		Low	QPSK	22.25	22.31	22.28
			16QAM	21.17	21.21	21.18
	100RB	/	QPSK	22.42	22.47	22.41
			16QAM	21.26	21.3	21.27

Conducted Power Measurement Results (LTE FDD Band 26)

LTE-FDD Band 26	Actual output Power (dBm)

Band-width	RBallocation	RBoffset	Modulation	Low	Middle	High
1.4 MHz				814.7MHz	831.5MHz	848.3MHz
	1RB	High	QPSK	23.04	23.14	23.02
			16QAM	22.07	22.16	22.05
		Middle	QPSK	23.03	23.13	22.99
			16QAM	22.08	22.18	22.06
		Low	QPSK	23.05	23.1	22.99
			16QAM	22.1	22.18	22.07
	3RB	High	QPSK	22.92	23.03	22.89
			16QAM	21.84	21.92	21.8
		Middle	QPSK	22.93	23.01	22.9
			16QAM	21.86	21.95	21.81
		Low	QPSK	22.92	23.04	22.92
			16QAM	21.84	21.94	21.82
	6RB	/	QPSK	22.09	22.2	22.05
			16QAM	20.93	21.03	20.91
3 MHz				815.5MHz	831.5MHz	847.5MHz
	1RB	High	QPSK	23.02	23.11	23
			16QAM	22.11	22.19	22.08
		Middle	QPSK	23	23.11	22.98
			16QAM	22.12	22.22	22.09
		Low	QPSK	23.02	23.12	23
			16QAM	22.1	22.19	22.07
	8RB	High	QPSK	22.09	22.18	22.04
			16QAM	20.94	21.03	20.91
		Middle	QPSK	22.04	22.11	22.01
			16QAM	20.93	21.03	20.89
		Low	QPSK	22.05	22.14	22.02
			16QAM	20.95	21.03	20.93
	15RB	/	QPSK	22.01	22.12	21.99
			16QAM	20.92	21.04	20.87
5 MHz				816.5MHz	831.5MHz	846.5MHz
	1RB	High	QPSK	23	23.09	22.98
			16QAM	22.1	22.19	22.08
		Middle	QPSK	23.02	23.12	23
			16QAM	22.12	22.22	22.08
		Low	QPSK	23.01	23.09	22.97
			16QAM	22.1	22.19	22.08
	12RB	High	QPSK	22.1	22.21	22.04
			16QAM	20.99	21.12	20.96
		Middle	QPSK	22.1	22.2	22.07

			16QAM	21	21.1	20.95
		Low	QPSK	22.09	22.18	22.06
			16QAM	21.02	21.11	20.99
	25RB		QPSK	22.07	22.17	22.04
			16QAM	20.96	21.05	20.92

10 MHz				820MHz	831.5MHz	844MHz
	1RB	High	QPSK	23.01	23.1	22.98
			16QAM	22.09	22.18	22.07
		Middle	QPSK	23.02	23.12	22.99
			16QAM	22.11	22.21	22.07
		Low	QPSK	23.02	23.12	22.99
			16QAM	22.11	22.19	22.08
	25RB	High	QPSK	22.06	22.17	22.04
			16QAM	20.99	21.09	20.96
		Middle	QPSK	22.06	22.17	22.04
			16QAM	21.03	21.11	20.98
		Low	QPSK	22.05	22.15	22.02
			16QAM	21.01	21.1	20.98
	50RB	/	QPSK	22.08	22.17	22.03
			16QAM	20.97	21.06	20.92
15 MHz				822.5MHz	831.5MHz	841.5MHz
	1RB	High	QPSK	23.04	23.13	23.02
			16QAM	22.1	22.19	22.08
		Middle	QPSK	23.01	23.13	22.98
			16QAM	22.11	22.22	22.08
		Low	QPSK	23.03	23.12	23.01
			16QAM	22.12	22.21	22.1
	36RB	High	QPSK	22.08	22.18	22.05
			16QAM	20.99	21.07	20.95
		Middle	QPSK	22.06	22.17	22.01
			16QAM	21.01	21.1	20.96
		Low	QPSK	22.09	22.2	22.07
			16QAM	20.97	21.07	20.94
	75RB	/	QPSK	21.99	22.09	21.96
			16QAM	20.92	21.03	20.89

Conducted Power Measurement Results (LTE FDD Band 27)

LTE-FDD Band 27				Actual output Power (dBm)		
Band-width	RBallocation	RBoffset	Modulation	Low	Middle	High

1.4 MHz				807.7MHz	815.5MHz	823.3MHz
	1RB	High	QPSK	23.14	23.24	23.12
			16QAM	22.17	22.26	22.15
		Middle	QPSK	23.13	23.23	23.09
			16QAM	22.18	22.28	22.16
		Low	QPSK	23.15	23.2	23.09
			16QAM	22.2	22.28	22.17
	3RB	High	QPSK	23.02	23.13	22.99
			16QAM	21.94	22.02	21.9
		Middle	QPSK	23.03	23.11	23
			16QAM	21.96	22.05	21.91
		Low	QPSK	23.02	23.14	23.02
			16QAM	21.94	22.04	21.92
	6RB	/	QPSK	22.19	22.3	22.15
			16QAM	21.03	21.13	21.01
3 MHz				808.5MHz	815.5MHz	822.5MHz
	1RB	High	QPSK	23.12	23.21	23.1
			16QAM	22.21	22.29	22.18
		Middle	QPSK	23.1	23.21	23.08
			16QAM	22.22	22.32	22.19
		Low	QPSK	23.12	23.22	23.1
			16QAM	22.2	22.29	22.17
	8RB	High	QPSK	22.19	22.28	22.14
			16QAM	21.04	21.13	21.01
		Middle	QPSK	22.14	22.21	22.11
			16QAM	21.03	21.13	20.99
		Low	QPSK	22.15	22.24	22.12
			16QAM	21.05	21.13	21.03
	15RB	/	QPSK	22.11	22.22	22.09
			16QAM	21.02	21.14	20.97
5 MHz				809.5MHz	815.5MHz	821.5MHz
	1RB	High	QPSK	23.1	23.19	23.08
			16QAM	22.2	22.29	22.18
		Middle	QPSK	23.12	23.22	23.1
			16QAM	22.22	22.32	22.18
		Low	QPSK	23.11	23.19	23.07
			16QAM	22.2	22.29	22.18
	12RB	High	QPSK	22.2	22.31	22.14
			16QAM	21.09	21.22	21.06
		Middle	QPSK	22.2	22.3	22.17
			16QAM	21.1	21.2	21.05

		Low	QPSK	22.19	22.28	22.16
			16QAM	21.12	21.21	21.09
	25RB		QPSK	22.17	22.27	22.14
			16QAM	21.06	21.15	21.02

10 MHz				812MHz	815.5MHz	819MHz
	1RB	High	QPSK	23.11	23.2	23.08
			16QAM	22.19	22.28	22.17
		Middle	QPSK	23.12	23.22	23.09
			16QAM	22.21	22.31	22.17
		Low	QPSK	23.12	23.22	23.09
			16QAM	22.21	22.29	22.18
	25RB	High	QPSK	22.16	22.27	22.14
			16QAM	21.09	21.19	21.06
		Middle	QPSK	22.16	22.27	22.14
			16QAM	21.13	21.21	21.08
		Low	QPSK	22.15	22.25	22.12
			16QAM	21.11	21.2	21.08
	50RB	/	QPSK	22.18	22.27	22.13
			16QAM	21.07	21.16	21.02

Conducted Power Measurement Results (LTE FDD Band 66)

LTE-FDD Band 66				Actual output Power (dBm)		
Band-width	RBallocation	RBoffset	Modulation	Low	Middle	High
1.4 MHz				1710.7MHz	1745MHz	1779.3MHz
	1RB	High	QPSK	23.03	23.13	23.01
			16QAM	22.06	22.15	22.04
		Middle	QPSK	23.02	23.12	22.98
			16QAM	22.07	22.17	22.05
		Low	QPSK	23.04	23.09	22.98
			16QAM	22.09	22.17	22.06
	3RB	High	QPSK	22.91	23.02	22.88
			16QAM	21.83	21.91	21.79
		Middle	QPSK	22.92	23	22.89
			16QAM	21.85	21.94	21.8
		Low	QPSK	22.91	23.03	22.91
			16QAM	21.83	21.93	21.81
	6RB	/	QPSK	22.08	22.19	22.04
			16QAM	20.92	21.02	20.9
3 MHz				1711.5MHz	1745MHz	1778.5MHz
	1RB	High	QPSK	23.01	23.1	22.99

			16QAM	22.1	22.18	22.07
		Middle	QPSK	22.99	23.1	22.97
			16QAM	22.11	22.21	22.08
		Low	QPSK	23.01	23.11	22.99
			16QAM	22.09	22.18	22.06
	8RB	High	QPSK	22.08	22.17	22.03
			16QAM	20.93	21.02	20.9
		Middle	QPSK	22.03	22.1	22
			16QAM	20.92	21.02	20.88
		Low	QPSK	22.04	22.13	22.01
			16QAM	20.94	21.02	20.92
	15RB	/	QPSK	22	22.11	21.98
			16QAM	20.91	21.03	20.86
5 MHz				1712.5MHz	1745MHz	1777.5MHz
	1RB	High	QPSK	22.99	23.08	22.97
			16QAM	22.09	22.18	22.07
		Middle	QPSK	23.01	23.11	22.99
			16QAM	22.11	22.21	22.07
		Low	QPSK	23	23.08	22.96
			16QAM	22.09	22.18	22.07
	12RB	High	QPSK	22.09	22.2	22.03
			16QAM	20.98	21.11	20.95
		Middle	QPSK	22.09	22.19	22.06
			16QAM	20.99	21.09	20.94
		Low	QPSK	22.08	22.17	22.05
			16QAM	21.01	21.1	20.98
	25RB		QPSK	22.06	22.16	22.03
			16QAM	20.95	21.04	20.91
10 MHz				1715MHz	1745MHz	1775MHz
	1RB	High	QPSK	23	23.09	22.97
			16QAM	22.08	22.17	22.06
		Middle	QPSK	23.01	23.11	22.98
			16QAM	22.1	22.2	22.06
		Low	QPSK	23.01	23.11	22.98
			16QAM	22.1	22.18	22.07
	25RB	High	QPSK	22.05	22.16	22.03
			16QAM	20.98	21.08	20.95
		Middle	QPSK	22.05	22.16	22.03
			16QAM	21.02	21.1	20.97
		Low	QPSK	22.04	22.14	22.01

			16QAM	21	21.09	20.97
	50RB	/	QPSK	22.07	22.16	22.02
			16QAM	20.96	21.05	20.91
15 MHz				1717.5	1745	1772.5
	1RB	High	QPSK	23.02	23.09	22.99
			16QAM	21.93	22	21.9
		Middle	QPSK	22.99	23.09	22.95
			16QAM	21.94	22.03	21.9
		Low	QPSK	23.01	23.08	22.98
			16QAM	21.95	22.02	21.92
	36RB	High	QPSK	22.06	22.14	22.02
			16QAM	20.82	20.88	20.77
		Middle	QPSK	22.04	22.13	21.98
			16QAM	20.84	20.91	20.78
		Low	QPSK	22.07	22.16	22.04
			16QAM	20.8	20.88	20.76
	75RB		QPSK	21.97	22.05	21.93
			16QAM	20.75	20.84	20.71
20 MHz				1720	1745	1770
	1RB	High	QPSK	22.98	23.08	23.05
			16QAM	21.93	22.02	22.01
		Middle	QPSK	23.01	23.09	23.08
			16QAM	21.96	22.02	22
		Low	QPSK	23.03	23.1	23.1
			16QAM	21.96	22.03	22.03
	50RB	High	QPSK	22.07	22.17	22.04
			16QAM	20.8	20.9	20.86
		Middle	QPSK	22.06	22.14	22.12
			16QAM	20.86	20.94	20.92
		Low	QPSK	22.07	22.14	22.13
			16QAM	20.87	20.94	20.93
	100RB		QPSK	22	22.1	22.04
			16QAM	20.74	20.84	20.78

Conducted Power Measurement Results (LTE FDD Band 71)

LTE-TDD Band 71				Actual output Power (dBm)		
Band-width	RBallocation	RBoffset	Modulation	Low	Middle	High
5 MHz				665.5	680.5	695.5
	1RB	High	QPSK	23.01	23.08	22.98
			16QAM	21.96	22.03	21.93

		Middle	QPSK	23.03	23.11	23
			16QAM	21.98	22.06	21.93
		Low	QPSK	23.02	23.08	22.97
			16QAM	21.96	22.03	21.93
	12RB	High	QPSK	22.11	22.2	22.04
			16QAM	20.85	20.96	20.81
		Middle	QPSK	22.11	22.19	22.07
			16QAM	20.86	20.94	20.8
		Low	QPSK	22.1	22.17	22.06
			16QAM	20.88	20.95	20.84
	25RB		QPSK	22.08	22.16	22.04
			16QAM	20.82	20.89	20.77
10 MHz				668.0	680.5	693.0
	1RB	High	QPSK	23.02	23.06	23.03
			16QAM	22.05	22.08	22.06
		Middle	QPSK	23.01	23.05	23
			16QAM	22.06	22.1	22.07
		Low	QPSK	23.03	23.02	23
			16QAM	22.08	22.1	22.08
	25RB	High	QPSK	22.9	22.95	22.9
			16QAM	21.82	21.84	21.81
		Middle	QPSK	22.91	22.93	22.91
			16QAM	21.84	21.87	21.82
		Low	QPSK	22.9	22.96	22.93
			16QAM	21.82	21.86	21.83
	50RB		QPSK	22.07	22.12	22.06
			16QAM	20.91	20.95	20.92
15 MHz				/	680.5	/
	1RB	High	QPSK	/	23.05	/
			16QAM	/	21.96	/
		Middle	QPSK	/	23.05	/
			16QAM	/	21.99	/
		Low	QPSK	/	23.04	/
			16QAM	/	21.98	/
	36RB	High	QPSK	/	22.1	/
			16QAM	/	20.84	/
		Middle	QPSK	/	22.09	/
			16QAM	/	20.87	/
		Low	QPSK	/	22.12	/
			16QAM	/	20.84	/

	75RB		QPSK	/	22.01	/
			16QAM	/	20.8	/
20 MHz				/	680.5	/
	1RB	High	QPSK	/	23.04	/
			16QAM	/	21.98	/
		Middle	QPSK	/	23.05	/
			16QAM	/	21.98	/
		Low	QPSK	/	23.06	/
			16QAM	/	21.99	/
	50RB	High	QPSK	/	22.13	/
			16QAM	/	20.86	/
		Middle	QPSK	/	22.1	/
			16QAM	/	20.9	/
		Low	QPSK	/	22.1	/
			16QAM	/	20.9	/
	100RB		QPSK	/	22.06	/
			16QAM	/	20.8	/

Note: LTE Band 71 at 15/20 MHz bandwidth does not support three non-overlapping channels. 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.

Conducted Power Measurement Results (LTE TDD Band 41)

LTE-TDD Band 41				Actual output Power (dBm)				
BW	RBallocation	RBoffset	Modulation	Low	Middle1	Middle2	Middle3	High
5 MHz				2498.5 MHz	2545.8 MHz	2593 MHz	2640.3 MHz	2687.5 MHz
	1RB	High	QPSK	23.23	23.17	23.26	23.24	23.26
			16QAM	22.22	22.11	22.17	22.15	22.17
		Middle	QPSK	23.25	23.19	23.26	23.23	23.25
			16QAM	22.21	22.16	22.23	22.22	22.24
		Low	QPSK	23.26	23.19	23.21	23.25	23.27
			16QAM	22.19	22.15	22.19	22.22	22.24
	12RB	High	QPSK	22.35	22.33	22.37	22.35	22.08
			16QAM	21.09	21.09	21.16	21.14	21.07
		Middle	QPSK	22.34	22.36	22.42	22.42	22.35
			16QAM	21.11	21.1	21.18	21.14	21.07
		Low	QPSK	22.32	22.36	22.39	22.35	22.28
			16QAM	21.08	21.18	21.21	21.12	21.05
	25RB		QPSK	22.37	22.35	22.45	22.37	22.3

			16QAM	21.11	21.15	21.21	21.17	21.1
10 MHz				2501 MHz	2547 MHz	2593 MHz	2639 MHz	2685 MHz
	1RB	High	QPSK	23.3	23.25	23.27	23.22	23.24
			16QAM	22.22	22.17	22.21	22.19	22.21
		Middle	QPSK	23.3	23.25	23.23	23.19	23.21
			16QAM	22.26	22.21	22.22	22.19	22.21
		Low	QPSK	23.25	23.2	23.2	23.2	23.22
			16QAM	22.23	22.18	22.2	22.2	22.22
	25RB	High	QPSK	22.3	22.33	22.37	22.38	22.31
			16QAM	21.07	21.1	21.11	21.11	21.04
		Middle	QPSK	22.37	22.4	22.4	22.38	22.31
			16QAM	21.13	21.16	21.17	21.18	21.11
		Low	QPSK	22.36	22.39	22.43	22.34	22.27
			16QAM	21.07	21.1	21.13	21.15	21.08
	50RB		QPSK	22.36	22.39	22.39	22.37	22.3
			16QAM	21.09	21.12	21.15	21.14	21.07
15 MHz				2503.5 MHz	2548.3 MHz	2593 MHz	2637.8 MHz	2682.5 MHz
	1RB	High	QPSK	23.25	23.2	23.25	23.22	23.24
			16QAM	22.22	22.17	22.2	22.2	22.22
		Middle	QPSK	23.23	23.18	23.28	23.24	23.26
			16QAM	22.24	22.19	22.23	22.22	22.24
		Low	QPSK	23.28	23.23	23.25	23.22	23.24
			16QAM	22.21	22.16	22.2	22.22	22.24
	36RB	High	QPSK	22.28	22.31	22.4	22.37	22.3
			16QAM	21.08	21.11	21.15	21.12	21.05
		Middle	QPSK	22.32	22.35	22.41	22.39	22.32
			16QAM	21.09	21.12	21.17	21.13	21.06
		Low	QPSK	22.33	22.36	22.36	22.37	22.3
			16QAM	21.15	21.18	21.2	21.11	21.04
	75RB		QPSK	22.34	22.37	22.43	22.41	22.34
			16QAM	21.12	21.15	21.17	21.13	21.06

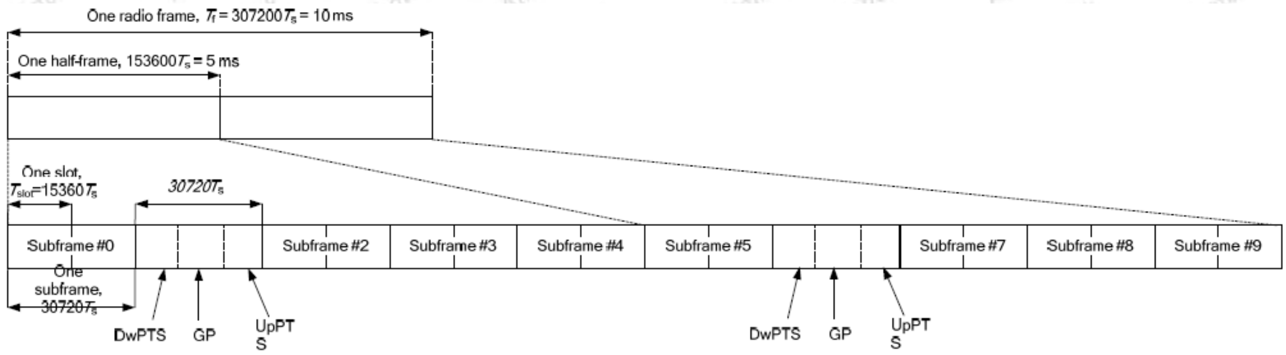
20 MHz				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
	1RB	High	QPSK	23.25	23.21	23.29	23.25	23.24
			16QAM	22.22	22.2	22.22	22.2	22.22
		Middle	QPSK	23.23	23.23	23.31	23.3	23.26
			16QAM	22.24	22.19	22.25	22.23	22.24

		Low	QPSK	23.28	23.24	23.29	23.27	23.24
			16QAM	22.21	22.17	22.2	22.19	22.24
	50RB	High	QPSK	22.28	22.44	22.46	22.42	22.3
			16QAM	21.08	21.12	21.18	21.13	21.05
		Middle	QPSK	22.32	22.37	22.42	22.41	22.32
			16QAM	21.09	21.14	21.18	21.15	21.06
		Low	QPSK	22.33	22.35	22.38	22.43	22.3
			16QAM	21.15	21.11	21.18	21.15	21.04
	100RB		QPSK	22.34	22.4	22.46	22.43	22.34
			16QAM	21.12	21.14	21.2	21.27	21.06

TDD test:

TDD testing is performed using guidance from FCC KDB 941225 D05v02r03 and the SAR test guidance provided in April 2013 TCB works hop notes. TDD is tested at the highest duty factor using UL-DL configuration 0 with special subframe configuration 6 and applying the FDD LTE procedures in KDB 941225 D05v02r03. SAR testing is performed using the extended cyclic prefix listed in 3GPP TS 36.211.

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



Configuration of special subframe (lengths of DwPTS/GP/UpPTS)

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-

Uplink-downlink configurations

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

Duty factor is calculated by:
Duty factor = uplink frame*6+UpPTS*2/one frame length
= (30720.Ts * 6+5120. Ts*2)/307200.Ts
= 0.633
According to the KDB 447498 D01, SAR should be evaluated at more than 3 frequencies for devices supporting transmit bands wider than 100MHz. Oct.2014 FCC-TCB conference notes
(Dec. 2014 rev.) specifies the 5 test channels to use for 3GPP band 41 SAR evaluation.

<WIFI 2.4GHz Conducted Power>

Ant0

Mode	Channel	Frequency (MHz)	Conducted Peak Power	Tune-up Peak Power	Conducted Average Power	Tune-up Average Power	Test Rate Data

			(dBm)	(dBm)	(dBm)	(dBm)	
802.11b	1	2412	16.37	17.0	13.39	14.0	1 Mbps
	6	2437	16.01	17.0	13.27	14.0	1 Mbps
	11	2462	16.71	17.0	13.25	14.0	1 Mbps
802.11g	1	2412	16.84	17.0	13.40	14.0	6 Mbps
	6	2437	16.57	17.0	13.62	14.0	6 Mbps
	11	2462	16.38	17.0	13.91	14.0	6 Mbps
802.11n(20MHz)	1	2412	16.65	17.0	12.66	13.0	MCS0
	6	2437	16.50	17.0	12.07	13.0	MCS0
	11	2462	16.76	17.0	12.43	13.0	MCS0
802.11n(40MHz)	3	2422	15.68	16.0	10.20	11.5	MCS0
	6	2437	15.87	16.0	10.19	11.5	MCS0
	9	2452	15.22	16.0	10.53	11.5	MCS0

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Mode	Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Tune-up Peak Power (dBm)	Conducted Average Power (dBm)	Tune-up Average Power (dBm)	Test Rate Data
802.11b	1	2412	16.86	17.0	13.82	14.0	1 Mbps
	6	2437	16.79	17.0	13.61	14.0	1 Mbps
	11	2462	16.68	17.0	13.91	14.0	1 Mbps
802.11g	1	2412	16.60	17.0	13.25	14.0	6 Mbps
	6	2437	16.65	17.0	13.75	14.0	6 Mbps
	11	2462	16.91	17.0	13.78	14.0	6 Mbps
802.11n(20MHz)	1	2412	16.26	17.0	12.22	12.5	MCS0
	6	2437	16.57	17.0	12.23	12.5	MCS0
	11	2462	16.32	17.0	12.10	12.5	MCS0
802.11n(40MHz)	3	2422	15.71	16.0	10.07	11.5	MCS0
	6	2437	15.77	16.0	10.02	11.5	MCS0
	9	2452	15.20	16.0	10.91	11.5	MCS0

MIMO*2

Type	Channel	Peak Output power ANT0 (dBm)	Peak Output power ANT1 (dBm)	Average Output power ANT0 (dBm)	average Output power ANT1 (dBm)	Peak Output power Total (dBm)	average Output power Total (dBm)	Tune-up Average power Total (dBm)
802.11n (HT20)	01	16.65	16.26	12.66	12.22	19.47	15.46	15.5
	06	16.50	16.57	12.07	12.23	19.55	15.16	15.5
	11	16.76	16.32	12.43	12.10	19.56	15.28	15.5
802.11n	03	15.68	15.71	10.20	10.07	18.71	13.15	14.0

(HT40)	06	15.87	15.77	10.19	10.02	18.83	13.12	14.0
	09	15.22	15.20	10.53	10.91	18.22	13.73	14.0

11.Maximum Tune-up Limit

Mode	Burst Average Power (dBm)		
	WCDMA Band V	WCDMA Band IV	WCDMA Band II
RMC 12.2Kbps	22.5	24.0	24.0
HSDPA Subtest-1	22.0	23.0	24.0
HSDPA Subtest-2	22.0	22.0	24.0
HSDPA Subtest-3	22.0	22.0	24.0
HSDPA Subtest-4	22.5	23.0	23.0
HSUPA Subtest-1	22.0	22.0	23.0
HSUPA Subtest-2	22.0	22.0	22.0
HSUPA Subtest-3	22.0	22.0	24.0
HSUPA Subtest-4	22.0	22.0	23.0
HSUPA Subtest-5	22.0	22.0	22.0
HSPA+	22.0	22.0	22.0

LTE

LTE Band 2			
Channel	Low	Middle	High
Tune-up(dB)	24	24	24
LTE Band 4			
Channel	Low	Middle	High
Tune-up(dB)	24	24	24
LTE Band 5			
Channel	Low	Middle	High
Tune-up(dB)	24	24	24
LTE Band 12			
Channel	Low	Middle	High
Tune-up(dB)	24	24	24
LTE Band 13			
Channel	Low	Middle	High
Tune-up(dB)	24	24	24

LTE Band 17			
Channel	Low	Middle	High
Tune-up(dB)	24	24	24

LTE Band 25			
Channel	Low	Middle	High
Tune-up(dB)	24	24	24

LTE Band 26			
Channel	Low	Middle	High
Tune-up(dB)	24	24	24

LTE Band 27			
Channel	Low	Middle	High
Tune-up(dB)	24	24	24

LTE Band 66			
Channel	Low	Middle	High
Tune-up(dB)	24	24	24

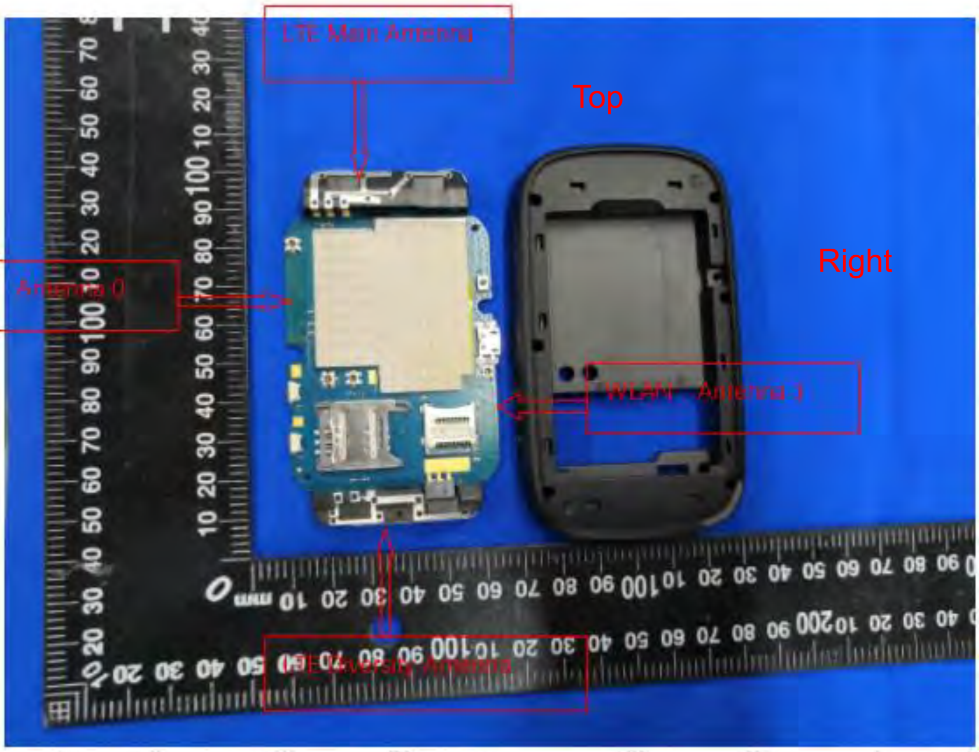
LTE Band 71			
Channel	Low	Middle	High
Tune-up(dB)	24	24	24

LTE Band 41					
Channel	Low	Middle1	Middle2	Middle3	High
Tune-up(dB)	24	24	24	24	24

LTE MPR will follow up 3GPP setting as below:

Modulation	Channel bandwidth / Transmission bandwidth (NRB)						MPR (dB)
	1.4MHz	3.0MHz	5MHz	10MHz	15MHz	20MHz	
QPSK	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	0
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	2

12. Antenna Location



Distance of The Antenna to the EUT surface and edge						
Antennas	**Front**	**Back**	**Top Side**	**Bottom Side**	**Left Side**	**Right Side**
WWAN	<25mm	<25mm	<25mm	>25mm	<25mm	<25mm
WLAN Ant0	<25mm	<25mm	<25mm	>25mm	<25mm	>25mm
WLAN Ant1	<25mm	<25mm	>25mm	<25mm	>25mm	<25mm

Positions for SAR tests; Hotspot mode						
Antennas	**Back**	**Front**	**Top side**	**Bottom side**	**Left Side**	**Right Side**
WWAN	Yes	Yes	Yes	No	Yes	Yes
WLAN Ant0	Yes	Yes	Yes	No	Yes	No
WLAN Ant1	Yes	Yes	No	Yes	No	Yes

General Note: Referring to KDB 941225 D06 v02, SAR must be measured for all sides and surfaces with a transmitting antenna located with 25mm from that surface or edge.

13.SAR Test Results Summary

General Note:

1. Per KDB 447498 D01v05r01, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   Scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   Reported SAR(W/kg)= Measured SAR(W/kg) Scaling Factor*
2. Per KDB 447498 D01v05r01, for each exposure position, if the highest output channel reported SAR≤0.8W/kg, other channels SAR testing are not necessary
3. Per KDB 941225 D05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05, smaller bandwidth SAR testing is not required.
8. Per KDB865664 D01, for each frequency band, **repeated SAR measurement is required** only when the measured SAR is ≥0.8W/Kg; if the deviation among the repeated measurement is ≤20%,and the measured SAR <1.45W/Kg, only one repeated measurement is required.

WCDMA Band II										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Test Plot
		CH	MHz							
RMC	Front	9262	1852.40	23.57	24	1.10	-	-	-	-
		9400	1880.00	23.63	24	1.09	0.06	0.111	0.121	-
		9538	1907.60	23.53	24	1.11	-	-	-	-
	Back	9262	1852.40	23.57	24	1.10	-	-	-	-
		9400	1880.00	23.63	24	1.09	-0.15	**0.162**	**0.176**	#1
		9538	1907.60	23.53	24	1.11	-	-	-	-
	Left	9400	1880.00	23.63	24	1.09	-0.26	0.077	0.084	-
	Right	9400	1880.00	23.63	24	1.09	0.16	0.087	0.095	-
	Top	9400	1880.00	23.63	24	1.09	0.05	0.084	0.091	-
	Bottom	9400	1880.00	23.63	24	1.09	-	-	-	-

WCDMA Band IV										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Test Plot
		CH	MHz							
RMC	Front	1312	1712.40	23.55	24	1.11	-	-	-	-
		1413	1732.60	23.43	24	1.14	-0.02	0.121	0.138	-
		1513	1752.60	23.37	24	1.16	-	-	-	-
	Back	1312	1712.40	23.55	24	1.11	-	-	-	-
		1413	1732.60	23.43	24	1.14	-0.04	0.177	0.202	#2
		1513	1752.60	23.37	24	1.16	-	-	-	-
	Left	1413	1732.60	23.43	24	1.14	0.03	0.084	0.096	-
	Right	1413	1732.60	23.43	24	1.14	-0.05	0.095	0.109	-
	Top	1413	1732.60	23.43	24	1.14	-0.02	0.092	0.104	-
	Bottom	1413	1732.60	23.43	24	1.14	-	-	-	-

WCDMA Band V										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Test Plot
		CH	MHz							
RMC	Front	4132	826.40	21.45	22.50	1.27	-	-	-	-
		4182	836.40	21.28	22.50	1.32	-0.04	0.069	0.092	-
		4233	846.60	21.05	22.50	1.40	-	-	-	-
	Back	4132	826.40	21.45	22.50	1.27	-	-	-	-
		4182	836.40	21.28	22.50	1.32	-0.10	0.101	0.134	#3
		4233	846.60	21.05	22.50	1.40	-	-	-	-
	Left	4182	836.40	21.28	22.50	1.32	0.07	0.048	0.063	-
	Right	4182	836.40	21.28	22.50	1.32	-0.13	0.054	0.072	-
	Top	4182	836.40	21.28	22.50	1.32	-0.05	0.052	0.069	-
	Bottom	4182	836.40	21.28	22.50	1.32	-	-	-	-

LTE Band 25										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Test Plot
		CH	MHz							
20M_1 RB	Front	26140	1860.00	23.37	24	1.16	-	-	-	-
		26365	1882.50	23.41	24	1.15	-0.05	0.114	0.130	-
		26590	1905.00	23.38	24	1.15	-	-	-	-
	Back	26140	1860.00	23.37	24	1.16	-	-	-	-
		26365	1882.50	23.41	24	1.15	0.11	0.172	0.197	#4
		26590	1905.00	23.38	24	1.15	-	-	-	-
	Left	26365	1882.50	23.41	24	1.15	-0.06	0.076	0.087	-
	Right	26365	1882.50	23.41	24	1.15	0.04	0.055	0.063	-
	Top	26365	1882.50	23.41	24	1.15	0.15	0.098	0.112	-
	Bottom	26365	1882.50	23.41	24	1.15	-	-	-	-
20M_5 0RB	Front	26140	1860.00	22.25	23	1.19	-	-	-	-
		26365	1882.50	22.3	23	1.17	-0.01	0.070	0.082	-
		26590	1905.00	22.25	23	1.19	-	-	-	-
	Back	26140	1860.00	22.25	23	1.19	-	-	-	-
		26365	1882.50	22.3	23	1.17	0.08	0.123	0.144	-
		26590	1905.00	22.25	23	1.19	-	-	-	-
	Left	26365	1882.50	22.3	23	1.17	-0.02	0.067	0.079	-
	Right	26365	1882.50	22.3	23	1.17	-0.02	0.041	0.048	-
	Top	26365	1882.50	22.3	23	1.17	0.09	0.056	0.066	-
	Bottom	26365	1882.50	22.3	23	1.17	-	-	-	-

Note:

Per KDB865664 D01v01r04, Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg

Per KDB 941225 D05v02r03, for QPSK with 100% RB allocation, SAR is not required when the highest maximumoutput power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations andthe highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highestoutput power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also betested.

LTE Band 66										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Test Plot
		CH	MHz							
20M_1 RB	Front	132072	1720.00	23.03	24	1.25	-	-	-	-
		132322	1745.00	23.1	24	1.23	0.04	0.125	0.154	-
		132572	1770.00	23.1	24	1.23	-	-	-	-
	Back	132072	1720.00	23.03	24	1.25	-	-	-	-
		132322	1745.00	23.1	24	1.23	0.17	0.269	0.331	#5
		132572	1770.00	23.1	24	1.23	-	-	-	-
	Left	132322	1745.00	23.1	24	1.23	-0.13	0.093	0.114	-
	Right	132322	1745.00	23.1	24	1.23	0.02	0.062	0.077	-
	Top	132322	1745.00	23.1	24	1.23	0.06	0.096	0.118	-
	Bottom	132322	1745.00	23.1	24	1.23	-	-	-	-
20M_5 0RB	Front	132072	1720.00	22.07	23	1.24	-	-	-	-
		132322	1745.00	22.14	23	1.22	-0.02	0.070	0.086	-
		132572	1770.00	22.13	23	1.22	-	-	-	-
	Back	132072	1720.00	22.07	23	1.24	-	-	-	-
		132322	1745.00	22.14	23	1.22	0.13	0.192	0.234	-
		132572	1770.00	22.13	23	1.22	-	-	-	-
	Left	132322	1745.00	22.14	23	1.22	-0.09	0.105	0.128	-
	Right	132322	1745.00	22.14	23	1.22	0.02	0.083	0.101	-
	Top	132322	1745.00	22.14	23	1.22	0.03	0.069	0.084	-
	Bottom	132322	1745.00	22.14	23	1.22	-	-	-	-

Note:

Per KDB865664 D01v01r04, Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg

Per KDB 941225 D05v02r03, for QPSK with 100% RB allocation, SAR is not required when the highest maximumoutput power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations andthe highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highestoutput power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also betested.

LTE Band 26										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Test Plot
		CH	MHz							
15M_1 RB	Front	26775	822.5	23.04	24	1.25	-	-	-	-
		26865	831.5	23.13	24	1.22	-0.01	0.227	0.277	-
		26965	841.5	23.02	24	1.25	-	-	-	-
	Back	26775	822.5	23.04	24	1.25	-	-	-	-
		26865	831.5	23.13	24	1.22	0.03	0.368	0.450	#6
		26965	841.5	23.02	24	1.25	-	-	-	-
	Left	26865	831.5	23.13	24	1.22	-0.01	0.174	0.213	-
	Right	26865	831.5	23.13	24	1.22	0.01	0.154	0.188	-
	Top	26865	831.5	23.13	24	1.22	0.01	0.190	0.232	-
	Bottom	26865	831.5	23.13	24	1.22	-	-	-	-
15M_3 6RB	Front	26775	822.5	22.08	23	1.24	-	-	-	-
		26865	831.5	22.18	23	1.21	-0.01	0.159	0.193	-
		26965	841.5	22.05	23	1.24	-	-	-	-
	Back	26775	822.5	22.08	23	1.24	-	-	-	-
		26865	831.5	22.18	23	1.21	0.02	0.263	0.318	-
		26965	841.5	22.05	23	1.24	-	-	-	-
	Left	26865	831.5	22.18	23	1.21	-0.01	0.143	0.173	-
	Right	26865	831.5	22.18	23	1.21	0.01	0.061	0.074	-
	Top	26865	831.5	22.18	23	1.21	0.03	0.150	0.181	-
	Bottom	26865	831.5	22.18	23	1.21	-	-	-	-

Note:

Per KDB865664 D01v01r04, Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg

Per KDB 941225 D05v02r03, for QPSK with 100% RB allocation, SAR is not required when the highest maximumoutput power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations andthe highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highestoutput power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also betested.

LTE Band 12										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Test Plot
		CH	MHz							
10M_1 RB	Front	23060	704	23.22	24	1.20	-	-	-	-
		23095	707.5	23.02	24	1.25	0.04	0.098	0.122	-
		23130	711	23.12	24	1.22	-	-	-	-
	Back	23060	704	23.22	24	1.20	-	-	-	-
		23095	707.5	23.02	24	1.25	-0.12	0.151	0.189	#7
		23130	711	23.12	24	1.22	-	-	-	-
	Left	23095	707.5	23.02	24	1.25	0.06	0.064	0.080	-
	Right	23095	707.5	23.02	24	1.25	-0.04	0.048	0.060	-
	Top	23095	707.5	23.02	24	1.25	-0.08	0.069	0.086	-
	Bottom	23095	707.5	23.02	24	1.25	-	-	-	-
10M_25RB	Front	23060	704	22.12	23	1.22	-	-	-	-
		23095	707.5	22.11	23	1.23	0.06	0.050	0.062	-
		23130	711	22.08	23	1.24	-	-	-	-
	Back	23060	704	22.12	23	1.22	-	-	-	-
		23095	707.5	22.11	23	1.23	-0.09	0.108	0.133	-
		23130	711	22.08	23	1.24	-	-	-	-
	Left	23095	707.5	22.11	23	1.23	0.07	0.070	0.085	-
	Right	23095	707.5	22.11	23	1.23	-0.03	0.057	0.070	-
	Top	23095	707.5	22.11	23	1.23	-0.01	0.049	0.061	-
	Bottom	23095	707.5	22.11	23	1.23	-	-	-	-

Note:

Per KDB865664 D01v01r04, Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg

Per KDB 941225 D05v02r03, for QPSK with 100% RB allocation, SAR is not required when the highest maximumoutput power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations andthe highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highestoutput power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also betested.

LTE Band 13											
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Test Plot
		CH	MHz							
10M_1 RB	Front	23230	782	23.31	23.00	1.17	0.06	0.118	0.138	-
	Back	23230	782	23.31	23.00	1.17	-0.12	0.172	0.202	#8
	Left	23230	782	23.31	23.00	1.17	0.07	0.079	0.115	-
	Right	23230	782	23.31	23.00	1.17	-0.04	0.057	0.083	-
	Top	23230	782	23.31	23.00	1.17	-0.16	0.102	0.118	-
	Bottom	23230	782	23.31	23.00	1.17	-	-	-	-
10M_2 5RB	Front	23230	782	22.36	23.00	1.16	0.01	0.072	0.084	-
	Back	23230	782	22.36	23.00	1.16	-0.09	0.128	0.150	-
	Left	23230	782	22.36	23.00	1.16	0.02	0.070	0.082	-
	Right	23230	782	22.36	23.00	1.16	0.02	0.042	0.050	-
	Top	23230	782	22.36	23.00	1.16	-0.10	0.058	0.069	-
	Bottom	23230	782	22.36	23.00	1.16	-	-	-	-

Note:

Per KDB865664 D01v01r04, Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg

Per KDB 941225 D05v02r03, for QPSK with 100% RB allocation, SAR is not required when the highest maximumoutput power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations andthe highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highestoutput power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also betested.

LTE Band 27										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Test Plot
		CH	MHz							
10M_1 RB	Front	27090	812	23.12	24	1.22	-	-	-	-
		27125	815.5	23.22	24	1.20	-0.03	0.118	0.141	-
		27160	819	23.09	24	1.23	-	-	-	-
	Back	27090	812	23.12	24	1.22	-	-	-	-
		27125	815.5	23.22	24	1.20	-0.12	0.253	0.303	#9
		27160	819	23.09	24	1.23	-	-	-	-
	Left	27125	815.5	23.22	24	1.20	0.09	0.087	0.104	-
	Right	27125	815.5	23.22	24	1.20	-0.02	0.059	0.070	-
	Top	27125	815.5	23.22	24	1.20	-0.04	0.090	0.108	-
	Bottom	27125	815.5	23.22	24	1.20	-	-	-	-
10M_25RB	Front	27090	812	22.15	23	1.22	-	-	-	-
		27125	815.5	22.25	23	1.19	0.01	0.066	0.079	-
		27160	819	22.12	23	1.22	-	-	-	-
	Back	27090	812	22.15	23	1.22	-	-	-	-
		27125	815.5	22.25	23	1.19	-0.09	0.181	0.215	-
		27160	819	22.12	23	1.22	-	-	-	-
	Left	27125	815.5	22.25	23	1.19	0.06	0.098	0.117	-
	Right	27125	815.5	22.25	23	1.19	-0.01	0.078	0.093	-
	Top	27125	815.5	22.25	23	1.19	-0.02	0.065	0.077	-
	Bottom	27125	815.5	22.25	23	1.19	-	-	-	-

Note:

Per KDB865664 D01v01r04, Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg

Per KDB 941225 D05v02r03, for QPSK with 100% RB allocation, SAR is not required when the highest maximumoutput power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations andthe highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highestoutput power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also betested.

LTE Band 41											
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Test Plot
		CH	MHz							
20M_1 RB	Front	39750	2506	23.28	24	1.18	-	-	-	-
		40185	2549.5	23.24	24	1.19	-	-	-	-
		40620	2593	23.29	24	1.18	0.05	0.246	0.290	-
		41055	2636.5	23.27	24	1.18	-	-	-	-
		41490	2680	23.24	24	1.19	-	-	-	-
	Back	39750	2506	23.28	24	1.18	-	-	-	-
		40185	2549.5	23.24	24	1.19	-	-	-	-
		40620	2593	23.29	24	1.18	-0.13	0.381	0.450	#10
		41055	2636.5	23.27	24	1.18	-	-	-	-
		41490	2680	23.24	24	1.19	-	-	-	-
	Left	40620	2593	23.29	24	1.18	0.07	0.162	0.191	-
	Right	40620	2593	23.29	24	1.18	-0.05	0.121	0.143	-
	Top	40620	2593	23.29	24	1.18	-0.08	0.174	0.205	-
	Bottom	40620	2593	23.29	24	1.18	-	-	-	-
20M_5 0RB	Front	39750	2506	22.33	23	1.17	-	-	-	-
		40185	2549.5	22.35	23	1.16	-	-	-	-
		40620	2593	22.38	23	1.15	0.06	0.127	0.146	-
		41055	2636.5	22.43	23	1.14	-	-	-	-
		41490	2680	22.3	23	1.17	-	-	-	-
	Back	39750	2506	22.33	23	1.17	-	-	-	-
		40185	2549.5	22.35	23	1.16	-	-	-	-
		40620	2593	22.38	23	1.15	-0.10	0.272	0.313	-
		41055	2636.5	22.43	23	1.14	-	-	-	-
		41490	2680	22.3	23	1.17	-	-	-	-
	Left	40620	2593	22.38	23	1.15	0.08	0.175	0.201	-
	Right	40620	2593	22.38	23	1.15	-0.04	0.145	0.167	-
	Top	40620	2593	22.38	23	1.15	-0.01	0.124	0.143	-
	Bottom	40620	2593	22.38	23	1.15	-	-	-	-

Note:

Per KDB865664 D01v01r04, Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg

Per KDB 941225 D05v02r03, for QPSK with 100% RB allocation, SAR is not required when the highest maximumoutput power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations andthe highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highestoutput power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also betested.

LTE Band 71										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Test Plot
		CH	MHz							
20M_1 RB	Front	133297	680.50	23.06	24	1.24	-0.02	0.119	0.148	-
	Back	133297	680.50	23.06	24	1.24	0.05	0.18	0.223	#11
	Left	133297	680.50	23.06	24	1.24	-0.03	0.079	0.097	-
	Right	133297	680.50	23.06	24	1.24	0.02	0.057	0.071	-
	Top	133297	680.50	23.06	24	1.24	0.07	0.103	0.126	-
	Bottom	133297	680.50	23.06	24	1.24	-	-	-	-
20M_5 0RB	Front	133297	680.50	22.1	23	1.23	-0.01	0.073	0.090	-
	Back	133297	680.50	22.1	23	1.23	0.04	0.129	0.151	-
	Left	133297	680.50	22.1	23	1.23	-0.01	0.070	0.082	-
	Right	133297	680.50	22.1	23	1.23	-0.01	0.043	0.050	-
	Top	133297	680.50	22.1	23	1.23	0.04	0.059	0.069	-
	Bottom	133297	680.50	22.1	23	1.23	-	-	-	-

Note:

Per KDB865664 D01v01r04, Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg

Per KDB 941225 D05v02r03, for QPSK with 100% RB allocation, SAR is not required when the highest maximumoutput power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations andthe highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highestoutput power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also betested.

WLAN Ant0										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Test Plot
		CH	MHz							
802.11b 1Mbps	Front	1	2412	13.39	14.0	1.15	0.18	0.082	0.094	-
		6	2437	13.27	14.0	1.18	-	-	-	-
		11	2462	13.25	14.0	1.19	-	-	-	-
	Back	1	2412	13.39	14.0	1.15	-0.19	0.134	0.154	#12
		6	2437	13.27	14.0	1.18	-	-	-	-
		11	2462	13.25	14.0	1.19	-	-	-	
	Left	1	2412	13.39	14.0	1.15	-0.14	0.046	0.053	-
	Right	1	2412	13.39	14.0	1.15	-	-	-	-
	Top	1	2412	13.39	14.0	1.15	-0.15	0.010	0.012	-
	Bottom	1	2412	13.39	14.0	1.15	-	-	-	-

Note:

According to the above table, the initial test position for body is “Back”, and its reported SAR is≤ 0.4W/kg. Thus further SAR measurement is not required for the other (remaining) test positions. Because the reported SAR of the highest measured maximum output power channel for the exposureconfiguration is ≤ 0.8W/kg, no further SAR testing is required for 802.11b DSSS in that exposureconfiguration.

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied. SAR is not required for the following 2.4 GHz OFDM conditions.

When KDB Publication 447498 D01 SAR test exclusion applies to the OFDM configuration.

When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg. the 802.11g/n is not required

WLAN- Scaled Reported SAR							
Mode	Test Position	Frequency		Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
		CH	MHz				
802.11b 1Mbps	Front	1	2412	98.96%	100%	0.094	0.095
	Back	1	2412	98.96%	100%	0.154	0.156
	Left	1	2412	98.96%	100%	0.053	0.054
	Top	1	2412	98.96%	100%	0.012	0.012

WLAN Ant1										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Test Plot
		CH	MHz							
802.11b 1Mbps	Front	1	2412	13.82	14.0	1.04	-	-	-	-
		6	2437	13.61	14.0	1.09	-	-	-	-
		11	2462	13.91	14.0	1.02	0.16	0.084	0.086	-
	Back	1	2412	13.82	14.0	1.04	-	-	-	-
		6	2437	13.61	14.0	1.09	-	-	-	-
		11	2462	13.91	14.0	1.02	-0.11	0.137	0.140	#13
	Left	6	2437	13.61	14.0	1.09	-	-	-	-
	Right	6	2437	13.61	14.0	1.09	-0.08	0.046	0.050	-
	Top	6	2437	13.61	14.0	1.09	-	-	-	-
	Bottom	6	2437	13.61	14.0	1.09	-0.14	0.071	0.077	-

Note:

According to the above table, the initial test position for body is “Back”, and its reported SAR is≤ 0.4W/kg. Thus further SAR measurement is not required for the other (remaining) test positions. Because the reported SAR of the highest measured maximum output power channel for the exposureconfiguration is ≤ 0.8W/kg, no further SAR testing is required for 802.11b DSSS in that exposureconfiguration.

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied. SAR is not required for the following 2.4 GHz OFDM conditions.

When KDB Publication 447498 D01 SAR test exclusion applies to the OFDM configuration.

When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg. the 802.11g/n is not required

WLAN- Scaled Reported SAR							
Mode	Test Position	Frequency		Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
		CH	MHz				
802.11b 1Mbps	Front	11	2462	98.96%	100%	0.086	0.087
	Back	11	2462	98.96%	100%	0.140	0.141
	Right	11	2462	98.96%	100%	0.050	0.051
	Bottom	11	2462	98.96%	100%	0.077	0.078

Note:

According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. A maximum transmission duty factor of 98.96% is achievable for WLAN in this project.

14.SAR Measurement Variability

SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. The following procedures are applied to determine if repeated measurements are required.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.

2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.

3) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.

15.Simultaneous Transmission Analysis

No.	Simultaneous Transmission Configurations	Body	Note
1	WCDMA (data) + WIFI 2.4G (data)	Yes	
2	LTE + WIFI FI.4G (data)	Yes	

General note:

1. EUT will choose either WCDMA LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.
2. The reported SAR summation is calculated based on the same configuration and test position

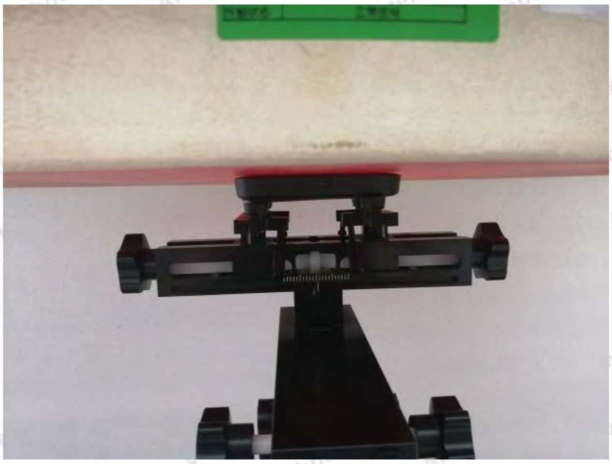
Frequency Band	Highest Reported 1g-SAR(W/Kg)
WCDMA II	0.176
WCDMA IV	0.202
WCDMA V	0.134
LTE Band 25	0.197
LTE Band 2	NA
LTE Band 66	0.331
LTE Band 4	NA
LTE Band 26	0.45
LTE Band 5	NA
LTE Band 12	0.189
LTE Band 17	NA
LTE Band 13	0.202
LTE Band 27	0.303
LTE Band 41	0.45
LTE Band 71	0.223
WIFI2.4G Ant0	0.156
WIFI2.4G Ant1	0.141
Simultaneous SAR (WWAN+WLAN Ant0 + WLAN Ant1)	0.747

16.Measurement Uncertainty

NO	Source	Uncert. ai（%）	Prob. Dist.	Div. k	ci (1g)	ci (10g)	Stand.Uncert. ui (1g)	Stand.Uncert. ui (10g)	*Veff*
1	Repeat	0. 4	N	1	1	1	0. 4	0. 4	9
Instrument									
2	Probe calibration	7	N	2	1	1	3.5	3.5	∞
3	Axial isotropy	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
4	Hemispherical isotropy	9.4	R	$\sqrt{3}$	0.7	0.7	3.9	3.9	∞
5	Boundary effect	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
6	Linearity	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
7	Detection limits	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
8	Readout electronics	0.3	N	1	1	1	0.3	0.3	∞
9	Response time	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
10	Integration time	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
11	Ambient noise	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
12	Ambient reflections	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
13	Probe positioner mech. restrictions	0.4	R	$\sqrt{3}$	1	1	0.2	0.2	∞
14	Probe positioning with respect to phantom shell	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
15	Max.SAR evaluation	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞

Test sample related									
16	Device positioning	3.8	N	1	1	1	3.8	3.8	99
17	Device holder	5.1	N	1	1	1	5.1	5.1	5
18	Drift of output power	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up									
19	Phantom uncertainty	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
20	Liquid conductivity (target)	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
21	Liquid conductivity (meas)	2.5	N	1	0.64	0.43	1.6	1.2	∞
22	Liquid Permittivity (target)	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.5	∞
23	Liquid Permittivity (meas)	2.5	N	1	0.6	0.49	1.5	1.2	∞
Combined standard			RSS	$U_C=\sqrt{\sum_{i=1}^{n}C_i^2U_i^2}$			11.4%	11.3%	236
Expanded uncertainty(P=95%)		$U=k\,U_C$,k=2					**22.8%**	**22.6%**	

Appendix A. EUT Photos and Test Setup Photos


Front Side (0mm)


Rear Side (0mm)


Left Side (0mm)


Right Side (0mm)


Top Side (0mm)


Bottom Side (0mm)

Appendix B. Plots of SAR System Check

System Performance Check at 750 MHz Head

Date: 10/30/2020

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1163

Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used: f =750MHz; σ = 0.87 mho/m; εr = 41.87; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(9.82, 9.82, 9.82); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 387; Calibrated: 9/6/2020
- Phantom: ELI 4.0; Type: QDOVA001BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (61x131x1): Measurement grid: dx=15.00 mm, dy=15.00 mm

Maximum value of SAR (interpolated) = 2.03 mW/g

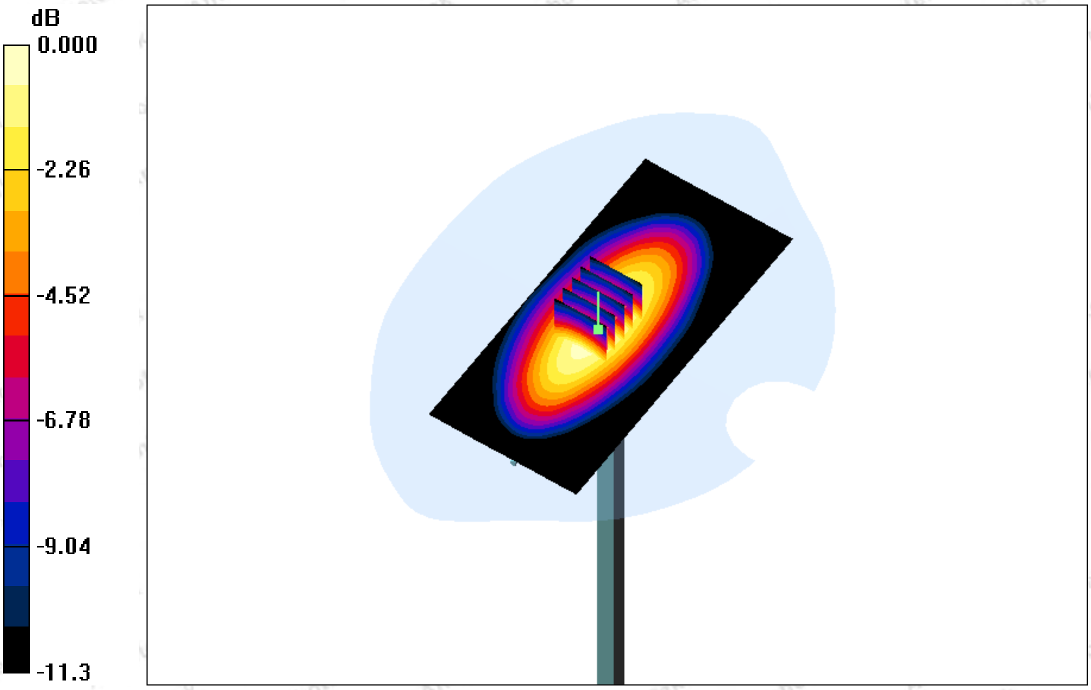
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 47.4 V/m; Power Drift = -0.091 dB

Peak SAR (extrapolated) = 2.96 W/kg

SAR(1 g) = 2.15mW/g; SAR(10 g) = 1.25 mW/g

Maximum value of SAR (measured) = 2.10 mW/g



System Performance Check 750MHz Head 250mW

System Performance Check at 835 MHz Head

Date: 10/31/2020

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d154

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: f =835MHz; σ = 0.95 mho/m; εr = 42.32; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(9.71, 9.71, 9.71); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 387; Calibrated: 9/6/2020
- Phantom: ELI 4.0; Type: QDOVA001BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (61x61x1): Measurement grid: dx=15.00 mm, dy=15.00 mm

Maximum value of SAR (interpolated) = 2.82 mW/g

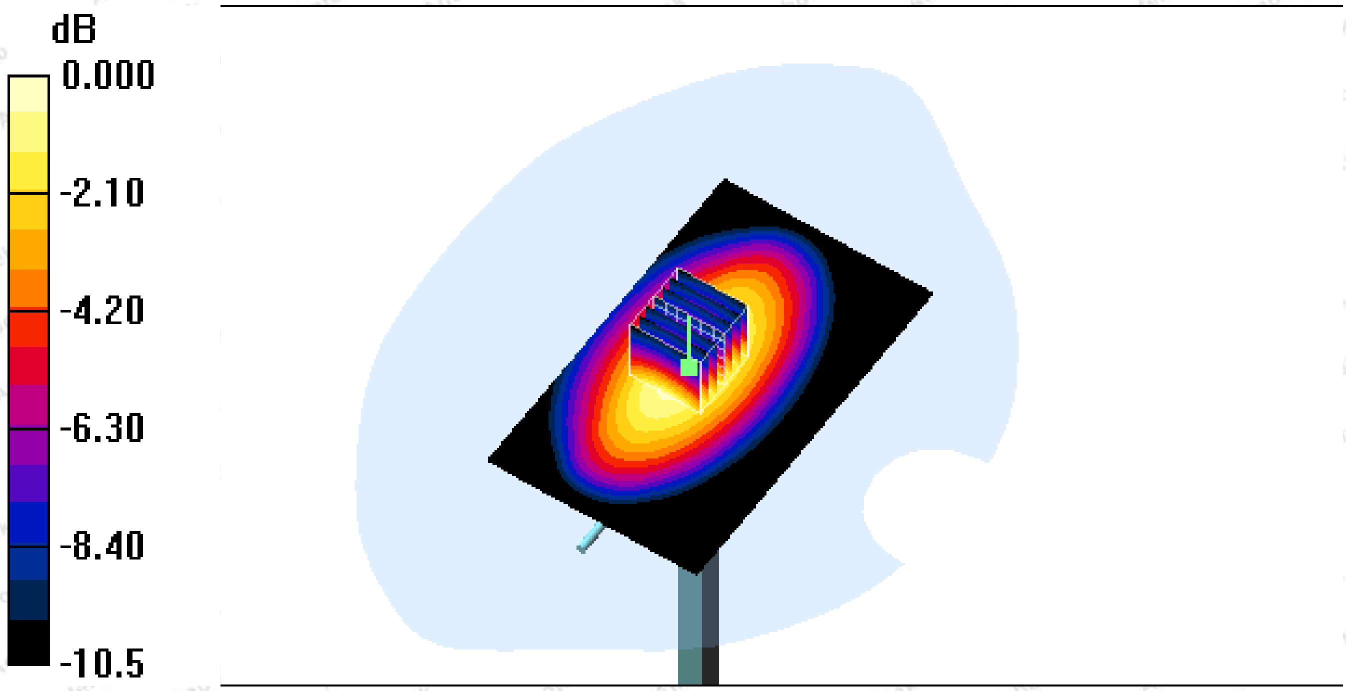
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 54.523 V/m; Power Drift = -0.01dB

Peak SAR (extrapolated) = 4.068 W/kg

SAR(1 g) = 2.32mW/g; SAR(10 g) = 1.68 mW/g

Maximum value of SAR (measured) = 2.90 mW/g



System Performance Check 835MHz Head 250mW

System Performance Check at 1750 MHz Head

Date: 11/1/2020

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1021

Communication System: CW; Frequency: 1750MHz; Duty Cycle: 1:1

Medium parameters used: f =1750MHz; σ = 1.39 mho/m; εr = 39.84; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(8.61, 8.61, 8.61); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 387; Calibrated: 9/6/2020
- Phantom: ELI 4.0; Type: QDOVA001BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (61x61x1): Measurement grid: dx=15.00 mm, dy=15.00 mm

Maximum value of SAR (interpolated) = 8.60 mW/g

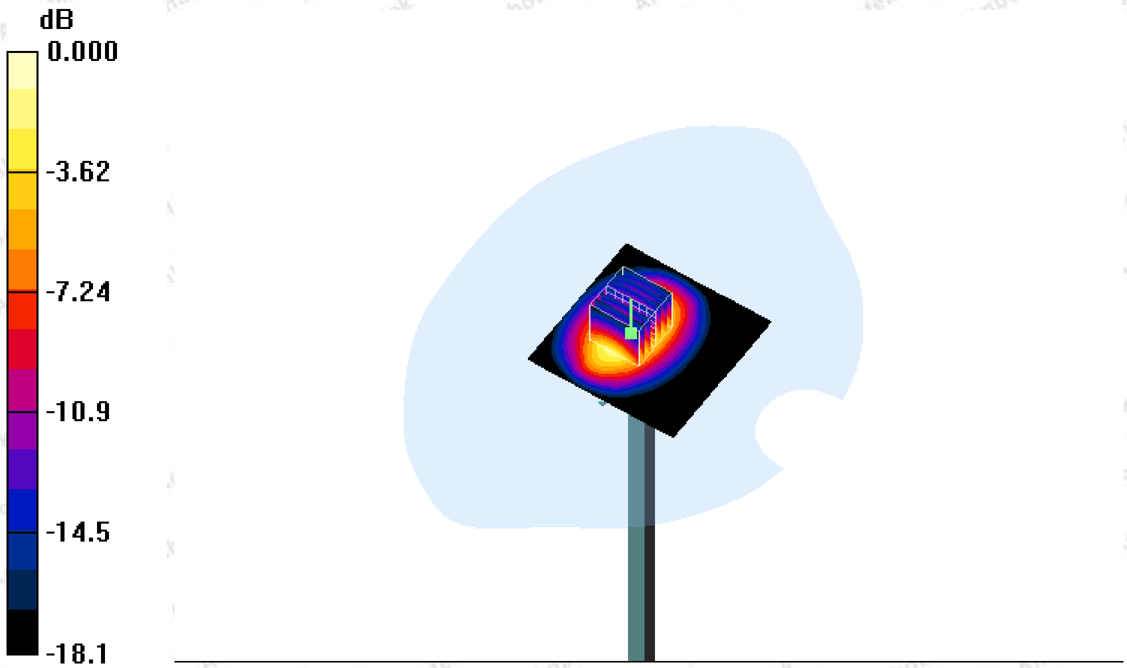
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 83.712 V/m; Power Drift = 0.03dB

Peak SAR (extrapolated) = 16.718 W/kg

SAR(1 g) = 9.24mW/g; SAR(10 g) = 4.64 mW/g

Maximum value of SAR (measured) = 9.95 mW/g



System Performance Check 1750MHz Head 250mW

System Performance Check at 1900 MHz Head

Date: 11/1/2020

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d175

Communication System: CW; Frequency: 1900MHz; Duty Cycle: 1:1

Medium parameters used: f =1900MHz; σ = 1.35 mho/m; εr = 40.15; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(8.13, 8.13, 8.13); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 387; Calibrated: 9/6/2020
- Phantom: ELI 4.0; Type: QDOVA001BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (61x61x1): Measurement grid: dx=15.00 mm, dy=15.00 mm

Maximum value of SAR (interpolated) = 11.3 mW/g

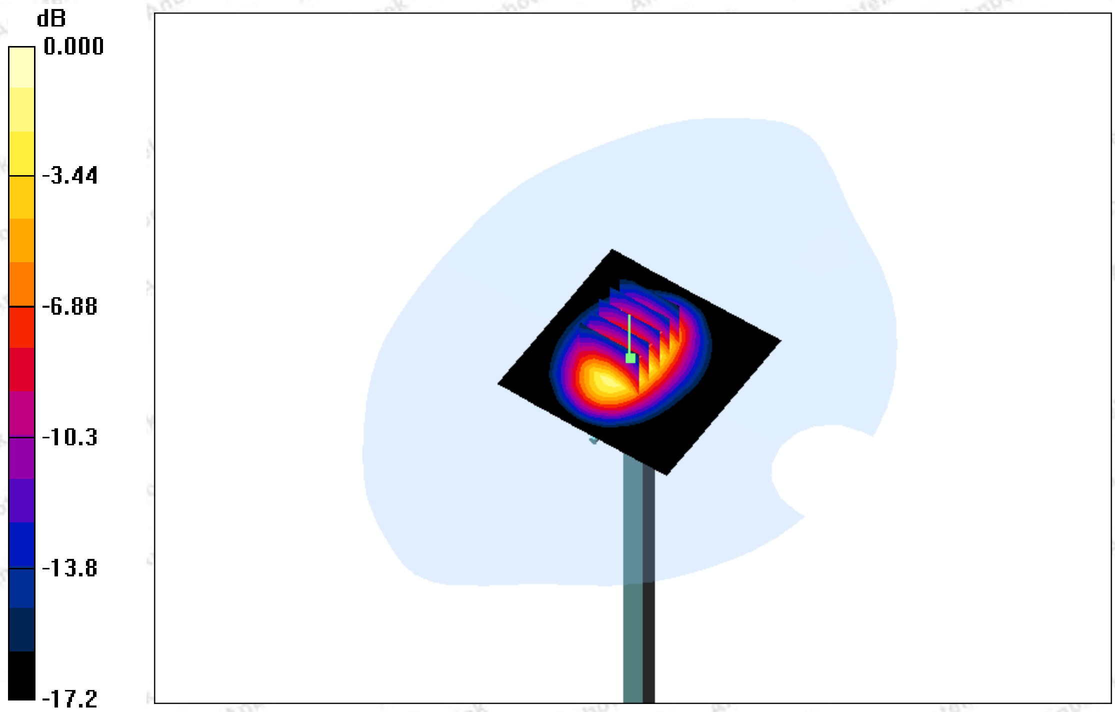
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 80.6 V/m; Power Drift = -0.005 dB

Peak SAR (extrapolated) = 17.5 W/kg

SAR(1 g) = 10.12mW/g; SAR(10 g) = 5.28mW/g

Maximum value of SAR (measured) = 11.24 mW/g



System Performance Check 1900MHz Head 250mW

System Performance Check at 2450 MHz Head

Date: 11/3/2020

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 910

Communication System: CW; Frequency: 2450MHz; Duty Cycle: 1:1

Medium parameters used: f =2450MHz; σ = 1.76 mho/m; εr = 38.93; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(7.57, 7.57, 7.57); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 387; Calibrated: 9/6/2020
- Phantom: ELI 4.0; Type: QDOVA001BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (61x61x1): Measurement grid: dx=15.00 mm, dy=15.00 mm

Maximum value of SAR (interpolated) = 16.7 mW/g

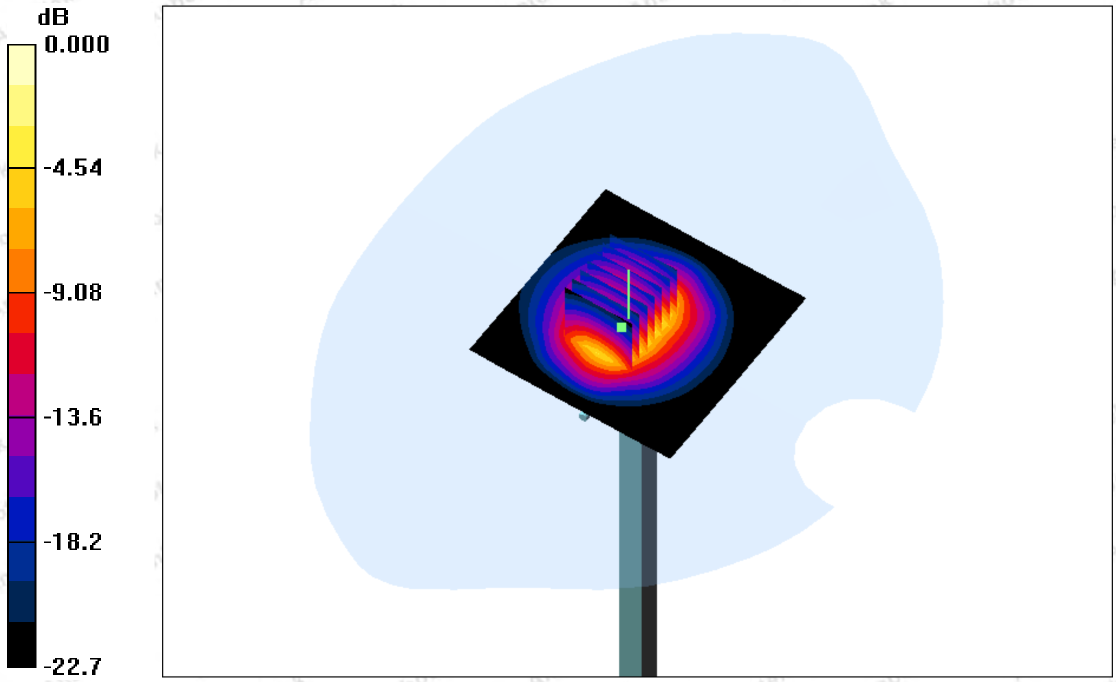
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 87.0 V/m; Power Drift = 0.019 dB

Peak SAR (extrapolated) = 30.7 W/kg

SAR(1 g) = 13.08mW/g; SAR(10 g) = 6.24mW/g

Maximum value of SAR (measured) = 16.07mW/g



System Performance Check 2450MHz Head 250mW

System Performance Check at 2600 MHz Head

Date: 11/3/2020

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1058

Communication System: CW; Frequency: 2600MHz; Duty Cycle: 1:1

Medium parameters used: f =2600MHz; σ =1.89 mho/m; εr = 38.55; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(7.38, 7.38, 7.38); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 387; Calibrated: 9/6/2020
- Phantom: ELI 4.0; Type: QDOVA001BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (61x61x1): Measurement grid: dx=15.00 mm, dy=15.00 mm

Maximum value of SAR (interpolated) = 21.1 mW/g

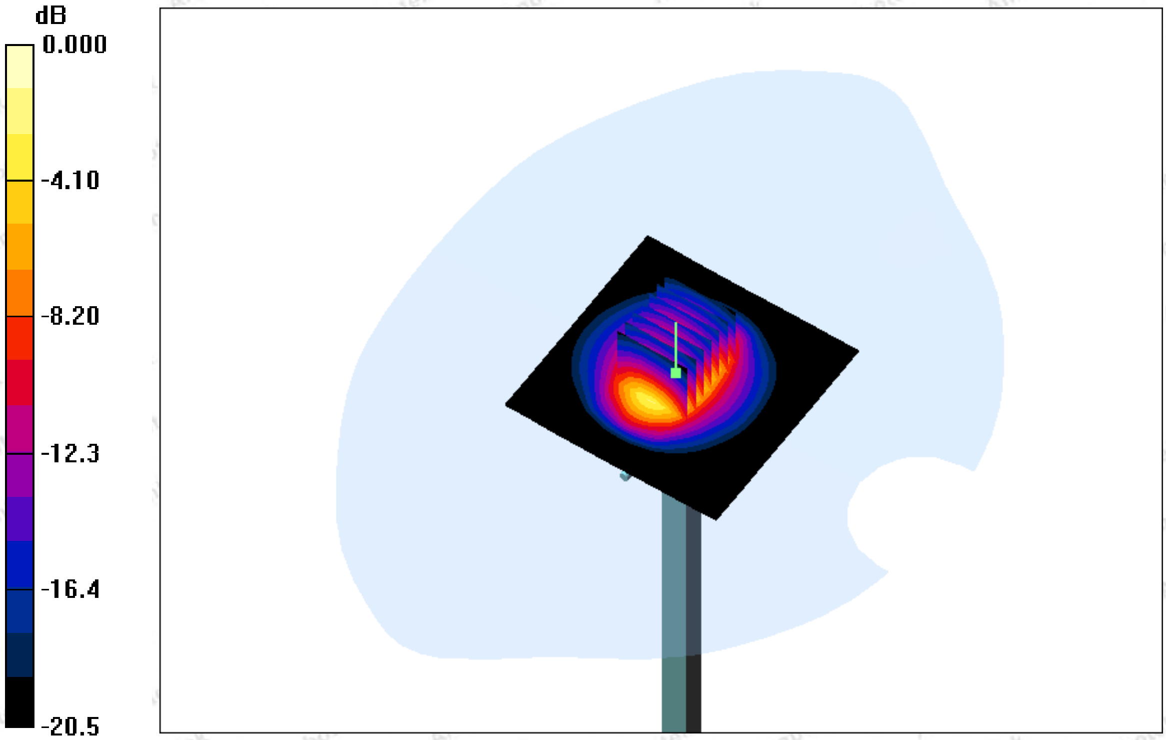
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 84.1 V/m; Power Drift = 0.032 dB

Peak SAR (extrapolated) = 30.2 W/kg

SAR(1 g) = 14.27mW/g; SAR(10 g) = 6.50mW/g

Maximum value of SAR (measured) =19.73mW/g



System Performance Check 2600MHz Head 250mW

Appendix C. Plots of SAR Test Data

SAR plots for **the highest measured SAR** in each exposure configuration, wireless mode and frequency band combination according to FCC KDB 865664 D02

WCDMA Band II_RCM

Date: 11/1/2020

Communication System: W1900; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1880 MHz; σ = 1.36 mho/m; εr = 39.8; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(8.13, 8.13, 8.13); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 387; Calibrated: 9/6/2020
- Phantom: ELI 4.0; Type: QDOVA001BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (51x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) =0.166 W/kg

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

Reference Value = 8.670 V/m; Power Drift = -0.15 dB

Peak SAR (extrapolated) = 0.220 mW/g

SAR(1 g) = 0.162 mW/g; SAR(10 g) = 0.132 mW/g

Maximum value of SAR (measured) = 0.169 W/kg

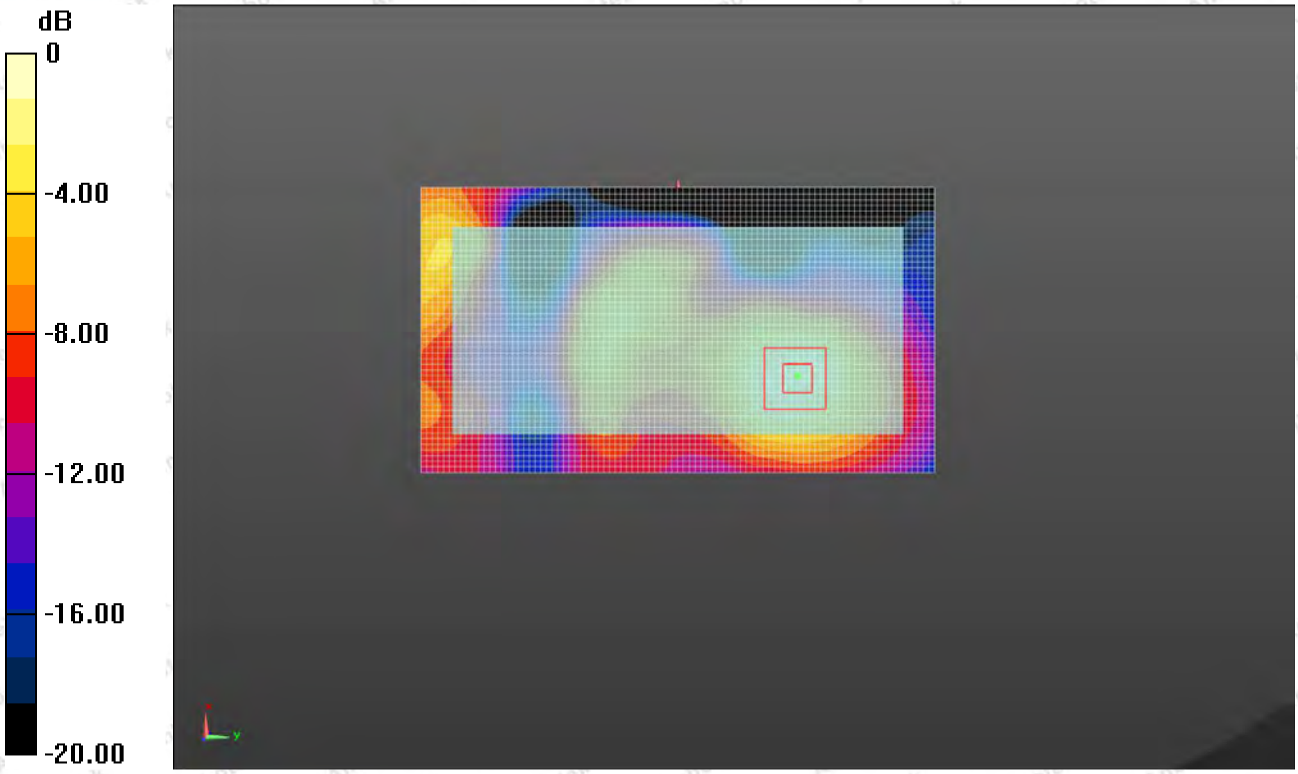


Figure 1: WCDMA Band II_RCM

WCDMA Band IV_RCM

Date: 11/1/2020

Communication System: LTE B4; Frequency: 1732.6 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1732.6 MHz; σ = 1.34 mho/m; εr = 41.5; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(8.61, 8.61, 8.61); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 387; Calibrated: 9/6/2020
- Phantom: ELI 4.0; Type: QDOVA001BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (51x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) =0.181 W/kg

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

Reference Value = 9.299 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.197 mW/g

SAR(1 g) = 0.177 mW/g; SAR(10 g) = 0.158 mW/g

Maximum value of SAR (measured) = 0.181 W/kg

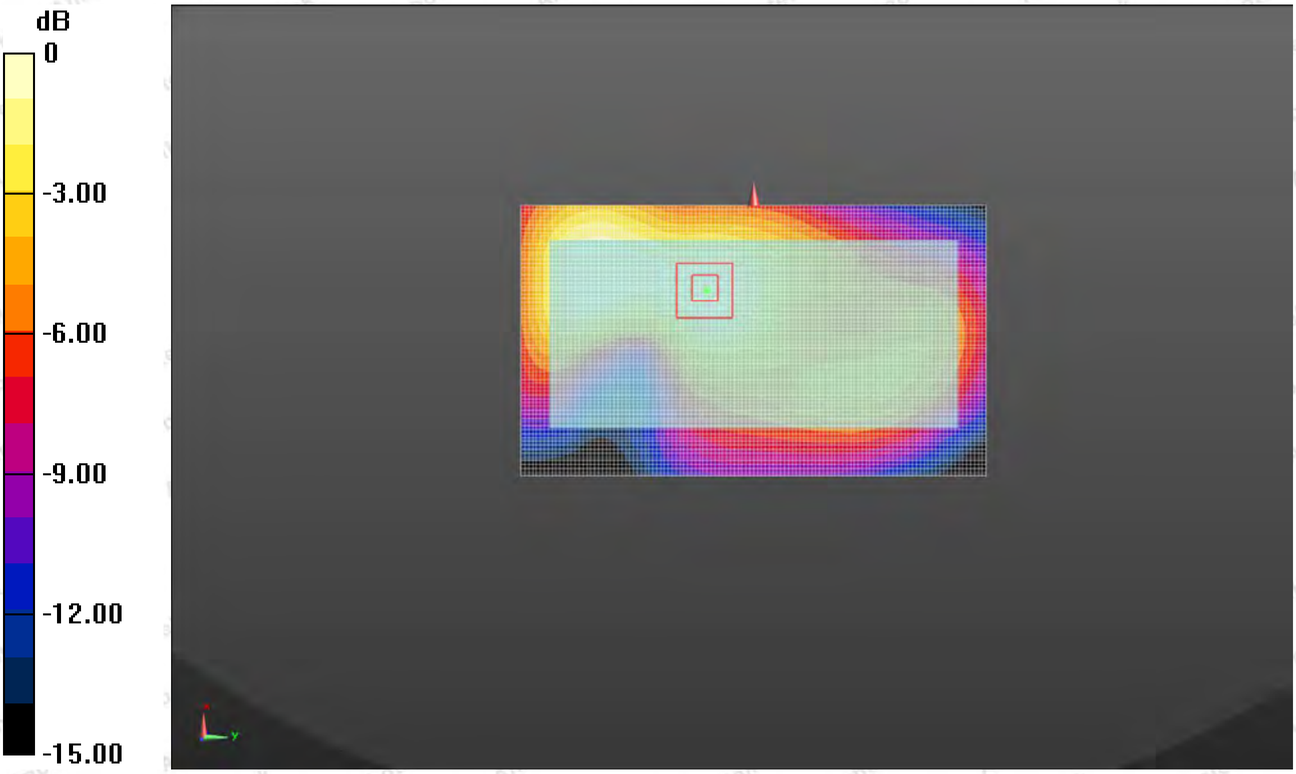


Figure 2: WCDMA Band IV_RCM

WCDMA Band V_RCM

Date: 10/31/2020

Communication System: W850; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): f = 837 MHz; σ = 0.898 mho/m; εr = 41.4; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF((9.71, 9.71, 9.71); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 387; Calibrated: 9/6/2020
- Phantom: ELI 4.0; Type: QDOVA001BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (51x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) =0.110 W/kg

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

Reference Value = 6.346 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 0.153 mW/g

SAR(1 g) = 0.101 mW/g; SAR(10 g) = 0.065 mW/g

Maximum value of SAR (measured) = 0.110 W/kg

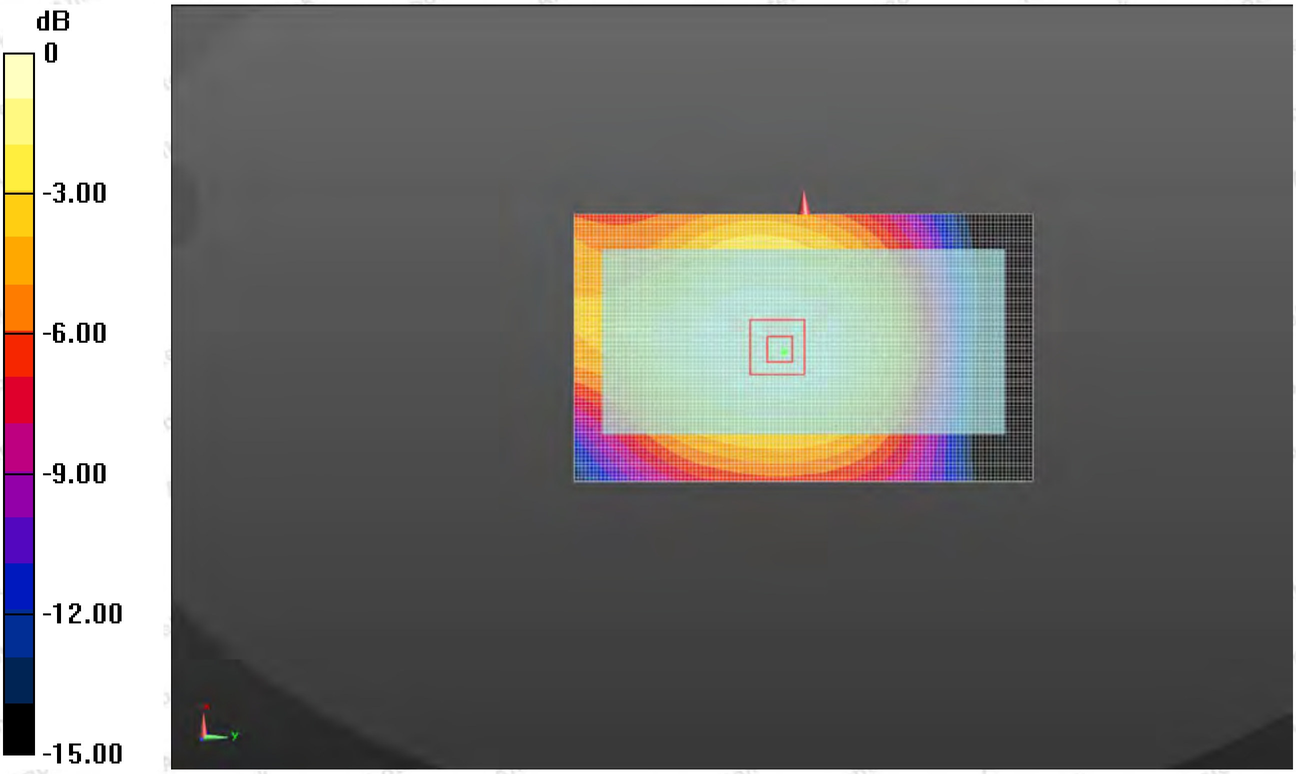


Figure 3: WCDMA Band V_RCM _ Rear side_0mm

LTE Band 25_QPSK

Date: 11/1/2020

Communication System: Customer System; Frequency: 1882.50 MHz;Duty Cycle:1:1

Medium parameters used (interpolated): f =1882.50MHz; σ = 1.41 mho/m; ε = 40.01; ρ=1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(8.13, 8.13, 8.13); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 387; Calibrated: 9/6/2020
- Phantom: ELI 4.0; Type: QDOVA001BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (51x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.184 W/kg

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

Reference Value = 8.313 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 0.261 mW/g

SAR(1 g) = 0.172 mW/g; SAR(10 g) = 0.109 mW/g

Maximum value of SAR (measured) = 0.185 W/kg

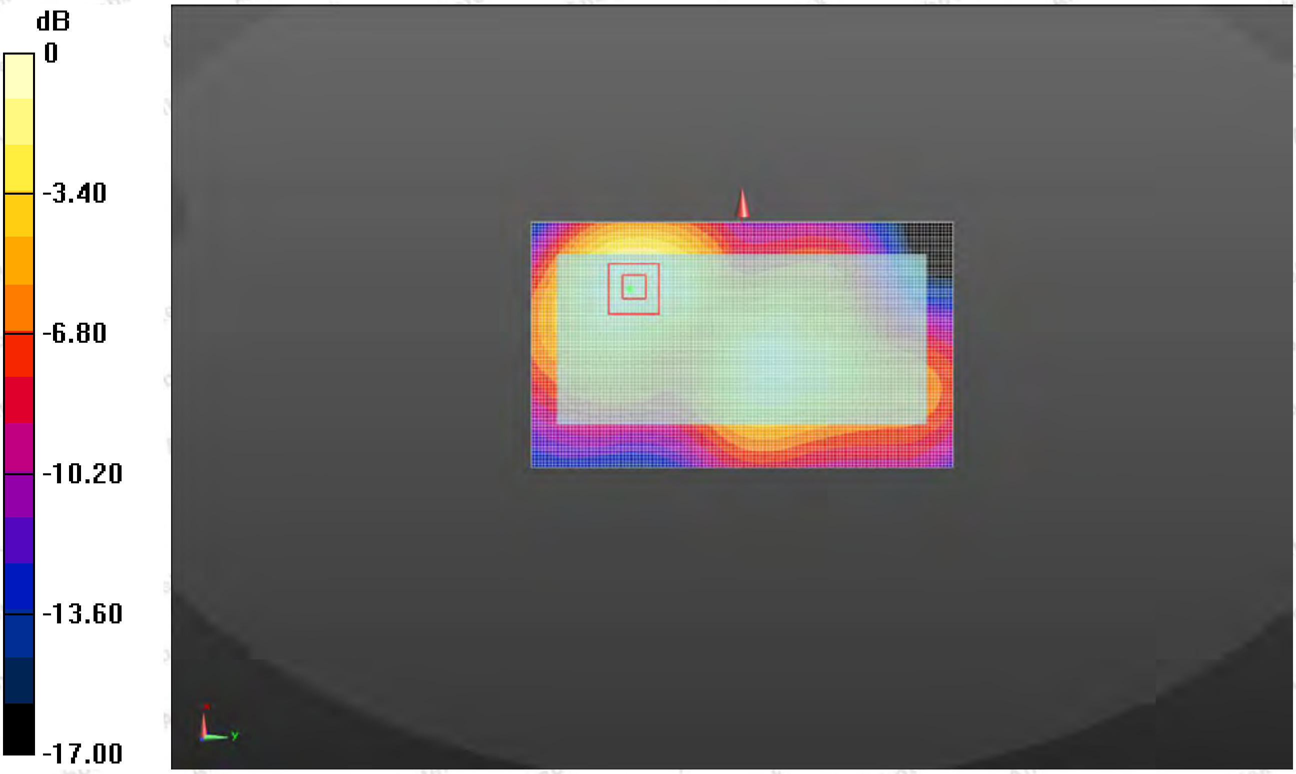


Figure 4: LTE Band 25_QPSK

LTE Band 66_QPSK _Rear side_0mm

Date: 11/1/2020

Communication System: LTE B66; Frequency: 1745.0 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1745.0 MHz; σ = 1.34 mho/m; εr = 41.5; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(8.61, 8.61, 8.61); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 387; Calibrated: 9/6/2020
- Phantom: ELI 4.0; Type: QDOVA001BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (51x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) =0.287 W/kg

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

Reference Value = 13.015 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.386 mW/g

SAR(1 g) = 0.269 mW/g; SAR(10 g) = 0.184 mW/g

Maximum value of SAR (measured) = 0.285 W/kg

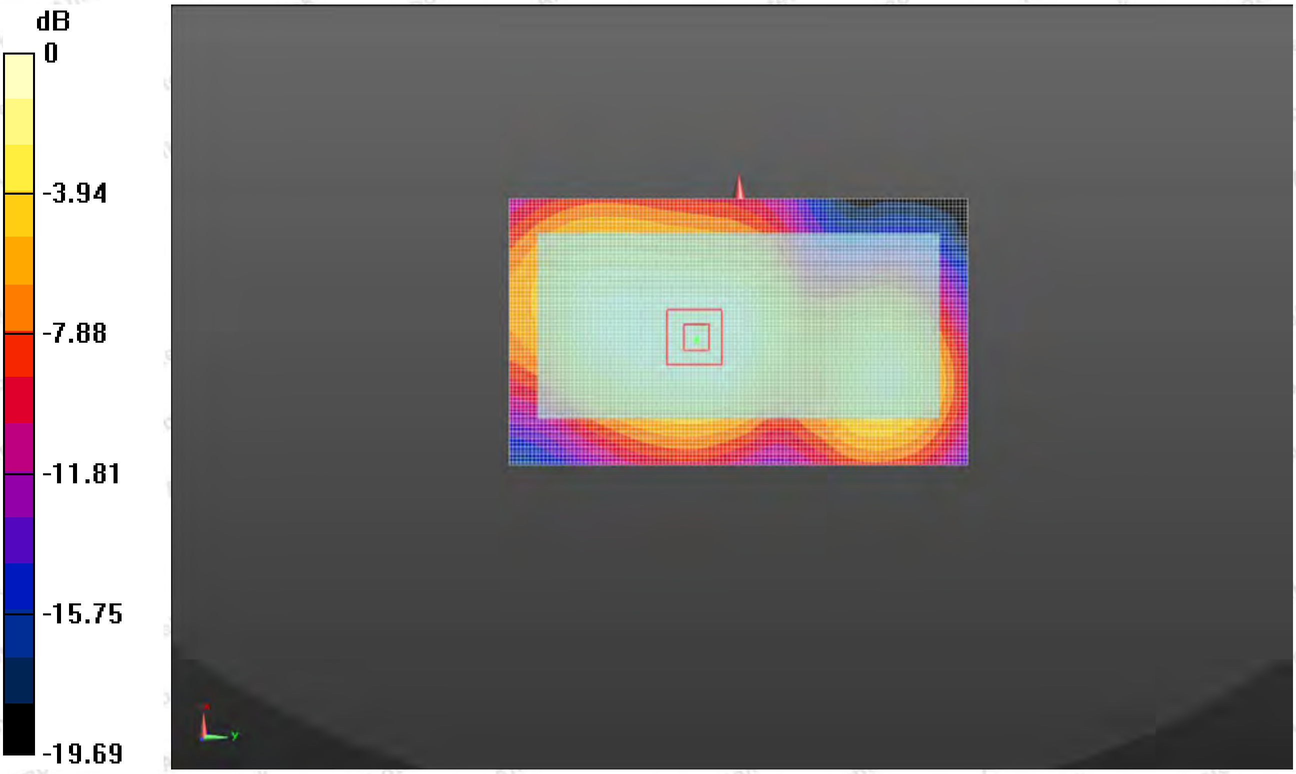


Figure 5: LTE Band 66_QPSK

LTE Band 26_QPSK _Rear side_0mm

Date: 10/31/2020

Communication System: Customer System; Frequency: 831.5 MHz;Duty Cycle:1:1
Medium parameters used (interpolated): f =831.5 MHz; σ = 1.91 mho/m; εr=41.48; ρ=1000 kg/m3
Phantom section: Flat Section
DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(9.71, 9.71, 9.71); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 387; Calibrated: 9/6/2020
- Phantom: ELI 4.0; Type: QDOVA001BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (51x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.425 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.165 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.517 mW/g
SAR(1 g) = 0.368 mW/g; SAR(10 g) = 0.259 mW/g
Maximum value of SAR (measured) = 0.419 W/kg

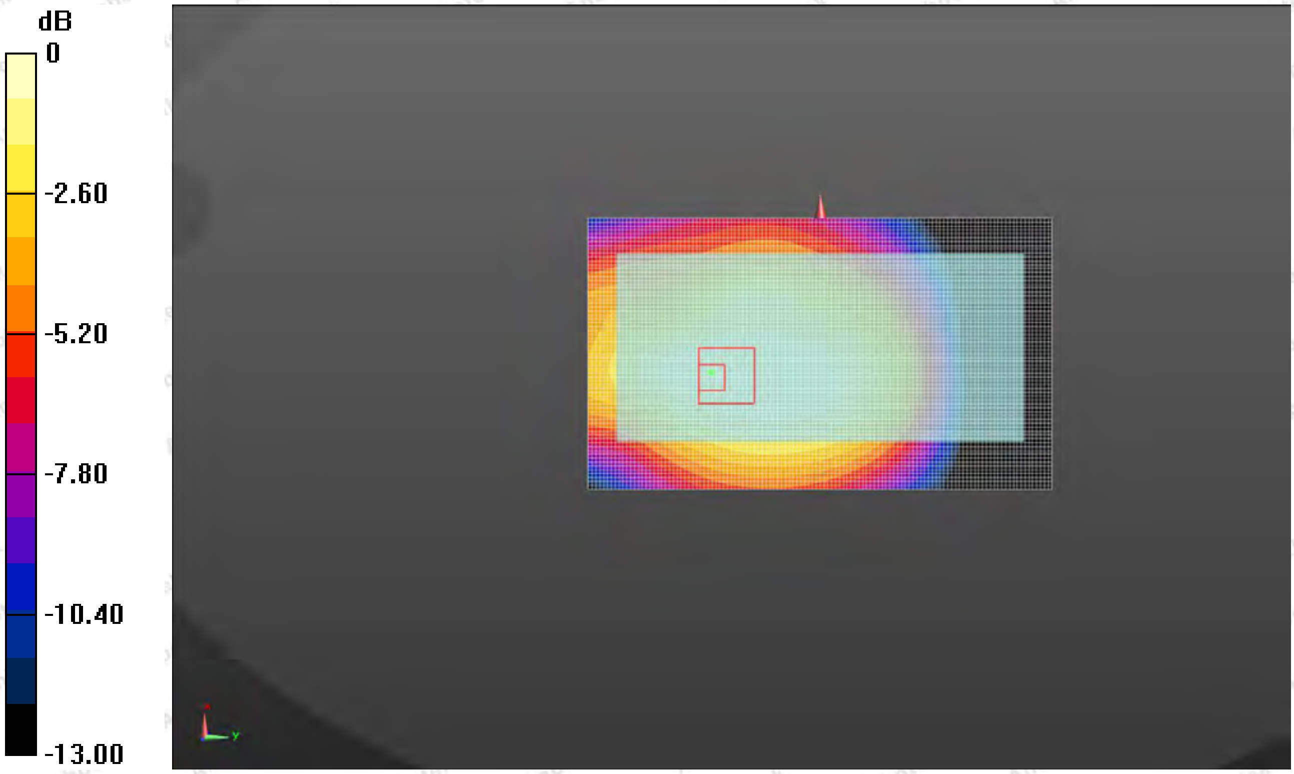


Figure 6: LTE Band 26 _QPSK _ Rear side

LTE Band 12_QPSK _Rear side

Date: 10/30/2020

Communication System: Generic LTE; Frequency: 707.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.86 mho/m; εr = 42.412; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(9.82, 9.82, 9.82); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 387; Calibrated: 9/6/2020
- Phantom: ELI 4.0; Type: QDOVA001BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (51x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.164W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.624 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 0.240 mW/g

SAR(1 g) = 0.151 mW/g; SAR(10 g) = 0.092 mW/g

Maximum value of SAR (measured) = 0.166 W/kg

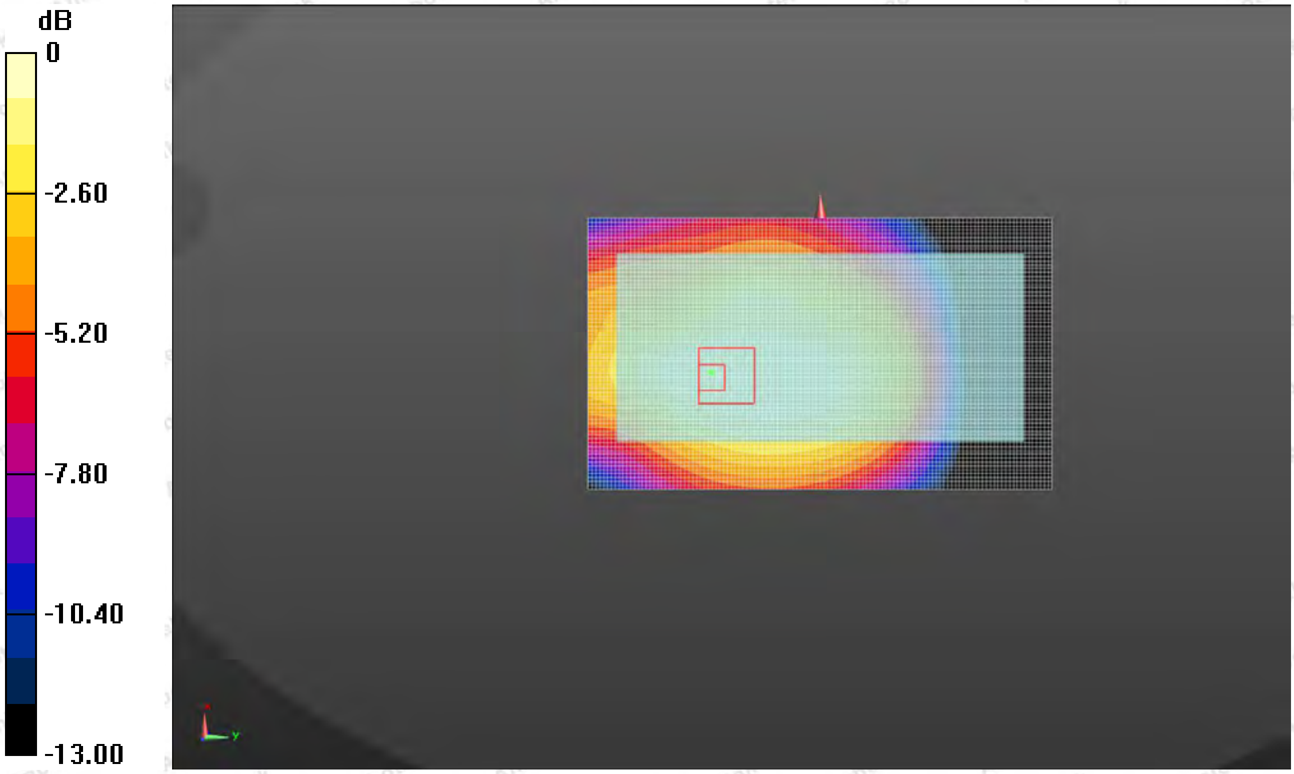


Figure 7: LTE Band 12 _QPSK _ Rear side

LTE Band 13_QPSK _

Date: 10/30/2020

Communication System: Customer System; Frequency: 782 MHz;Duty Cycle:1:1

Medium parameters used (interpolated): f=782 MHz; σ=0.90 S/m; εr=41.86; ρ=1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(9.82, 9.82, 9.82); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 387; Calibrated: 9/6/2020
- Phantom: ELI 4.0; Type: QDOVA001BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (121x181x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) =0.212 W/kg

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7mm, dy=7mm, dz=5mm

Reference Value = 13.255 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 0.259 mW/g

SAR(1 g) = 0.172 mW/g; SAR(10 g) = 0.107 mW/g

Maximum value of SAR (measured) = 0.219 W/kg

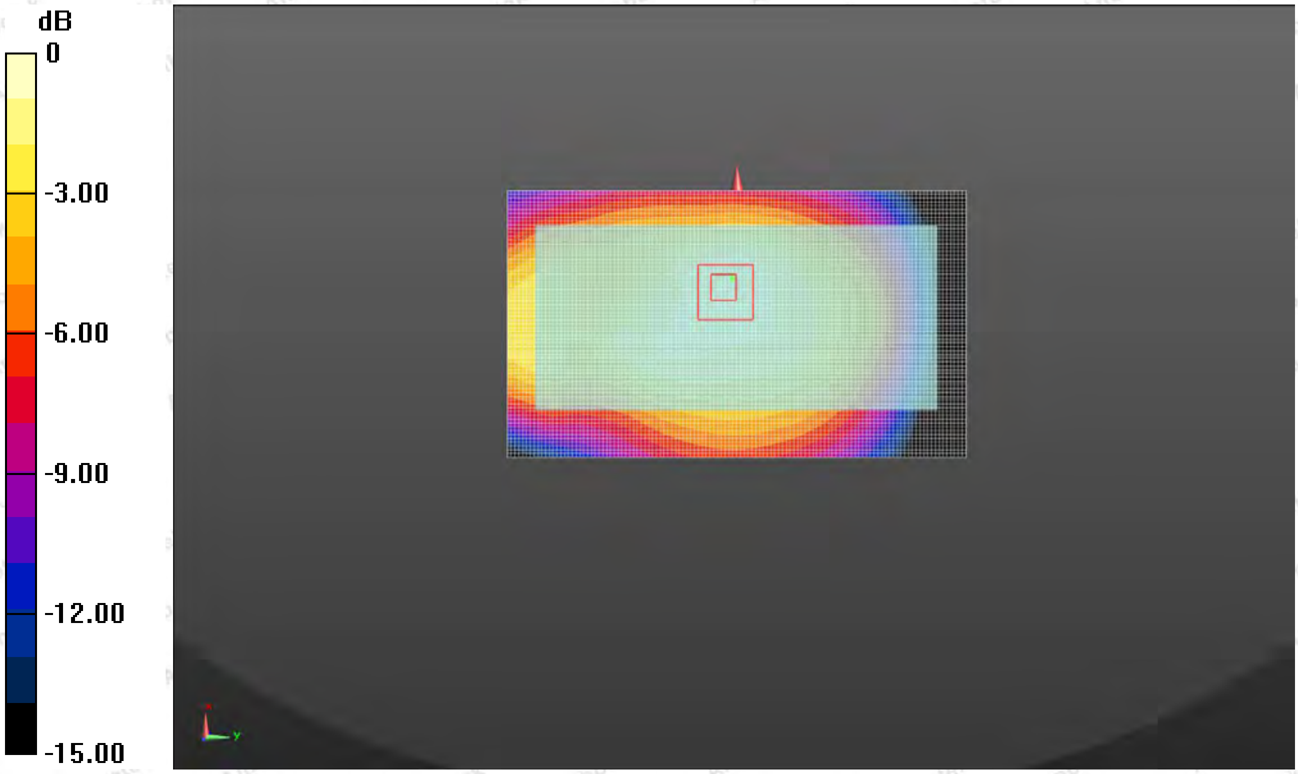


Figure 8: LTE Band 13_QPSK

LTE Band 27_QPSK

Date: 10/31/2020

Communication System: Customer System; Frequency: 815.5 MHz;Duty Cycle:1:1

Medium parameters used (interpolated): f =815.5 MHz; σ = 0.91 mho/m; εr=41.59; ρ=1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(9.71, 9.71, 9.71); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 387; Calibrated: 9/6/2020
- Phantom: ELI 4.0; Type: QDOVA001BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (51x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) =0.284 W/kg

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

Reference Value = 6.042 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 0.491 mW/g

SAR(1 g) = 0.253 mW/g; SAR(10 g) = 0.128 mW/g

Maximum value of SAR (measured) = 0.288 W/kg

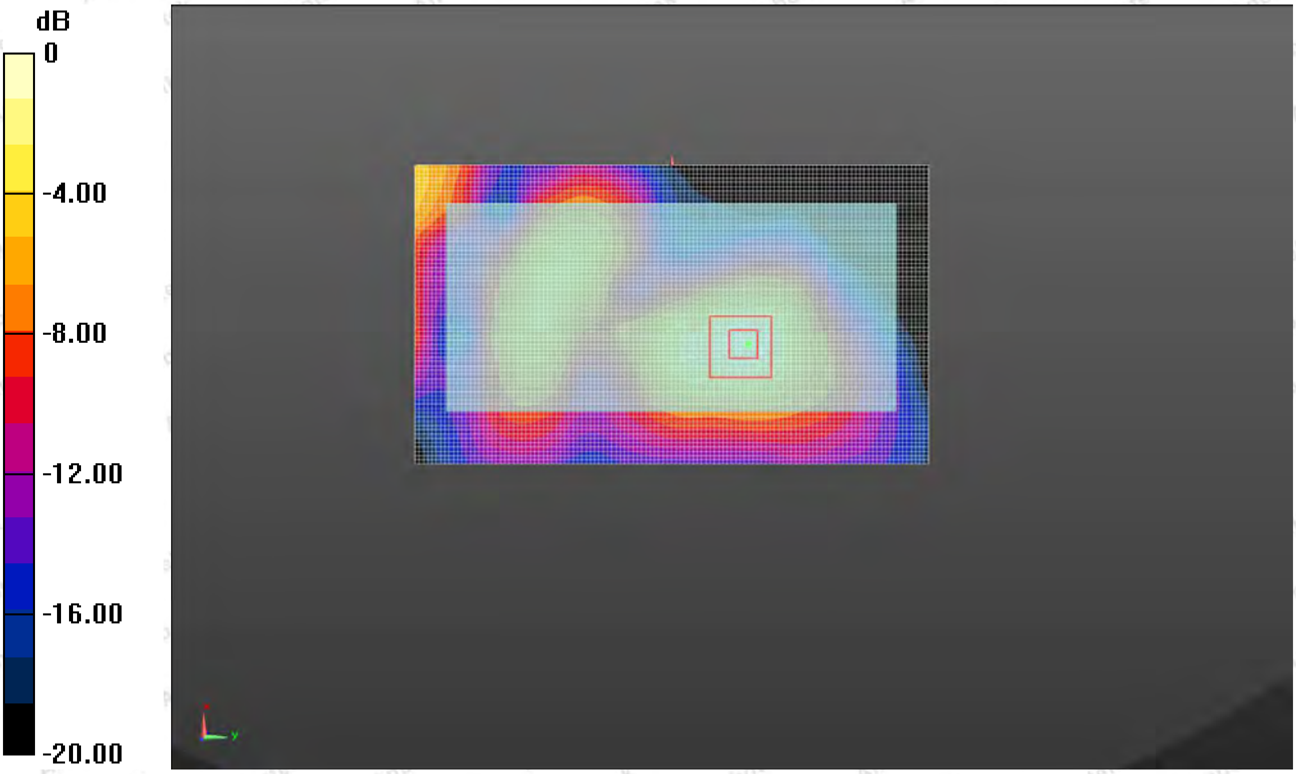


Figure 9: LTE Band 27 _QPSK _ Rear side

LTE Band 41_QPSK

Date: 11/3/2020

Communication System: Customer System; Frequency: 2593.0 MHz;Duty Cycle:1:1

Medium parameters used (interpolated): f =2593.0 MHz; σ = 1.93 mho/m; ε = 38.85; ρ=1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(7.38, 7.38, 7.38); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 387; Calibrated: 9/6/2020
- Phantom: ELI 4.0; Type: QDOVA001BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) =0.501 W/kg

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

Reference Value = 7.136 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.550 mW/g

SAR(1 g) = 0.381 mW/g; SAR(10 g) = 0.279 mW/g

Maximum value of SAR (measured) = 0.498 W/kg

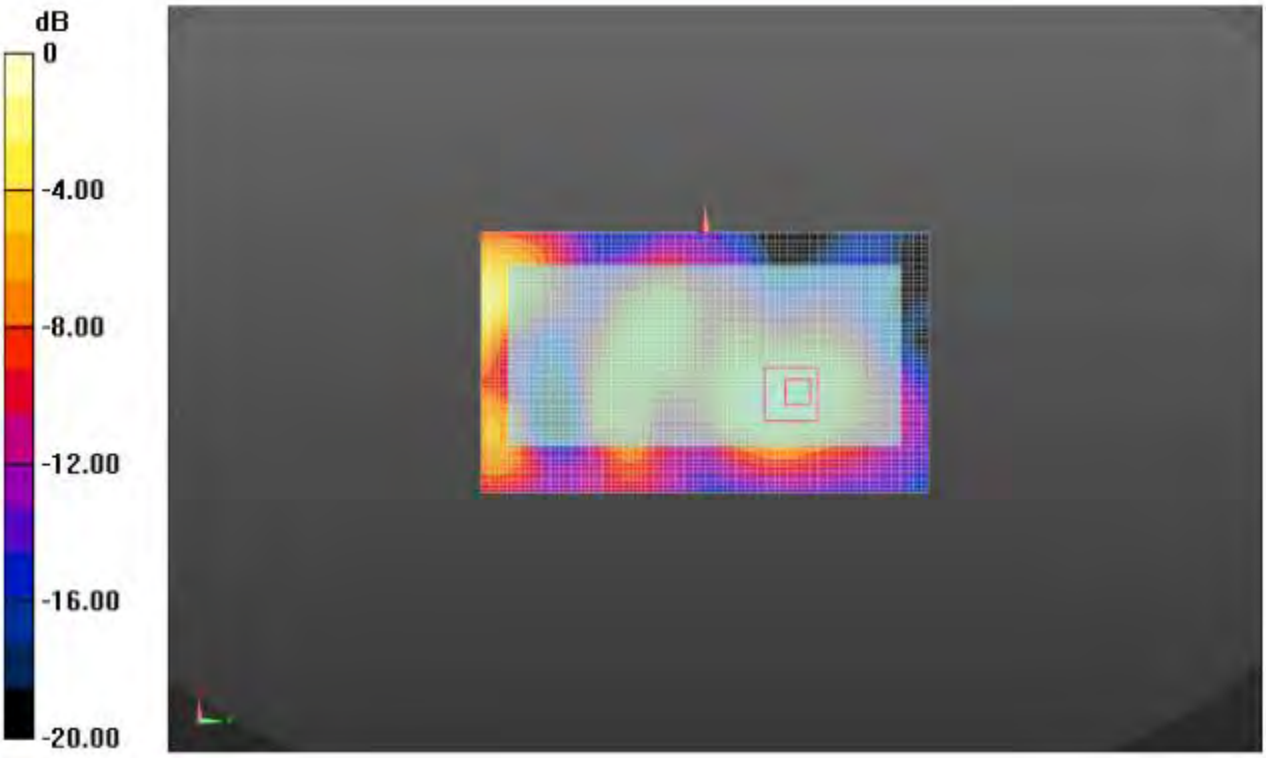


Figure 10: LTE Band 41 _QPSK _ Rear side

LTE Band 71_QPSK

Date: 10/30/2020

Communication System: Customer System; Frequency: 680.5 MHz;Duty Cycle:1:1

Medium parameters used (interpolated): f =680.5 MHz; σ = 0.85 mho/m; εr=42.55; ρ=1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(9.82, 9.82, 9.82); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 387; Calibrated: 9/6/2020
- Phantom: ELI 4.0; Type: QDOVA001BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (51x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) =0.189 W/kg

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

Reference Value = 13.430 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.222 mW/g

SAR(1 g) = 0.180 mW/g; SAR(10 g) = 0.136 mW/g

Maximum value of SAR (measured) = 0.190 W/kg

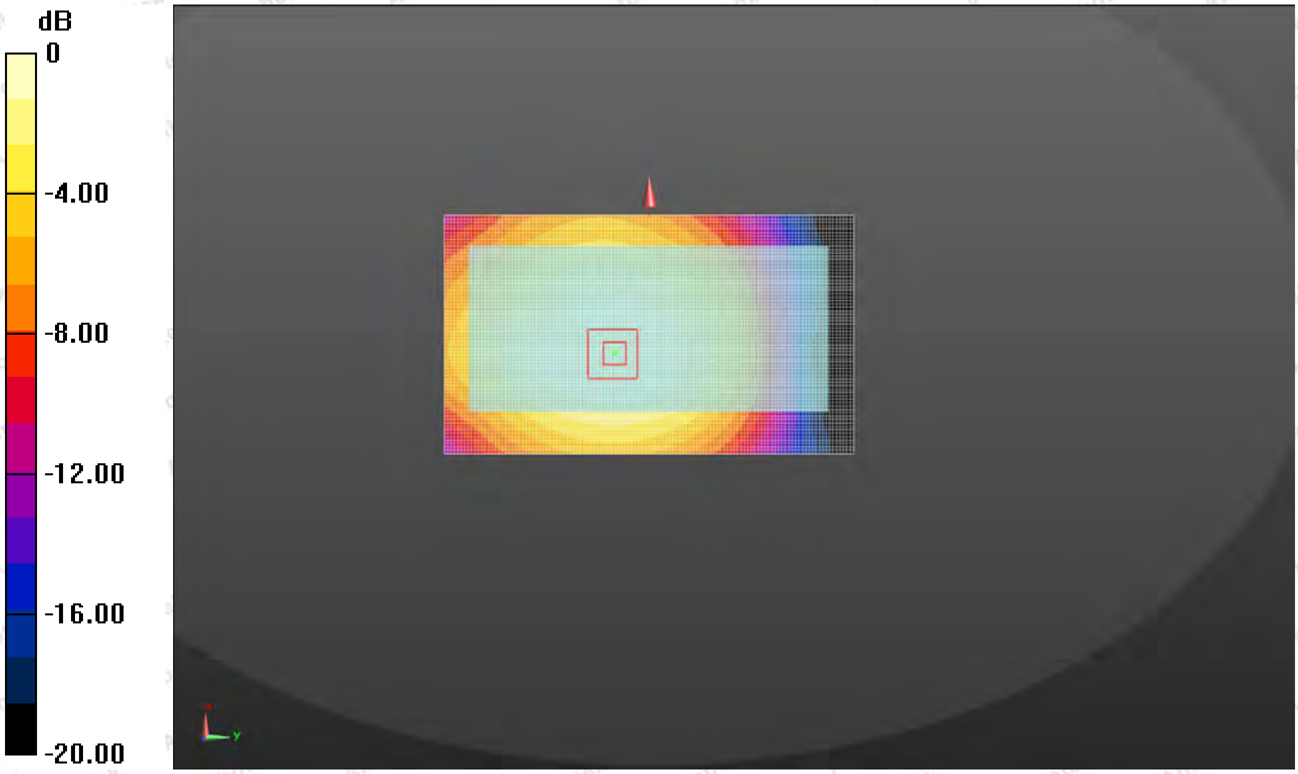


Figure 11: LTE Band 71 _QPSK _ Rear side

WLAN2.4G_Rear side

Date: 11/3/2020

Communication System: 802.11; Frequency: 2412 MHz;

Medium parameters used: f = 2412 MHz; σ = 1.88 mho/m; εr = 37.6; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(7.57, 7.57, 7.57); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 387; Calibrated: 9/6/2020
- Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (51x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.139 W/kg

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

Reference Value = 3.867 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 0.247 mW/g

SAR(1 g) = 0.134 mW/g; SAR(10 g) = 0.071 mW/g

Maximum value of SAR (measured) = 0.143 W/kg

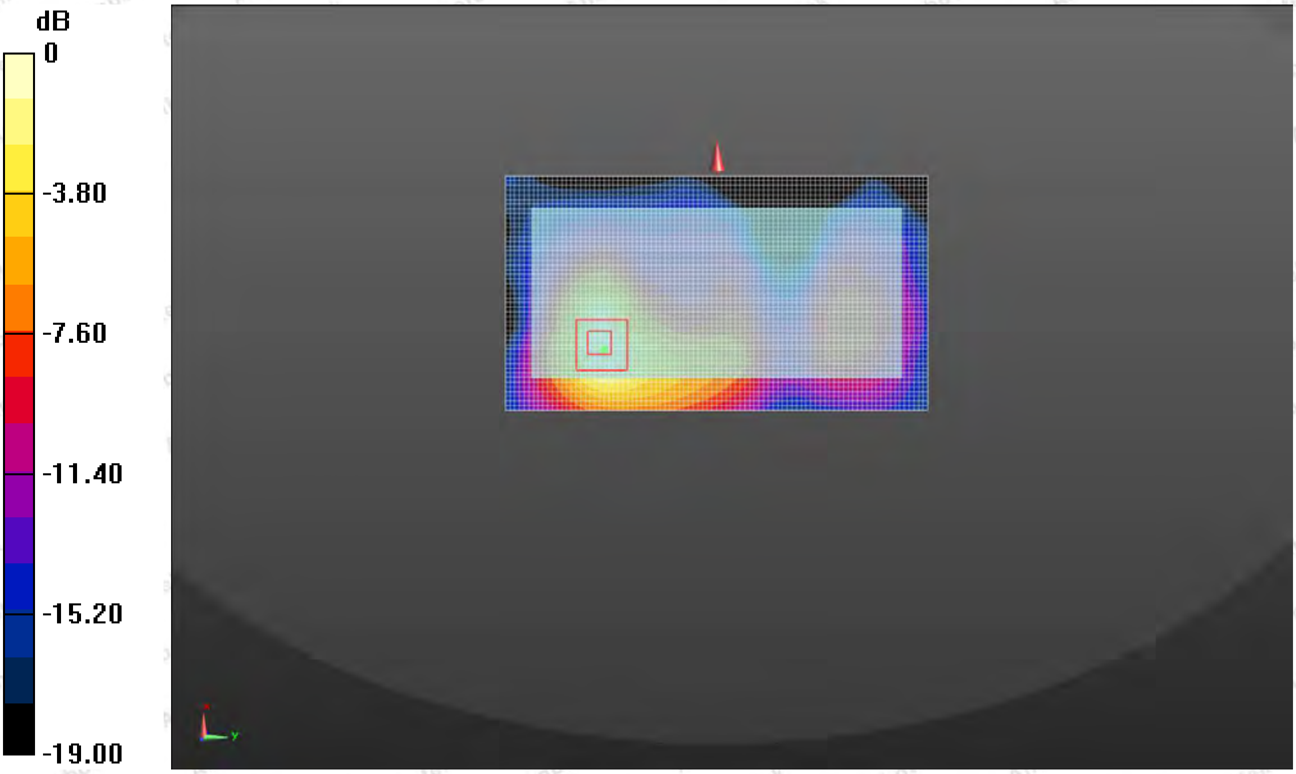


Figure 12: WLAN 2.4G_ Rear side_0mm

WLAN2.4G_Rear side

Date: 11/3/2020

Communication System: 802.11; Frequency: 2472 MHz;

Medium parameters used: f = 2472 MHz; σ = 1.89 mho/m; εr = 37.2; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(7.57, 7.57, 7.57); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 387; Calibrated: 9/6/2020
- Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (51x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.145 W/kg

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

Reference Value = 3.897 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 0.251 mW/g

SAR(1 g) = 0.137 mW/g; SAR(10 g) = 0.072 mW/g

Maximum value of SAR (measured) = 0.148 W/kg

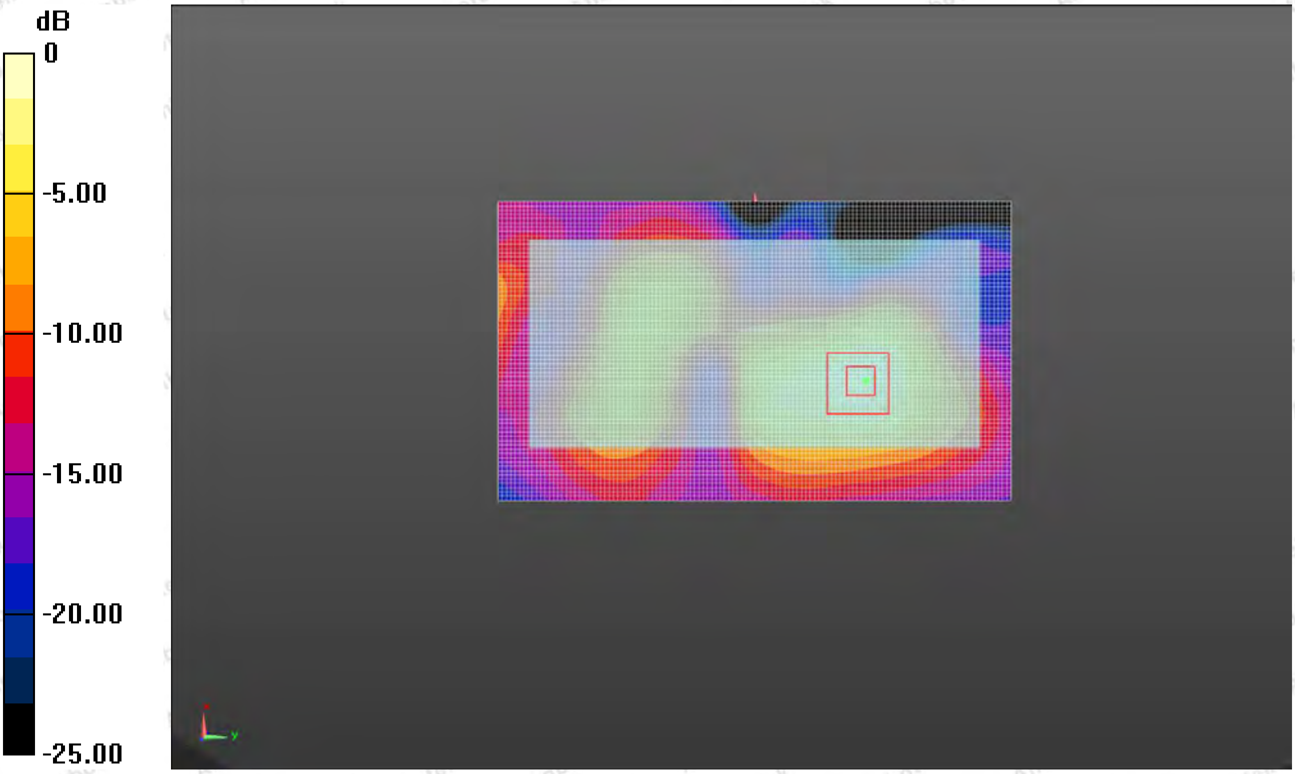


Figure 13: WLAN 2.4G_ Rear side_0mm

Appendix D. DASY System Calibration Certificate

CTTL In Collaboration with s p e a g CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209
E-mail: cttl@chinattl.com Http://www.chinattl.cn

ilac-MRA CNAS 中国认可 国际互认 校准 CALIBRATION CNAS L0570

Client **Anbotek (Auden)** Certificate No: **Z20-68716**

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:7396

Calibration Procedure(s) FF-Z11-007-03
Calibration Procedures for Dosimetric E-field Probes

Calibration date: May06, 2020

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	20-Jun-19 (CTTL, No.J18X07447)	Jun-20
Power sensor NRP-Z91	101547	20-Jun-19 (CTTL, No.J18X07447)	Jun-20
Power sensor NRP-Z91	101548	20-Jun-19 (CTTL, No.J18X07447)	Jun-20
Reference10dBAttenuator	18N50W-10dB	13-Mar-20(CTTL,No.J19X01547)	Mar-21
Reference20dBAttenuator	18N50W-20dB	13-Mar-20(CTTL, No.J19X01548)	Mar-21
Reference Probe EX3DV4	SN 7433	26-Sep-19(SPEAG,No.EX3-7433_Sep18)	Sep-20
DAE4	SN 549	13-Dec-19(SPEAG, No.DAE4-549_Dec18)	Dec -20
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
SignalGeneratorMG3700A	6201052605	27-Jun-19 (CTTL, No.J18X04776)	Jun-20
Network Analyzer E5071C	MY46110673	13-Jan-20 (CTTL, No.J19X00285)	Jan -21

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: May07, 2020

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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 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 300MHz to 3GHz)", February 2005

c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010

d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization θ=0 (f≤900MHz in TEM-cell; f>1800MHz: waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect 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 (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; VRx,y,z:*A,B,C 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≤800MHz) and inside waveguide using analytical field distributions based on power measurements for f >800MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty valued 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±50MHz to±100MHz.
- *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).

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Probe EX3DV4

SN: 7396

Calibrated: May 06, 2020

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7396

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μV/(V/m)^2)[A]	0.54	0.53	0.50	±10.0%
DCP(mV)[B]	97.8	104.5	102.5	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	199.9	±2.4%
		Y	0.0	0.0	1.0		203.3	
		Z	0.0	0.0	1.0		195.0	

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

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

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7396

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)
750	41.9	0.89	9.82	9.82	9.82	0.30	0.85	±12.1%
835	41.5	0.90	9.71	9.71	9.71	0.15	1.36	±12.1%
900	41.5	0.97	9.87	9.87	9.87	0.16	1.37	±12.1%
1750	40.1	1.37	8.61	8.61	8.61	0.25	1.04	±12.1%
1900	40.0	1.40	8.13	8.13	8.13	0.24	1.01	±12.1%
2100	39.8	1.49	8.14	8.14	8.14	0.24	1.04	±12.1%
2300	39.5	1.67	7.85	7.85	7.85	0.40	0.75	±12.1%
2450	39.2	1.80	7.57	7.57	7.57	0.50	0.75	±12.1%
2600	39.0	1.96	7.38	7.38	7.38	0.64	0.68	±12.1%
5250	35.9	4.71	5.33	5.33	5.33	0.45	1.30	±13.3%
5600	35.5	5.07	4.89	4.89	4.89	0.45	1.35	±13.3%
5750	35.4	5.22	4.92	4.92	4.92	0.45	1.45	±13.3%

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

[F] At frequency 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 the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7396

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)
750	55.5	0.96	10.09	10.09	10.09	0.30	0.90	±12.1%
835	55.2	0.97	9.88	9.88	9.88	0.19	1.32	±12.1%
900	55.0	1.05	9.82	9.82	9.82	0.23	1.15	±12.1%
1750	53.4	1.49	8.24	8.24	8.24	0.24	1.06	±12.1%
1900	53.3	1.52	7.97	7.97	7.97	0.19	1.24	±12.1%
2100	53.2	1.62	8.18	8.18	8.18	0.19	1.39	±12.1%
2300	52.9	1.81	7.88	7.88	7.88	0.55	0.80	±12.1%
2450	52.7	1.95	7.53	7.53	7.53	0.46	0.89	±12.1%
2600	52.5	2.16	7.38	7.38	7.38	0.52	0.80	±12.1%
5250	48.9	5.36	4.93	4.93	4.93	0.45	1.80	±13.3%
5600	48.5	5.77	4.19	4.19	4.19	0.48	1.90	±13.3%
5750	48.3	5.94	4.52	4.52	4.52	0.48	1.95	±13.3%

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

[F] At frequency 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 the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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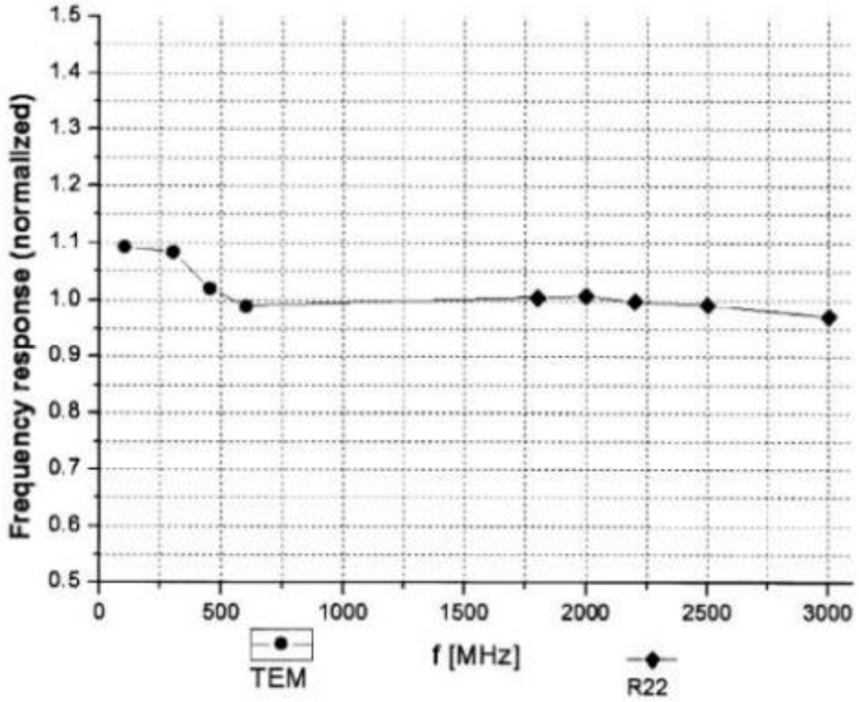
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ±7.4% (k=2)

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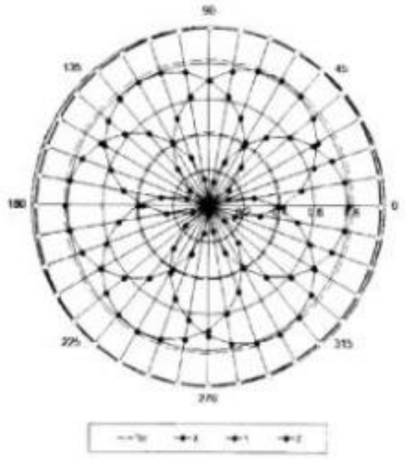
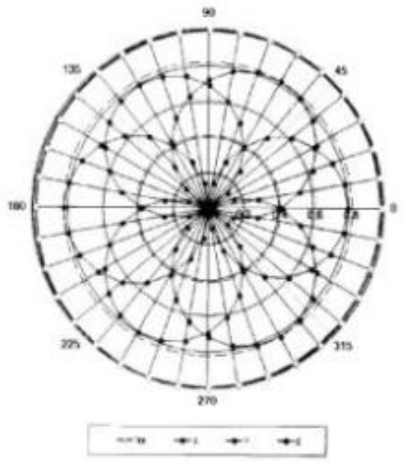
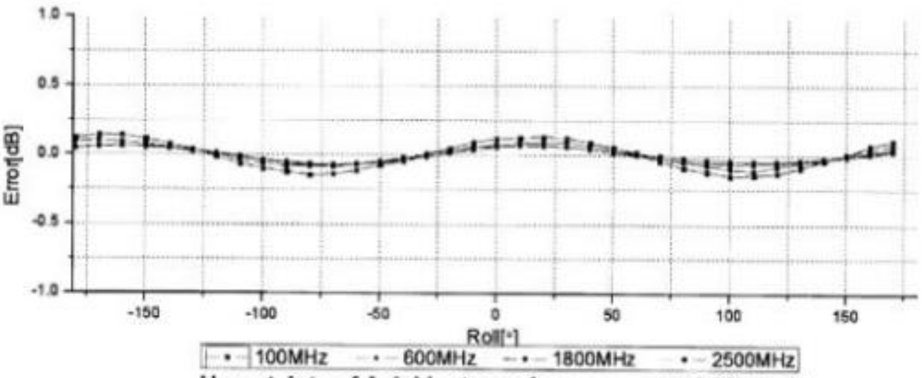
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM

f=1800 MHz, R22







Uncertainty of Axial Isotropy Assessment: ±1.2% (k=2)

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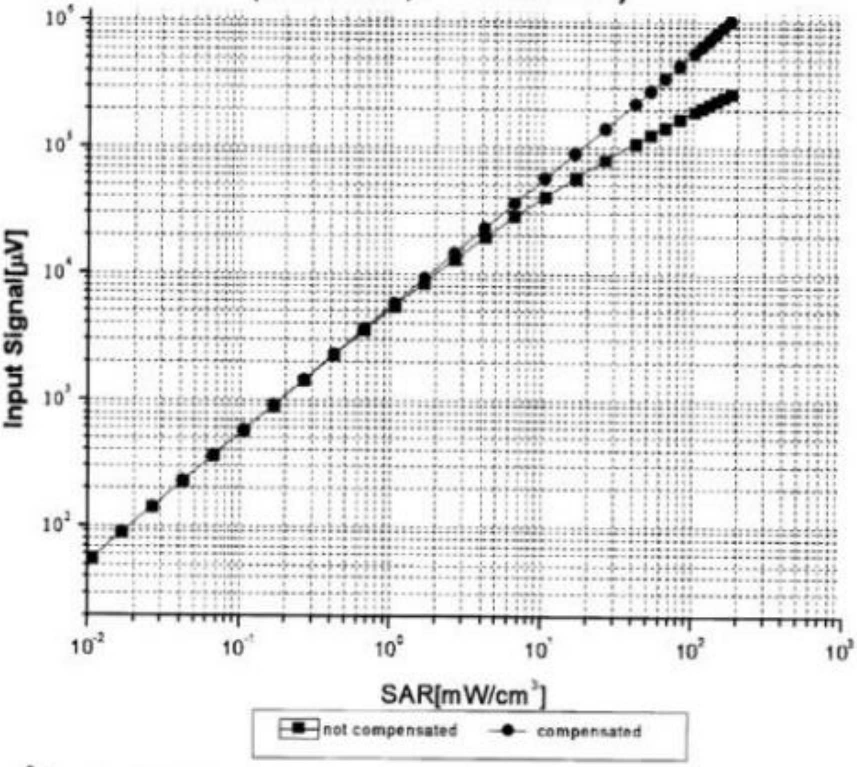
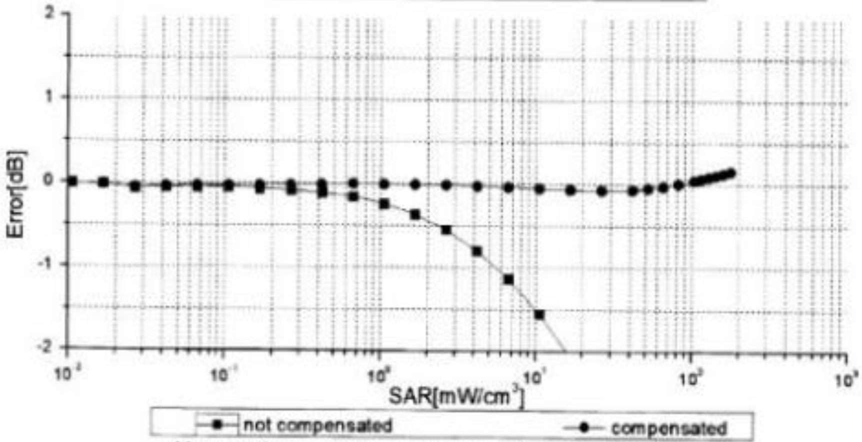
Dynamic Range f(SAR$_{head}$) (TEM cell, f = 900 MHz)





Uncertainty of Linearity Assessment: ±0.9% (k=2)

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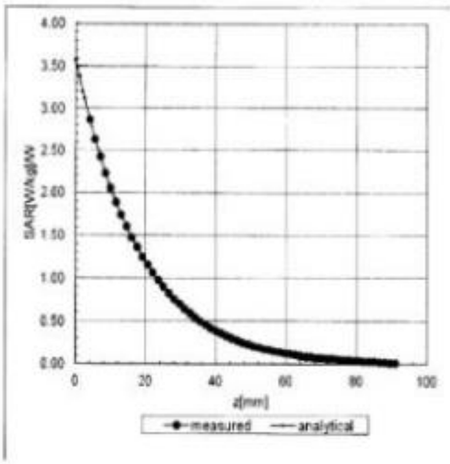
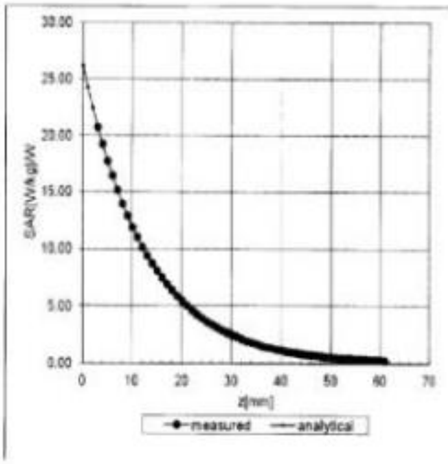
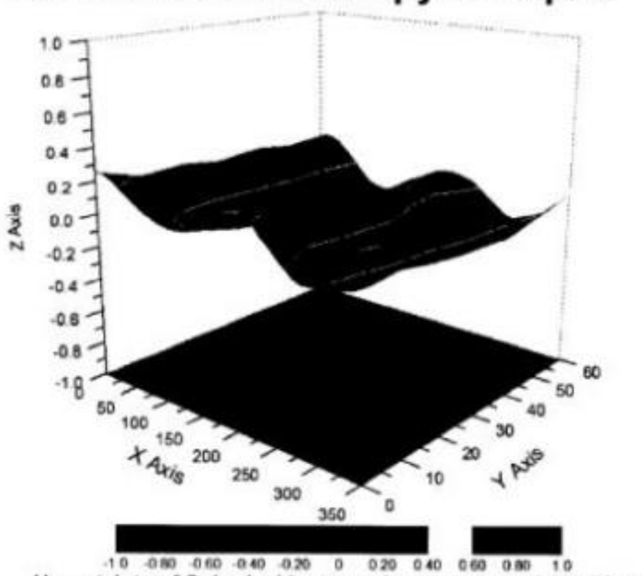
Conversion Factor Assessment

f=900 MHz, WGLS R9(H_convF) f=1750 MHz, WGLS R22(H_convF)





Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: ±3.2% (K=2)

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7396

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	156.9
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	9mm
Tip Diameter	2.5mm
Probe Tip to Sensor X Calibration Point	1mm
Probe Tip to Sensor Y Calibration Point	1mm
Probe Tip to Sensor Z Calibration Point	1mm
Recommended Measurement Distance from Surface	1.4mm

Schmid & Partner Engineering AG **s p e a g**

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IMPORTANT NOTICE

USAGE OF THE DAE 4

The DAE unit is a delicate, high precision instrument and requires careful treatment by the user. There are no serviceable parts inside the DAE. Special attention shall be given to the following points:

Battery Exchange: The battery cover of the DAE4 unit is closed using a screw, over tightening the screw may cause the threads inside the DAE to wear out.

Shipping of the DAE: Before shipping the DAE to SPEAG for calibration, remove the batteries and pack the DAE in an antistatic bag. This antistatic bag shall then be packed into a larger box or container which protects the DAE from impacts during transportation. The package shall be marked to indicate that a fragile instrument is inside.

E-Stop Failures: Touch detection may be malfunctioning due to broken magnets in the E-stop. Rough handling of the E-stop may lead to damage of these magnets. Touch and collision errors are often caused by dust and dirt accumulated in the E-stop. To prevent E-stop failure, the customer shall always mount the probe to the DAE carefully and keep the DAE unit in a non-dusty environment if not used for measurements.

Repair: Minor repairs are performed at no extra cost during the annual calibration. However, SPEAG reserves the right to charge for any repair especially if rough unprofessional handling caused the defect.

DASY Configuration Files: Since the exact values of the DAE input resistances, as measured during the calibration procedure of a DAE unit, are not used by the DASY software, a nominal value of 200 MOhm is given in the corresponding configuration file.

Important Note:
Warranty and calibration is void if the DAE unit is disassembled partly or fully by the Customer.

Important Note:
Never attempt to grease or oil the E-stop assembly. Cleaning and readjusting of the E-stop assembly is allowed by certified SPEAG personnel only and is part of the annual calibration procedure.

Important Note:
To prevent damage of the DAE probe connector pins, use great care when installing the probe to the DAE. Carefully connect the probe with the connector notch oriented in the mating position. Avoid any rotational movement of the probe body versus the DAE while turning the locking nut of the connector. The same care shall be used when disconnecting the probe from the DAE.

Schmid & Partner Engineering

TN_BR040315AD DAE4.doc 11.12.2009

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Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S 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 0108

Client **Anbotek (Auden)** **Certificate No: DAE4-387_Sep10**

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BM - SN: 387
Calibration procedure(s)	QA CAL-06.v29 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	September 06, 2020

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	15-Aug-20 (No:21092)	Aug-21
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	05-Jan-20 (in house check)	In house check: Jan-21
Calibrator Box V2.1	SE UMS 006 AA 1002	05-Jan-20 (in house check)	In house check: Jan-21

	Name	Function	Signature
Calibrated by:	Dominique Steffen	Laboratory Technician	
Approved by:	Sven Kühn	Deputy Manager	

Issued: September 06, 2020

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Accreditation No.: **SCS 0108**

Glossary

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
  - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
  - *Input Offset Measurement:* Output voltage and statistical results over a large number of zero voltage measurements.
  - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV , full range = -100...+300 mV

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

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

Calibration Factors	X	Y	Z
High Range	404.489 ± 0.02% (k=2)	404.852 ± 0.02% (k=2)	404.862 ± 0.02% (k=2)
Low Range	3.97827 ± 1.50% (k=2)	3.95875 ± 1.50% (k=2)	3.97982 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	53.0 ° ± 1 °

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Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200032.85	-3.31	-0.00
Channel X	+ Input	20007.64	1.88	0.01
Channel X	- Input	-20003.48	1.18	-0.01
Channel Y	+ Input	200034.23	-1.43	-0.00
Channel Y	+ Input	20006.60	0.91	0.00
Channel Y	- Input	-20004.04	0.72	-0.00
Channel Z	+ Input	200035.38	-0.83	-0.00
Channel Z	+ Input	20003.69	-2.11	-0.01
Channel Z	- Input	-20006.38	-1.59	0.01

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2001.63	0.08	0.00
Channel X	+ Input	202.29	0.70	0.35
Channel X	- Input	-197.90	0.60	-0.30
Channel Y	+ Input	2001.33	-0.07	-0.00
Channel Y	+ Input	200.86	-0.60	-0.30
Channel Y	- Input	-199.87	-1.23	0.62
Channel Z	+ Input	2001.61	0.27	0.01
Channel Z	+ Input	200.60	-0.70	-0.35
Channel Z	- Input	-199.51	-0.85	0.43

2. Common mode sensitivity

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

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	13.50	11.56
	- 200	-8.64	-11.18
Channel Y	200	-0.81	-1.28
	- 200	1.05	0.09
Channel Z	200	7.17	6.91
	- 200	-9.46	-9.01

3. Channel separation

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

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	-1.70	0.33
Channel Y	200	10.70	-	-0.38
Channel Z	200	7.11	7.89	-

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4. AD-Converter Values with inputs shorted

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

	High Range (LSB)	Low Range (LSB)
Channel X	15969	17466
Channel Y	15661	16162
Channel Z	15990	16190

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.73	-2.58	3.29	0.62
Channel Y	0.41	-0.49	1.23	0.40
Channel Z	-0.80	-1.88	0.30	0.42

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	**Alarm Level (VDC)**
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	**Switched off (mA)**	**Stand by (mA)**	**Transmitting (mA)**
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	–0.01	-8	-9

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Client Anbotek (Auden) Certificate No: Z18-97089

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d154
Calibration Procedure(s)	FD-Z11-2-003-01 Calibration Procedures for dipole validation kits
Calibration date:	Jun 16, 2018

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)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	01-Jul-17 (CTTL, No.J17X04256)	Jun-18
Power sensor NRP-Z91	101547	01-Jul-17 (CTTL, No.J17X04256)	Jun-18
Reference Probe EX3DV4	SN 7307	19-Feb-18(SPEAG,No.EX3-7307_Feb18)	Feb-19
DAE4	SN 771	02-Feb-18(CTTL-SPEAG,No.Z18-97011)	Feb-19
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	01-Feb-18 (CTTL, No.J18X00893)	Jan-19
Network Analyzer E5071C	MY46110673	26-Jan-18 (CTTL, No.J18X00894)	Jan-19

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	[signature]
Reviewed by:	Qi Dianyuan	SAR Project Leader	[signature]
Approved by:	Lu Bingsong	Deputy Director of the laboratory	[signature]

Issued: Jun 17, 2018

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

Certificate No: Z18-97089 Page 1 of 8

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Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,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 300MHz to 3GHz)", February 2005
c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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Measurement Conditions

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

DASY Version	DASY52	52.8.8.1258
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
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	41.0 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.30 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.24 mW /g ± 20.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.50 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.02 mW /g ± 20.4 % (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	55.4 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.43 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.57 mW /g ± 20.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.61 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.36 mW /g ± 20.4 % (k=2)**

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.2Ω- 3.11jΩ
Return Loss	- 29.8dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.6Ω- 2.33jΩ
Return Loss	- 27.4dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.508 ns

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

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

Additional EUT Data

Manufactured by	SPEAG

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DASY5 Validation Report for Head TSL Date: 06.16.2018

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d154

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: f = 835 MHz; σ = 0.891 S/m; ε_r = 40.97; ρ = 1000 kg/m^3

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7307; ConvF(10.01, 10.01,10.01); Calibrated: 2/19/2018;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn771; Calibrated: 2018-02-02
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

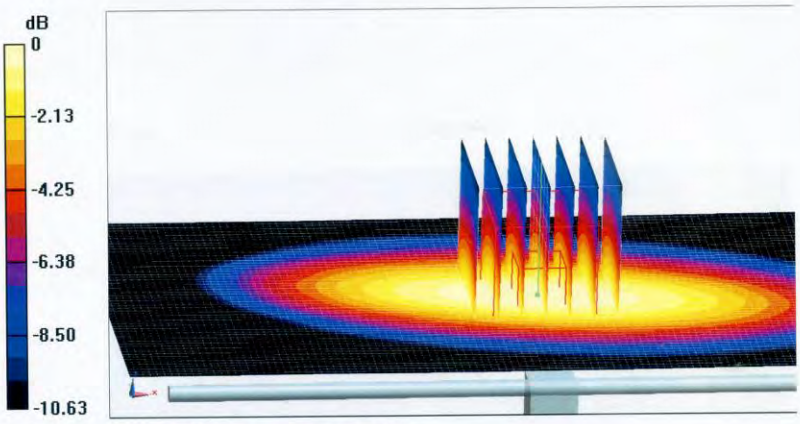
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 58.14V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 3.41 W/kg

SAR(1 g) = 2.3 W/kg; SAR(10 g) = 1.5 W/kg

Maximum value of SAR (measured) = 2.91 W/kg



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

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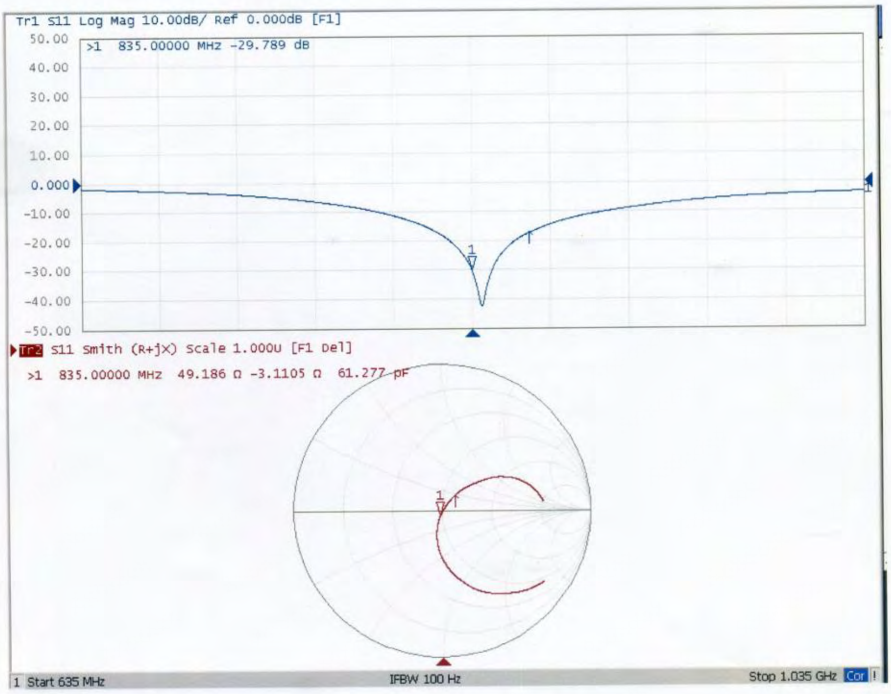
Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL Date: 06.16.2018

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d154

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: f = 835 MHz; σ = 0.991 S/m; ε_r = 55.41; ρ = 1000 kg/m^3

Phantom section: Center Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7307; ConvF(9.83,9.83, 9.83); Calibrated: 2/19/2018;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn771; Calibrated: 2018-02-02
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

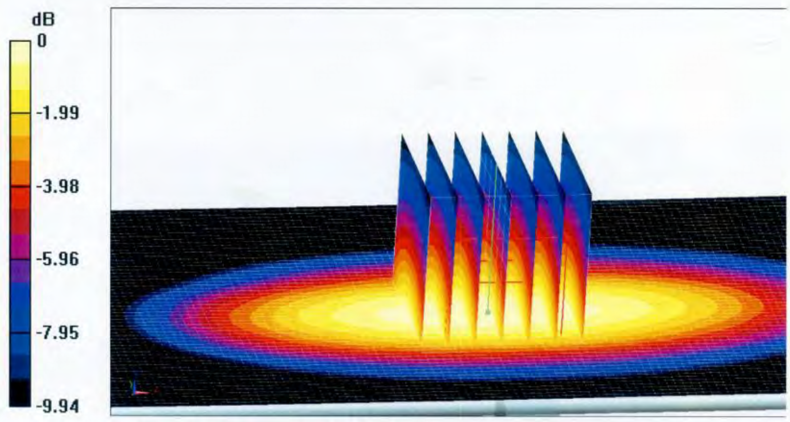
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.01 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.53 W/kg

SAR(1 g) = 2.43 W/kg; SAR(10 g) = 1.61 W/kg

Maximum value of SAR (measured) = 3.04 W/kg



0 dB = 3.04 W/kg = 4.83 dBW/kg

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Impedance Measurement Plot for Body TSL