SWEDAC ACKREDITERING
10057
ISO/IEC 17025

Test Report: 2015_SONY-CDTLE_S0007_04_SAR_0007_V1.0	
Test report for:	CDTLE_S0007
	Sony SWR50 / RD-0090
Client Name:	Sony Mobile Communications Inc.
Client address	1-8-15 Konan, Minato-ku
	108-0075 Tokyo, Japan
According to:	IEEE Std. 1528-2013
	& Published KDB procedures
Report Issued By:	Niall Forrester / Technical Manager
	N. Forre
Issue Date:	2015-01-19
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	N. Forre
Test Date(s):	2015-01-15
Authorised By:	Håkan Sjöberg
	Håkan Sjöberg
Review Date:	2015-01-16

This test report includes annexes and therefore the total number of pages is 90.

CONTENTS

*DETAILS OF PROPOSAL USED AS INPUT TO KDB INQUIRY

1 COMPETENCIES AND ASSURANCE

- CDTL Europe, Tech Mahindra Ltd. (referred to as 'The Lab' herewith) is a communication device testing laboratory competent to carry out the tests described in this report.
- In order to assure the traceability to other national and international laboratories, the Lab has a calibration and maintenance program for its measurement equipment according to the ISO/IEC 17025 standard
- The Lab assures the reliability of the data presented in this report, which is the result of the measurements and the tests performed on the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at Lab at the time of performance of the test.
- The Lab is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

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3 APPLICATION

3.1 APPLICANT DETAILS

Table 3.1 Applicant Details	
Company Name	Sony Mobile Communications Inc.
Address:	1-8-15 Konan, Minato-ku
	108-0075 Tokyo, Japan
Telephone:	+81 3 5782 5085
Contact Name	Fredrik Svensson
e-mail	fredrik3.svensson@sonymobile.com
Telephone:	+46 10 801 7253

3.2 TYPE OF TESTING REQUIRED

Table 3.2 Type of Testing Requested	
Testing according to:	IEEE Std. 1528-2013
	& Published KDB procedures
Testing Detail	SAR Testing for WLAN 2.4GHz (for additional accessory)

For further details of the test specifications used, please see Section 7.

3.3 DATES OF RECEIPT AND TESTING

Table 3.3 Dates of Receipt and testing	
Receipt of Application	2015-01-14
Receipt of Test Items	2015-01-14
Testing Commenced	2015-01-15*
Testing Completed	2015-01-15

*Note that existing results for conducted power testing from 2014-07-11
Have been re-used for the scaling of SAR values in this report

4 TEST ITEM

4.1 DETAILS OF DEVICE UNDER TEST (DUT)

Table 4.1 Details of Device Under Test (DUT)	
Description of DUT:	Smart Watch
Device Type for Test Purposes:	Portable Device (Wrist-worn)
Manufacturer:	Sony Mobile Communications Inc.
Model Name:	RD-0090
Other Model Names:	SWR50
FCC ID	PY7-RD0090
Industry Canada ID	4170B-RD0090
Project ID:	CDTLE_S0007
Sample Identification (DUT #00037):	S/N 14271D14A372674
Sample Identification (DUT #00038):	S/N 14271D18A372010
Device Hardware Version:	AP
Device Software Version:	ANDROID-20140704.154857 (DUT #00038)
Alternative Device Software:	ETS_13 (DUT #00037 & #00038)
DUT Status	Identical Prototype

- Note: DUT #00037 used for previous Conducted Power measurements only
- Note: DUT #00038 used for SAR testing only

4.2 DETAILS OF ANCILLARY EQUIPMENT TO THE DUT

Table 4.2 Details of Ancillary Equipment to the DUT	
Description of Item:	Watch Strap (Plastic/Leather)
Manufacturer:	Sony
Model Name:	1294-5702 (Carrier) 1276-4067 (Leather Band)
Sample Identification (DUT #00087):	Internal ID 00087

Note: the RD-00090 Smart Watch product will be available with a number of different strap types. The tables of SAR results in this report show the DUT ID for the device and also the DUT ID for the strap so the exact configuration under test can be easily identified.

For further technical details of the DUT, please see Section 10.

For photographs of the DUT and Ancillary Equipment, please Appendix I

5 COMPLIANCE

5.1 STATEMENT OF COMPLIANCE

The highest SAR value measured for the device of type RD0090 with accessories 1294-5702 (Carrier) and 1276-4067 (Leather Band) was below the maximum recommended level of 4W/Kg (averaged over 10g of tissue) for a device used at the limbs (extremities) for the general population (uncontrolled exposure) according to the following documents:

FCC 47 CFR rule §2.1093

RSS-102 Issue 4 Section 4.1

Testing was carried out in accordance with the specifications listed in Section 7 of this report together with the methods documented in Appendix K.

5.2 DETAILS OF COMPLIANCE

Details of Compliance

Table 5.2 Details of Compliance			
Test Type	**Details**	**Requirement Reference(s)**	**Result**
Specific Absorption Rate (SAR)	WLAN 2.4GHz Extremities General Population	FCC 47 CFR rule §2.1093 RSS-102 Issue 4 Section 4.1	**COMPLIED**

5.3 EXPOSURE LIMITS

Table 5.3 Exposure Limits As defined by FCC 47 CFR rule §2.1093 and RSS-102 Issue 4 Section 4.1		
Exposure Type	**Limit for General Population [Uncontrolled Environment] (W/Kg)**	**Occupational Limit [Controlled Environment] (W/Kg)**
Whole Body (Averaged over whole body)	0.08	0.4
Localised [Head and Trunk] (Averaged over 1g of tissue)	1.6	8
Extremities [Limbs] (Averaged over 10g of tissue)	4	20

6 SUMMARY OF HIGHEST REPORTED SAR VALUES BY CONFIGURATION / CLASS

Summary of Measurement Results by Configuration and Class

Table 6 Summary of Measurement Results by Configuration and Class	
Test Configuration	Maximum reported SAR value (W/Kg) for 10g by Equipment Class
	DTS
Extremities	0.62

This table shows only the highest reported SAR value for each combination of test configuration (e.g. Use at the Ear, Body-worn accessory, Use at the Extremities) and Equipment Class. For detailed SAR results please refer to the tables in Section 13.

7 TEST SPECIFICATION REFERENCES

7.1 PRIMARY TEST SPECIFICATIONS

Evaluation of the Device Under Test was conducted according to the requirements in the following standard(s):

IEEE Std. 1528-2013

IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques

IEEE Std. 1528-2003

IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques

RSS-102 Issue 4

Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)

KDB 447498 D01 General RF Exposure Guidance v05r02

Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies

KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r03

SAR Measurement Requirements for 100 MHz to 6 GHz

KDB 248227 D01 SAR meas for 802 11 a b g v01r02

SAR Measurement Procedures for 802.11 a/b/g Transmitters

7.2 Further References for Test Methods and Reporting Procedures

In addition to the primary test specifications, the methods documented in Appendix K of this report were used.

The following test specifications were also used in determining the information to be included in the report:

KDB 865664 D02 RF Exposure Reporting v01r01

RF Exposure Compliance Reporting and Documentation Considerations

RSS-102 Issue 4 Annex E

Information that should be included in the RF Exposure Technical Brief to Document SAR Compliance

7.3 Additional References

The following specifications were referred to in determining the maximum allowable SAR level for the device under test:

FCC 47 CFR rule §2.1093

Radiofrequency radiation exposure evaluation: portable devices.

ANSI/IEEE C95.1-2005

IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz

RSS-102 Issue 4 Section 4.1

SAR Limits for Devices Used by the General Public (Uncontrolled Environment)

8 ENVIRONMENTAL CONDITIONS IN THE LAB

8.1 TEMPERATURE

The temperature is monitored and logged automatically by a calibrated temperature/humidity reader and the logs are reviewed regularly. In case of any deviations, immediate corrective actions are taken to ensure that the Lab temperature is maintained within the specified range.

The temperature of the Tissue Simulating Liquids is measured at the time of test. The measured temperatures are included with the SAR results in section 13.

8.2 HUMIDITY

The relative humidity (RH) is maintained between 20% and 75%. The relative humidity is monitored and logged automatically by a calibrated temperature/humidity reader and the logs are reviewed regularly. In case of any deviations, immediate corrective actions are taken to ensure that the Lab humidity is maintained within the specified range.

8.3 RF SHIELDING

At the Lab, all relevant test equipment is placed inside shielded rooms (Faraday cages) which ensure that RF interference is within the bounds set by the test requirements, where this is necessary.

The Lab staff are made aware of the test requirements and the proper operation of these shielded chambers. Lab engineers periodically verify the performance of the chambers through appropriate checks. The Technical Manager is primarily responsible to ensure that these checks are carried out correctly and if required necessary corrective actions are taken immediately to rectify any problem.

9 GENERALISED SAR TEST METHODS AND PROCEDURES

9.1 OVERVIEW

Testing has been performed according to established standard methods as listed in section 7. This overview section is intended to summarise the fundamental concepts that are used in all the SAR testing carried out in the Lab. For full and precise details, please refer to the specifications mentioned above.

In order to find the highest SAR values for the DUT, a number of steps are necessary. Firstly, the correct configurations (combinations of radio link parameters and physical placement of the device) must be determined. The performance of the test apparatus must be verified, and environmental conditions recorded. The various test configurations are set up and measurements are taken. Finally the results are analysed and presented in this report. The equipment used for testing is compliant with appropriate standards. For a full list of the equipment used, see APPENDIX A.

9.2 DETERMINING THE CONFIGURATIONS TO BE TESTED

To determine the configurations that need to be tested, it is first necessary to consult the technical details of the DUT provided by the manufacturer. Using this information, appropriate frequency bands, wireless technologies and operating modes can be tested, and configurations that are not supported by the DUT may be excluded from the test scope.

From the manufacturer's technical documentation other parameters are also determined, such as the test separation for testing body-worn and hotspot configurations (where appropriate) and some test positions may be excluded: for example it may not be necessary to test certain orientations of the DUT depending on the location of the antenna(s).

In addition, the conducted output power is measured for a various radio link configurations for the different technologies and frequency bands supported by the DUT, and this data is used to select the 'worst case' configurations for which SAR testing is performed. Tables of these conducted power measurements are included in Section 11 together with a description of the test setup.

Details of the configurations that were selected prior to testing are shown in Section 0, together with justification of these selections.

During the testing of the device, it may be necessary to include additional test configurations depending on the SAR levels measured, for example if the reported SAR is above a certain threshold, it may be necessary to repeat certain test configurations. These additional configurations, if required, are documented in Section 14.1.

9.3 Ensuring The Measurements Are Accurate

Prior to SAR testing, the performance of the measuring apparatus is verified through checking of the dielectric properties of the tissue simulating fluids and by using the test apparatus to measure the SAR for a source with known characteristics. The results are then compared with previous reference measurements with the same equipment. These checks are known as “System Checks”

At regular intervals, after critical equipment has been calibrated or when new equipment is introduced to the lab, further checks of the equipment are performed in a similar way to the System Checks, but with additional checks and measurements made. These checks are known as “System Validation”.

The results of these checks are presented in APPENDIX F.

9.4 Setting Up the Radio Link

In most cases, the desired radio link configuration for cellular wireless services is set up via the air interface between a Radio Communication Tester and the DUT and the power levels are controlled by commands from this instrument also. In some cases, special software or applications may be installed on the DUT in order to control the test configurations and output power of the device.

9.5 Performing the Tests

Environmental conditions are logged (air temperature and humidity and the temperature of the fluid). The DUT is placed in a device holder at the appropriate position relative to a SAR phantom containing a suitable tissue simulating fluid, and measurements are then made by the SAR test system, which measures the fields induced in the fluid, and uses the results to calculate the SAR value over a specified volume of tissue. For technical details of the apparatus and its operation, please see APPENDIX B.

The process is repeated using different radio link configurations, different DUT positions and different tissue simulating fluids (where appropriate) until all the required combinations have been tested. Results are stored electronically and are summarised in this report. Examples of the original SAR scan data from the SAR test system are also attached to this report: see APPENDIX H.

9.6 Presenting the Results

The individual results from each test scan are stored electronically. The results are summarised in tables in Section 13. Statements regarding the compliance of the DUT are shown in Section 5.

10 TECHNICAL DETAILS OF THE DEVICE UNDER TEST

10.1 GENERAL DESCRIPTION OF THE DUT

The Device Under Test is a Smart Watch supporting WLAN 2.4GHz and Bluetooth / Bluetooth LE Configurations, as detailed below. The device is configured as a wristwatch and is intended for use when worn on the wrist (i.e. extremities conditions) by the General Population.

10.2 WIRELESS TECHNOLOGIES AND FREQUENCY BANDS SUPPORTED BY THE DUT

Table 10.2 Wireless Technologies and Frequency Bands supported by the DUT

Technology	Band	Frequency Range (Tx)	Power Class	Modulations	Results Included *
WLAN 802.11 b/g/n	2.4 GHz	2412 MHz – 2462 MHz	N/A	OFDM, CCK	YES
Bluetooth / BT LE	2.4 GHz	2402 MHz – 2480 MHz	1	GFSK	NO

* Note that details are included here for all wireless configurations supported by the DUT.

Configurations marked with a "NO" in this column are not relevant for the scope of this report and hence no test results are included for these configurations. For justifications of SAR test configurations and exclusions, see Section 12.

10.3 DUT MAXIMUM POWER CAPABILITIES

Table 10.3 DUT Maximum Power capabilities

Technology	Band	Maximum Average Output Power*
WLAN 802.11 b/g/n	2.4 GHz	19.0 dBm
Bluetooth / BT LE	2.4 GHz	9.5 dBm

*These figures represent the maximum average output power attainable by the device type, including manufacturing tolerances. They are based on the manufacturer's own data.

Further details of the maximum power capabilities for each wireless configuration tested are included together with the scaling factors in Section 11.2

10.4 DUT Release versions, Classes and Categories

Table 10.4 DUT Release Versions, Classes and Categories		
Technology	**Detail**	**Supported**
WLAN 2.4GHz	Protocols	b/g/n

10.5 Additional Technical Details of the DUT

Table 10.5 Additional Technical Details of the DUT	
Technology	**Supported**
Battery Voltage (Max):	4.35V
Battery Type:	Lithium-Ion Polymer
WiFi Hotspot Supported:	NO
Inductive Charging Supported:	NO
Connection for Headset	NO

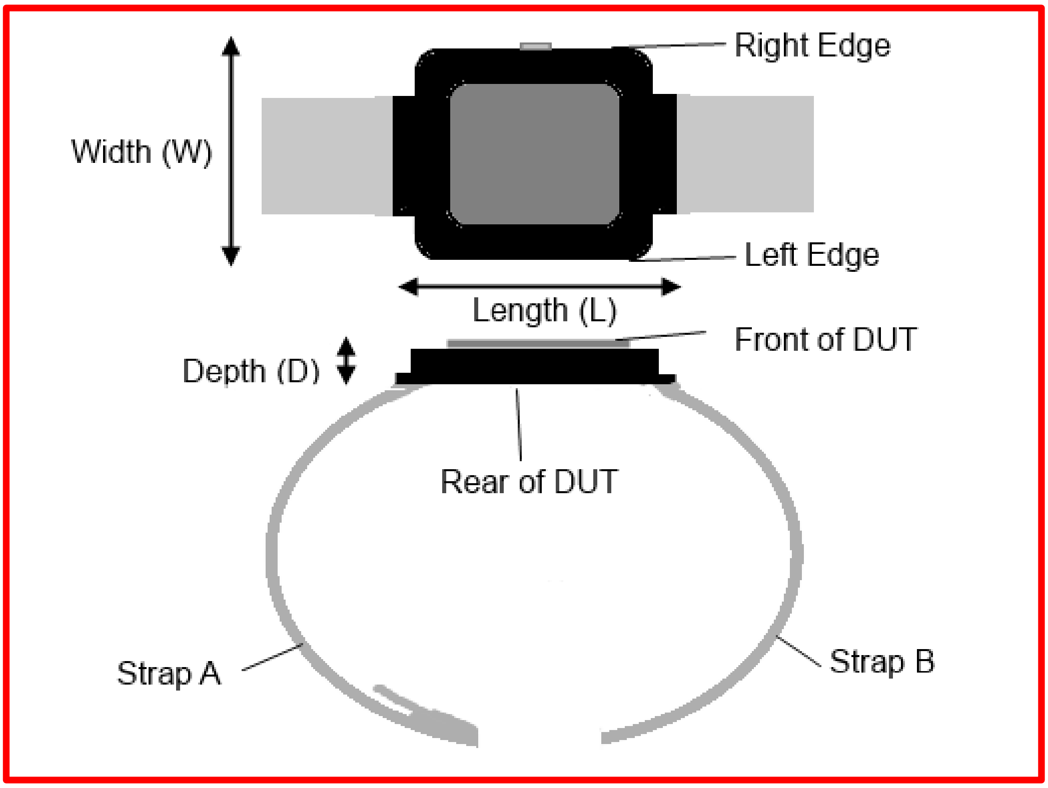
10.6 Special Operation Details

There are no special power reduction configurations supported by the device.

It is not possible to make or receive voice calls (either through cellular technologies or Voice Over IP) from the device.

There is no connector intended for physical connection of accessories such as a headset whilst the device is worn by the user. The USB connector that is present is intended for charging only and, due to its placement on the rear of the device, it cannot be used while the device is worn by the user. Connection of a headset via Bluetooth is possible.

10.7 OVERALL DIMENSIONS OF THE DUT



Note: This diagram is not intended to accurately represent the actual appearance of the DUT

Table 10.7 Approximate Overall Dimensions of the DUT	
Dimension	**Size**
Width (W)	41 mm
Depth (D)	10 mm
Length not including straps (L)*	60 mm
Length of Strap A (“Plastic/Leather” type)*	88 mm
Length of Strap B (“Plastic/Leather” type)*	109 mm

* The figures above for the length of the device are approximate as the straps are flexible and can be positioned at varying angles in relation to the carrier.

10.8 Antenna Types and Placement

Table 10.8 Antenna Types and Placement									
				Minimum Distance (mm) from Edges and Sides					
Antenna	Type	Technologies (Tx)	Technologies (Rx)	Front	Back	Left	Right	Top	Bottom
BT/WLAN /GNSS	IFA	BT/WLAN	BT/WLAN/ GPS/GLONASS	<25	<25	<25	<25	N/A	N/A
NFC	COIL	NFC	NFC	<25	<25	<25	<25	N/A	N/A

Note: Both antennas are within 25mm of all relevant sides / edges of the device, so precise measurements have not been given.

Due to the rounded shape of the device, there is no “top” or “bottom” edge (all measurements have been performed with the back of the device positioned closest to the SAR phantom).

10.9 Supported Simultaneous Transmission Configurations

No simultaneous transmission configurations are supported by the device.

Bluetooth and WLAN can be ‘active’ at the same time, but only through interleaving of packages switched on board level. For the purposes of SAR testing, this means that they do not transmit at the same time.

11 CONDUCTED POWER MEASUREMENTS AND SCALING FACTORS

The conducted power measurements were made by connecting the RF output of the device to a calibrated Power Sensor via a 3dB attenuator (Method two in APPENDIX D). The test sample used for these measurements was specially modified with a short semi-rigid cable and RF connector.

The devices were supplied with additional software installed by the manufacturer that allowed for direct control of the WLAN parameters. These parameters were controlled via USB using a software interface supplied by the manufacturer that allowed the operator to directly select WLAN modes and channels and set the output power to the maximum attainable level.

The device was set to transmit dummy data in such a way as to ensure the duty factor was as close as possible to 100%.

Note that conducted power testing was performed for previous testing of the RD-0090 device, and those results are replicated here. As the only changes for this report involved accessories that have no effect on conducted power, the tests were not repeated. Results shown here are from 2014-07-11.

11.1 Conducted Power Measurement Results – WLAN 2.4GHz

Conducted Power Measurements for WLAN 2.4GHz 802.11b

Table 11.1a Conducted Power Measurements for WLAN 2.4 802.11b

Channel	Frequency (MHz)	Modulation Type	WLAN Mode	Bit Rate	Average Power (dBm)
1	2412	CCK	802.11b	1 Mbps	18.03
6	2437	CCK	802.11b	1 Mbps	18.17
11	2462	CCK	802.11b	1 Mbps	18.29
1	2412	CCK	802.11b	2 Mbps	18.00
6	2437	CCK	802.11b	2 Mbps	18.24
11	2462	CCK	802.11b	2 Mbps	18.39
1	2412	CCK	802.11b	5.5 Mbps	17.96
6	2437	CCK	802.11b	5.5 Mbps	18.32
11	2462	CCK	802.11b	5.5 Mbps	18.53
1	2412	CCK	802.11b	11 Mbps	17.99
6	2437	CCK	802.11b	11 Mbps	18.28
11	2462	CCK	802.11b	11 Mbps	18.49

Conducted Power Measurements for WLAN 2.4GHz 802.11g

Table 11.1b Conducted Power Measurements for WLAN 2.4 802.11g					
Channel	Frequency (MHz)	Modulation Type	WLAN Mode	Bit Rate	Average Power (dBm)
1	2412	OFDM	802.11g	6 Mbps	16.74
6	2437	OFDM	802.11g	6 Mbps	16.90
11	2462	OFDM	802.11g	6 Mbps	17.00
1	2412	OFDM	802.11g	9 Mbps	16.69
6	2437	OFDM	802.11g	9 Mbps	16.90
11	2462	OFDM	802.11g	9 Mbps	17.03
1	2412	OFDM	802.11g	12 Mbps	16.69
6	2437	OFDM	802.11g	12 Mbps	16.89
11	2462	OFDM	802.11g	12 Mbps	17.00
1	2412	OFDM	802.11g	18 Mbps	16.69
6	2437	OFDM	802.11g	18 Mbps	16.89
11	2462	OFDM	802.11g	18 Mbps	17.03
1	2412	OFDM	802.11g	24 Mbps	16.89
6	2437	OFDM	802.11g	24 Mbps	17.00
11	2462	OFDM	802.11g	24 Mbps	17.13
1	2412	OFDM	802.11g	36 Mbps	16.79
6	2437	OFDM	802.11g	36 Mbps	16.97
11	2462	OFDM	802.11g	36 Mbps	17.13
1	2412	OFDM	802.11g	48 Mbps	16.25
6	2437	OFDM	802.11g	48 Mbps	16.42
11	2462	OFDM	802.11g	48 Mbps	16.62
1	2412	OFDM	802.11g	54 Mbps	15.33
6	2437	OFDM	802.11g	54 Mbps	15.55
11	2462	OFDM	802.11g	54 Mbps	15.70

Conducted Power Measurements for WLAN 2.4GHz 802.11n

Table 11.1c Conducted Power Measurements for WLAN 2.4 802.11n					
Channel	Frequency (MHz)	Modulation Type	WLAN Mode	Bit Rate	Average Power (dBm)
1	2412	OFDM	802.11n	6.5 Mbps	16.60
6	2437	OFDM	802.11n	6.5 Mbps	16.82
11	2462	OFDM	802.11n	6.5 Mbps	16.98
1	2412	OFDM	802.11n	13 Mbps	16.60
6	2437	OFDM	802.11n	13 Mbps	16.83
11	2462	OFDM	802.11n	13 Mbps	16.95
1	2412	OFDM	802.11n	19.5 Mbps	16.58
6	2437	OFDM	802.11n	19.5 Mbps	16.79
11	2462	OFDM	802.11n	19.5 Mbps	16.94
1	2412	OFDM	802.11n	26 Mbps	16.58
6	2437	OFDM	802.11n	26 Mbps	16.81
11	2462	OFDM	802.11n	26 Mbps	16.95
1	2412	OFDM	802.11n	39 Mbps	16.63
6	2437	OFDM	802.11n	39 Mbps	16.86
11	2462	OFDM	802.11n	39 Mbps	16.99
1	2412	OFDM	802.11n	52 Mbps	16.08
6	2437	OFDM	802.11n	52 Mbps	16.33
11	2462	OFDM	802.11n	52 Mbps	16.49
1	2412	OFDM	802.11n	58.5 Mbps	15.17
6	2437	OFDM	802.11n	58.5 Mbps	15.42
11	2462	OFDM	802.11n	58.5 Mbps	15.56
1	2412	OFDM	802.11n	65 Mbps	13.77
6	2437	OFDM	802.11n	65 Mbps	13.99
11	2462	OFDM	802.11n	65 Mbps	14.14

11.2 SAR Scaling Factors

Where ‘Reported’ SAR values are listed together with ‘Measured’ SAR values, the former were obtained by multiplying the measured values by a factor based on the following equation

Scaling Factor = 10 ^ [(Maximum Power – Measured Power) / 10]

The actual scaling factors used for each tested wireless link configuration are listed below:

Table 11.2 SAR Scaling Factors

Band	Channel	Frequency (MHz)	Wireless Link Configuration	Measured Average Power (dBm)	Maximum* Average Power (dBm)	Scaling Factor
WLAN_2.4	1	2412	802.11b - 1 Mbps	18.03	19.0	1.25
WLAN_2.4	6	2437	802.11b - 1 Mbps	18.17	19.0	1.21
WLAN_2.4	11	2462	802.11b - 1 Mbps	18.29	19.0	1.18

* The maximum power is based on figures from the manufacturer and includes manufacturing tolerances.

12 TEST CONFIGURATIONS, EXCLUSIONS AND JUSTIFICATIONS

This section details the configurations (DUT orientations, test separations and wireless channel configurations) chosen for test in each band, together with justifications for these choices. Any configurations that have been excluded from testing are tabulated below.

12.1 TEST EXCLUSIONS

Based on the requirements in the published KDBs, the table below shows which stand-alone test configurations have been excluded from SAR testing due to the maximum output power of the various wireless technologies supported by the device.

The result for comparison is calculated according to the maximum output power, test separation and RF channel frequency and where the value is lower than the threshold for a particular configuration, this configuration may be excluded from stand-alone SAR testing.

Table 12.1 Stand Alone SAR Test Exclusion Considerations

Technology	Band	F (GHz)	Max. Pwr (dBm)	M (mW)	Configuration	S (mm)	Result*	Threshold	Testing Excluded
WLAN 802.11 b/g/n	2.4 GHz	2.45	19	79.4	Extremities (10g)	5 {0}	24.9	7.5	NO
Bluetooth / BT LE	2.4 GHz	2.45	9.5	8.9	Extremities (10g)	5 {0}	2.8	7.5	YES

*The result for comparison is derived from the equation:

Result = [M / S] x [√F]

Where

- "M" is the maximum output power of the device (including tune-up tolerance) in mW declared by the manufacturer for this configuration.
- "S is the minimum separation for this test configuration in mm. If the actual separation is less than 5mm, a value of 5 is used for the purposes of this calculation.
- "F" is the RF channel transmit frequency in GHz.
- The result is rounded to one decimal place for comparison.

12.2 Test Configurations For WLAN 2.4GHz

The device is only intended for use when worn on the wrist; hence the requirements in KDB 447498 D01 v05r02 section 6.2 have been applied.

The device does not support voice communications, so “next to the mouth” configurations have been excluded from SAR testing.

For WLAN 2.4GHz modes, SAR testing for wrist-worn configurations has been performed with the rear of the device positioned in direct contact against a SAR phantom. The shape of the device means that testing against a flat phantom would create a space between the device and the phantom that would not be representative of actual use conditions. Because of this, a position on the neck region of a SAM phantom has been used for SAR testing. Details are included as Appendix K to this report.

The WLAN channels selected for testing are those specified in KDB 248227 D01 v01r02: channels 1, 6, 11.

The maximum average output power for 802.11g and 802.11n is less than ¼ dB higher than that measured on corresponding 802.11b channels, so SAR testing has been performed with the device operating in 802.11b mode, in accordance with KDB 248227 D01 v01r02.

The maximum average power for higher data rates is less than ¼ dB higher than that measured for the lowest data rate; therefore, in accordance with KDB 248227 D01 v01r02, SAR testing has been performed with the device operating at the lowest data rate (1Mbps).

12.3 Test Configurations For Bluetooth

The device is only intended for use when worn on the wrist. Based on the test exclusion considerations listed in Section 12.1, no SAR testing is required for Bluetooth mode for this device when used at the extremities.

Therefore, all SAR testing has been excluded for Bluetooth modes.

13 DETAILED SAR MEASUREMENT RESULTS

13.1 SAR MEASUREMENT RESULTS – WLAN 2.4 GHZ

TABLE 13.1.1 SAR MEASUREMENT RESULTS – WLAN 2.4 GHZ Extremities* DUT #00038 with watch strap #00087 [accessories 1294-5702 (Carrier) and 1276-4067 (Leather Band)]									
Tissue Simulating Fluid Temperature Range: 20.9°C to 22.5°C Tissue Simulating Fluid Depth: 15.4cm (Measured at test position)							Measured 2015-01-15		
Scan No.	**DUT ID**	**Band**	**Chn.**	**Freq. (MHz)**	**Modulation Type**	**Position**	**Wireless Link Configuration**	**Measured 10g SAR (W/Kg)**	**Reported 10g SAR (W/Kg)**
1	00038 + 00087	WLAN_2.4	1	2412	CCK	Special* - Back - 0 mm	802.11b - 1 Mbps	0.42	0.52
2	00038 + 00087	WLAN_2.4	6	2437	CCK	Special* - Back - 0 mm	802.11b - 1 Mbps	0.48	0.58
3	00038 + 00087	WLAN_2.4	11	2462	CCK	Special* - Back - 0 mm	802.11b - 1 Mbps	**0.53**	**0.62**

Position Notes:
- Special* – The device was tested in a position on the neck region of a SAM phantom as it was not possible to place it against a flat SAR phantom. See Appendix K for further details.
- Back – The back of the device was placed closest to the phantom.
- 0mm – The device was placed at distance of 0mm from the phantom (touching) at the closest point.

14 MEASURMENT UNCERTAINTY & VARIABILITY

14.1 SAR MEASUREMENT VARIABILITY

As the highest measured SAR value is below the thresholds stated in KDB 865664 D01, no SAR variability analysis is included in this report.

14.2 SAR MEASUREMENT UNCERTAINTY

As with any real-life measurement, imperfections occur during the measurement of SAR values that give rise to some amount of error in the results. The tables set out below summarise the effects of the various factors involved and give an estimate of the total uncertainty, using standard methods.

These tables represent a worst-case analysis and are included as part of the requirements for ISO/IEC 17025. Depending on exact test configurations, the uncertainty could be smaller.

DASY 5 Uncertainty Budget for SAR Tests

Table 14.2 DASY 5 Uncertainty Budget for SAR Tests According to IEEE 1528-2013 (0.3 – 3.0 GHz Range)						
Uncertainty Component	**Uncertainty Value**	**Probability Distribution**	**Divisor**	**C_i (10g)**	**Standard Uncertainty (10g)**	**V_i or V_{eff}**
- ***Measurement System***						
Probe Calibration	±6.0%	Normal	1	1.00	±6.0%	∞
Axial Isotropy	±4.7%	Rectangular	√3	0.70	±1.9%	∞
Hemispherical Isotropy	±9.6%	Rectangular	√3	0.70	±3.9%	∞
Boundary Effects	±1.0%	Rectangular	√3	1.00	±0.6%	∞
Linearity	±4.7%	Rectangular	√3	1.00	±2.7%	∞
System Detection Limits	±1.0%	Rectangular	√3	1.00	±0.6%	∞
Modulation Response	±2.4%	Rectangular	√3	1.00	±1.4%	∞
Readout Electronics	±0.3%	Normal	1	1.00	±0.3%	∞
Response Time	±0.8%	Rectangular	√3	1.00	±0.5%	∞
Integration Time	±2.6%	Rectangular	√3	1.00	±1.5%	∞
RF Ambient Conditions - Noise	±3.0%	Rectangular	√3	1.00	±1.7%	∞
RF Ambient Conditions - Reflections	±3.0%	Rectangular	√3	1.00	±1.7%	∞
Probe Positioner Mechanical Tolerance	±0.4%	Rectangular	√3	1.00	±0.2%	∞
Probe Positioning w.r.t. Phantom Shell	±2.9%	Rectangular	√3	1.00	±1.7%	∞
Maximum SAR Evaluation	±2.0%	Rectangular	√3	1.00	±1.2%	∞
- ***Test Sample Related***						
Test Sample Positioning	±6.8%	Normal	1	1.00	±6.8%	5
Device Holder Disturbance	±3.6%	Normal	1	1.00	±3.6%	5
Power Drift	±5.0%	Rectangular	√3	1.00	±2.9%	∞
- ***Phantom and Liquid Parameters***						
Phantom Shell Uncertainty	±6.1%	Rectangular	√3	1.00	±3.5%	∞
Liquid Conductivity Measurement	±2.5%	Rectangular	√3	0.71	±1.0%	∞
Liquid Permittivity Measurement	±2.5%	Rectangular	√3	0.26	±0.4%	∞
Liquid Conductivity Deviation from Target	±5.0%	Rectangular	√3	0.43	±1.2%	∞
Liquid Permittivity Deviation from Target	±5.0%	Rectangular	√3	0.49	±1.4%	∞
Temperature Uncertainty (Conductivity)	±3.4%	Rectangular	√3	0.71	±1.4%	∞
Temperature Uncertainty (Permittivity)	±0.4%	Rectangular	√3	0.26	±0.1%	∞
COMBINED STANDARD UNCERTAINTY					**±12.8%**	58
EXPANDED STANDARD UNCERTAINTY		k=2			**±25.6%**	

15 AMENDMENT HISTORY

Version	Date	Author(s)/ Function	Reviewed by	Approved by	Nature of Changes
Initial Draft	2015-01-15	Niall Forrester			Initial Draft
V1.0	2015-01-19	Niall Forrester	Kent Lorentzon	Håkan Sjöberg	First Release

APPENDIX A. TEST EQUIPMENT

A1 TEST EQUIPMENT USED

Table A.1 Test Equipment Used

Manufacturer	Model	Type	Serial Number	Unique ID	Calibrated	Cal. Due
SPEAG	Twin SAM	SAR Phantom	TP-1144	LB000143AA	N/A	N/A
SPEAG	DAE4	Data Aquisition Electronics	798	LB000031AA	2014-06-18	2015-06-17
SPEAG	ES3DV3	Dosimetric Probe	3164	LB000003AA	2014-06-17	2015-06-16
SPEAG	MSL2450V2	SAR Fluid	-	LB000182AA	N/A	N/A
Rohde & Schwarz	NRP-Z91*	Power Sensor	100510	LE000094AA	2013-12-18*	2014-12-18*
SPEAG	D2450V2	System Validation Kit	745	LB000042AA	2014-06-13	2015-06-12
Rohde & Schwarz	NRVD	Power Meter	846068/016	LB000090AA	2014-07-30	2015-07-29
Rohde & Schwarz	NRV-Z5	Power Sensor	100374	LB000093AA	2014-07-30	2015-07-29
Rohde & Schwarz	NRV-Z5	Power Sensor	100385	LB000094AA	2014-07-30	2015-07-29
Hewlett Packard	E4433A	Signal Generator	GB37420224	LB000082AA	2014-07-30	2015-07-29
Bonn Elektronik	BLMA 0830-3	Power Amplifier	056144A-02	LB000071AA	2014-10-14	2015-10-13
ET Industries	C-0520-10	Directional Coupler	071	LB000075AA	2014-08-13	2015-08-12
SPEAG	DAK	Dielectric Probe	0009	LB000243AE	2014-03-04	2015-03-03
Copper Mountain	R140	Vector Reflectometer	60913	LB000243AB	N/A	N/A
Fluke	51	Digital Thermometer	6913171	LB000076AA	2014-12-01	2015-13-30

*The NRP–Z91 sensor was used only for the conducted power measurements performed on 2014-07-11, the results of which are replicated in this report. As no new conducted power measurements were necessary for this report, the calibration status at the time of those tests is listed here.

For copies of relevant calibration documents, please see Appendix J.

APPENDIX B. SAR TEST SYSTEM DESCRIPTION

The Tech Mahindra CDTL-Europe SAR Lab uses the DASY5 system from Schmid & Partner Engineering AG (SPEAG) for SAR measurements. The Lab contains three complete DASY5 systems each located in its own shielded chamber to allow for parallel use.

For the purpose of verifying the performance of the Tissue Simulating Fluids used with the DASY5 systems, the lab uses a SPEAG "DAKS" Dielectric Assessment Kit or alternatively a Hewlett Packard 85070 Dielectric Probe Kit, together with an HP 8753D Network Analyzer, also from Hewlett Packard.

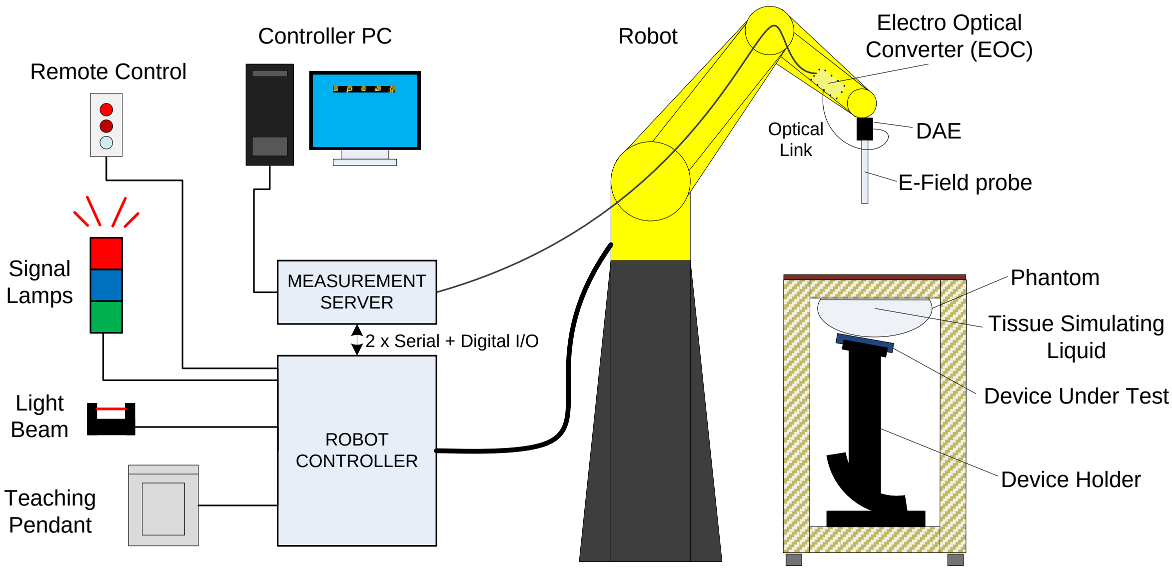
In addition to this, the Lab maintains a pool of equipment required for additional verification of the systems performance and, where necessary, to emulate the wireless networks used by the devices under test.

B1 DASY5 OVERVIEW

Each of the lab's DASY5 (Dosimetric Assessment SYstem, 5th generation) consists of the following items

- A standard high precision 6-axis robot (Stäubli RX90B L) with controller.
- Remote control and teaching pendant for the robot
- An isotropic E-Field probe optimized and calibrated for the targeted measurement.
- A "Data Acquisition Electronics" (DAE) which performs signal processing and other tasks.
- An "Electro-Optical Converter" (EOC) which performs conversion from optical to electrical signals.
- A measurement server to perform time-critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A Light Beam for probe alignment.
- A computer running "Windows 7 Professional" operating system and the DASY5 software.
- One or more phantoms (Twin SAM or ELI types) which contain the Tissue Simulating Fluid and hold it in the required form.
- Tissue Simulating Liquid(s)
- A Device Holder
- Other circuitry to ensure robot safety including warning lamps and cut-off switches.

Figure B1 – DASY 5 Block Diagram



B2 STÄUBLI RX90B L ROBOT DETAILS

The Stäubli robot is a standard industrial robot arm with 6 axes. In this application, it is used to position the E-Field probe in 3-dimensions with high accuracy and repeatability.

Specifications	RX90B L
Number of Axes	6
Nominal Load	3.5 kg
Maximum Load	6 kg
Reach	1100 mm
Repeatability	± 0.025 mm
Weight	113 kg

B3 E-FIELD PROBE DETAILS

For SAR testing, the Lab uses two types of Dosimetric E-Field probes from SPEAG. These are the ES3DV3 type and the EX3DV4 type. These probes are specially designed and calibrated for use in liquids with high permittivities.

Specifications	ES3DV3 Probe
Frequency	10 MHz to 4 GHz; Linearity: ± 0.2 dB (30 MHz to 4 GHz)
Directivity	± 0.2 dB in TSL (rotation around probe axis) ± 0.3 dB in TSL (rotation normal to probe axis)
Dynamic Range	5 µW/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm

Specifications	EX3DV4 Probe
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 µW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/g)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm

B4 DATA ACQUISITION ELECTRONICS DETAILS

The data acquisition electronics (DAE4 or DAE3) 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 with a 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 mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.

Specifications	DAE
Measurement Range	-100 to +300 mV (16 bit resolution and two range settings: 4mV, 400mV)
Input Offset Voltage	< 5 µV (with auto zero)
Input Resistance	200 MOhm
Input Bias Current	< 50 fA
Battery Power	> 10 hours of operation (with two 9.6 V NiMH accus)
Dimensions (L x W x H)	60 x 60 x 68 mm
Calibration	ISO/IEC 17025 calibration service available.

B5 SAR PHANTOM DETAILS

Currently available in the Lab are two types of phantom, both supplied by SPEAG. To allow for testing of devices that are intended for use at the ear, several "Twin SAM" phantoms are in place. For testing of larger devices in other positions, an "ELI" model phantom is also available

Specifications	Twin SAM Phantom
The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.	
Material	Vinylester, glass fibre reinforced (VE-GF)
Liquid Compatibility	Compatible with all SPEAG tissue simulating
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)
Dimensions (incl. Wooden Support)	Length: 1000 mm Width: 500 mm Height: adjustable feet
Filling Volume	approx. 25 litres
Wooden Support	SPEAG standard phantom table

Specifications	ELI Phantom
Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.	
Material	Vinylester, glass fibre reinforced (VE-GF)
Liquid Compatibility	Compatible with all SPEAG tissue simulating
Shell Thickness	2.0 ± 0.2 mm (bottom plate)
Dimensions	Major axis: 600 mm Minor axis: 400 mm
Filling Volume	approx. 30 litres
Wooden Support	SPEAG standard phantom table

B6 TISSUE SIMULATING LIQUID DETAILS

The Lab stocks quantities of multiple Tissue Simulating Liquids to cover a wide range of test frequencies, from around 700MHz to above 5GHz and for different test requirements: e.g. simulating head tissue or muscle tissue. The ingredients vary depending on the frequency and can include substances such as water, Sugar, Salt, Diethylene Glycol Butyl Ether (DGBE), emulsifiers such as 'Tween', and oil.

The liquids are supplied ready-mixed and conform to the suggested recipes in the various test specifications.

B7 DEVICE HOLDER DETAILS

The mounting device for hand-held transmitters supplied by SPEAG enables rotation of the mounted transmitter device to specified spherical coordinates. At the heads, the rotation axis is at the ear opening. Transmitter devices can be easily and accurately positioned according to IEC 62209-1, IEEE 1528, FCC, or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat).

In addition, an extension for laptop devices is available which facilitates testing of larger devices according to IEC 62209-2 (e.g., laptops, cameras, etc.). It is lightweight and fits easily on the upper part of the standard mounting device in place of the phone positioner. The extension is fully compatible with the Twin SAM, ELI and other flat phantoms.

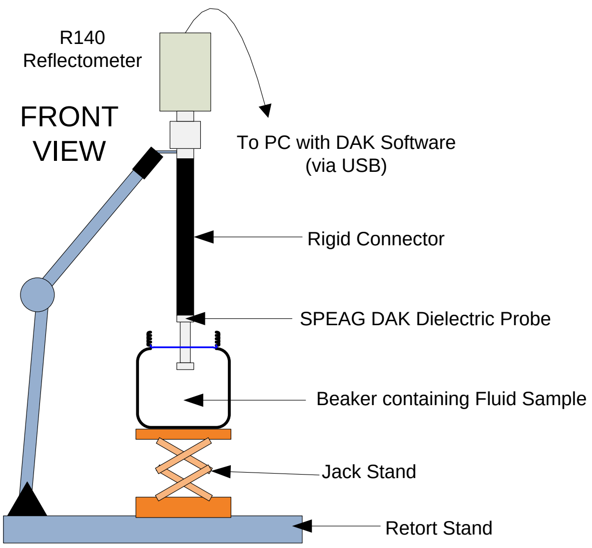
APPENDIX C. TEST SETUP FOR DIELECTRIC MEASUREMENTS

For measuring the dielectric properties of the various Tissue Simulating Fluids, a SPEAG “DAKS” Dielectric Assessment Kit is used. The DAK probe is mounted on a retort stand using the supplied clamp and is connected to the R140 Reflectometer via a rigid connector that provides very good stability and allows for a high degree of repeatability compared to a flexible cable. The reflectometer is connected to a standard Personal Computer via a USB cable.

A jack stand is placed under the probe to allow for raising and lowering the sample. Alternatively, the rigid connector makes it possible to move the probe and reflectometer together to the phantom where the SAR fluid is placed and perform measurements directly in the phantom. Calculations and control of the instruments are performed by the SPEAG DAK software supplied with the kit.

The measurement system is calibrated prior to each set of measurements using three references: Open Air, a Short Circuit and De-Ionised Water.

Figure C1 – Dielectric Measurement equipment Setup



APPENDIX D. TEST SETUP FOR CONDUCTED POWER MEASUREMENTS

There are two different methods for measuring the conducted power of a DUT. Which of these is chosen depends on how the output of the DUT can be controlled. If the DUT supports multiple wireless technologies, a mixture of these two methods may be necessary.

Method 1

For wireless technologies where the DUT output is controlled by the network (or in this case the test network), the DUT antenna connector can be connected to a Network Emulator that has the capability to measure output power, and measurement can be read directly from this instrument. This is typically the case for GSM, UMTS and LTE devices, for example

Method 2

For wireless technologies where the DUT output can be controlled directly by a test engineer, power measurements can be performed by connecting the DUT antenna connector to a power meter and/or power probe via a suitable attenuator.

Network emulators used in the lab include:

Rohde & Schwarz CMU200

Rohde & Schwarz CMW500

Power Meter and Power Probe models used in the lab:

Rohde & Schwarz NRVD

Rohde & Schwarz NRV-Z5

Rohde & Schwarz NRP-Z91

APPENDIX E. TISSUE SIMULATING LIQUIDS

E1 DETAILS OF TISSUE SIMULATING LIQUIDS USED

The following fluids were used when performing the SAR tests detailed in this report:

Table E.1 Tissue Simulating Fluids Used

Manufacturer	Type	Used to simulate	Nominal Frequency(s)	Main Ingredients*	Unique ID
SPEAG	MSL2450V2	Body Tissue	2450 MHz	H2O, DGBE	LB000182AA

*The recipes for these fluids are proprietary to the manufacturers and hence the exact proportions of ingredients are not available.

DGBE = Diethylene-Glycol-Monobutyl-Ether

H2O = De-ionised water

E2 DIELECTRIC PARAMETERS

The tables below show the measured dielectric parameters for each fluid by date and frequency, together with deviation from the target values.

Table E.2.1 Dielectric Parameters of LB000182AA MSL2450V2

Date	Tech. / Band	Channel No.	Channel Frequency (MHz)	Actual Permit-tivity	Actual Conduc-tivity	Target Permittivity	Target Conductivity	Permittivity Deviation	Conductivity Deviation
15/01/2015	Sys. Check	2450	2450.0	52.46	2.01	52.70	1.95	-0.5%	3.2%
15/01/2015	WLAN_2.4	1	2412.0	52.57	1.95	52.75	1.91	-0.3%	2.1%
15/01/2015	WLAN_2.4	6	2437.0	52.50	1.99	52.72	1.94	-0.4%	2.9%
15/01/2015	WLAN_2.4	11	2462.0	52.41	2.03	52.68	1.97	-0.5%	3.3%

APPENDIX F. SAR SYSTEM VERIFICATION

F1 DESCRIPTION OF THE SYSTEM VERIFICATION METHODS

System verification consists of two procedures:

1) A "System Check" which is performed at least once in each period of 24 hours for each test setup (combination of SAR Test System, E-Field Probe, Tissue Simulating Liquid and Phantom).

2) "System Validation" which is performed when new equipment is added to the lab, and on a periodic basis to check existing equipment.

In both cases, the method is described by the manufacturer of the equipment (Schmid & Partners Engineering AG) and their instructions are followed carefully, together with any requirements listed in the test methods.

In short, a dipole antenna with known characteristics is placed at a set position relative to the SAR Phantom, and a measurement or series of measurements are taken by the SAR system with the relevant peripherals (e.g. E-Field probe) in place. The SAR results can then be compared to reference results and the performance of the test system can be assessed.

F2 SYSTEM CHECK RESULTS

The following tables show the results for the system checks for each fluid and each day of testing.

TABLE F2 System Check Results

			Equipment IDs				Normalised SAR (W/Kg)		Target SAR (W/Kg)		Deviation From Target	
Date & Fluid ID	Sys. ID	Freq. (MHz)	Sys. Val. Kit	E-Probe	DAE	Fluid Type	1g	10g	1g	10g	1g	10g
15/01/2015 LB000182AA	DASY 1 LUND	2450	D2450V2 745	ES3DV3 3164	798	MSL2450V2 (Body Fluid)	53.74	24.92	50.30	23.30	6.9%	7.0%

F3 SYSTEM CHECK REPORTS

The following pages contain copies of the DASY system reports for each System Check routine performed:

Date/Time: 2015-01-15 09:15:43

Test Laboratory: Tech Mahindra: Device Testing Lab - Europe (SAR Lab 1)

SystemPerformanceCheck-D2450V2_LAB1_2015-01-15

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:745

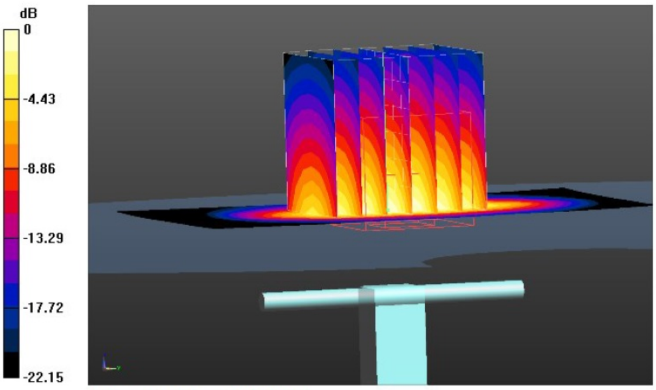
Communication System: UID 0, CW (0); Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2450 MHz; σ = 2.012 S/m; ε_r = 52.457; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ES3DV3 - SN3164; ConvF(4.2, 4.2, 4.2); Calibrated: 2014-06-17;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn798; Calibrated: 2014-06-18
- Phantom: SAM 1 (30deg probe tilt); Type: SAM; Serial: TP:1144
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

System Performance Check at Frequencies above 1 GHz/d=10mm, Pin=251.19 mW, dist=3.0mm (ES-Probe)/Area Scan (61x91x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 18.3 W/kg

System Performance Check at Frequencies above 1 GHz/d=10mm, Pin=251.19 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.12 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 28.3 W/kg
SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.26 W/kg
Maximum value of SAR (measured) = 17.7 W/kg



0 dB = 17.7 W/kg = 12.48 dBW/kg

F4 SYSTEM VALIDATION DETAILS

The following table shows the results of System Validation for relevant systems and components at the frequencies relevant for the tests presented in this report.

System Validation Results

TABLE F4 System Validation Results									
			Equipment IDs						
Date	Sys. ID	Freq. (MHz)	Sys. Val. Kit	E-Probe	DAE	Fluid Type	Signal Type(s)	Result
2014-07-09	DASY 1 LUND	2450	D2450V2 745	ES3DV3 3164	798	MSL2450V2 (Body Fluid)	CW	All parameters OK

APPENDIX G. DETAILS OF SAR TEST METHODS USED

- Testing was performed according to the technical requirements in:
- IEEE Std. 1528-2013 / IEEE Std. 1528-2003
- KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r03

- Appropriate WLAN configurations were chosen based on the requirements in:
- KDB 248227 D01 SAR meas for 802 11 a b g v01r02

- The devices were supplied with additional software installed by the manufacturer that allowed for direct control of the WLAN parameters. These parameters were controlled via USB using a software interface supplied by the manufacturer that allowed the operator to directly select WLAN modes and channels and set the output power to the maximum attainable level.

- The device was mounted against the SAR phantom using the SPEAG device holder for hand-held transmitters, together with a small piece of low-loss foam (see test setup photographs in Appendix I)

- All testing was performed with the rear of the device (i.e. the side that is normally in contact with the wearers wrist) placed against the SAR phantom with no gap at the closest point.

- As it was not possible to mount the device against a flat phantom, a position on the neck region of the SAM phantom was used. This position was chosen as being as close as possible to the position required for extremities testing. See Appendix K for details.

- The test position was marked on the outer surface of the phantom to allow for accurate and repeatable placement of the DUT.

- To allow probe access to the neck region of the SAM phantom, settings were chosen in the DASY system interface (using a standard configuration file provided by SPEAG that was delivered with the system) that allowed the probe to deviate a maximum of 30° from the normal to the phantom surface.

- Area Scans, Zoom Scans and other test procedures were performed in the usual manner, as defined in the technical requirements above. The Area Scan size was chosen so that the whole of the central module and carrier was covered with sufficient overlap on all sides. As much as possible of the strap was also included in the area scan, see appendix K for details.

- For additional details specific to the testing of the device with accessories 1294-5702 (Carrier) and 1276-4067 (Leather Band)], see Appendix L.

APPENDIX H. SAR RESULT REPORTS

The following pages contain copies of the relevant SAR Result Reports generated from the SAR Test systems. Each Result Report is identified by a unique "Scan" number which corresponds to the numbers listed in the SAR result tables.

Table H shows the details for each scan.

TABLE H List of SAR Result Reports

Scan No.	DUT ID	Band	Chn.	Freq. (MHz)	Modulation Type	Position	Wireless Link Configuration
1	00038 + 00087	WLAN_2.4	1	2412	CCK	Special* - Back - 0 mm	802.11b - 1 Mbps
2	00038 + 00087	WLAN_2.4	6	2437	CCK	Special* - Back - 0 mm	802.11b - 1 Mbps
3	00038 + 00087	WLAN_2.4	11	2462	CCK	Special* - Back - 0 mm	802.11b - 1 Mbps

Date/Time: 2015-01-15 09:49:02

Test Laboratory: Tech Mahindra: Device Testing Lab - Europe (SAR Lab 1)

Scan1_CDTLE_S0007 DUT00038 with 00087 WLAN 2_4 Extremities - Special Placement - FCC

DUT: CDTLE_S0007; Type: Wristwatch; Serial: 00038 (with strap 00087)

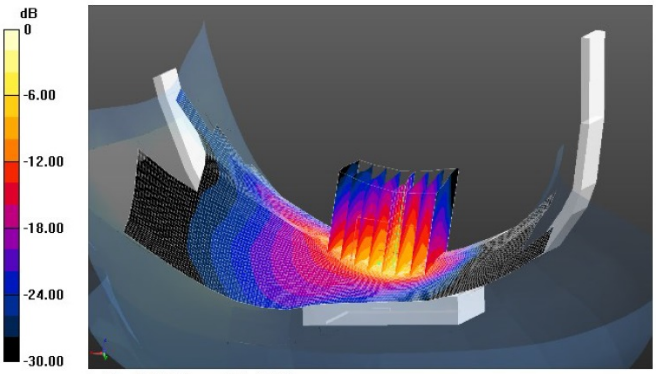
Communication System: UID 0, WLAN 802.11 2.4GHz (0); Communication System Band: WLAN 802.11 a/b/g/n; Frequency: 2412 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2412.5 MHz; σ = 1.954 S/m; ε_r = 52.573; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ES3DV3 - SN3164; ConvF(4.2, 4.2, 4.2); Calibrated: 2014-06-17;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn798; Calibrated: 2014-06-18
- Phantom: SAM 1 (30deg probe tilt); Type: SAM; Serial: TP:1144
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Back - Phantom (Special Placement)/80211.b 1MBps CH1/Area Scan (81x161x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.966 W/kg

Back - Phantom (Special Placement)/80211.b 1MBps CH1/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.75 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.15 W/kg
SAR(1 g) = 0.731 W/kg; SAR(10 g) = 0.419 W/kg
Maximum value of SAR (measured) = 0.892 W/kg



0 dB = 4.00 W/kg = 6.02 dBW/kg

Date/Time: 2015-01-15 13:38:11

Test Laboratory: Tech Mahindra: Device Testing Lab - Europe (SAR Lab 1)

Scan2_CDTLE_S0007 DUT00038 with 00087 WLAN 2_4 Extremities - Special Placement - FCC

DUT: CDTLE_S0007; Type: Wristwatch; Serial: 00038 (with strap 00087)

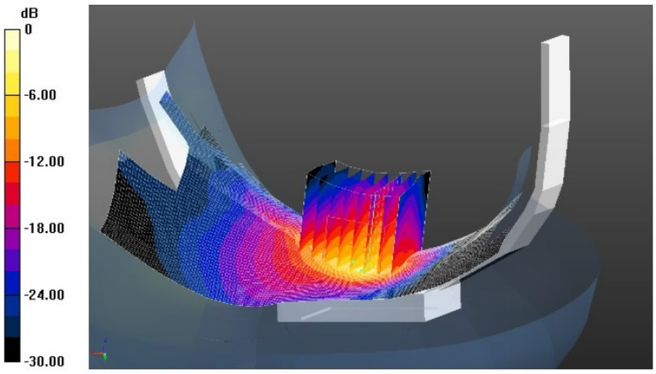
Communication System: UID 0, WLAN 802.11 2.4GHz (0); Communication System Band: WLAN 802.11 a/b/g/n; Frequency: 2437 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2437.5 MHz; σ = 1.994 S/m; ε_r = 52.501; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ES3DV3 - SN3164; ConvF(4.2, 4.2, 4.2); Calibrated: 2014-06-17;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn798; Calibrated: 2014-06-18
- Phantom: SAM 1 (30deg probe tilt); Type: SAM; Serial: TP:1144
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Back - Phantom (Special Placement)/80211.b 1MBps CH6/Area Scan (81x161x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.24 W/kg

Back - Phantom (Special Placement)/80211.b 1MBps CH6/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.75 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 0.806 W/kg; SAR(10 g) = 0.476 W/kg
Maximum value of SAR (measured) = 0.963 W/kg



0 dB = 4.00 W/kg = 6.02 dBW/kg

Date/Time: 2015-01-15 15:04:17

Test Laboratory: Tech Mahindra: Device Testing Lab - Europe (SAR Lab 1)

Scan3_CDTLE_S0007 DUT00038 with 00087 WLAN 2_4 Extremities - Special Placement - FCC

DUT: CDTLE_S0007; Type: Wristwatch; Serial: 00038 (with strap 00087)

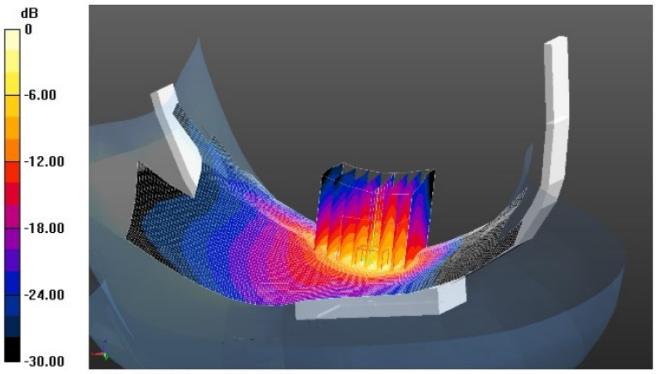
Communication System: UID 0, WLAN 802.11 2.4GHz (0); Communication System Band: WLAN 802.11 a/b/g/n; Frequency: 2462 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2462.5 MHz; σ = 2.032 S/m; ε_r = 52.41; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ES3DV3 - SN3164; ConvF(4.2, 4.2, 4.2); Calibrated: 2014-06-17;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn798; Calibrated: 2014-06-18
- Phantom: SAM 1 (30deg probe tilt); Type: SAM; Serial: TP:1144
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Back - Phantom (Special Placement)/80211.b 1MBps CH11/Area Scan (81x161x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.36 W/kg

Back - Phantom (Special Placement)/80211.b 1MBps CH11/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.93 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 1.55 W/kg
SAR(1 g) = 0.918 W/kg; SAR(10 g) = 0.531 W/kg
Maximum value of SAR (measured) = 1.08 W/kg



0 dB = 4.00 W/kg = 6.02 dBW/kg