

FCC SAR Test Report

APPLICANT : Hewlett-Packard Company
EQUIPMENT : HP ElitePad 900
BRAND NAME : hp
MODEL NAME : HSTNN-C75C
FCC ID : B94HNC75CHWCP
STANDARD : FCC 47 CFR Part 2 (2.1093)
ANSI/IEEE C95.1-1992
IEEE 1528-2003
FCC OET Bulletin 65 Supplement C (Edition 01-01)

The product was completely tested on Sep. 25, 2012. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:



Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



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Appendix A. Plots of System Performance Check

Appendix B. Plots of SAR Measurement

Appendix C. DASY Calibration Certificate



Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA290555	Rev. 01	Initial issue of report	Oct. 2, 2012
FA290555	Rev. 02	Update Tune-up power.	Nov. 28, 2012

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Hewlett-Packard Company, HP ElitePad 900, HSTNN-C75C**, are as follows.

<Highest standalone SAR Summary>

Band	Position	SAR _{1g} (W/kg)	Scaled SAR _{1g} (W/kg)
GSM850	Body (0 cm Gap)	1.29	1.462
GSM1900	Body (0 cm Gap)	1.22	1.495
WCDMA Band V	Body (0 cm Gap)	1.26	1.404
WCDMA Band II	Body (0 cm Gap)	1.34	1.564
WCDMA Band IV	Body (0 cm Gap)	1.39	1.542
WLAN 2.4G	Body (0 cm Gap)	1.06	1.141
WLAN 5G	Body (0 cm Gap)	1.35	1.449

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 C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2003 and FCC OET Bulletin 65 Supplement C (Edition 01-01).

2. Administration Data

2.1 Testing Laboratory

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978

2.2 Applicant

Company Name	Hewlett-Packard Company
Address	3000 Hanover Street, Palo Alto, California 94304, U.S.A.

2.3 Manufacturer

Company Name	COMPAL ELECTRONICS, INC.
Address	No. 581, Ruiguang Rd., Neihu District, Taipei City 11492, Taiwan (R.O.C.)

2.4 Application Details

Date of Start during the Test	Sep. 08, 2012
Date of End during the Test	Sep. 25, 2012

3. General Information

3.1 Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT	HP ElitePad 900
Brand Name	hp
Model Name	HSTNN-C75C
FCC ID	B94HNC75CHWCP
Tx Frequency	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WLAN2.4G: 2412 MHz ~ 2462 MHz WLAN5G: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5700 MHz; 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC : 13.56 MHz
Maximum Average Output Power to Antenna	GSM850: 32.49 dBm GSM1900: 29.59 dBm WCDMA Band V: 23.45 dBm WCDMA Band II: 23.63 dBm WCDMA Band IV: 23.24 dBm 802.11b: 18.20 dBm 802.11g: 18.07 dBm 802.11n-HT20 (2.4GHz): 18.07 dBm 802.11a: 15.12 dBm 802.11n-HT20 (5GHz): 15.09 dBm 802.11n-HT40 (5GHz): 14.09 dBm Bluetooth: 5.11 dBm
Antenna Type	WWAN: Fixed Internal Antenna WLAN: PIFA Antenna Bluetooth: PIFA Antenna NFC: PCB antenna
Uplink Modulations	GPRS: GMSK EDGE: GMSK / 8PSK WCDMA (Rel 99): QPSK HSDPA (Rel 6): QPSK HSUPA (Rel 6): QPSK 802.11b: DSSS (BPSK / QPSK / CCK) 802.11a/g/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) Bluetooth: GFSK Bluetooth EDR: $\pi/4$ -DQPSK / 8-DPSK Bluetooth 4.0 LE: GFSK NFC: ASK
EUT Stage	Identical Prototype
Remark: 1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description. 2. This device only supports up to HSPA uplink category 6; category 7(16QAM in uplink) is not supported. 3. Voice call is not supported. 4. 5600 MHz ~ 5650 MHz is notched.	

3.2 Product Photos

Please refer to Appendix D.

3.3 Applied Standard

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

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2003
- FCC OET Bulletin 65 Supplement C (Edition 01-01)
- FCC KDB 447498 D01 v04
- FCC KDB 616217 D03 v01
- FCC KDB 941225 D01 v02
- FCC KDB 941225 D03 v01
- FCC KDB 248227 D01 v01r02

3.4 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. Limit for General Population/Uncontrolled exposure should be applied for this device, it is 1.6 W/kg as averaged over any 1 gram of tissue.

3.5 Test Conditions

3.5.1 Ambient Condition

Ambient Temperature	20 to 24 °C
Humidity	< 60 %

3.5.2 Test Configuration

For WWAN SAR testing, 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 WWAN output power during all tests. For Bottom-Face testing at 0cm separation, the proximity sensor will activate the power reduction and the maximum power is limited at the pre-defined level implemented in this device; For Edge1 testing at 0cm separation, the display screen orientation will activate the power reduction and the maximum power is limited at the pre-defined level implemented in this device. The power reduction level of Bottom-Face and Edge1 are the same.

The power reduction scheme compliance is also verified at the proximity sensor trigger distance. During this testing the proximity sensor was disabling and EUT will transmit at the maximum power requested by the base station simulator.

For WLAN SAR testing, WLAN engineering testing software installed on the EUT can provide continuous transmitting RF signal.

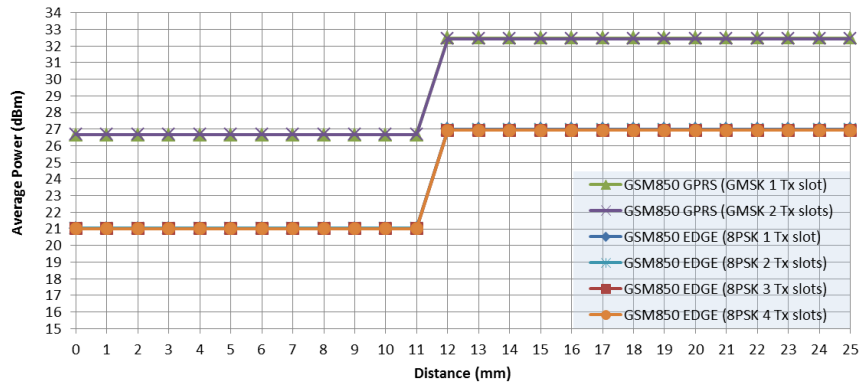
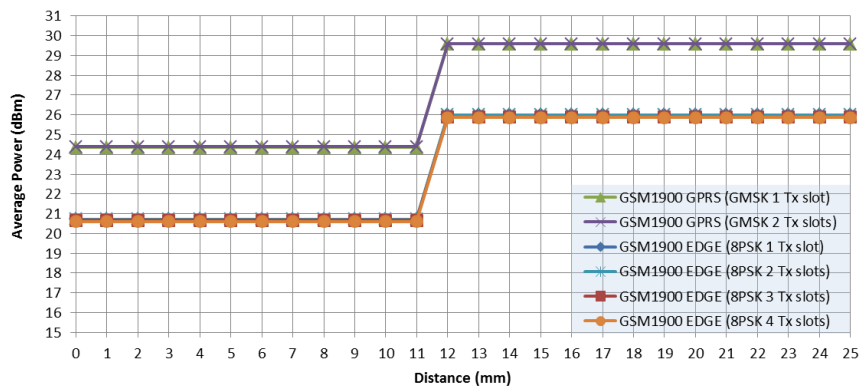
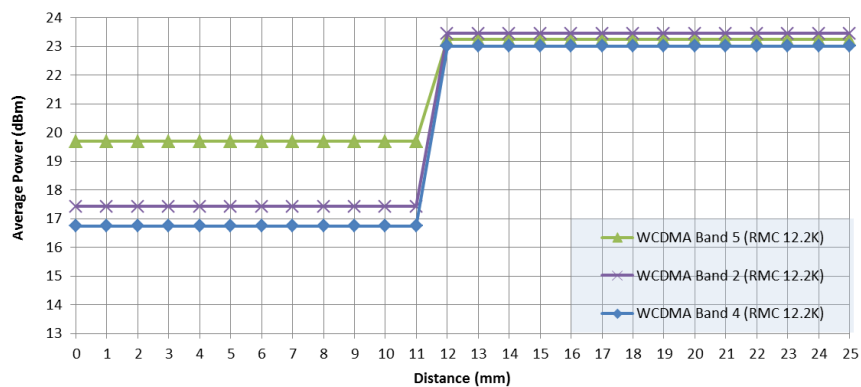
Power reduction applied for each wireless mode and orientation

Exposure Position / wireless mode	GPRS/EDGE 850	GPRS/EDGE 1900	WCDMA Band 5	WCDMA Band 2	WCDMA Band 4
Bottom Face	Yes ⁽¹⁾	Yes ⁽¹⁾	Yes ⁽¹⁾	Yes ⁽¹⁾	Yes ⁽¹⁾
Edge1	Yes ⁽²⁾	Yes ⁽²⁾	Yes ⁽²⁾	Yes ⁽²⁾	Yes ⁽²⁾
Edge2	N/A	N/A	N/A	N/A	N/A
Edge3	N/A	N/A	N/A	N/A	N/A
Edge4	N/A	N/A	N/A	N/A	N/A

Remark:

1. Yes⁽¹⁾: Reduced maximum limit applied by activation of proximity sensor.
2. Yes⁽²⁾: Reduced maximum limit applied by orientation of display screen.
3. No: Normal output power without reduction
4. Power reduction is not applicable for WiFi and Bluetooth.

Band/Mode	Ch #	Measured power reduction (dBm)		Reduction Levels
		w/o power back-off	w/ power back-off	(dB)
GSM850 GPRS (GMSK 1 Tx slot)	189	32.49	26.65	5.84
GSM850 GPRS (GMSK 2 Tx slots)	189	32.45	26.67	5.78
GSM850 EDGE (8PSK 1 Tx slot)	189	27.00	21.02	5.98
GSM850 EDGE (8PSK 2 Tx slots)	189	26.96	21.03	5.93
GSM850 EDGE (8PSK 3 Tx slots)	189	26.94	21.02	5.92
GSM850 EDGE (8PSK 4 Tx slots)	189	26.93	21.02	5.91
GSM1900 GPRS (GMSK 1 Tx slot)	661	29.59	24.36	5.23
GSM1900 GPRS (GMSK 2 Tx slots)	661	29.58	24.39	5.19
GSM1900 EDGE (8PSK 1 Tx slot)	661	26.00	20.72	5.28
GSM1900 EDGE (8PSK 2 Tx slots)	661	26.00	20.72	5.28
GSM1900 EDGE (8PSK 3 Tx slots)	661	25.88	20.67	5.21
GSM1900 EDGE (8PSK 4 Tx slots)	661	25.87	20.61	5.26
WCDMA Band 5 (RMC 12.2K)	4182	23.24	19.70	3.54
WCDMA Band 2 (RMC 12.2K)	9262	23.63	17.77	5.86
WCDMA Band 4 (RMC 12.2K)	1413	23.02	16.75	6.27

Proximity Sensor for Bottom Face detection
Power reduction vs. distance - Bottom Face

Power reduction vs. distance - Bottom Face

Power reduction vs. distance - Bottom Face


4. Specific Absorption Rate (SAR)

4.1 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.

4.2 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:

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

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

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

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

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

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

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.

5. SAR Measurement System

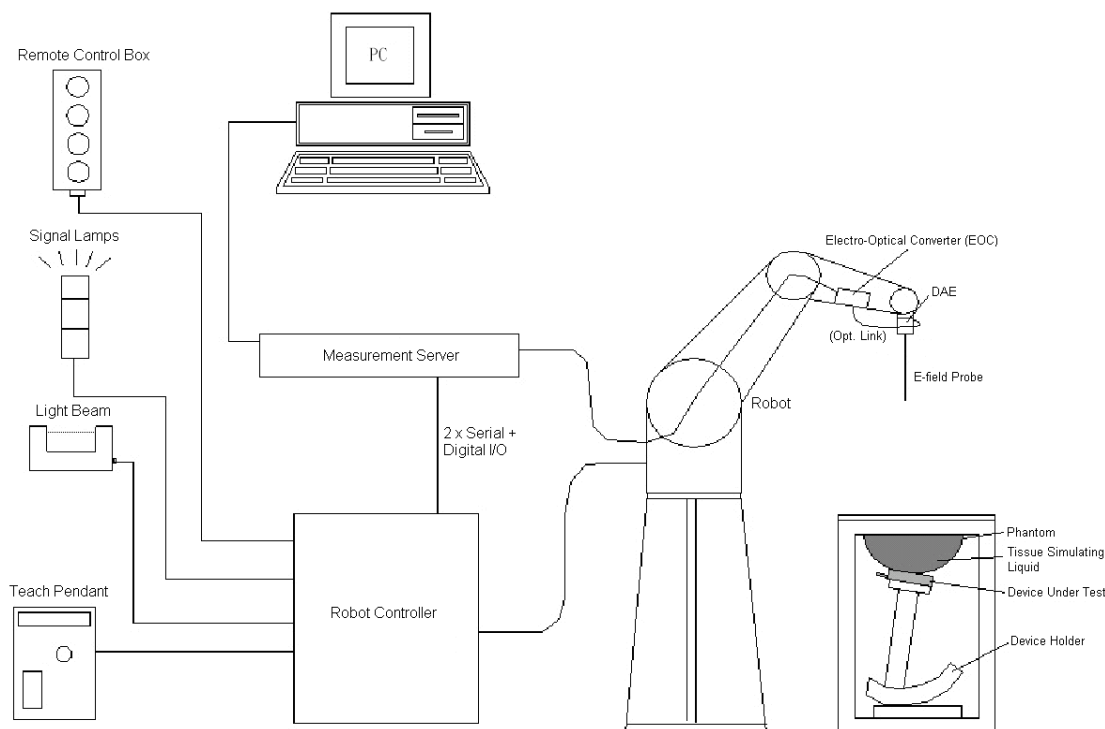


Fig 5.1 SPEAG DASY System Configurations

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
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom
- A device holder
- Tissue simulating liquid
- Dipole for evaluating the proper functioning of the system

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

5.1 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.

5.1.1 E-Field Probe Specification

<ET3DV6 / ET3DV6R Probe >

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection system. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	 Fig 5.2 Photo of ET3DV6/ET3DV6R
Frequency	10 MHz to 3 GHz; Linearity: ± 0.2 dB	
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.4 dB in HSL (rotation normal to probe axis)	
Dynamic Range	5 μ W/g to 100 mW/g; Linearity: ± 0.2 dB	
Dimensions	Overall length: 330 mm (Tip: 16 mm) Tip diameter: 6.8 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.7 mm	

<EX3DV4 / ES3DV4 Probe>

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	 Fig 5.3 Photo of EX3DV4/ES3DV4
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 μ W/g to 100 mW/g; Linearity: ± 0.2 dB (noise: typically < 1 μ W/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	

5.1.2 E-Field Probe Calibration

Each probe needs to be calibrated according to a dosimetric assessment procedure. The calibration data can be referred to appendix C of this report.

5.2 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 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.



Fig 5.4 Photo of DAE

5.3 Robot

The SPEAG DASY system uses the high precision robots (DASY4: RX90BL; DASY5: TX90XL) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY4: CS7MB; DASY5: CS8c) from Stäubli is used. The Stäubli robot 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)



Fig 5.5 Photo of DASY4



Fig 5.6 Photo of DASY5

5.4 Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY4: 166 MHz, Intel Pentium; DASY5: 400 MHz, Intel Celeron), chipdisk (DASY4: 32 MB; DASY5: 128 MB), RAM (DASY4: 64 MB, 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.



Fig 5.7 Photo of Server for DASY4



Fig 5.8 Photo of Server for DASY5

5.5 Phantom

<SAM Twin Phantom>

Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm	 Fig 5.9 Photo of SAM Phantom
Filling Volume	Approx. 25 liters	
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet	
Measurement Areas	Left Hand, Right Hand, Flat 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%)	 Fig 5.10 Photo of ELI4 Phantom
Filling Volume	Approx. 30 liters	
Dimensions	Major ellipse axis: 600 mm Minor axis: 400 mm	

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.

5.6 Device Holder

<Device Holder for SAM Twin Phantom>

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

The DASY device holder is designed to cope with 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 $\epsilon = 3$ and loss tangent $\delta = 0.02$. 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.



Fig 5.11 Device Holder

<Laptop Extension Kit>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.

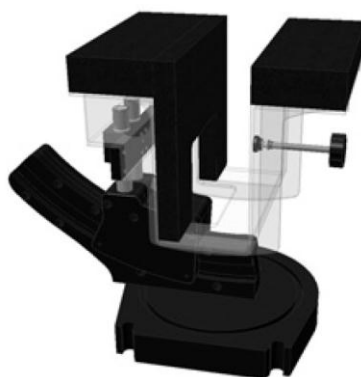


Fig 5.12 Laptop Extension Kit

5.7 Data Storage and Evaluation

5.7.1 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-lossy media, will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

5.7.2 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	$\text{Norm}_i, a_{i0}, a_{i1}, a_{i2}$
	- 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 :

$$\text{E-field Probes : } E_i = \sqrt{\frac{V_i}{\text{Norm}_i \cdot \text{ConvF}}}$$

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

with V_i = compensated signal of channel i, (i = x, y, z)
 Norm_i = sensor sensitivity of channel i, (i = x, y, z), $\mu\text{V}/(\text{V/m})^2$ 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) :

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

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

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

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.

5.8 Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	835MHz System Validation Kit	D835V2	499	Mar. 22, 2010	Mar. 21, 2013
SPEAG	1750MHz System Validation Kit	D1750V2	1023	Jun. 20, 2012	Jun. 19, 2013
SPEAG	1900MHz System Validation Kit	D1900V2	5d041	Mar. 23, 2010	Mar. 22, 2013
SPEAG	2450MHz System Validation Kit	D2450V2	736	Jul. 25, 2011	Jul. 24, 2013
SPEAG	5GHz System Validation Kit	D5GHzV2	1006	Jan. 18, 2012	Jan. 17, 2013
SPEAG	Data Acquisition Electronics	DAE4	1279	May 03, 2012	May 02, 2013
SPEAG	Data Acquisition Electronics	DAE4	1338	Jun. 12, 2012	Jun. 11, 2013
SPEAG	Dosimetric E-Field Probe	ET3DV6R	1788	Jan. 26, 2012	Jan. 25, 2013
SPEAG	Dosimetric E-Field Probe	EX3DV4	3819	Nov. 16, 2011	Nov. 15, 2012
SPEAG	Dosimetric E-Field Probe	EX3DV4	3578	Jun. 21, 2012	Jun. 20, 2013
SPEAG	Device Holder	N/A	N/A	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 C	TP-1303	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 C	TP-1383	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 C	TP-1446	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 C	TP-1478	NCR	NCR
SPEAG	SAM Phantom	QD 000 P41 C	TP-1150	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 CD	TP-1644	NCR	NCR
SPEAG	SAM Phantom	SM 000 T01 DA	TP-1542	NCR	NCR
SPEAG	ELI4 Phantom	QD 0VA 001 BB	1026	NCR	NCR
SPEAG	ELI4 Phantom	QD 0VA 001 BA	1029	NCR	NCR
SPEAG	ELI4 Phantom	QD 0VA 002 AA	TP-1127	NCR	NCR
SPEAG	ELI4 Phantom	QD 0VA 002 AA	TP-1131	NCR	NCR
Agilent	Network Analyzer	E5071C	MY46101588	May 11, 2012	May 10, 2013
Agilent	ESG Vector Series Signal Generator	E4438C	MY49070755	Oct. 17, 2011	Oct. 16, 2012
Anritsu	Power Meter	ML2495A	0932001	Sep. 21, 2011	Sep. 20, 2012
Anritsu	Power Meter	ML2495A	1132003	Aug. 14, 2012	Aug. 13, 2013
Anritsu	Radio Communication Analyzer	MT8820C	6201074414	Dec. 21, 2011	Dec. 20, 2012
Agilent	Wireless Communication Test Set	E5515C	MY48360820	Jan. 05, 2012	Jan. 04, 2014
Agilent	Wireless Communication Test Set	E5515C	GB46311322	Mar. 23, 2011	Mar. 22, 2013
Agilent	Wireless Communication Test Set	E5515C	MY50264370	Apr. 19, 2011	Apr. 18, 2013
Agilent	Wireless Communication Test Set	E5515C	MY50266977	Nov. 13, 2011	Nov. 12, 2013
R&S	Universal Digital Radiocommunication Tester	CMU200	106656	Jun. 28, 2012	Jun. 27, 2013
R&S	Spectrum Analyzer	FSP	101131	Jul. 23, 2012	Jul. 22, 2013

Table 5.1 Test Equipment List

Note:

1. The calibration certificate of DASY can be referred to appendix C of this report.
2. Referring to KDB 450824 D02, 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 justification data of dipole D835V2, SN: 499, D1900V2, SN: 5d041, and D2450V2, SN: 736 can be found in appendix C. The return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration.

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 in Fig. 6.2.



Fig 6.1 Photo of Liquid Height for Head SAR



Fig 6.2 Photo of Liquid Height for Body SAR

The following table gives the recipes for tissue simulating liquid.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (ϵ_r)
For Head								
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
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								
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
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

Table 6.1 Recipes of Tissue Simulating Liquid

Simulating Liquid for 5G, Manufactured by SPEAG

Ingredients	(% by weight)
Water	64~78%
Mineral oil	11~18%
Emulsifiers	9~15%
Additives and Salt	2~3%

The dielectric parameters of the liquids were verified prior to the SAR evaluation using an Agilent 85070D Dielectric Probe Kit and an Agilent Network Analyzer.

The following table shows the measuring results for simulating liquid.

Freq. (MHz)	Liquid Type	Temp. (°C)	Conductivity (σ)	Permittivity (ϵ_r)	Conductivity Target (σ)	Permittivity Target (ϵ_r)	Delta (σ) (%)	Delta (ϵ_r) (%)	Limit (%)	Date
835	Body	21.5	0.996	55.4	0.97	55.2	2.68	0.36	±5	Sep. 08, 2012
835	Body	21.4	0.953	52.741	0.97	55.2	-1.75	-4.45	±5	Sep. 25, 2012
1750	Body	21.7	1.546	51.742	1.52	53.3	1.71	-2.92	±5	Sep. 25, 2012
1900	Body	21.5	1.52	54.6	1.52	53.3	0.00	2.44	±5	Sep. 08, 2012
1900	Body	21.7	1.499	53.26	1.52	53.3	-1.38	-0.08	±5	Sep. 25, 2012
2450	Body	21.5	1.97	52.3	1.95	52.7	1.03	-0.76	±5	Sep. 05, 2012
5200	Body	21.3	5.28	48.5	5.30	49.0	-0.38	-1.02	±5	Sep. 06, 2012
5500	Body	21.3	5.72	48	5.65	48.6	1.24	-1.23	±5	Sep. 06, 2012
5500	Body	21.5	5.723	46.972	5.65	48.6	1.29	-3.35	±5	Sep. 25, 2012
5800	Body	21.3	6.11	47.2	6	48.2	1.83	-2.07	±5	Sep. 06, 2012

Table 6.2 Measuring Results for Simulating Liquid

7. SAR Measurement Evaluation

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.

7.1 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.

7.2 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:

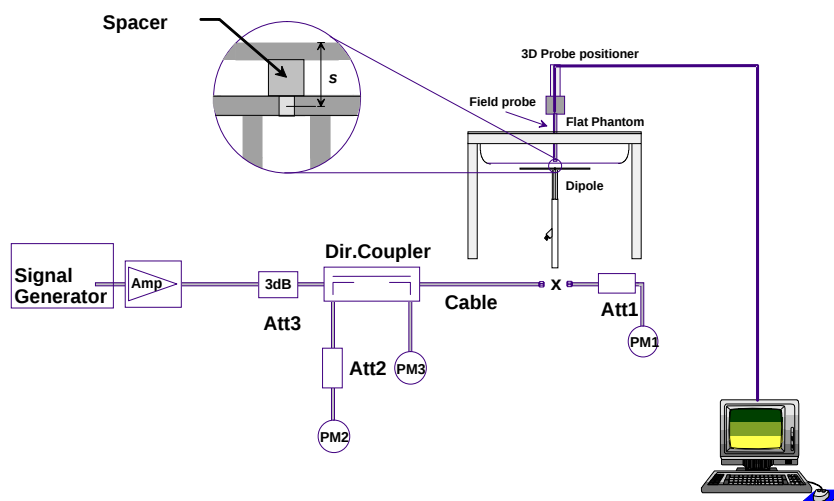


Fig 7.1 System Setup for System Evaluation



Fig 7.2 Photo of Dipole Setup

1. Signal Generator
2. Amplifier
3. Directional Coupler
4. Power Meter
5. Calibrated Dipole

The output power on dipole port must be calibrated to 24 dBm (250 mW) before dipole is connected.

7.3 Validation Results

Comparing to the original SAR value provided by SPEAG, the validation data should be within its specification of 10 %. Table 7.1 shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

Measurement Date	Frequency (MHz)	Liquid Type	Targeted SAR _{1g} (W/kg)	Measured SAR _{1g} (W/kg)	Normalized SAR _{1g} (W/kg)	Deviation (%)
Sep. 08, 2012	835	Body	9.82	2.5	10.00	1.83
Sep. 25, 2012	835	Body	9.82	2.33	9.32	-5.09
Sep. 25, 2012	1750	Body	37	9.22	36.88	-0.32
Sep. 08, 2012	1900	Body	40	9.24	36.96	-7.60
Sep. 25, 2012	1900	Body	40	10.4	41.60	4.00
Sep. 05, 2012	2450	Body	52.3	12.9	51.60	-1.34
Sep. 06, 2012	5200	Body	72.6	17	68.00	-6.34
Sep. 06, 2012	5500	Body	78.8	18.2	72.80	-7.61
Sep. 25, 2012	5500	Body	78.8	18.6	74.40	-5.58
Sep. 06, 2012	5800	Body	73.1	17.1	68.40	-6.43

Table 7.1 Target and Measurement SAR after Normalized

8. EUT Testing Position

This EUT was tested in four different positions. They are bottom face of tablet PC, Edge1, Edge2, and Edge4. In these positions, the surface of EUT is touching with phantom 0 cm gap.

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 highest power 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) Set scan area, grid size and other setting on the DASY software.
- (e) Measure SAR results for the highest power channel on each testing position.
- (f) Find out the largest SAR result on these testing positions of each band
- (g) Measure SAR results for other channels in worst SAR testing position if the SAR of highest power channel is larger than 0.8 W/kg

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 from 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 Area & Zoom Scan Procedures

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan measures 5x5x7 points with step size 8, 8 and 5 mm for 300 MHz to 3 GHz, and 8x8x8 points with step size 4, 4 and 2.5 mm for 3 GHz to 6 GHz. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g.

9.3 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 (step-size is 4, 4 and 2.5 mm). When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

9.4 SAR Averaged Methods

In DASY, the interpolation and extrapolation are both based on the modified Quadratic Shepard's method. The interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation.

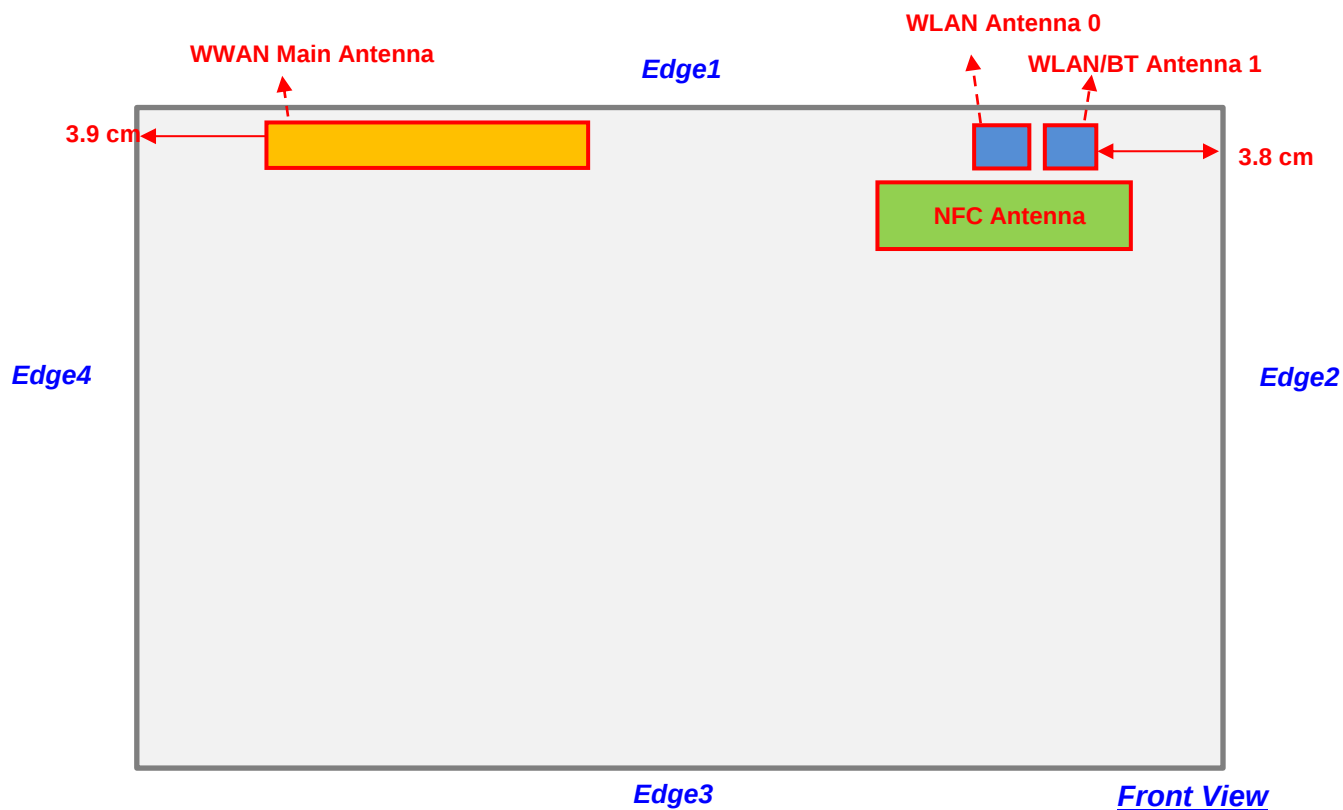
Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5 mm.

9.5 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.

10. SAR Test Configurations

10.1 Exposure Positions Consideration



Antennas	Wireless Interface
WWAN Main (Tx/Rx)	GSM850 GSM1900 WCDMA Band V WCDMA Band II WCDMA Band IV
WLAN Main (Tx/Rx)	WiFi 2.4G 802.11 b/g/n WiFi 5G 802.11 a/n
WLAN Aux./ BT (Tx/Rx)	WiFi 2.4G 802.11 b/g/n WiFi 5G 802.11 a/n Bluetooth
NFC (Tx/Rx)	NFC

	WLAN Antenna Label		Remark
	Ant. 0	Ant. 1	
Operational Mode Supported	2.4GHz WLAN	No	
	2.4GHz WLAN	2.4GHz WLAN	Simultaneous Transmission
	5GHz WLAN	No	
	5GHz WLAN	5GHz WLAN	Simultaneous Transmission
	No	2.4GHz Bluetooth	
	2.4GHz WLAN	2.4GHz Bluetooth	Simultaneous Transmission
	2.4GHz WLAN	2.4GHz Bluetooth	Simultaneous Transmission
	5GHz WLAN	5GHz WLAN 2.4GHz Bluetooth	Simultaneous Transmission ⁽¹⁾

Note:

- Bluetooth and 5GHz WLAN will be supported to transmit simultaneously on Antenna 1. Bluetooth and 2.4GHz WLAN simultaneous transmission on Antenna 1 is not supported.

Sides for SAR tests; Tablet mode						
Antenna	Front Face	Bottom Face	Edge1	Edge2	Edge3	Edge4
WWAN	No	Yes (0, 8mm)	Yes (0mm)	No	No	Yes (0mm)
WLAN Ant. 0	No	Yes (0mm)	Yes (0mm)	Yes (0mm)	No	No
WLAN/BT Ant. 1	No	Yes (0mm)	Yes (0mm)	Yes (0mm)	No	No
WLAN Ant. 0+ WLAN Ant. 1	No	Yes (0mm)	Yes (0mm)	Yes (0mm)	No	No

Note:

- Per KDB 941225 D07, the EUT diagonal > 20 cm and Mini-Tablet procedure is not applied. Therefore, SAR tests follow the Tablet Mode in KDB 447498.
- As in (1), the test distance is 0 mm to the flat phantom; SAR evaluation is required for Bottom Face and each applicable Edge with the antenna within 5 cm to the user.
- The proximity sensor is designed to be triggered for Bottom Face exposure positions. During SAR tests for EUT other edges, the sensor is disabled via software setting.
- The test distance 8 mm at Bottom Face are for verifying the conservative condition, whichever EUT proximity sensor maximum activated distance are 11 mm. The EUT is set in full-power mode at 8 mm test distance to the phantom for Bottom Face.
- EUT does not support voice call function; therefore GSM SAR is not required.
- Per KDB 447498 D01, the distance from WWAN Main antenna to the Edge2 / Edge3 > 5 cm, therefore the stand-alone in these configurations SAR are not required.
- Per KDB 447498 D01, the distance from WLAN antenna to the Edge3 / Edge4 > 5 cm, therefore the stand-alone SAR in these configurations are not required.
- For 2.4GHz Bluetooth, $60/f_{(GHz)} = 24.5mW$. Per KDB 447498 D01, Bluetooth output power $3.24mW \leq 24.5mW$, where. Therefore Bluetooth standalone SAR is not required.

10.2 Conducted RF Output Power (Unit: dBm)

<GSM Conducted Power>

GSM850 Burst Average Power (dBm)									
Channel	128	189	251	128	189	251	128	189	251
Frequency (MHz)	824.2	836.4	848.8	824.2	836.4	848.8	824.2	836.4	848.8
Mode	Without Power Back-off			With Power Back-off			Pwr. Reduction (dB)		
GPRS 8 (1 Uplink) CS1	32.45	32.49	32.42	26.64	26.65	26.55	5.81	5.84	5.87
GPRS 10 (2 Uplink) CS1	32.43	32.45	32.40	26.65	26.67	26.59	5.78	5.78	5.81
EDGE 8 (GMSK, 1 Uplink) MCS1	32.43	32.45	32.39	26.63	26.64	26.56	5.80	5.81	5.83
EDGE 10 (GMSK, 2 Uplink) MCS1	32.39	32.43	32.38	26.62	26.61	26.63	5.77	5.82	5.75
EDGE 8 (8PSK, 1 Uplink) MCS5	26.98	27.00	26.92	21.03	21.02	21.01	5.95	5.98	5.91
EDGE 10 (8PSK, 2 Uplink) MCS5	26.94	26.96	26.88	21.02	21.03	20.91	5.92	5.93	5.97
EDGE 11 (8PSK, 3 Uplink) MCS5	26.93	26.94	26.87	21.01	21.02	20.98	5.92	5.92	5.89
EDGE 12 (8PSK, 4 Uplink) MCS5	26.92	26.93	26.86	21.04	21.02	20.99	5.88	5.91	5.87
GSM850 Frame-Average Power (dBm)									
Channel	128	189	251	128	189	251	128	189	251
Frequency (MHz)	824.2	836.4	848.8	824.2	836.4	848.8	824.2	836.4	848.8
Mode	Without Power Back-off			With Power Back-off			Pwr. Reduction (dB)		
GPRS 8 (1 Uplink) CS1	23.45	23.49	23.42	17.64	17.65	17.55	5.81	5.84	5.87
GPRS 10 (2 Uplink) CS1	26.43	26.45	26.40	20.65	20.67	20.59	5.78	5.78	5.81
EDGE 8 (GMSK, 1 Uplink) MCS1	23.43	23.45	23.39	17.63	17.64	17.56	5.80	5.81	5.83
EDGE 10 (GMSK, 2 Uplink) MCS1	26.39	26.43	26.38	20.62	20.61	20.63	5.77	5.82	5.75
EDGE 8 (8PSK, 1 Uplink) MCS5	17.98	18.00	17.92	12.03	12.02	12.01	5.95	5.98	5.91
EDGE 10 (8PSK, 2 Uplink) MCS5	20.94	20.96	20.88	15.02	15.03	14.91	5.92	5.93	5.97
EDGE 11 (8PSK, 3 Uplink) MCS5	22.67	22.68	22.61	16.75	16.76	16.72	5.92	5.92	5.89
EDGE 12 (8PSK, 4 Uplink) MCS5	23.92	23.93	23.86	18.04	18.02	17.99	5.88	5.91	5.87
Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots. The calculated method is shown as below: Frame-average power = Maximum burst averaged power (1 Uplink) - 9 dB Frame-average power = Maximum burst averaged power (2 Uplink) - 6 dB Frame-average power = Maximum burst averaged power (3 Uplink) - 4.26 dB Frame-average power = Maximum burst averaged power (4 Uplink) - 3 dB									

Note:

- Following KDB 941225 D03, for Body SAR testing, the EUT operating without power back-off was set in GPRS 10 and the EUT operating with power back-off was set in GPRS 10 due to its highest frame-average power.
- Per KDB 447498, the maximum output power channel is used for SAR testing and for further SAR test reduction.

GSM1900 Burst Average Power (dBm)									
Channel	512	661	810	512	661	810	512	661	810
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8	1850.2	1880	1909.8
Mode	Without Power Back-off			With Power Back-off			Pwr. Reduction (dB)		
GPRS 8 (1 Uplink) CS1	29.50	29.59	29.50	24.28	24.36	24.22	5.22	5.23	5.28
GPRS 10 (2 Uplink) CS1	29.49	29.58	29.49	24.31	24.39	24.28	5.18	5.19	5.21
EDGE 8 (GMSK, 1 Uplink) MCS1	29.48	29.58	29.49	24.26	24.30	24.29	5.22	5.28	5.20
EDGE 10 (GMSK, 2 Uplink) MCS1	29.47	29.57	29.48	24.23	24.32	24.26	5.24	5.25	5.22
EDGE 8 (8PSK, 1 Uplink) MCS5	25.86	26.00	25.97	20.69	20.72	20.72	5.17	5.28	5.25
EDGE 10 (8PSK, 2 Uplink) MCS5	25.86	26.00	25.97	20.61	20.72	20.68	5.25	5.28	5.29
EDGE 11 (8PSK, 3 Uplink) MCS5	25.80	25.88	25.76	20.63	20.67	20.55	5.17	5.21	5.21
EDGE 12 (8PSK, 4 Uplink) MCS5	25.79	25.87	25.75	20.66	20.61	20.63	5.13	5.26	5.12
GSM1900 Frame-Averaged Power (dBm)									
Channel	512	661	810	512	661	810	512	661	810
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8	1850.2	1880	1909.8
Mode	Without Power Back-off			With Power Back-off			Pwr. Reduction (dB)		
GPRS 8 (1 Uplink) CS1	20.50	20.59	20.50	15.28	15.36	15.22	5.22	5.23	5.28
GPRS 10 (2 Uplink) CS1	23.49	23.58	23.49	18.31	18.39	18.28	5.18	5.19	5.21
EDGE 8 (GMSK, 1 Uplink) MCS1	20.48	20.58	20.49	15.26	15.30	15.29	5.22	5.28	5.20
EDGE 10 (GMSK, 2 Uplink) MCS1	23.47	23.57	23.48	18.23	18.32	18.26	5.24	5.25	5.22
EDGE 8 (8PSK, 1 Uplink) MCS5	16.86	17.00	16.97	11.69	11.72	11.72	5.17	5.28	5.25
EDGE 10 (8PSK, 2 Uplink) MCS5	19.86	20.00	19.97	14.61	14.72	14.68	5.25	5.28	5.29
EDGE 11 (8PSK, 3 Uplink) MCS5	21.54	21.62	21.50	16.37	16.41	16.29	5.17	5.21	5.21
EDGE 12 (8PSK, 4 Uplink) MCS5	22.79	22.87	22.75	17.66	17.61	17.63	5.13	5.26	5.12
Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots. The calculated method is shown as below: Frame-average power = Maximum burst averaged power (1 Uplink) - 9 dB Frame-average power = Maximum burst averaged power (2 Uplink) - 6 dB Frame-average power = Maximum burst averaged power (3 Uplink) - 4.26 dB Frame-average power = Maximum burst averaged power (4 Uplink) - 3 dB									

Note:

- Following KDB 941225 D03, for Body SAR testing, the EUT operating without power back-off was set in GPRS 10 and the EUT operating with power back-off was set in GPRS 10 due to its highest frame-average power.
- Per KDB 447498, the maximum output power channel is used for SAR testing and for further SAR test reduction.

<WCDMA Conducted Power>

The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification. A summary of these settings are illustrated below:

HSDPA Setup Configuration:

- a. The EUT was connected to Base Station referred to the drawing of Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting:
 - i. Set Gain Factors (β_c and β_d) and parameters were set according to each
 - ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
 - iii. Set RMC 12.2Kbps + HSDPA mode.
 - iv. Set Cell Power = -86 dBm
 - v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
 - vi. Select HSDPA Uplink Parameters
 - vii. Set Delta ACK, Delta NACK and Delta CQI = 8
 - viii. Set Ack-Nack Repetition Factor to 3
 - ix. Set CQI Feedback Cycle (k) to 4 ms
 - x. Set CQI Repetition Factor to 2
 - xi. Power Ctrl Mode = All Up bits
- d. The transmitted maximum output power was recorded.

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (Note 1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$.

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and $\Delta_{NACK} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$, and $\Delta_{CQI} = 24/15$ with $\beta_{hs} = 24/15 * \beta_c$.

Note 3: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

Setup Configuration

HSUPA Setup Configuration:

- a. The EUT was connected to Base Station referred to the drawing of Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting * :
 - i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
 - ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
 - iii. Set Cell Power = -86 dBm
 - iv. Set Channel Type = 12.2k + HSPA
 - v. Set UE Target Power
 - vi. Power Ctrl Mode= Alternating bits
 - vii. Set and observe the E-TFCI
 - viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI
- d. The transmitted maximum output power was recorded.

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note 1)	β_{ec}	β_{ed} (Note 5) (Note 6)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 6)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/25	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1} : 47/15 β_{ed2} : 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$.

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.

Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$.

Note 5: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 6: β_{ed} can not be set directly, it is set by Absolute Grant Value.

Setup Configuration

<WCDMA Conducted Power>

WCDMA Band V Average power (dBm)									
Channel	4132	4182	4233	4132	4182	4233	4132	4182	4233
Frequency (MHz)	826.4	836.4	846.6	826.4	836.4	846.6	826.4	836.4	846.6
Mode	Without Power Back-off			With Power Back-off			Pwr. Reduction (dB)		
3GPP Rel 99	RMC 12.2K	23.45	23.24	23.26	19.92	19.70	19.73	3.53	3.54
3GPP Rel 6	HSDPA Subtest-1	23.43	23.23	23.24	19.91	19.69	19.72	3.52	3.54
3GPP Rel 6	HSDPA Subtest-2	22.91	22.73	22.76	19.90	19.67	19.71	3.01	3.06
3GPP Rel 6	HSDPA Subtest-3	22.45	22.26	22.28	19.89	19.63	19.68	2.56	2.63
3GPP Rel 6	HSDPA Subtest-4	22.22	22.03	22.07	19.87	19.65	19.67	2.35	2.38
3GPP Rel 6	HSUPA Subtest-1	22.45	22.22	22.23	19.34	19.14	19.23	3.11	3.08
3GPP Rel 6	HSUPA Subtest-2	20.71	20.55	20.57	19.21	19.42	19.51	1.50	1.13
3GPP Rel 6	HSUPA Subtest-3	21.56	21.33	21.36	19.31	19.44	19.50	2.25	1.89
3GPP Rel 6	HSUPA Subtest-4	21.07	20.88	20.94	19.53	19.43	19.49	1.54	1.45
3GPP Rel 6	HSUPA Subtest-5	22.99	22.78	22.83	19.20	19.83	19.91	3.79	2.95

WCDMA Band V MPR Results (dB)								
Channel	4132	4182	4233	4132	4182	4233	3GPP MPR	
Subtests	Without Power Back-off			With Power Back-off			(dB)	
3GPP Rel 6	HSDPA Subtest-1	0.00	0.00	0.00	0.00	0.00	0	
3GPP Rel 6	HSDPA Subtest-2	0.52	0.50	0.48	0.01	0.02	0	
3GPP Rel 6	HSDPA Subtest-3	0.98	0.97	0.96	0.02	0.06	≤ 0.5	
3GPP Rel 6	HSDPA Subtest-4	1.21	1.20	1.17	0.04	0.04	≤ 0.5	
3GPP Rel 6	HSUPA Subtest-1	0.54	0.56	0.60	-0.14	0.69	0	
3GPP Rel 6	HSUPA Subtest-2	2.28	2.23	2.26	-0.01	0.41	≤ 2	
3GPP Rel 6	HSUPA Subtest-3	1.43	1.45	1.47	-0.11	0.39	≤ 1	
3GPP Rel 6	HSUPA Subtest-4	1.92	1.90	1.89	-0.33	0.40	≤ 2	
3GPP Rel 6	HSUPA Subtest-5	0.00	0.00	0.00	0.00	0.00	0	

Note:

1. Applying the subtest setup in Table C.11.1.3 of 3GPP TS 34.121-1 V9.1.0 to Rel. 6 HSPA.
2. Per KDB 941225 D01, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA/HSUPA output power is < 0.25dB higher than RMC, or SAR with RMC 12.2kbps setting is ≤ 1.2W/kg, HSDPA/HSUPA SAR evaluation can be excluded.
3. By design, HSDPA/HSUPA RF power will not be larger than RMC 12.2kbps, detailed information is included in Tune-up Procedure exhibit.
4. It is expected by the manufacturer that MPR for some HSDPA/HSUPA subtests may differ from the specification of 3GPP, according to the chipset implementation in this model. The implementation and expected deviation are detailed in tune-up procedure exhibit.

WCDMA Band II Average power (dBm)									
Channel	9262	9400	9538	9262	9400	9538	9262	9400	9538
Frequency (MHz)	1852.4	1880.0	1907.6	1852.4	1880.0	1907.6	1852.4	1880.0	1907.6
Mode	Without Power Back-off			With Power Back-off			Pwr. Reduction (dB)		
3GPP Rel 99 RMC 12.2K	23.63	23.46	23.50	17.77	17.43	17.50	5.86	6.03	6.00
3GPP Rel 6 HSDPA Subtest-1	23.61	23.43	23.46	17.64	17.42	17.33	5.97	6.01	6.13
3GPP Rel 6 HSDPA Subtest-2	23.17	22.95	22.99	17.62	17.47	17.31	5.55	5.48	5.68
3GPP Rel 6 HSDPA Subtest-3	22.68	22.49	22.53	17.68	17.45	17.31	5.00	5.04	5.22
3GPP Rel 6 HSDPA Subtest-4	22.40	22.20	22.25	17.71	17.45	17.30	4.69	4.75	4.95
3GPP Rel 6 HSUPA Subtest-1	22.69	22.50	22.53	17.35	17.16	17.26	5.34	5.34	5.27
3GPP Rel 6 HSUPA Subtest-2	21.03	20.88	20.94	17.62	17.43	17.34	3.41	3.45	3.60
3GPP Rel 6 HSUPA Subtest-3	21.72	21.59	21.63	17.52	17.39	17.20	4.20	4.20	4.43
3GPP Rel 6 HSUPA Subtest-4	21.41	21.24	21.26	17.50	17.45	17.31	3.91	3.79	3.95
3GPP Rel 6 HSUPA Subtest-5	23.10	22.93	22.97	17.69	17.65	17.56	5.41	5.28	5.41

WCDMA Band II MPR Results (dB)								
Channel	9262	9400	9538	9262	9400	9538	3GPP MPR	
Subtests	Without Power Back-off			With Power Back-off			(dB)	
3GPP Rel 6 HSDPA Subtest-1	0.00	0.00	0.00	0.00	0.00	0.00	0	
3GPP Rel 6 HSDPA Subtest-2	0.44	0.48	0.47	0.02	-0.05	0.02	0	
3GPP Rel 6 HSDPA Subtest-3	0.93	0.94	0.93	-0.04	-0.03	0.02	≤ 0.5	
3GPP Rel 6 HSDPA Subtest-4	1.21	1.23	1.21	-0.07	-0.03	0.03	≤ 0.5	
3GPP Rel 6 HSUPA Subtest-1	0.41	0.43	0.44	0.34	0.49	0.30	0	
3GPP Rel 6 HSUPA Subtest-2	2.07	2.05	2.03	0.07	0.22	0.22	≤ 2	
3GPP Rel 6 HSUPA Subtest-3	1.38	1.34	1.34	0.17	0.26	0.36	≤ 1	
3GPP Rel 6 HSUPA Subtest-4	1.69	1.69	1.71	0.19	0.20	0.25	≤ 2	
3GPP Rel 6 HSUPA Subtest-5	0.00	0.00	0.00	0.00	0.00	0.00	0	

Note:

- Applying the subtest setup in Table C.11.1.3 of 3GPP TS 34.121-1 V9.1.0 to Rel. 6 HSPA.
- Per KDB 941225 D01, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA/HSUPA output power is < 0.25dB higher than RMC, or SAR with RMC 12.2kbps setting is ≤ 1.2W/kg, HSDPA/HSUPA SAR evaluation can be excluded.
- By design, HSDPA/HSUPA RF power will not be larger than RMC 12.2kbps, detailed information is included in Tune-up Procure exhibit.
- It is expected by the manufacturer that MPR for some HSDPA/HSUPA subtests may differ from the specification of 3GPP, according to the chipset implementation in this model. The implementation and expected deviation are detailed in tune-up procedure exhibit.

WCDMA Band IV Average power (dBm)									
Channel	1312	1413	1513	1312	1413	1513	1312	1413	1513
Frequency (MHz)	1712.4	1732.6	1752.6	1712.4	1732.6	1752.6	1712.4	1732.6	1752.6
Mode	Without Power Back-off			With Power Back-off			Pwr. Reduction (dB)		
3GPP Rel 99 RMC 12.2K	23.16	23.02	23.24	16.93	16.75	16.95	6.23	6.27	6.29
3GPP Rel 6 HSDPA Subtest-1	23.06	22.83	23.12	16.91	16.63	16.90	6.15	6.20	6.22
3GPP Rel 6 HSDPA Subtest-2	22.65	22.45	22.74	16.93	16.64	16.94	5.72	5.81	5.80
3GPP Rel 6 HSDPA Subtest-3	22.24	22.02	22.32	16.94	16.64	16.91	5.30	5.38	5.41
3GPP Rel 6 HSDPA Subtest-4	21.95	21.72	22.00	16.93	16.63	16.93	5.02	5.09	5.07
3GPP Rel 6 HSUPA Subtest-1	22.16	22.08	22.19	16.21	16.04	16.24	5.95	6.04	5.95
3GPP Rel 6 HSUPA Subtest-2	20.51	20.44	20.54	16.42	16.36	16.43	4.09	4.08	4.11
3GPP Rel 6 HSUPA Subtest-3	21.27	21.18	21.30	16.39	16.30	16.44	4.88	4.88	4.86
3GPP Rel 6 HSUPA Subtest-4	20.86	20.78	20.87	16.46	16.33	16.48	4.40	4.45	4.39
3GPP Rel 6 HSUPA Subtest-5	22.51	22.42	22.52	16.85	16.60	16.89	5.66	5.82	5.63

WCDMA Band IV MPR Results (dB)								
Channel	1312	1413	1513	1312	1413	1513	3GPP MPR	
Subtests	Without Power Back-off			With Power Back-off			(dB)	
3GPP Rel 6 HSDPA Subtest-1	0.00	0.00	0.00	0.00	0.00	0.00	0	
3GPP Rel 6 HSDPA Subtest-2	0.41	0.38	0.38	-0.02	-0.01	-0.04	0	
3GPP Rel 6 HSDPA Subtest-3	0.82	0.81	0.80	-0.03	-0.01	-0.01	≤ 0.5	
3GPP Rel 6 HSDPA Subtest-4	1.11	1.11	1.12	-0.02	0.00	-0.03	≤ 0.5	
3GPP Rel 6 HSUPA Subtest-1	0.35	0.34	0.33	0.64	0.56	0.65	0	
3GPP Rel 6 HSUPA Subtest-2	2.00	1.98	1.98	0.43	0.24	0.46	≤ 2	
3GPP Rel 6 HSUPA Subtest-3	1.24	1.24	1.22	0.46	0.30	0.45	≤ 1	
3GPP Rel 6 HSUPA Subtest-4	1.65	1.64	1.65	0.39	0.27	0.41	≤ 2	
3GPP Rel 6 HSUPA Subtest-5	0.00	0.00	0.00	0.00	0.00	0.00	0	

Note:

- Applying the subtest setup in Table C.11.1.3 of 3GPP TS 34.121-1 V9.1.0 to Rel. 6 HSPA.
- Per KDB 941225 D01, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA/HSUPA output power is < 0.25dB higher than RMC, or SAR with RMC 12.2kbps setting is ≤ 1.2W/kg, HSDPA/HSUPA SAR evaluation can be excluded.
- By design, HSDPA/HSUPA RF power will not be larger than RMC 12.2kbps, detailed information is included in Tune-up Procure exhibit.
- It is expected by the manufacturer that MPR for some HSDPA/HSUPA subtests may differ from the specification of 3GPP, according to the chipset implementation in this model. The implementation and expected deviation are detailed in tune-up procedure exhibit.

<WLAN 2.4G Conducted Power>
<Ant. 0>

WLAN 2.4G 802.11b Average Power (dBm)						
Power vs. Channel			Power vs. Data Rate			
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)		
		1M		2M	5.5M	11M
CH 01	2412	15.08	CH 11	15.12	15.13	15.11
CH 06	2437	15.14				
CH 11	2462	15.19				

WLAN 2.4G 802.11g Average Power (dBm)									
Power vs. Channel			Power vs. Data Rate						
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)					
		6M		9M	12M	18M	24M	36M	48M
CH 01	2412	10.44	CH 06	15.00	14.96	14.89	14.90	14.92	14.95
CH 06	2437	15.05							
CH 11	2462	11.30							

WLAN 2.4G 802.11n-HT20 Average Power (dBm)									
Power vs. Channel			Power vs. Data Rate						
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)					
		MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6
CH 01	2412	9.38	CH 06	15.01	15.03	14.94	14.97	14.96	14.99
CH 06	2437	15.07							
CH 11	2462	9.09							

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WLAN 2.4G 802.11b Average Power (dBm)							
Power vs. Channel				Power vs. Data Rate			
Channel	Frequency (MHz)	Chain	Data Rate (bps)	Channel	Data Rate (bps)		
			1M		2M	5.5M	11M
CH 01	2412	0	15.06	CH 11	18.16	18.13	18.14
		1	15.18				
		0+1	18.13				
CH 06	2437	0	15.14				
		1	15.19				
		0+1	18.18				
CH 11	2462	0	15.17				
		1	15.20				
		0+1	18.20				

WLAN 2.4G 802.11g Average Power (dBm)											
Power vs. Channel				Power vs. Data Rate							
Channel	Frequency (MHz)	Chain	Data Rate (bps)	Channel	Data Rate (bps)						
			6M		9M	12M	18M	24M	36M	48M	54M
CH 01	2412	0	10.44	CH 06	18.04	17.97	17.94	17.95	17.93	17.99	18.00
		1	10.59								
		0+1	13.53								
CH 06	2437	0	15.07								
		1	15.04								
		0+1	18.07								
CH 11	2462	0	11.11								
		1	10.84								
		0+1	13.99								

WLAN 2.4G 802.11n-HT20 Average Power (dBm)											
Power vs. Channel				Power vs. Data Rate							
Channel	Frequency (MHz)	Chain	MCS Index	Channel	MCS Index						
			MCS8		MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 01	2412	0	9.37	CH 06	17.84	17.90	17.96	18.00	18.02	17.99	18.03
		1	9.39								
		0+1	12.39								
CH 06	2437	0	15.07								
		1	15.04								
		0+1	18.07								
CH 11	2462	0	9.11								
		1	8.34								
		0+1	11.75								

Note:

1. Per KDB 248227, choose the highest output power channel to test SAR and determine further SAR exclusion
2. Per KDB 248227, 11g and 11n-HT20 average output power is less than 0.25dB higher than 11b mode, thus the SAR can be excluded.
3. For each frequency band, testing at higher data rates and higher order modulations is not required when the maximum average output power for each of these configurations is less than 0.25dB higher than those measured at the lowest data rate.

<Bluetooth Conducted Power>

Channel	Frequency (MHz)	Average power (dBm)		
		Mode		
		GFSK	$\pi/4$ -DQPSK	8-DPSK
CH 0	2402	2.37	2.54	2.54
CH 39	2441	4.95	5.08	5.11
CH 78	2480	3.76	3.91	3.94

Channel	Frequency (MHz)	Average power (dBm)	
		Mode	
		BT 4.0 LE, GFSK	
CH 0	2402	-1.89	
CH 19	2440	0.81	
CH 39	2480	-0.43	

Note: Per KDB 447498, Bluetooth standalone SAR is excluded due to highest output power $(3.24\text{mW}) \leq 60/f_{(\text{GHz})} \text{ mW}$, where $60/f_{(\text{GHz})} = 24.5\text{mW}$.

<WLAN 5G Conducted Power>
<Ant. 0>

WLAN 5G 802.11a Average Power (dBm)							
Power vs. Channel				Power vs. Data Rate			
Channel	Frequency (MHz)	Chain	Data Rate (bps)	Channel	Data Rate (bps)		
			6M		9M	12M	18M
CH 36	5180	0	12.00	CH 36	11.90	11.92	11.84
CH 40	5200	0	11.96				
CH 44	5220	0	11.48				
CH 48	5240	0	11.53				
CH 52	5260	0	11.48	CH 60	11.71	11.74	11.66
CH 56	5280	0	11.46				
CH 60	5300	0	11.79				
CH 64	5320	0	11.65				
CH 100	5500	0	9.42	CH 116	11.37	11.29	11.33
CH 104	5520	0	9.38				
CH 108	5540	0	9.36				
CH 112	5560	0	9.32				
CH 116	5580	0	11.45				
CH 132	5660	0	10.50				
CH 136	5680	0	10.71				
CH 140	5700	0	9.61				
CH 149	5745	0	11.82	CH 149	11.74	11.71	11.62
CH 153	5765	0	11.71				
CH 157	5785	0	11.74				
CH 161	5805	0	11.48				
CH 165	5825	0	11.51				

WLAN 5G 802.11n (BW 20MHz) Average Power (dBm)							
Power vs. Channel				Power vs. Data Rate			
Channel	Frequency (MHz)	Chain	MCS Index	Channel	Data Rate (bps)		
			MCS0		MCS1	MCS2	MCS3
CH 36	5180	0	11.80	CH 36	11.74	11.70	11.64
CH 40	5200	0	11.71				
CH 44	5220	0	11.47				
CH 48	5240	0	11.29				
CH 52	5260	0	11.52	CH 64	11.68	11.65	11.59
CH 56	5280	0	11.48				
CH 60	5300	0	11.60				
CH 64	5320	0	11.75				
CH 100	5500	0	9.78	CH 116	11.31	11.35	11.38
CH 104	5520	0	9.68				
CH 108	5540	0	9.70				
CH 112	5560	0	9.67				
CH 116	5580	0	11.41				
CH 132	5660	0	9.86				
CH 136	5680	0	8.23				
CH 140	5700	0	6.40				
CH 149	5745	0	11.80	CH 149	11.75	11.70	11.63
CH 153	5765	0	11.76				
CH 157	5785	0	11.64				
CH 161	5805	0	11.53				
CH 165	5825	0	11.57				



WLAN 5G 802.11n (BW 40MHz) Average Power (dBm)											
Power vs. Channel				Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index		Channel	MCS Index						
		Chain	MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 38	5190	0	8.10	CH 46	10.55	10.51	10.48	10.51	10.53	10.48	10.46
CH 46	5230	0	10.61								
CH 54	5270	0	10.34								
CH 62	5310	0	7.82	CH 54	10.28	10.25	10.25	10.21	10.23	10.19	10.24
CH 102	5510	0	6.31								
CH 134	5670	0	10.59								
CH 151	5755	0	10.57	CH 151	10.44	10.48	10.39	10.48	10.37	10.42	10.41
CH 159	5795	0	10.21								

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WLAN 5G 802.11a Average Power (dBm)											
Power vs. Channel				Power vs. Data Rate							
Channel	Frequency (MHz)	Chain	Data Rate (bps)	Channel	Data Rate (bps)						
			6M		9M	12M	18M	24M	36M	48M	54M
CH 36	5180	0+1	15.12	CH 36	15.01	15.06	14.95	14.91	14.90	14.87	14.85
CH 40	5200	0+1	15.08								
CH 44	5220	0+1	14.84								
CH 48	5240	0+1	15.01	CH 60	14.88	14.85	14.80	14.91	14.84	14.79	14.83
CH 52	5260	0+1	14.91								
CH 56	5280	0+1	14.82								
CH 60	5300	0+1	14.96								
CH 64	5320	0+1	14.84								
CH 100	5500	0+1	12.66	CH 116	13.80	13.74	13.84	13.72	13.76	13.77	13.82
CH 104	5520	0+1	12.53								
CH 108	5540	0+1	12.56								
CH 112	5560	0+1	12.61								
CH 116	5580	0+1	13.89								
CH 132	5660	0+1	13.76								
CH 136	5680	0+1	13.82								
CH 140	5700	0+1	12.84	CH 165	14.84	14.85	14.76	14.71	14.83	14.87	14.75
CH 149	5745	0+1	14.87								
CH 153	5765	0+1	14.84								
CH 157	5785	0+1	14.86								
CH 161	5805	0+1	14.83								
CH 165	5825	0+1	14.90								

WLAN 5G 802.11n (BW 20MHz) Average Power (dBm)											
Power vs. Channel				Power vs. Data Rate							
Channel	Frequency (MHz)	Chain	MCS Index	Channel	Data Rate (bps)						
			MCS8		MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 36	5180	0+1	15.09	CH 36	15.01	14.92	14.87	14.99	15.02	14.95	14.91
CH 40	5200	0+1	14.96								
CH 44	5220	0+1	15.01								
CH 48	5240	0+1	14.82								
CH 52	5260	0+1	14.70	CH 64	14.88	14.81	14.76	14.80	14.78	14.85	14.79
CH 56	5280	0+1	14.55								
CH 60	5300	0+1	14.87								
CH 64	5320	0+1	14.90								
CH 100	5500	0+1	13.03	CH 116	13.75	13.71	13.68	13.74	13.73	13.79	13.69
CH 104	5520	0+1	13.01								
CH 108	5540	0+1	12.97								
CH 112	5560	0+1	12.98								
CH 116	5580	0+1	13.82								
CH 132	5660	0+1	12.84								
CH 136	5680	0+1	11.39								
CH 140	5700	0+1	9.96								
CH 149	5745	0+1	14.86	CH 149	14.81	14.75	14.71	14.68	14.80	14.75	14.72
CH 153	5765	0+1	14.83								
CH 157	5785	0+1	14.84								
CH 161	5805	0+1	14.69								
CH 165	5825	0+1	14.77								

WLAN 5G 802.11n (BW 40MHz) Average Power (dBm)											
Power vs. Channel				Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index		Channel	MCS Index						
		Chain	MCS8		MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 38	5190	0+1	11.11	CH 46	13.88	13.81	13.92	13.84	13.82	13.78	13.77
CH 46	5230	0+1	13.95								
CH 54	5270	0+1	13.94	CH 54	13.90	13.85	13.78	13.86	13.81	13.79	13.75
CH 62	5310	0+1	11.18								
CH 102	5510	0+1	9.71	CH 134	13.78	13.81	13.71	13.72	13.75	13.69	13.68
CH 134	5670	0+1	13.84								
CH 151	5755	0+1	14.09	CH 151	14.01	13.96	13.87	13.88	13.95	13.84	13.96
CH 159	5795	0+1	13.89								

Note:

1. Per KDB 248227, choose the highest output power channel to test SAR and determine further SAR exclusion
2. Per KDB 248227, 11n output power is less than 0.25dB higher than 11a mode, thus the SAR can be excluded.
3. For each frequency band, testing at higher data rates and higher order modulations is not required when the maximum average output power for each of these configurations is less than 0.25dB higher than those measured at the lowest data rate.

11. SAR Test Results

11.1 Test Records for Body SAR Test

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Power Back-off	Power Drift (dB)	SAR _{1g} (W/kg)	Tune-up Scaling Factor	Tune-up Scaled SAR _{1g}
47	GSM850	GPRS10	Bottom Face	0.8	189	836.4	32.45	33.2	OFF	-0.163	1.23	1.189	1.462
53	GSM850	GPRS10	Bottom Face	0.8	128	824.2	32.43	33.2	OFF	-0.124	1.13	1.194	1.349
54	GSM850	GPRS10	Bottom Face	0.8	251	848.8	32.40	33.2	OFF	-0.105	1.17	1.202	1.407
48	GSM850	GPRS10	Edge4	0	189	836.4	32.45	33.2	OFF	0.155	0.209	1.189	0.248
74	GSM850	GPRS10	Bottom Face	0	189	836.4	26.67	27.2	ON	-0.131	1.29	1.130	1.457
75	GSM850	GPRS10	Bottom Face	0	128	824.2	26.65	27.2	ON	-0.186	1.22	1.135	1.385
76	GSM850	GPRS10	Bottom Face	0	251	848.8	26.59	27.2	ON	-0.14	1.25	1.151	1.439
77	GSM850	GPRS10	Edge1	0	189	836.4	26.67	27.2	ON	0.123	0.752	1.130	0.850
57	GSM1900	GPRS10	Bottom Face	0.8	661	1880	29.58	30.2	OFF	-0.157	0.835	1.153	0.963
58	GSM1900	GPRS10	Bottom Face	0.8	512	1850.2	29.49	30.2	OFF	-0.156	0.827	1.178	0.974
59	GSM1900	GPRS10	Bottom Face	0.8	810	1909.8	29.49	30.2	OFF	-0.033	0.843	1.178	0.993
60	GSM1900	GPRS10	Edge4	0	661	1880	29.58	30.2	OFF	0.071	0.279	1.153	0.322
61	GSM1900	GPRS10	Bottom Face	0	661	1880	24.39	25.2	ON	-0.108	1.22	1.205	1.470
62	GSM1900	GPRS10	Bottom Face	0	512	1850.2	24.31	25.2	ON	-0.151	1.21	1.227	1.485
63	GSM1900	GPRS10	Bottom Face	0	810	1909.8	24.28	25.2	ON	-0.172	1.21	1.236	1.495
64	GSM1900	GPRS10	Edge1	0	661	1880	24.39	25.2	ON	-0.176	0.783	1.205	0.944

Note:

- Per KDB 447498, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.

**<WCDMA SAR>**

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Power Back-off	Power Drift (dB)	SAR _{1g} (W/kg)	Tune-up Scaling Factor	Tune-up Scaled SAR _{1g}
49	WCDMA V	RMC12.2K	Bottom Face	0.8	4132	826.4	23.45	24.2	OFF	-0.184	0.716	1.189	0.851
50	WCDMA V	RMC12.2K	Edge4	0	4132	826.4	23.45	24.2	OFF	0.1	0.122	1.189	0.145
70	WCDMA V	RMC12.2K	Bottom Face	0	4132	826.4	19.92	20.2	ON	-0.19	1.23	1.067	1.312
71	WCDMA V	RMC12.2K	Bottom Face	0	4182	836.4	19.70	20.2	ON	-0.176	1.18	1.122	1.324
72	WCDMA V	RMC12.2K	Bottom Face	0	4233	846.6	19.73	20.2	ON	-0.063	1.26	1.114	1.404
73	WCDMA V	RMC12.2K	Edge1	0	4132	826.4	19.92	20.2	ON	-0.034	0.668	1.067	0.712
96	WCDMA V	HSDPA	Bottom Face	0	4233	846.6	19.72	20.2	ON	0.18	1.06	1.117	1.184
110	WCDMA V	HSDPA	Bottom Face	0	4132	826.4	19.91	20.2	ON	-0.06	1.1	1.069	1.176
111	WCDMA V	HSDPA	Bottom Face	0	4182	836.4	19.69	20.2	ON	-0.05	1.07	1.125	1.203
97	WCDMA V	HSUPA	Bottom Face	0	4233	846.6	19.91	20.2	ON	-0.08	1.08	1.069	1.155
112	WCDMA V	HSUPA	Bottom Face	0	4132	826.4	19.76	20.2	ON	0.17	1.1	1.107	1.217
113	WCDMA V	HSUPA	Bottom Face	0	4182	836.4	19.83	20.2	ON	0.18	1.09	1.089	1.187
51	WCDMA II	RMC12.2K	Bottom Face	0.8	9262	1852.4	23.63	24.2	OFF	-0.149	0.888	1.140	1.013
55	WCDMA II	RMC12.2K	Bottom Face	0.8	9400	1880	23.46	24.2	OFF	-0.136	0.852	1.186	1.010
56	WCDMA II	RMC12.2K	Bottom Face	0.8	9538	1907.6	23.50	24.2	OFF	-0.103	0.862	1.175	1.013
52	WCDMA II	RMC12.2K	Edge4	0	9262	1852.4	23.63	24.2	OFF	0.017	0.298	1.140	0.340
65	WCDMA II	RMC12.2K	Bottom Face	0	9262	1852.4	17.77	18.2	ON	-0.162	1.34	1.104	1.479
78	WCDMA II	RMC12.2K	Bottom Face	0	9400	1880	17.43	18.2	ON	0.136	1.31	1.194	1.564
79	WCDMA II	RMC12.2K	Bottom Face	0	9538	1907.6	17.50	18.2	ON	-0.121	1.32	1.175	1.551
80	WCDMA II	RMC12.2K	Edge1	0	9262	1852.4	17.77	18.2	ON	-0.176	0.783	1.104	0.864
105	WCDMA II	HSDPA	Bottom Face	0	9262	1852.4	17.64	18.2	ON	0.01	1.28	1.138	1.456
94	WCDMA II	HSDPA	Bottom Face	0	9400	1880	17.42	18.2	ON	0.07	1.21	1.197	1.448
106	WCDMA II	HSDPA	Bottom Face	0	9538	1907.6	17.33	18.2	ON	0.15	1.22	1.222	1.491
107	WCDMA II	HSUPA	Bottom Face	0	9262	1852.4	17.69	18.2	ON	0.15	1.3	1.125	1.462
95	WCDMA II	HSUPA	Bottom Face	0	9400	1880	17.65	18.2	ON	0.11	1.25	1.135	1.419
108	WCDMA II	HSUPA	Bottom Face	0	9538	1907.6	17.56	18.2	ON	0	1.19	1.159	1.379
98	WCDMA IV	RMC12.2K	Bottom Face	0.8	1513	1752.6	23.24	24.2	OFF	0.05	1.08	1.247	1.347
81	WCDMA IV	RMC12.2K	Bottom Face	0.8	1312	1712.4	23.16	24.2	OFF	0.06	1.07	1.271	1.360
82	WCDMA IV	RMC12.2K	Bottom Face	0.8	1413	1732.6	23.02	24.2	OFF	0.17	1.06	1.312	1.391
83	WCDMA IV	RMC12.2K	Edge4	0	1513	1752.6	23.24	24.2	OFF	0.19	0.186	1.247	0.232
88	WCDMA IV	RMC12.2K	Bottom Face	0	1513	1752.6	16.95	17.2	ON	0.05	1.35	1.059	1.430
89	WCDMA IV	RMC12.2K	Bottom Face	0	1312	1712.4	16.93	17.2	ON	0.16	1.35	1.064	1.437
90	WCDMA IV	RMC12.2K	Bottom Face	0	1413	1732.6	16.75	17.2	ON	0.19	1.39	1.109	1.542
91	WCDMA IV	RMC12.2K	Edge1	0	1513	1752.6	16.95	17.2	ON	0.07	0.855	1.059	0.906
99	WCDMA IV	RMC12.2K	Edge1	0	1312	1712.4	16.93	17.2	ON	-0.09	0.695	1.064	0.740
100	WCDMA IV	RMC12.2K	Edge1	0	1413	1732.6	16.75	17.2	ON	0.05	0.684	1.109	0.759
92	WCDMA IV	HSDPA	Bottom Face	0	1413	1732.6	16.63	17.2	ON	0.14	1.35	1.140	1.539
101	WCDMA IV	HSDPA	Bottom Face	0	1312	1712.4	16.91	17.2	ON	0	1.19	1.069	1.272
102	WCDMA IV	HSDPA	Bottom Face	0	1513	1752.6	16.90	17.2	ON	0.13	1.21	1.072	1.297
93	WCDMA IV	HSUPA	Bottom Face	0	1413	1732.6	16.60	17.2	ON	0.1	1.32	1.148	1.516
103	WCDMA IV	HSUPA	Bottom Face	0	1312	1712.4	16.85	17.2	ON	0.14	1.19	1.084	1.290
104	WCDMA IV	HSUPA	Bottom Face	0	1513	1752.6	16.89	17.2	ON	-0.01	1.22	1.074	1.310

Note:

1. Per KDB 447498, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Ant Label	Power Drift (dB)	SAR _{1g} (W/kg)	Tune-up Scaling Factor	Tune-up Scaled SAR _{1g}
1	WLAN2.4G	802.11b	Bottom Face	0	11	2462	15.19	15.5	0	0.023	0.864	1.074	0.928
2	WLAN2.4G	802.11b	Bottom Face	0	1	2412	15.08	15.5	0	0.123	0.987	1.102	1.087
3	WLAN2.4G	802.11b	Bottom Face	0	6	2437	15.14	15.5	0	0.109	0.98	1.086	1.065
4	WLAN2.4G	802.11b	Edge 1	0	11	2462	15.19	15.5	0	0.147	0.297	1.074	0.319
5	WLAN2.4G	802.11b	Edge 2	0	11	2462	15.19	15.5	0	0.176	0.086	1.074	0.092
6	WLAN2.4G	802.11b	Bottom Face	0	11	2462	18.20	18.5	0+1	0.069	0.888	1.072	0.952
7	WLAN2.4G	802.11b	Bottom Face	0	1	2412	18.13	18.5	0+1	0.111	0.983	1.089	1.070
8	WLAN2.4G	802.11b	Bottom Face	0	6	2437	18.18	18.5	0+1	0.174	1.06	1.076	1.141
9	WLAN2.4G	802.11b	Edge 1	0	11	2462	18.20	18.5	0+1	0.128	0.46	1.072	0.493
10	WLAN2.4G	802.11b	Edge 2	0	11	2462	18.20	18.5	0+1	-0.125	0.049	1.072	0.053

Note:

- Per KDB 447498, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Ant Status	Power Drift (dB)	SAR _{1g} (W/kg)	Tune-up Scaling Factor	Tune-up Scaled SAR _{1g}
11	WLAN5G	802.11a	Bottom Face	0	36	5180	12.00	12.2	0	0	0.667	1.047	0.698
12	WLAN5G	802.11a	Edge 1	0	36	5180	12.00	12.2	0	0.133	0.535	1.047	0.560
13	WLAN5G	802.11a	Edge 2	0	36	5180	12.00	12.2	0	-0.072	0.091	1.047	0.095
14	WLAN5G	802.11a	Bottom Face	0	36	5180	15.12	15.2	0+1	0.112	0.797	1.019	0.812
15	WLAN5G	802.11a	Edge 1	0	36	5180	15.12	15.2	0+1	0.03	0.994	1.019	1.012
17	WLAN5G	802.11a	Edge 1	0	48	5240	15.01	15.2	0+1	0.143	0.895	1.045	0.935
16	WLAN5G	802.11a	Edge 2	0	36	5180	15.12	15.2	0+1	-0.047	0.165	1.019	0.168
18	WLAN5G	802.11a	Bottom Face	0	60	5300	11.79	12.2	0	0.108	0.541	1.099	0.595
19	WLAN5G	802.11a	Edge 1	0	60	5300	11.79	12.2	0	0.064	0.573	1.099	0.630
20	WLAN5G	802.11a	Edge 2	0	60	5300	11.79	12.2	0	0.124	0.098	1.099	0.108
21	WLAN5G	802.11a	Bottom Face	0	60	5300	14.96	15.2	0+1	0.123	0.962	1.057	1.017
22	WLAN5G	802.11a	Bottom Face	0	52	5260	14.91	15.2	0+1	0.123	1.05	1.069	1.123
37	WLAN5G	802.11a	Edge 1	0	60	5300	14.96	15.2	0+1	0.177	1.2	1.057	1.268
38	WLAN5G	802.11a	Edge 1	0	52	5260	14.91	15.2	0+1	0.044	1.06	1.069	1.133
44	WLAN5G	802.11a	Edge 2	0	60	5300	14.96	15.2	0+1	0.149	0.144	1.057	0.152
23	WLAN5G	802.11a	Bottom Face	0	116	5580	11.45	11.5	0	-0.139	1.19	1.012	1.204
30	WLAN5G	802.11a	Bottom Face	0	100	5500	9.42	10	0	0.104	0.759	1.143	0.867
31	WLAN5G	802.11a	Bottom Face	0	136	5680	10.71	11	0	0.003	0.543	1.069	0.580
24	WLAN5G	802.11a	Edge 1	0	116	5580	11.45	11.5	0	0.07	0.355	1.012	0.359
46	WLAN5G	802.11a	Edge 2	0	116	5580	11.45	11.5	0	0	0.032	1.012	0.032
26	WLAN5G	802.11a	Bottom Face	0	116	5580	13.89	14.2	0+1	-0.148	1.35	1.074	1.449
27	WLAN5G	802.11a	Bottom Face	0	100	5500	12.66	13.2	0+1	0	1.22	1.132	1.382
28	WLAN5G	802.11a	Bottom Face	0	136	5680	13.82	13.2	0+1	0.192	0.888	0.867	0.770
34	WLAN5G	802.11a	Edge 1	0	116	5580	13.89	14.2	0+1	-0.167	0.944	1.074	1.014
35	WLAN5G	802.11a	Edge 1	0	100	5500	12.66	13.2	0+1	0.113	1.09	1.132	1.234
36	WLAN5G	802.11a	Edge 1	0	136	5680	13.82	13.2	0+1	0.047	1.07	0.867	0.928
43	WLAN5G	802.11a	Edge 2	0	116	5580	13.89	14.2	0+1	0.12	0.232	1.074	0.249
32	WLAN5G	802.11a	Bottom Face	0	149	5745	11.82	12	0	0	0.471	1.042	0.491
33	WLAN5G	802.11a	Edge 1	0	149	5745	11.82	12	0	0.135	0.181	1.042	0.189
45	WLAN5G	802.11a	Edge 2	0	149	5745	11.82	12	0	0.124	0.012	1.042	0.013
29	WLAN5G	802.11a	Bottom Face	0	165	5825	14.90	15.2	0+1	0	0.728	1.072	0.780
39	WLAN5G	802.11a	Edge 1	0	165	5825	14.90	15.2	0+1	0.019	1.01	1.072	1.082
40	WLAN5G	802.11a	Edge 1	0	149	5745	14.87	15.2	0+1	-0.016	1.17	1.079	1.262
41	WLAN5G	802.11a	Edge 1	0	157	5785	14.86	15.2	0+1	0.015	1.17	1.081	1.265
42	WLAN5G	802.11a	Edge 2	0	165	5825	14.90	15.2	0+1	0.102	0.18	1.072	0.193

Note:

- Per KDB 447498, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.

11.2 Simultaneous Transmission SAR Analysis and Measurements

No.	Applicable Simultaneous Transmission Combination
1.	BT + WLAN 2.4G
2.	BT + WLAN 5G
3.	BT + WWAN
4.	WWAN + 2.4GHz WLAN
5.	WWAN+ 5GHz Band4 WLAN
6.	WWAN + 2.4GHz WLAN + BT
7.	WWAN+ 5GHz Band4 WLAN +BT

Note:

- 5GHz WLAN band 1/2/3 does not support Ad-hoc and hotspot mode, and simultaneous transmission with WWAN is not supported.
- EUT will choose either WLAN2.4G or WLAN5G according to the network signal condition; therefore, they will not transmit simultaneously.
- For 2.4GHz Bluetooth, $60/f_{\text{(GHz)}} \text{ mW} = 24.5 \text{ mW}$. Per KDB 447498 D01 and KDB 616217 D03, Bluetooth output power 3.24mW is much smaller than 24.5 mW, thus standalone SAR evaluation and simultaneous consideration is not required. Therefore, Bluetooth was considered zero in the 1-g SAR summing process

<WWAN Without Power Back-off, WLAN Ant. 0>

Position	WWAN			Scaled WWAN				WLAN2.4G		Scaled WLAN2.4G				WWAN + WLAN	Scaled WWAN + Scaled WLAN	Case No
	WWAN Band	Plot No	Max. WWAN SAR (W/kg)	Average Power (dBm)	Tune-up Limit (dBm)	Scaling Factor	Scaled WWAN (W/kg)	Plot No	Max. WLAN SAR (W/kg)	Average Power (dBm)	Tune-up Limit (dBm)	Scaling Factor	Scaled WLAN (W/kg)			
Bottom Face At 0.8cm	GSM850	47	1.23	32.45	33.2	1.189	1.462	2	0.987	15.08	15.5	1.102	1.087	2.22	2.55	S01
	GSM1900	59	0.843	29.49	30.2	1.178	0.993	2	0.987	15.08	15.5	1.102	1.087	1.83	2.08	S02
	WCDMA V	49	0.716	23.45	24.2	1.189	0.851	2	0.987	15.08	15.5	1.102	1.087	1.70	1.94	S03
	WCDMA II	51	0.888	23.63	24.2	1.140	1.013	2	0.987	15.08	15.5	1.102	1.087	1.88	2.10	S04
	WCDMA IV	82	1.06	23.02	24.2	1.312	1.391	2	0.987	15.08	15.5	1.102	1.087	2.05	2.48	S05
Edge1 At 0cm	GSM850	-	-	-	-	-	-	4	0.297	15.19	15.5	1.074	0.319	0.30	0.32	-
	GSM1900	-	-	-	-	-	-	4	0.297	15.19	15.5	1.074	0.319	0.30	0.32	-
	WCDMA V	-	-	-	-	-	-	4	0.297	15.19	15.5	1.074	0.319	0.30	0.32	-
	WCDMA II	-	-	-	-	-	-	4	0.297	15.19	15.5	1.074	0.319	0.30	0.32	-
	WCDMA IV	-	-	-	-	-	-	4	0.297	15.19	15.5	1.074	0.319	0.30	0.32	-
Edge2 At 0cm	GSM850	-	-	-	-	-	-	5	0.086	15.19	15.5	1.074	0.092	0.09	0.09	-
	GSM1900	-	-	-	-	-	-	5	0.086	15.19	15.5	1.074	0.092	0.09	0.09	-
	WCDMA V	-	-	-	-	-	-	5	0.086	15.19	15.5	1.074	0.092	0.09	0.09	-
	WCDMA II	-	-	-	-	-	-	5	0.086	15.19	15.5	1.074	0.092	0.09	0.09	-
	WCDMA IV	-	-	-	-	-	-	5	0.086	15.19	15.5	1.074	0.092	0.09	0.09	-
Edge4 At 0cm	GSM850	48	0.209	32.45	33.2	1.189	0.248	-	-	-	-	-	-	0.21	0.25	-
	GSM1900	60	0.279	29.58	30.2	1.153	0.322	-	-	-	-	-	-	0.28	0.32	-
	WCDMA V	50	0.122	23.45	24.2	1.189	0.145	-	-	-	-	-	-	0.12	0.15	-
	WCDMA II	52	0.298	23.63	24.2	1.140	0.340	-	-	-	-	-	-	0.30	0.34	-
	WCDMA IV	83	0.186	23.24	24.2	1.247	0.232	-	-	-	-	-	-	0.19	0.23	-

Position	WWAN			Scaled WWAN				WLAN5G		Scaled WLAN5G				WWAN + WLAN	Scaled WWAN + Scaled WLAN	Case No
	WWAN Band	Plot No	Max. WWAN SAR (W/kg)	Average Power (dBm)	Tune-up Limit (dBm)	Scaling Factor	Scaled WWAN (W/kg)	Plot No	Max. WLAN SAR (W/kg)	Average Power (dBm)	Tune-up Limit (dBm)	Scaling Factor	Scaled WLAN (W/kg)			
Bottom Face At 0.8cm	GSM850	47	1.23	32.45	33.2	1.189	1.462	32	0.471	11.82	12	1.042	0.491	1.70	1.95	S06
	GSM1900	59	0.843	29.49	30.2	1.178	0.993	32	0.471	11.82	12	1.042	0.491	1.31	1.48	-
	WCDMA V	49	0.716	23.45	24.2	1.189	0.851	32	0.471	11.82	12	1.042	0.491	1.19	1.34	-
	WCDMA II	51	0.888	23.63	24.2	1.140	1.013	32	0.471	11.82	12	1.042	0.491	1.36	1.50	-
	WCDMA IV	82	1.06	23.02	24.2	1.312	1.391	32	0.471	11.82	12	1.042	0.491	1.53	1.88	S07
Edge1 At 0cm	GSM850	-	-	-	-	-	-	33	0.181	11.82	12	1.042	0.189	0.18	0.19	-
	GSM1900	-	-	-	-	-	-	33	0.181	11.82	12	1.042	0.189	0.18	0.19	-
	WCDMA V	-	-	-	-	-	-	33	0.181	11.82	12	1.042	0.189	0.18	0.19	-
	WCDMA II	-	-	-	-	-	-	33	0.181	11.82	12	1.042	0.189	0.18	0.19	-
	WCDMA IV	-	-	-	-	-	-	33	0.181	11.82	12	1.042	0.189	0.18	0.19	-
Edge2 At 0cm	GSM850	-	-	-	-	-	-	45	0.012	11.82	12	1.042	0.013	0.01	0.01	-
	GSM1900	-	-	-	-	-	-	45	0.012	11.82	12	1.042	0.013	0.01	0.01	-
	WCDMA V	-	-	-	-	-	-	45	0.012	11.82	12	1.042	0.013	0.01	0.01	-
	WCDMA II	-	-	-	-	-	-	45	0.012	11.82	12	1.042	0.013	0.01	0.01	-
	WCDMA IV	-	-	-	-	-	-	45	0.012	11.82	12	1.042	0.013	0.01	0.01	-
Edge4 At 0cm	GSM850	48	0.209	32.45	33.2	1.189	0.248	-	-	-	-	-	-	0.21	0.25	-
	GSM1900	60	0.279	29.58	30.2	1.153	0.322	-	-	-	-	-	-	0.28	0.32	-
	WCDMA V	50	0.122	23.45	24.2	1.189	0.145	-	-	-	-	-	-	0.12	0.15	-
	WCDMA II	52	0.298	23.63	24.2	1.140	0.340	-	-	-	-	-	-	0.30	0.34	-
	WCDMA IV	83	0.186	23.24	24.2	1.247	0.232	-	-	-	-	-	-	0.19	0.23	-

Note:

- The maximum SAR summation is calculated based on the same configuration and test position.
- When stand-alone 1-g SAR is not required for a transmitter or antenna, its SAR is considered zero in the 1-g SAR summing process to determine simultaneous transmission SAR evaluation requirements.
- If 1g-SAR scalar summation < 1.6W/kg, simultaneous SAR measurement is not necessary.
- If 1g-SAR summation ≥ 1.6W/kg, SPLSR calculation is necessary.
- The WWAN scaling factor is calculated according to the difference between measured output power and maximum tolerance power on this device.
- WLAN SAR data at 0mm is applied here, and it will represent more conservative situation than WLAN SAR data at 0.8mm.

<WWAN Without Power Back-off , WLAN Ant. 0+Ant. 1>

Position	WWAN			Scaled WWAN				WLAN2.4G		Scaled WLAN2.4G				WWAN + WLAN	Scaled WWAN + Scaled WLAN	Case No
	WWAN Band	Plot No	Max. WWAN SAR (W/kg)	Average Power (dBm)	Tune-up Limit (dBm)	Scaling Factor	Scaled WWAN (W/kg)	Plot No	Max. WLAN SAR (W/kg)	Average Power (dBm)	Tune-up Limit (dBm)	Scaling Factor	Scaled WLAN (W/kg)			
Bottom Face At 0.8cm	GSM850	47	1.23	32.45	33.2	1.189	1.462	8	1.06	18.18	18.5	1.076	1.141	2.29	2.60	S08
	GSM1900	59	0.843	29.49	30.2	1.178	0.993	8	1.06	18.18	18.5	1.076	1.141	1.90	2.13	S09
	WCDMA V	49	0.716	23.45	24.2	1.189	0.851	8	1.06	18.18	18.5	1.076	1.141	1.78	1.99	S10
	WCDMA II	51	0.888	23.63	24.2	1.140	1.013	8	1.06	18.18	18.5	1.076	1.141	1.95	2.15	S11
	WCDMA IV	82	1.06	23.02	24.2	1.312	1.391	8	1.06	18.18	18.5	1.076	1.141	2.12	2.53	S12
Edge1 At 0cm	GSM850	-	-	-	-	-	-	9	0.46	18.20	18.5	1.072	0.493	0.46	0.49	-
	GSM1900	-	-	-	-	-	-	9	0.46	18.20	18.5	1.072	0.493	0.46	0.49	-
	WCDMA V	-	-	-	-	-	-	9	0.46	18.20	18.5	1.072	0.493	0.46	0.49	-
	WCDMA II	-	-	-	-	-	-	9	0.46	18.20	18.5	1.072	0.493	0.46	0.49	-
	WCDMA IV	-	-	-	-	-	-	9	0.46	18.20	18.5	1.072	0.493	0.46	0.49	-
Edge2 At 0cm	GSM850	-	-	-	-	-	-	10	0.049	18.20	18.5	1.072	0.053	0.05	0.05	-
	GSM1900	-	-	-	-	-	-	10	0.049	18.20	18.5	1.072	0.053	0.05	0.05	-
	WCDMA V	-	-	-	-	-	-	10	0.049	18.20	18.5	1.072	0.053	0.05	0.05	-
	WCDMA II	-	-	-	-	-	-	10	0.049	18.20	18.5	1.072	0.053	0.05	0.05	-
	WCDMA IV	-	-	-	-	-	-	10	0.049	18.20	18.5	1.072	0.053	0.05	0.05	-
Edge4 At 0cm	GSM850	48	0.209	32.45	33.2	1.189	0.248	-	-	-	-	-	-	0.21	0.25	-
	GSM1900	60	0.279	29.58	30.2	1.153	0.322	-	-	-	-	-	-	0.28	0.32	-
	WCDMA V	50	0.122	23.45	24.2	1.189	0.145	-	-	-	-	-	-	0.12	0.15	-
	WCDMA II	52	0.298	23.63	24.2	1.140	0.340	-	-	-	-	-	-	0.30	0.34	-
	WCDMA IV	83	0.186	23.24	24.2	1.247	0.232	-	-	-	-	-	-	0.19	0.23	-

Position	WWAN			Scaled WWAN				WLAN5G		Scaled WLAN5G				WWAN + WLAN	Scaled WWAN + Scaled WLAN	Case No
	WWAN Band	Plot No	Max. WWAN SAR (W/kg)	Average Power (dBm)	Tune-up Limit (dBm)	Scaling Factor	Scaled WWAN (W/kg)	Plot No	Max. WLAN SAR (W/kg)	Average Power (dBm)	Tune-up Limit (dBm)	Scaling Factor	Scaled WLAN (W/kg)			
Bottom Face At 0.8cm	GSM850	47	1.23	32.45	33.2	1.189	1.462	29	0.728	14.90	15.2	1.072	0.780	1.96	2.24	S13
	GSM1900	59	0.843	29.49	30.2	1.178	0.993	29	0.728	14.90	15.2	1.072	0.780	1.57	1.77	S14
	WCDMA V	49	0.716	23.45	24.2	1.189	0.851	29	0.728	14.90	15.2	1.072	0.780	1.44	1.63	S42
	WCDMA II	51	0.888	23.63	24.2	1.140	1.013	29	0.728	14.90	15.2	1.072	0.780	1.79	1.79	S15
	WCDMA IV	82	1.06	23.02	24.2	1.312	1.391	29	0.728	14.90	15.2	1.072	0.780	1.62	2.17	S16
Edge1 At 0cm	GSM850	-	-	-	-	-	-	41	1.17	14.86	15.2	1.081	1.265	1.17	1.27	-
	GSM1900	-	-	-	-	-	-	41	1.17	14.86	15.2	1.081	1.265	1.17	1.27	-
	WCDMA V	-	-	-	-	-	-	41	1.17	14.86	15.2	1.081	1.265	1.17	1.27	-
	WCDMA II	-	-	-	-	-	-	41	1.17	14.86	15.2	1.081	1.265	1.17	1.27	-
	WCDMA IV	-	-	-	-	-	-	41	1.17	14.86	15.2	1.081	1.265	1.17	1.27	-
Edge2 At 0cm	GSM850	-	-	-	-	-	-	42	0.18	14.90	15.2	1.072	0.193	0.18	0.19	-
	GSM1900	-	-	-	-	-	-	42	0.18	14.90	15.2	1.072	0.193	0.18	0.19	-
	WCDMA V	-	-	-	-	-	-	42	0.18	14.90	15.2	1.072	0.193	0.18	0.19	-
	WCDMA II	-	-	-	-	-	-	42	0.18	14.90	15.2	1.072	0.193	0.18	0.19	-
	WCDMA IV	-	-	-	-	-	-	42	0.18	14.90	15.2	1.072	0.193	0.18	0.19	-
Edge4 At 0cm	GSM850	48	0.209	32.45	33.2	1.189	0.248	-	-	-	-	-	-	0.21	0.25	-
	GSM1900	60	0.279	29.58	30.2	1.153	0.322	-	-	-	-	-	-	0.28	0.32	-
	WCDMA V	50	0.122	23.45	24.2	1.189	0.145	-	-	-	-	-	-	0.12	0.15	-
	WCDMA II	52	0.298	23.63	24.2	1.140	0.340	-	-	-	-	-	-	0.30	0.34	-
	WCDMA IV	83	0.186	23.24	24.2	1.247	0.232	-	-	-	-	-	-	0.19	0.23	-

Note:

1. The maximum SAR summation is calculated based on the same configuration and test position.
2. When stand-alone 1-g SAR is not required for a transmitter or antenna, its SAR is considered zero in the 1-g SAR summing process to determine simultaneous transmission SAR evaluation requirements
3. If 1g-SAR scalar summation < 1.6W/kg, simultaneous SAR measurement is not necessary.
4. If 1g-SAR summation ≥ 1.6W/kg, SPLSR calculation is necessary.
5. The WWAN scaling factor is calculated according to the difference between measured output power and maximum tolerance power on this device.
6. WLAN SAR data at 0mm is applied here, and it will represent more conservative situation than WLAN SAR data at 0.8mm.

<WWAN With Power Back-off, WLAN Ant. 0>

Position	WWAN			Scaled WWAN				WLAN2.4G		Scaled WLAN2.4G				WWAN + WLAN	Scaled WWAN + Scaled WLAN	Case No
	WWAN Band	Plot No	Max. WWAN SAR (W/kg)	Average Power (dBm)	Tune-up Limit (dBm)	Scaling Factor	Scaled WWAN (W/kg)	Plot No	Max. WLAN SAR (W/kg)	Average Power (dBm)	Tune-up Limit (dBm)	Scaling Factor	Scaled WLAN (W/kg)			
Bottom Face At 0cm	GSM850	74	1.29	26.67	27.2	1.130	1.457	2	0.987	15.08	15.5	1.102	1.087	2.28	2.54	S17
	GSM1900	63	1.21	24.28	25.2	1.236	1.495	2	0.987	15.08	15.5	1.102	1.087	2.20	2.58	S18
	WCDMA V	72	1.26	19.73	20.2	1.114	1.404	2	0.987	15.08	15.5	1.102	1.087	2.25	2.49	S19
	WCDMA II	78	1.31	17.43	18.2	1.194	1.564	2	0.987	15.08	15.5	1.102	1.087	2.30	2.65	S20
	WCDMA IV	90	1.39	16.75	17.2	1.109	1.542	2	0.987	15.08	15.5	1.102	1.087	2.38	2.63	S21
Edge1 At 0cm	GSM850	77	0.752	26.67	27.2	1.130	0.850	4	0.297	15.19	15.5	1.074	0.319	1.05	1.17	-
	GSM1900	64	0.783	24.39	25.2	1.205	0.944	4	0.297	15.19	15.5	1.074	0.319	1.08	1.26	-
	WCDMA V	73	0.668	19.92	20.2	1.067	0.712	4	0.297	15.19	15.5	1.074	0.319	0.97	1.03	-
	WCDMA II	80	0.783	17.77	18.2	1.104	0.864	4	0.297	15.19	15.5	1.074	0.319	1.08	1.18	-
	WCDMA IV	91	0.855	16.95	17.2	1.059	0.906	4	0.297	15.19	15.5	1.074	0.319	1.15	1.23	-
Edge2 At 0cm	GSM850	-	-	-	-	-	-	5	0.086	15.19	15.5	1.074	0.092	0.09	0.09	-
	GSM1900	-	-	-	-	-	-	5	0.086	15.19	15.5	1.074	0.092	0.09	0.09	-
	WCDMA V	-	-	-	-	-	-	5	0.086	15.19	15.5	1.074	0.092	0.09	0.09	-
	WCDMA II	-	-	-	-	-	-	5	0.086	15.19	15.5	1.074	0.092	0.09	0.09	-
	WCDMA IV	-	-	-	-	-	-	5	0.086	15.19	15.5	1.074	0.092	0.09	0.09	-

Position	WWAN			Scaled WWAN				WLAN5G		Scaled WLAN5G				WWAN + WLAN	Scaled WWAN + Scaled WLAN	Case No
	WWAN Band	Plot No	Max. WWAN SAR (W/kg)	Average Power (dBm)	Tune-up Limit (dBm)	Scaling Factor	Scaled WWAN (W/kg)	Plot No	Max. WLAN SAR (W/kg)	Average Power (dBm)	Tune-up Limit (dBm)	Scaling Factor	Scaled WLAN (W/kg)			
Bottom Face At 0cm	GSM850	74	1.29	26.67	27.2	1.130	1.457	32	0.471	11.82	12	1.042	0.491	1.76	1.95	S22
	GSM1900	63	1.21	24.28	25.2	1.236	1.495	32	0.471	11.82	12	1.042	0.491	1.68	1.99	S23
	WCDMA V	72	1.26	19.73	20.2	1.114	1.404	32	0.471	11.82	12	1.042	0.491	1.73	1.90	S24
	WCDMA II	78	1.31	17.43	18.2	1.194	1.564	32	0.471	11.82	12	1.042	0.491	1.78	2.06	S25
	WCDMA IV	90	1.39	16.75	17.2	1.109	1.542	32	0.471	11.82	12	1.042	0.491	1.86	2.03	S26
Edge1 At 0cm	GSM850	77	0.752	26.67	27.2	1.130	0.850	33	0.181	11.82	12	1.042	0.189	0.93	1.04	-
	GSM1900	64	0.783	24.39	25.2	1.205	0.944	33	0.181	11.82	12	1.042	0.189	0.96	1.13	-
	WCDMA V	73	0.668	19.92	20.2	1.067	0.712	33	0.181	11.82	12	1.042	0.189	0.85	0.90	-
	WCDMA II	80	0.783	17.77	18.2	1.104	0.864	33	0.181	11.82	12	1.042	0.189	0.96	1.05	-
	WCDMA IV	91	0.855	16.95	17.2	1.059	0.906	33	0.181	11.82	12	1.042	0.189	1.04	1.10	-
Edge2 At 0cm	GSM850	-	-	-	-	-	-	45	0.012	11.82	12	1.042	0.013	0.01	0.01	-
	GSM1900	-	-	-	-	-	-	45	0.012	11.82	12	1.042	0.013	0.01	0.01	-
	WCDMA V	-	-	-	-	-	-	45	0.012	11.82	12	1.042	0.013	0.01	0.01	-
	WCDMA II	-	-	-	-	-	-	45	0.012	11.82	12	1.042	0.013	0.01	0.01	-
	WCDMA IV	-	-	-	-	-	-	45	0.012	11.82	12	1.042	0.013	0.01	0.01	-

Note:

1. The maximum SAR summation is calculated based on the same configuration and test position.
2. When stand-alone 1-g SAR is not required for a transmitter or antenna, its SAR is considered zero in the 1-g SAR summing process to determine simultaneous transmission SAR evaluation requirements
3. If 1g-SAR scalar summation < 1.6W/kg, simultaneous SAR measurement is not necessary.
4. If 1g-SAR summation ≥ 1.6W/kg, SPLSR calculation is necessary.
5. The WWAN scaling factor is calculated according to the difference between measured output power and maximum tolerance power on this device.
6. WLAN SAR data at 0mm is applied here, and it will represent more conservative situation than WLAN SAR data at 0.8mm.

<WWAN With Power Back-off, WLAN Ant. 0+Ant. 1>

Position	WWAN			Scaled WWAN				WLAN2.4G		Scaled WLAN2.4G				WWAN + WLAN	Scaled WWAN + Scaled WLAN	Case No
	WWAN Band	Plot No	Max. WWAN SAR (W/kg)	Average Power (dBm)	Tune-up Limit (dBm)	Scaling Factor	Scaled WWAN (W/kg)	Plot No	Max. WLAN SAR (W/kg)	Average Power (dBm)	Tune-up Limit (dBm)	Scaling Factor	Scaled WLAN (W/kg)			
Bottom Face At 0cm	GSM850	74	1.29	26.67	27.2	1.130	1.457	8	1.06	18.18	18.5	1.076	1.141	2.35	2.60	S27
	GSM1900	63	1.21	24.28	25.2	1.236	1.495	8	1.06	18.18	18.5	1.076	1.141	2.27	2.64	S28
	WCDMA V	72	1.26	19.73	20.2	1.114	1.404	8	1.06	18.18	18.5	1.076	1.141	2.32	2.55	S29
	WCDMA II	78	1.31	17.43	18.2	1.194	1.564	8	1.06	18.18	18.5	1.076	1.141	2.37	2.71	S30
	WCDMA IV	90	1.39	16.75	17.2	1.109	1.542	8	1.06	18.18	18.5	1.076	1.141	2.45	2.68	S31
Edge1 At 0cm	GSM850	77	0.752	26.67	27.2	1.130	0.850	9	0.46	18.20	18.5	1.072	0.493	1.21	1.34	-
	GSM1900	64	0.783	24.39	25.2	1.205	0.944	9	0.46	18.20	18.5	1.072	0.493	1.24	1.44	-
	WCDMA V	73	0.668	19.92	20.2	1.067	0.712	9	0.46	18.20	18.5	1.072	0.493	1.13	1.21	-
	WCDMA II	80	0.783	17.77	18.2	1.104	0.864	9	0.46	18.20	18.5	1.072	0.493	1.24	1.36	-
	WCDMA IV	91	0.855	16.95	17.2	1.059	0.906	9	0.46	18.20	18.5	1.072	0.493	1.32	1.40	-
Edge2 At 0cm	GSM850	-	-	-	-	-	-	10	0.049	18.20	18.5	1.072	0.053	0.05	0.05	-
	GSM1900	-	-	-	-	-	-	10	0.049	18.20	18.5	1.072	0.053	0.05	0.05	-
	WCDMA V	-	-	-	-	-	-	10	0.049	18.20	18.5	1.072	0.053	0.05	0.05	-
	WCDMA II	-	-	-	-	-	-	10	0.049	18.20	18.5	1.072	0.053	0.05	0.05	-
	WCDMA IV	-	-	-	-	-	-	10	0.049	18.20	18.5	1.072	0.053	0.05	0.05	-

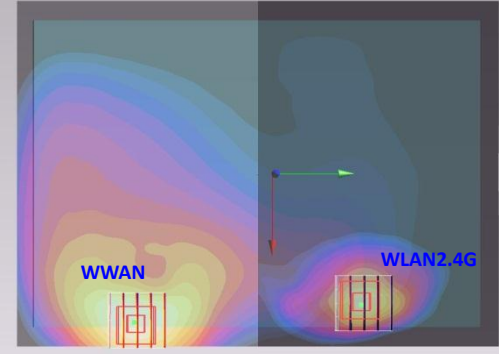
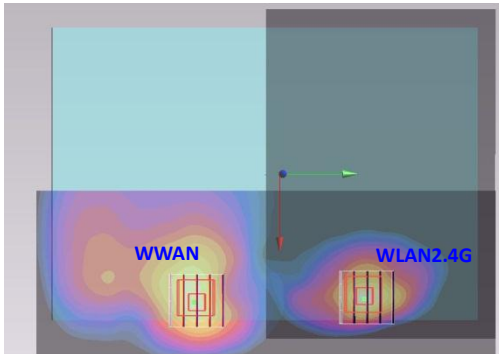
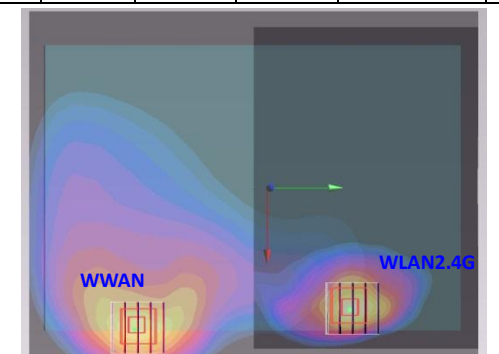
Position	WWAN			Scaled WWAN				WLAN5G		Scaled WLAN5G				WWAN + WLAN	Scaled WWAN + Scaled WLAN	Case No
	WWAN Band	Plot No	Max. WWAN SAR (W/kg)	Average Power (dBm)	Tune-up Limit (dBm)	Scaling Factor	Scaled WWAN (W/kg)	Plot No	Max. WLAN SAR (W/kg)	Average Power (dBm)	Tune-up Limit (dBm)	Scaling Factor	Scaled WLAN (W/kg)			
Bottom Face At 0cm	GSM850	74	1.29	26.67	27.2	1.130	1.457	29	0.728	14.90	15.2	1.072	0.780	2.02	2.24	S32
	GSM1900	63	1.21	24.28	25.2	1.236	1.495	29	0.728	14.90	15.2	1.072	0.780	1.94	2.28	S33
	WCDMA V	72	1.26	19.73	20.2	1.114	1.404	29	0.728	14.90	15.2	1.072	0.780	1.99	2.18	S34
	WCDMA II	78	1.31	17.43	18.2	1.194	1.564	29	0.728	14.90	15.2	1.072	0.780	2.04	2.34	S35
	WCDMA IV	90	1.39	16.75	17.2	1.109	1.542	29	0.728	14.90	15.2	1.072	0.780	2.12	2.32	S36
Edge1 At 0cm	GSM850	77	0.752	26.67	27.2	1.130	0.850	41	1.17	14.86	15.2	1.081	1.265	1.92	2.12	S37
	GSM1900	64	0.783	24.39	25.2	1.205	0.944	41	1.17	14.86	15.2	1.081	1.265	1.95	2.21	S38
	WCDMA V	73	0.668	19.92	20.2	1.067	0.712	41	1.17	14.86	15.2	1.081	1.265	1.84	1.98	S39
	WCDMA II	80	0.783	17.77	18.2	1.104	0.864	41	1.17	14.86	15.2	1.081	1.265	1.95	2.13	S40
	WCDMA IV	91	0.855	16.95	17.2	1.059	0.906	41	1.17	14.86	15.2	1.081	1.265	2.03	2.17	S41
Edge2 At 0cm	GSM850	-	-	-	-	-	-	42	0.18	14.90	15.2	1.072	0.193	0.18	0.19	-
	GSM1900	-	-	-	-	-	-	42	0.18	14.90	15.2	1.072	0.193	0.18	0.19	-
	WCDMA V	-	-	-	-	-	-	42	0.18	14.90	15.2	1.072	0.193	0.18	0.19	-
	WCDMA II	-	-	-	-	-	-	42	0.18	14.90	15.2	1.072	0.193	0.18	0.19	-
	WCDMA IV	-	-	-	-	-	-	42	0.18	14.90	15.2	1.072	0.193	0.18	0.19	-

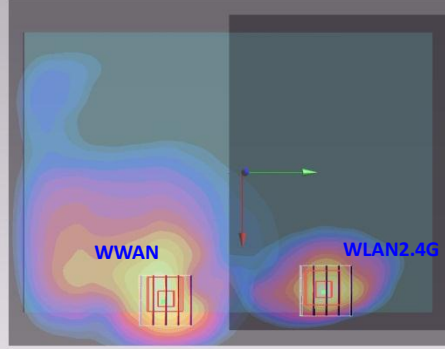
Note:

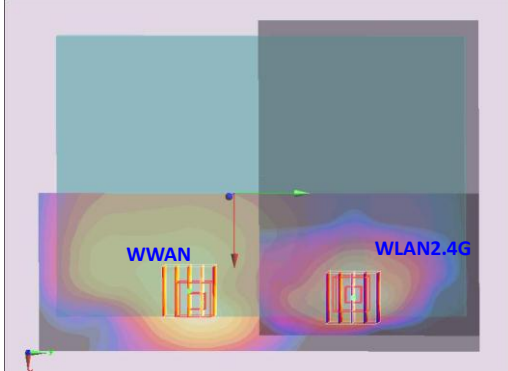
1. The maximum SAR summation is calculated based on the same configuration and test position.
2. When stand-alone 1-g SAR is not required for a transmitter or antenna, its SAR is considered zero in the 1-g SAR summing process to determine simultaneous transmission SAR evaluation requirements
3. If 1g-SAR scalar summation < 1.6W/kg, simultaneous SAR measurement is not necessary.
4. If 1g-SAR summation ≥ 1.6W/kg, SPLSR calculation is necessary.
5. The WWAN scaling factor is calculated according to the difference between measured output power and maximum tolerance power on this device.
6. WLAN SAR data at 0mm is applied here, and it will represent more conservative situation than WLAN SAR data at 0.8mm.

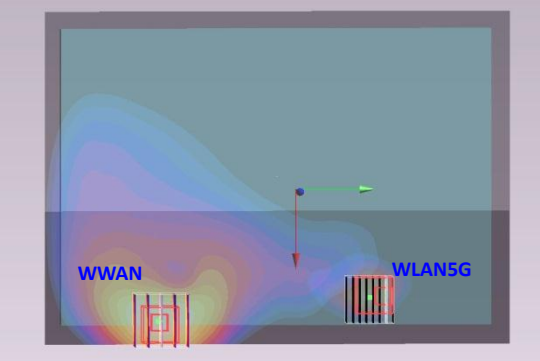
11.3 Simultaneous analysis - SPLSR calculation

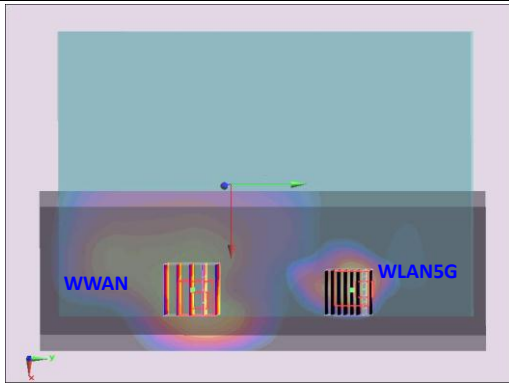
<WWAN Without Power Back-off, WLAN Ant. 0>

Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S01	#02	WLAN2.4G	Bottom Face	1.087	0	0.075	0.061	-0.18	13.2	2.55	0.19	Not required
	#47	GSM850		1.462	0.8	0.085	-0.071	-0.18				
												
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
S02	#02	WLAN2.4G	Bottom Face	1.087	0	0.075	0.061	-0.18	10.4	2.08	0.20	Not required
	#59	GSM1900		0.993	0.8	0.077	-0.043	-0.175				
												
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
S03	#02	WLAN2.4G	Bottom Face	1.087	0	0.075	0.061	-0.18	13.5	1.94	0.14	Not required
	#49	WCDMA V		0.851	0.8	0.087	-0.073	-0.18				
												

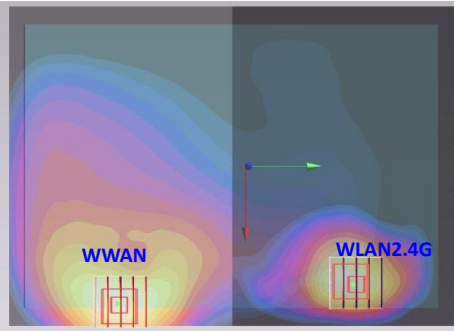
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S04	#02	WLAN2.4G	Bottom Face	1.087	0	0.075	0.061	-0.18	10.2	2.10	0.21	Not required
	#51	WCDMA II		1.013	0.8	0.081	-0.041	-0.175				
												

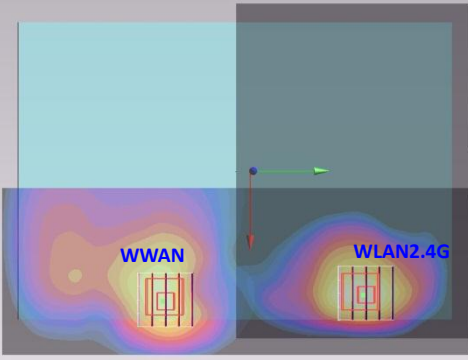
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S05	#02	WLAN2.4G	Bottom Face	1.087	0	0.075	0.061	-0.18	9.6	2.48	0.26	Not required
	#82	WCDMA IV		1.391	0.8	0.079	-0.035	-0.179				
												

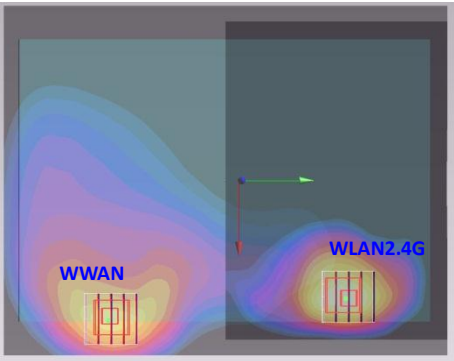
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S06	#32	WLAN5G	Bottom Face	0.491	0	0.073	0.069	-0.176	14.1	1.95	0.14	Not required
	#47	GSM850		1.462	0.8	0.085	-0.071	-0.18				
												

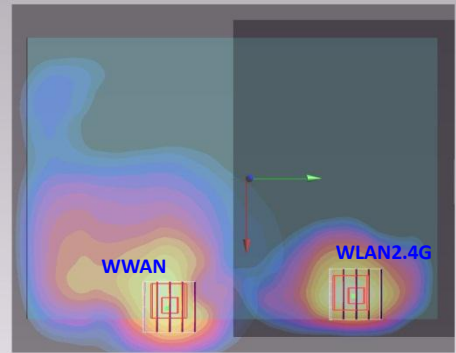
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S07	#32	WLAN5G	Bottom Face	0.491	0	0.073	0.069	-0.176	10.4	1.88	0.18	Not required
	#82	WCDMA IV		1.391	0.8	0.079	-0.035	-0.179				
												

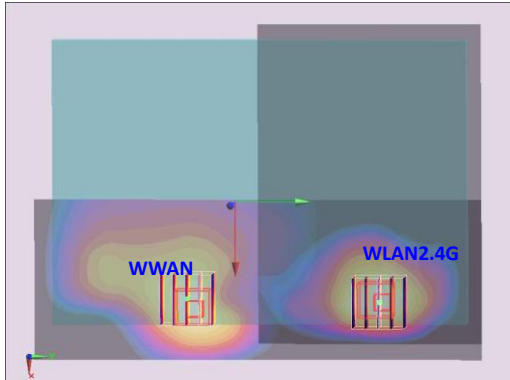
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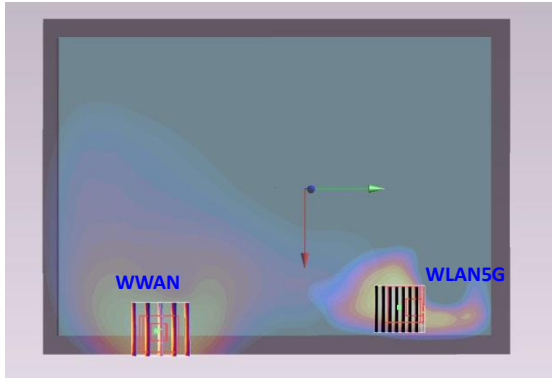
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S08	#08	WLAN2.4G	Bottom Face	1.141	0	0.073	0.077	-0.18	14.8	2.60	0.18	Not required
	#47	GSM850		1.462	0.8	0.085	-0.071	-0.18				
												

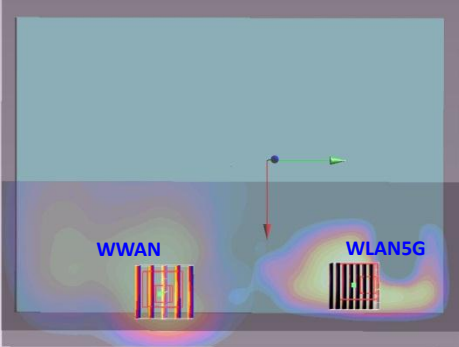
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S09	#08	WLAN2.4G	Bottom Face	1.141	0	0.073	0.077	-0.18	12.0	2.13	0.18	Not required
	#59	GSM1900		0.993	0.8	0.077	-0.043	-0.175				
												

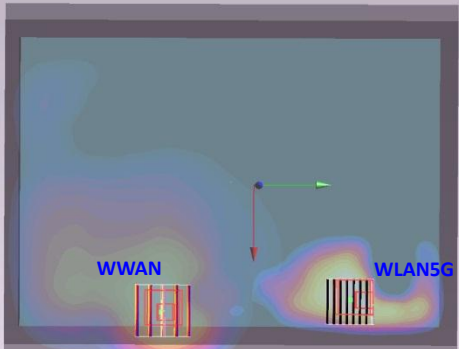
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S10	#08	WLAN2.4G	Bottom Face	1.141	0	0.073	0.077	-0.18	15.1	1.99	0.13	Not required
	#49	WCDMA V		0.851	0.8	0.087	-0.073	-0.18				
												

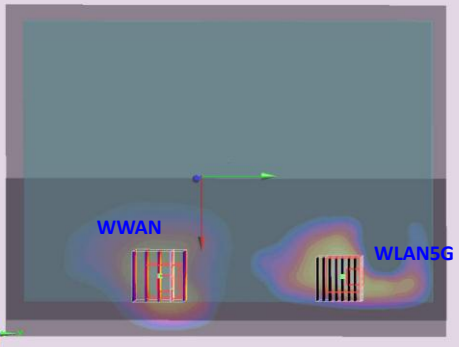
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S11	#08	WLAN2.4G	Bottom Face	1.141	0	0.073	0.077	-0.18	11.8	2.15	0.18	Not required
	#51	WCDMA II		1.013	0.8	0.081	-0.041	-0.175				
												

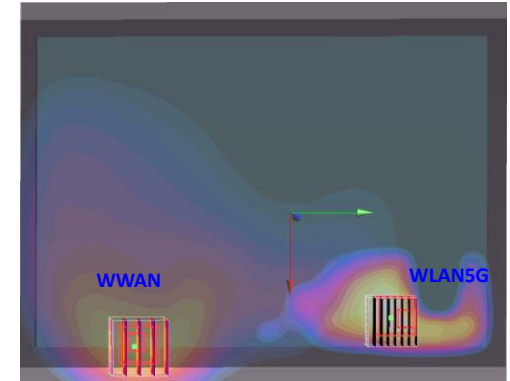
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S12	#08	WLAN2.4G	Bottom Face	1.141	0	0.073	0.077	-0.18	11.2	2.53	0.23	Not required
	#82	WCDMA IV		1.391	0.8	0.079	-0.035	-0.179				
												

Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S13	#29	WLAN5G	Bottom Face	0.780	0	0.071	0.065	-0.176	13.7	2.24	0.16	Not required
	#47	GSM850		1.462	0.8	0.085	-0.071	-0.18				
												

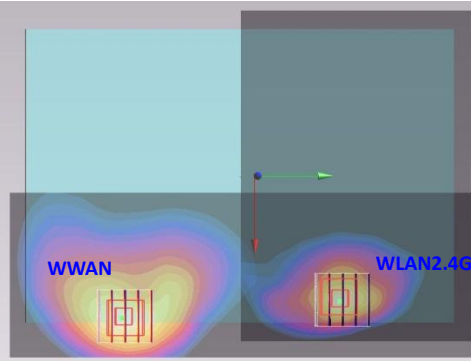
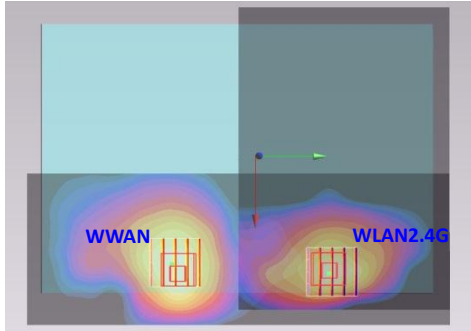
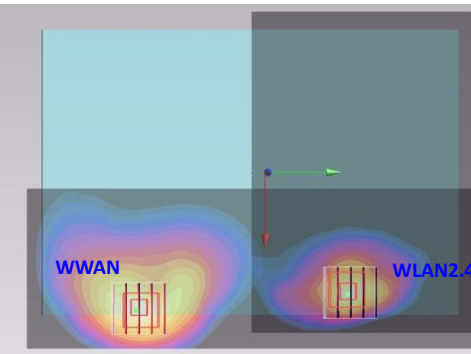
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S14	#29	WLAN5G	Bottom Face	0.780	0	0.071	0.065	-0.176	10.8	1.77	0.16	Not required
	#59	GSM1900		0.993	0.8	0.077	-0.043	-0.175				
												

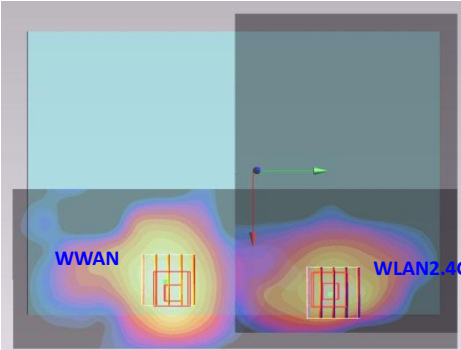
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S15	#29	WLAN5G	Bottom Face	0.780	0	0.071	0.065	-0.176	10.6	1.79	0.17	Not required
	#51	WCDMA II		1.013	0.8	0.081	-0.041	-0.175				
												

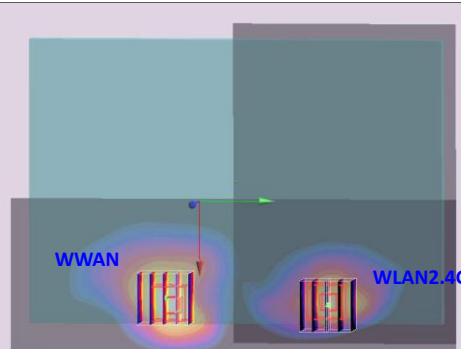
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S16	#29	WLAN5G	Bottom Face	0.780	0	0.071	0.065	-0.176	10.0	2.17	0.22	Not required
	#82	WCDMA IV		1.391	0.8	0.079	-0.035	-0.179				
												

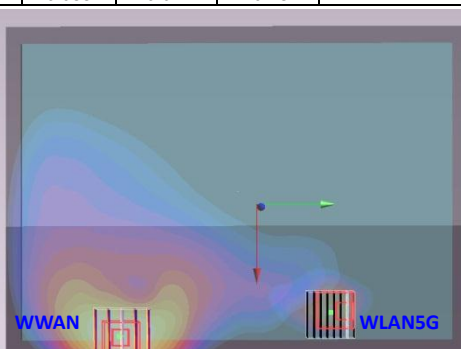
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S42	#29	WLAN5G	Bottom Face	0.780	0	0.071	0.065	-0.176	13.9	1.63	0.12	Not required
	#49	WCDMA V		0.851	0.8	0.087	-0.073	-0.18				
												

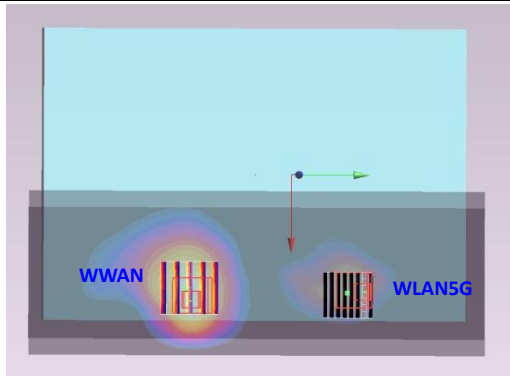
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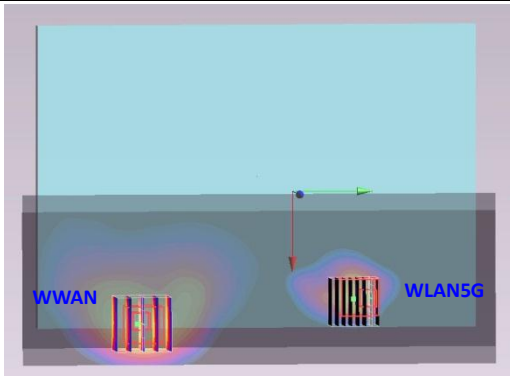
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S17	#02	WLAN2.4G	Bottom Face	1.087	0	0.075	0.061	-0.18	13.2	2.54	0.19	Not required
	#74	GSM850		1.457	0	0.085	-0.071	-0.18				
												
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S18	#02	WLAN2.4G	Bottom Face	1.087	0	0.075	0.061	-0.18	10.4	2.58	0.25	Not required
	#63	GSM1900		1.495	0	0.077	-0.043	-0.175				
												
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S19	#02	WLAN2.4G	Bottom Face	1.087	0	0.075	0.061	-0.18	13.2	2.49	0.19	Not required
	#72	WCDMA V		1.404	0	0.085	-0.071	-0.18				
												

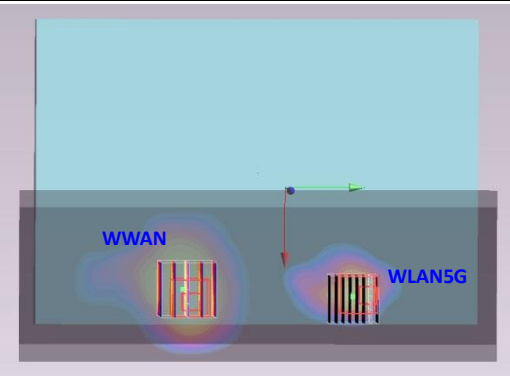
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S20	#02	WLAN2.4G	Bottom Face	1.087	0	0.075	0.061	-0.18	10.4	2.65	0.25	Not required
	#78	WCDMA II		1.564	0	0.075	-0.043	-0.175				
												

Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S21	#02	WLAN2.4G	Bottom Face	1.087	0	0.075	0.061	-0.18	9.4	2.63	0.28	Not required
	#90	WCDMA IV		1.542	0	0.079	-0.033	-0.179				
												

Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S22	#32	WLAN5G	Bottom Face	0.491	0	0.073	0.069	-0.176	14.1	1.95	0.14	Not required
	#74	GSM850		1.457	0	0.085	-0.071	-0.18				
												

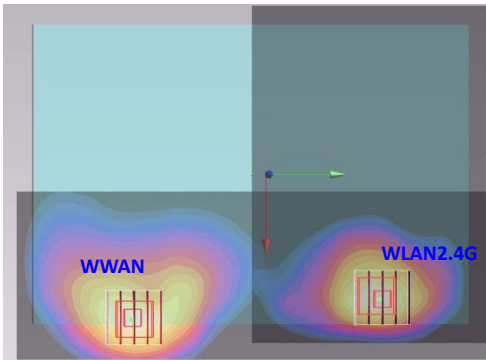
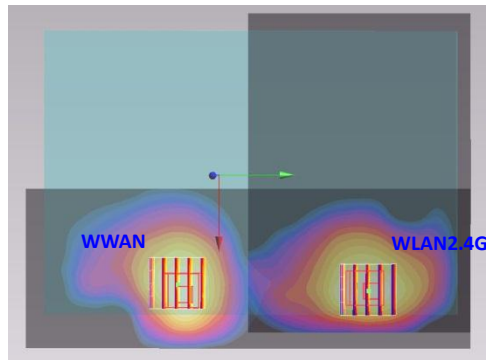
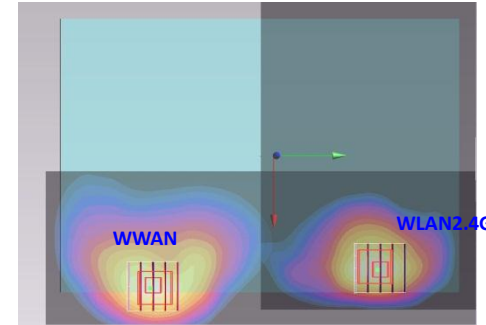
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S23	#32	WLAN5G	Bottom Face	0.491	0	0.073	0.069	-0.176	11.2	1.99	0.18	Not required
	#63	GSM1900		1.495	0	0.077	-0.043	-0.175				
												

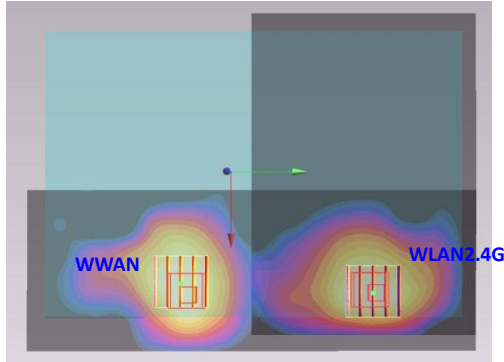
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S24	#32	WLAN5G	Bottom Face	0.491	0	0.073	0.069	-0.176	14.1	1.90	0.13	Not required
	#72	WCDMA V		1.404	0	0.085	-0.071	-0.18				
												

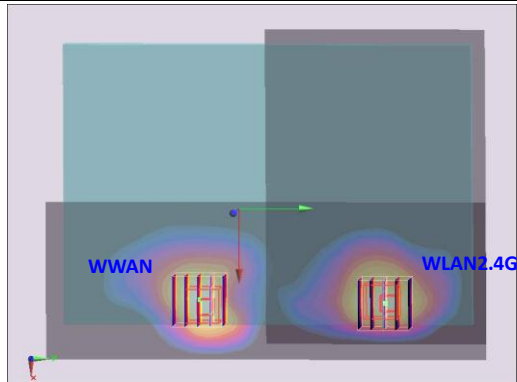
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S25	#32	WLAN5G	Bottom Face	0.491	0	0.073	0.069	-0.176	11.2	2.06	0.18	Not required
	#78	WCDMA II		1.564	0	0.075	-0.043	-0.175				
												

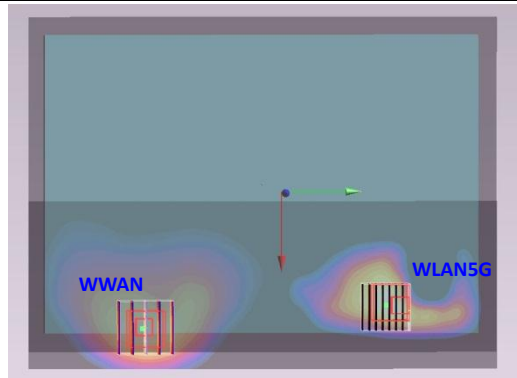
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S26	#32	WLAN5G	Bottom Face	0.491	0	0.073	0.069	-0.176	10.2	2.03	0.20	Not required
	#90	WCDMA IV		1.542	0	0.079	-0.033	-0.179				

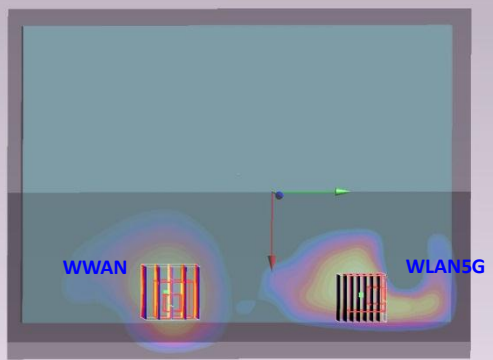
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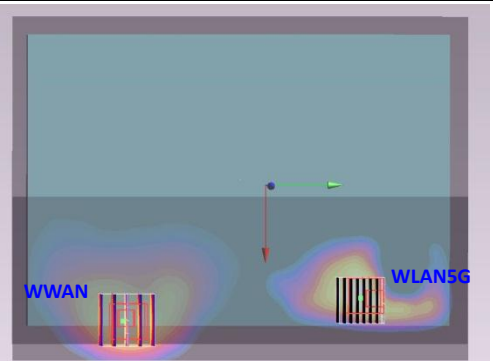
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S27	#08	WLAN2.4G	Bottom Face	1.141	0	0.073	0.077	-0.18	14.8	2.60	0.17	Not required
	#74	GSM850		1.457	0	0.085	-0.071	-0.18				
												
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S28	#08	WLAN2.4G	Bottom Face	1.141	0	0.073	0.077	-0.18	12.0	2.64	0.22	Not required
	#63	GSM1900		1.495	0	0.077	-0.043	-0.175				
												
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S29	#08	WLAN2.4G	Bottom Face	1.141	0	0.073	0.077	-0.18	14.8	2.55	0.17	Not required
	#72	WCDMA V		1.404	0	0.085	-0.071	-0.18				
												

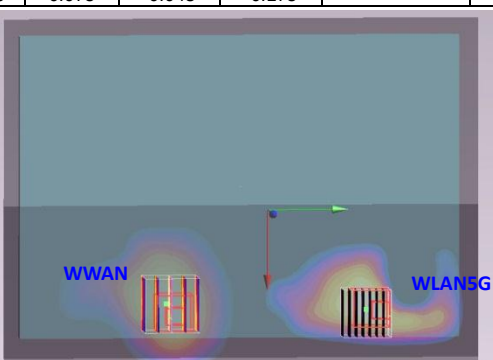
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S30	#08	WLAN2.4G	Bottom Face	1.141	0	0.073	0.077	-0.18	12.0	2.71	0.23	Not required
	#78	WCDMA II		1.564	0	0.075	-0.043	-0.175				
												

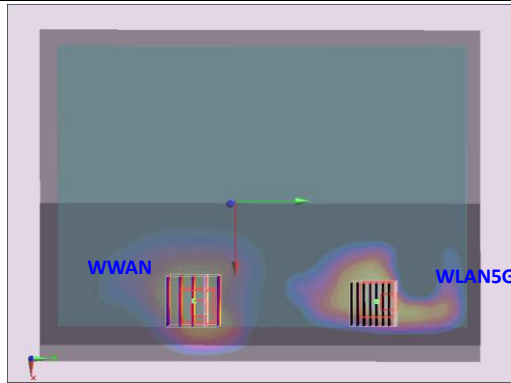
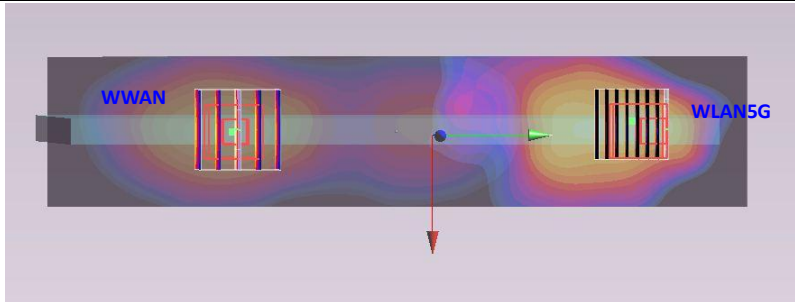
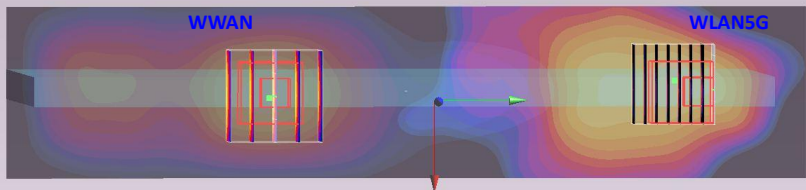
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S31	#08	WLAN2.4G	Bottom Face	1.141	0	0.073	0.077	-0.18	11.0	2.68	0.24	Not required
	#90	WCDMA IV		1.542	0	0.079	-0.033	-0.179				
												

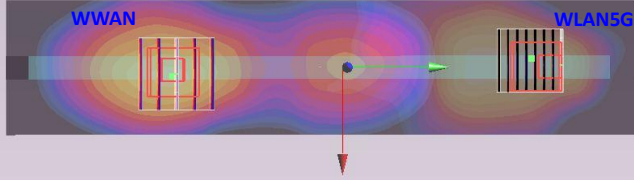
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S32	#29	WLAN5G	Bottom Face	0.780	0	0.071	0.065	-0.176	13.7	2.24	0.16	Not required
	#74	GSM850		1.457	0	0.085	-0.071	-0.18				
												

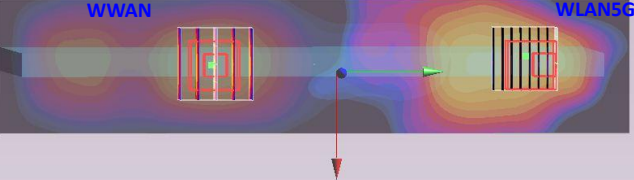
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S33	#29	WLAN5G	Bottom Face	0.780	0	0.071	0.065	-0.176	10.8	2.28	0.21	Not required
	#63	GSM1900		1.495	0	0.077	-0.043	-0.175				
												

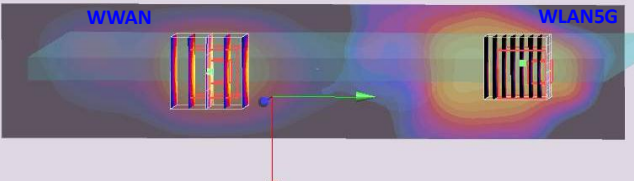
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S34	#29	WLAN5G	Bottom Face	0.780	0	0.071	0.065	-0.176	13.7	2.18	0.16	Not required
	#72	WCDMA V		1.404	0	0.085	-0.071	-0.18				
												

Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S35	#29	WLAN5G	Bottom Face	0.780	0	0.071	0.065	-0.176	10.8	2.34	0.22	Not required
	#78	WCDMA II		1.564	0	0.075	-0.043	-0.175				
												

Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S36	#29	WLAN5G	Bottom Face	0.780	0	0.071	0.065	-0.176	9.8	2.32	0.24	Not required
	#90	WCDMA IV		1.542	0	0.079	-0.033	-0.179				
												
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
S37	#41	WLAN5G	Edge1	1.265	0	-0.001	0.107	-0.176	17.2	2.12	0.12	Not required
	#77	GSM850		0.850	0	-0.001	-0.065	-0.181				
												
Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
S38	#41	WLAN5G	Edge1	1.265	0	-0.001	0.107	-0.176	15.4	2.21	0.14	Not required
	#64	GSM1900		0.944	0	0.001	-0.047	-0.176				
												

Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S39	#41	WLAN5G	Edge1	1.265	0	-0.001	0.107	-0.176	17.2	1.98	0.11	Not required
	#73	WCDMA V		0.712	0	0.003	-0.065	-0.181				
												

Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S40	#41	WLAN5G	Edge1	1.265	0	-0.001	0.107	-0.176	15.2	2.17	0.14	Not required
	#80	WCDMA II		0.906	0	-0.001	-0.045	-0.176				
												

Case No	Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
						X	Y	Z				
S41	#41	WLAN5G	Edge1	1.265	0	-0.001	0.107	-0.176	15.2	2.13	0.14	Not required
	#91	WCDMA IV		0.864	0	-0.001	-0.045	-0.176				
												

Note: Per KDB 447498, if SPLSR < 0.3, simultaneously transmission SAR is not necessary.

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12. Uncertainty Assessment

The component of uncertainty may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainty by the statistical analysis of a series of observations is termed a Type A evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience, and knowledge of the behavior and properties of relevant materials and instruments, manufacture's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in Table 12.1

Uncertainty Distributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor ^(a)	1/k ^(b)	1/√3	1/√6	1/√2

(a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity

(b) k is the coverage factor

Table 12.1 Standard Uncertainty for Assumed Distribution

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is shown in the following tables:

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g)	Standard Uncertainty (10g)
Measurement System							
Probe Calibration	6.0	Normal	1	1	1	± 6.0 %	± 6.0 %
Axial Isotropy	4.7	Rectangular	√3	0.7	0.7	± 1.9 %	± 1.9 %
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	0.7	± 3.9 %	± 3.9 %
Boundary Effects	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Linearity	4.7	Rectangular	√3	1	1	± 2.7 %	± 2.7 %
System Detection Limits	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Readout Electronics	0.3	Normal	1	1	1	± 0.3 %	± 0.3 %
Response Time	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Integration Time	2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %
RF Ambient Noise	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
RF Ambient Reflections	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Probe Positioner	0.4	Rectangular	√3	1	1	± 0.2 %	± 0.2 %
Probe Positioning	2.9	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Max. SAR Eval.	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Test Sample Related							
Device Positioning	2.9	Normal	1	1	1	± 2.9 %	± 2.9 %
Device Holder	3.6	Normal	1	1	1	± 3.6 %	± 3.6 %
Power Drift	5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %
Phantom and Setup							
Phantom Uncertainty	4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %
Liquid Conductivity (Target)	5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %
Liquid Conductivity (Meas.)	2.5	Normal	1	0.64	0.43	± 1.6 %	± 1.1 %
Liquid Permittivity (Target)	5.0	Rectangular	√3	0.6	0.49	± 1.7 %	± 1.4 %
Liquid Permittivity (Meas.)	2.5	Normal	1	0.6	0.49	± 1.5 %	± 1.2 %
Combined Standard Uncertainty						± 11.0 %	± 10.8 %
Coverage Factor for 95 %						K=2	
Expanded Uncertainty						± 22.0 %	± 21.5 %

Table 12.2 Uncertainty Budget of DASY for frequency range 300 MHz to 3 GHz

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g)	Standard Uncertainty (10g)
Measurement System							
Probe Calibration	6.55	Normal	1	1	1	± 6.55 %	± 6.55 %
Axial Isotropy	4.7	Rectangular	√3	0.7	0.7	± 1.9 %	± 1.9 %
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	0.7	± 3.9 %	± 3.9 %
Boundary Effects	2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %
Linearity	4.7	Rectangular	√3	1	1	± 2.7 %	± 2.7 %
System Detection Limits	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Readout Electronics	0.3	Normal	1	1	1	± 0.3 %	± 0.3 %
Response Time	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Integration Time	2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %
RF Ambient Noise	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
RF Ambient Reflections	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Probe Positioner	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Probe Positioning	9.9	Rectangular	√3	1	1	± 5.7 %	± 5.7 %
Max. SAR Eval.	4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %
Test Sample Related							
Device Positioning	2.9	Normal	1	1	1	± 2.9 %	± 2.9 %
Device Holder	3.6	Normal	1	1	1	± 3.6 %	± 3.6 %
Power Drift	5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %
Phantom and Setup							
Phantom Uncertainty	4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %
Liquid Conductivity (Target)	5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %
Liquid Conductivity (Meas.)	2.5	Normal	1	0.64	0.43	± 1.6 %	± 1.1 %
Liquid Permittivity (Target)	5.0	Rectangular	√3	0.6	0.49	± 1.7 %	± 1.4 %
Liquid Permittivity (Meas.)	2.5	Normal	1	0.6	0.49	± 1.5 %	± 1.2 %
Combined Standard Uncertainty						± 12.8 %	± 12.6 %
Coverage Factor for 95 %						K=2	
Expanded Uncertainty						± 25.6 %	± 25.2 %

Table 12.3 Uncertainty Budget of DASY for frequency range 3 GHz to 6 GHz

13. References

- [1] FCC 47 CFR Part 2 "Frequency Allocations and Radio Treaty Matters; General Rules and Regulations"
- [2] ANSI/IEEE Std. C95.1-1992, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz", September 1992
- [3] IEEE Std. 1528-2003, "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- [4] FCC OET Bulletin 65 (Edition 97-01) Supplement C (Edition 01-01), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields", June 2001
- [5] SPEAG DASY System Handbook
- [6] FCC KDB 248227 D01 v01r02, "SAR Measurement Procedures for 802.11 a/b/g Transmitters", May 2007
- [7] FCC KDB 447498 D01 v04, "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies", November 2009
- [8] FCC KDB 616217 D03 v01, "SAR Evaluation Considerations for Laptop/Notebook/Netbook and Tablet Computers", November 2009
- [9] FCC KDB 941225 D01 v02, "SAR Measurement Procedures for 3G Devices – CDMA 2000 / Ev-Do / WCDMA / HSDPA / HSPA", October 2007
- [10] FCC KDB 941225 D03 v01, "Recommended SAR Test Reduction Procedures for GSM / GPRS / EDGE", December 2008
- [11] FCC KDB 941225 D04 v01, "Evaluating SAR for GSM/(E)GPRS Dual Transfer Mode", January 27 2010
- [12] FCC KDB 941225 D05 v01, "SAR Test Considerations for LTE Handsets and Data Modems", December 2010
- [13] FCC KDB 941225 D07 01, "SAR Evaluation Procedure for UMPC Mini-Tablet Devices", April 2011
- [14] FCC KDB 388624 D02, "Permit But Ask List", December 2011.



Appendix A. Plots of System Performance Check

The plots are shown as follows.



Appendix B. Plots of SAR Measurement

The plots are shown as follows.



Appendix C. DASY Calibration Certificate

The DASY calibration certificates are shown as follows.