



**TEST REPORT
FROM
RFI GLOBAL SERVICES LTD**

Test of: CDMA SHL21

To: OET Bulletin 65 Supplement C: (2001-01)

IEEE 1528: 2003

FCC ID: APYHRO00178

Test Report Serial No:
RFI-SAR-RP90033JD01A V2.0

Version 2.0 supersedes all previous versions

| | |
|---|---|
| This Test Report Is Issued Under The Authority Of Chris Guy, Head of Global Approvals: | |
| |  <small>(APPROVED SIGNATORY)</small> |
| Checked By: Richelieu Quoi |  <small>(APPROVED SIGNATORY)</small> |
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1. Customer Information

| | |
|----------------------|--|
| Company Name: | Sharp Telecommunications of Europe Limited |
| Address: | Azure House Bagshot Road Bracknell RG21 7QY United Kingdom |

Manufacturer Information

| | |
|----------------------|--|
| Company Name: | Sharp Corporation |
| Address: | 2-13-1 Iida Hachihonmatsu Higashihiroshima-City Hiroshima 739-0192 Japan |

2. Equipment Under Test (EUT)

2.1. Identification of Equipment Under Test (EUT)

| | |
|---|-----------------|
| Description: | Mobile Handset |
| Brand Name: | Sharp |
| Model Name or Number: | CDMA SHL21 |
| Serial Number: | None Stated |
| IMEI Number: | 004401114094796 |
| Hardware Version Number: | 2PP |
| Software Version Number: | F7096 |
| Hardware Revision of GSM Module: | Not Applicable |
| Software Revision of GSM Module: | Not Applicable |
| FCC ID Number: | APYHRO00178 |
| Country of Manufacture: | Japan |
| Date of Receipt: | 16 August 2012 |

Note(s):

This sample was used to perform SAR evaluation measurements on WLAN 802.11a/n 5.0 GHz band only.

| | |
|---|-----------------|
| Description: | Mobile Handset |
| Brand Name: | Sharp |
| Model Name or Number: | CDMA SHL21 |
| Serial Number: | None Stated |
| IMEI Number: | 004401114094788 |
| Hardware Version Number: | 2PP |
| Software Version Number: | F7096 |
| Hardware Revision of GSM Module: | Not Applicable |
| Software Revision of GSM Module: | Not Applicable |
| FCC ID Number: | APYHRO00178 |
| Country of Manufacture: | Japan |
| Date of Receipt: | 16 August 2012 |

Note(s):

This sample was used to perform SAR evaluation measurements on WLAN 802.11a/n 5.0 GHz band only.

| Identification of Equipment Under Test (EUT) (Continued); | |
|--|-----------------|
| Description: | Mobile Handset |
| Brand Name: | Sharp |
| Model Name or Number: | CDMA SHL21 |
| Serial Number: | None Stated |
| IMEI Number: | 004401114094804 |
| Hardware Version Number: | 2PP |
| Software Version Number: | F7096 |
| Hardware Revision of GSM Module: | Not Applicable |
| Software Revision of GSM Module: | Not Applicable |
| FCC ID Number: | APYHRO00178 |
| Country of Manufacture: | Japan |
| Date of Receipt: | 16 August 2012 |
| Note(s): | |

This sample was used to perform WLAN conducted power measurements evaluation measurements on WLAN 802.11a/n 5.0 GHz band only.

2.2. Description of EUT

The Equipment Under Test is a: Dual-band CDMA (BC0, BC6) & Tri-band GSM (GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDDI, FDDV) & Dual-band LTE (B11, B18) multi mode cellular phone with Bluetooth, WLAN, NFC (FeliCa) and GPS.

2.3. Modifications Incorporated in the EUT

EUT (IMEI: 004401114094796 and 004401114094788) is used for WLAN 5.0 GHz Head SAR measurements only.

EUT (IMEI: 004401114094804) is used for WLAN Conducted Power measurements only.

| 2.4. Accessories | |
|--------------------------------|------------------|
| Description: | Integral Battery |
| Brand Name: | None Stated |
| Model Name or Number: | UBATIA210AF03 |
| Serial Number: | None Stated |
| Cable Length and Type: | Not Applicable |
| Country of Manufacture: | None Stated |
| Connected to Port | None Stated |

| | |
|--------------------------------|-------------------------|
| Description: | Memory Card |
| Brand Name: | None Stated (Generic) |
| Model Name or Number: | None Stated |
| Serial Number: | None Stated |
| Cable Length and Type: | Not Applicable |
| Country of Manufacture: | None Stated |
| Connected to Port | Dedicated Micro SD Slot |

2.5. Additional Information Related to Testing

| | | |
|---|--|--|
| Equipment Category | CDMA JP BC0, BC6, EGSM/GPRS/EDGE900, DCS/GPRS/EDGE1800, PCS/GPRS/EDGE1900, UMTS/HSPA FDD I, V, LTE Band 11, 18, WiFi802.11a/b/g/n, <i>Bluetooth</i> , NFC, GPS | |
| Type of Unit | Portable Transceiver | |
| Intended Operating Environment: | Within Wi-Fi Coverage / General Population/Uncontrolled limits | |
| Transmitter Maximum Output Power Characteristics: | 5.0 GHz Wi-Fi 802.11a/n (HT20 / HT40) | Test Software was used to configure the EUT to transmit at a maximum power of up to 15.3dBm. |
| Transmitter Frequency Range: | 5.0 GHz Wi-Fi 802.11a/n (HT20 / HT40) | 5180 to 5700 MHz |
| Transmitter Frequency Allocation of EUT When Under Test: | Channel Number | Frequency (MHz) |
| | 36 (Default Channel 'b/n') | 5180.0 |
| | 38 | 5190.0 |
| | 40 | 5200.0 |
| | 44 | 5220.0 |
| | 46(Default Channel 'n') | 5230.0 |
| | 48(Default Channel 'b/n') | 5240.0 |
| | 52(Default Channel 'b/n') | 5260.0 |
| | 54 | 5270.0 |
| | 56 | 5280.0 |
| | 60 | 5300.0 |
| | 62(Default Channel 'n') | 5310.0 |
| | 64(Default Channel 'b/n') | 5320.0 |
| | 100 | 5500.0 |
| | 102 | 5510.0 |
| | 104(Default Channel 'b/n') | 5520.0 |
| | 108 | 5540.0 |
| | 110 | 5550.0 |
| | 112 | 5560.0 |
| | 116(Default Channel 'b/n') | 5580.0 |
| | 118 | 5590.0 |
| 120 | 5600.0 | |
| 124(Default Channel 'b/n') | 5620.0 | |
| 126(Default Channel 'n') | 5630.0 | |
| 128 | 5640.0 | |
| 132 | 5660.0 | |
| 134 | 5670.0 | |
| 136(Default Channel 'b/n') | 5680.0 | |
| 140 | 5700.0 | |

| Additional Information Related to Testing (Continued) | |
|--|--------------------------|
| Modulation(s): | DBPSK, CCK (Wi-Fi): 0 Hz |
| Modulation Scheme (Crest Factor): | DBPSK, CCK (Wi-Fi): 1 |
| Antenna Type: | Internal integral |
| Antenna Length: | Unknown |
| Number of Antenna Positions: | None Stated |
| Power Supply Requirement: | 3.7V |
| Battery Type(s): | Li-ion |

3. Test Specification, Methods and Procedures

3.1. Test Specification

| | |
|-------------------------|--|
| Reference: | OET Bulletin 65 Supplement C: (2001-01) |
| Title: | Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields. |
| Purpose of Test: | To determine whether the equipment met the basic restrictions as defined in OET Bulletin 65 Supplement C: (2001-01) using the SAR averaging method as described in the test specification above. |

3.2. Methods and Procedures Reference Documentation

The methods and procedures used were as detailed in:

Federal Communications Commission, "Evaluating compliance with FCC Guidelines for human exposure to radio frequency electromagnetic fields", OET Bulletin 65 Supplement C, FCC, Washington, D.C, 20554, 2001.

Thomas Schmid, Oliver Egger and Neils Kuster, "Automated E-field scanning system for dosimetric assessments", IEEE Transaction on microwave theory and techniques, Vol. 44, pp. 105-113, January 1996.

Neils Kuster, Ralph Kastle and Thomas Schmid, "Dosimetric evaluation of mobile communications equipment with know precision", IEICE Transactions of communications, Vol. E80-B, No.5, pp. 645-652, May 1997.

EN 62209-1: 2006

Title: Basic standard for the measurement of specific absorption rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz).

EN 62209-2:2010

Human exposure to radio frequency fields from handheld and body mounted wireless communication devices — Human models, instrumentation, and procedures - Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz) (IEC 62209-2:2010)

KDB 248227 D01 "SAR measurements for 802.11a/b/g v01r02"

KDB 447498 D01 "Mobile Portable RF Exposure v04"

KDB 450824 D01 SAR Prob Cal and Ver Meas v01r01

KDB 450824 D02 Dipole SAR Validation Verification v01r01

KDB SAR 3 to 6 GHz Rev. 1.1

3.3. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the methods & procedures section above. Appendix 1 contains a list of the test equipment used.

4. Deviations from the Test Specification

Test was performed as per KDB 248227 D01 "SAR measurements for 802.11a/b/g v01r02", KDB 447498 D01 "Mobile Portable RF Exposure v04" and according to the handset procedures in IEEE Std 1528-2003 and OET Bulletin 65 Supplement C 01-01.

SAR measurement was performed on the highest output channels only for the 5GHz band, as the measured SAR level was less than 0.8 w/kg for the highest output channels and the other default channels within the divided block were ≤ 100 MHz apart. For the default channels that were ≤ 200 MHz apart SAR measurement was performed only on the highest output channel as the SAR level was less than 0.4 w/kg.

As per KDB 248227 - SAR is not required for 802.11n HT20 channels as the maximum average output power is less than $\frac{1}{4}$ db higher than 802.11a.

To prove the build of the sample IMEI: 004401114094796 and sample 004401114094788 are identical to the used for SAR testing; the following power reference was measured under the Flat section of the 'SAM' phantom. The rear of the EUTs was position in direct contact at a fixed reference point and single power reference measurement in v/m was measured for both samples. The minor deviation in the measurement can be accounted for as a positioning uncertainty.

| Sample IMEI | Power reference (v/m) |
|-----------------|-----------------------|
| 004401114094796 | 4.810 |
| 004401114094788 | 4.928 |

The report includes both 1g and 10g SAR results. The 10g SAR results are included for informational purpose only.

5. Operation and Configuration of the EUT during Testing

5.1. Operating Modes

The EUT was tested in the following operating mode(s) unless otherwise stated:

- 5.0 GHz WiFi802.11a/n HT20 Data allocated mode using 'Tera-term' software to excise mode 'a' and 'n', with maximum power of up to 15.3 dBm for 'a' mode and 14.0 dBm for 'n' modes.
- 5.0 GHz WiFi802.11n HT40 Data allocated mode using 'Tera-term' software to excise mode 'n', with maximum power of up to 14.5dBm.

5.2. Configuration and Peripherals

The EUTs was tested in the following configuration(s) unless otherwise stated:

- Standalone fully charged battery powered.
- Head configurations were evaluated.

6. Summary of Test Results

| Test Name | Specification Reference | Result |
|--|--|----------|
| Specific Absorption Rate-Wi-Fi802.11a 5.0 GHz Head Configuration | OET Bulletin 65 Supplement C: (2001-01) / FCC Title 47 § 2.1093 | Complied |
| Specific Absorption Rate-Wi-Fi802.11n HT40 5.0 GHz Head Configuration | OET Bulletin 65 Supplement C: (2001-01) / FCC Title 47 § 2.1093 | Complied |

Note(s):

Simultaneous transmission was not evaluated at RFI as only testing for 5 GHz band in the head configuration as requested by the manufacturer.

Summary of Test Results Measured and Scaled value to maximum tolerance

SAR Scale-Up Worst case Configuration Measurements per mode:

1g SAR

| Technology Mode | Configuration | Channel Number | Mode | Meas output power ¹ [dBm] | Max Rated Power ² [dBm] | Measured SAR(W/kg) | Calculated Scaled SAR(W/kg) |
|---------------------|---------------|----------------|------|---|---------------------------------------|--------------------|-----------------------------|
| | | | | | | 1g mass | 1g mass |
| WiFi802.11a | Head | 116 | Data | 15.3 | 15.0 | 0.163 | 0.152 |
| WiFi802.11n HT40 | Head | 126 | Data | 14.5 | 14.0 | 0.120 | 0.106 |

*Maximum tolerance:

11a/g: (+2dB)

11n: (+2dB)

*Maximum rated power:

11a/g:13.0 dBm

11n :12.0 dBm

Note(s):

1. Meas output power (Source Base average power) level measured by RFI.
2. Max Rated power (Source Base average power) level supplied by manufacturer plus tolerance.
3. Measured SAR value measured by RFI.
4. The "Maximum Rated Power" was provided by the customer.

6.1. Location of Tests

All the measurements described in this report were performed at the premises of RFI Global Services Ltd, Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire, RG23 8BG United Kingdom

7. Measurements, Examinations and Derived Results

7.1. General Comments

This section contains test results only.

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to section 8 for details of measurement uncertainties.

7.2. Test Results

7.2.1. Specific Absorption Rate - Wi-Fi802.11a (5.0 GHz) Head Configuration Test Summary:

| | |
|---------------------------------------|--------------|
| Tissue Volume: | 1g |
| Maximum 1g SAR Level (W/kg): | 0.163 |
| Environmental Conditions: | |
| Temperature Variation in Lab (°C): | 24.0 to 24.0 |
| Temperature Variation in Liquid (°C): | 22.5 to 22.5 |

Results:

| EUT Position | Phantom Configuration | Channel Number | Meas. Avg. Power (dBm) | Power Back Off (dB) | 1g Meas. Level (W/Kg) | Note(s) | Mod. |
|--------------|-----------------------|----------------|------------------------|---------------------|-----------------------|---------|-------|
| Touch | Left | 48 | 15.0 | N/A | 0.054 | 1, 2, 3 | DBPSK |
| Tilt | Left | 48 | 15.0 | N/A | 0.080 | 1, 2, 3 | DBPSK |
| Touch | Right | 48 | 15.0 | N/A | 0.163 | 1, 2, 3 | DBPSK |
| Tilt | Right | 48 | 15.0 | N/A | 0.134 | 1, 2, 4 | DBPSK |
| Touch | Right | 52 | 15.0 | N/A | 0.141 | 1, 2, 3 | DBPSK |
| Touch | Right | 116 | 15.3 | N/A | 0.163 | 1, 2, 4 | DBPSK |

Note(s):

1. WLAN 802.11a 6Mbps (Highest output channel)
2. SAR measurement was performed on the highest output channels only for the 5GHz band, as the measured SAR level was less than 0.8 w/kg for the highest output channels and the other default channels within the divided block were ≤ 100 MHz apart. For the default channels that were ≤ 200 MHz apart SAR measurement was performed only on the highest output channel as the SAR level was less than 0.4 w/kg.
3. Sample IMEI: 004401114094796 used
4. Sample IMEI 004401114094788 used

**KDB 248227 - SAR is not required for 802.11n HT20 channels as the maximum average output power is less than ¼ db higher than 802.11a.*

7.2.2. Specific Absorption Rate - Wi-Fi802.11n HT40 (5.0 GHz) Head Configuration Test Summary:

| | |
|-------------------------------------|-------|
| Tissue Volume: | 1g |
| Maximum 1g SAR Level (W/kg): | 0.120 |

Environmental Conditions:

| | |
|--|--------------|
| Temperature Variation in Lab (°C): | 24.0 to 24.0 |
| Temperature Variation in Liquid (°C): | 22.5 to 22.5 |

Results:

| EUT Position | Phantom Configuration | Channel Number | Meas. Avg. Power (dBm) | Power Back Off (dB) | 1g Meas. Level (W/Kg) | Note(s) | Mod. |
|--------------|-----------------------|----------------|------------------------|---------------------|-----------------------|------------|-------|
| Touch | Right | 46 | 13.8 | N/A | 0.111 | 1, 2, 3, 4 | DBPSK |
| Touch | Right | 62 | 13.6 | N/A | 0.103 | 1, 2, 3, 5 | DBPSK |
| Touch | Right | 126 | 14.5 | N/A | 0.120 | 1, 2, 3, 4 | DBPSK |

Note(s):

1. WLAN 802.11n HT40 13.5Mbps (Highest output channel)
2. Test performed on the most conservative configuration acquired from 802.11a mode.
3. SAR measurement was performed on the highest output channels only for the 5GHz band, as the measured SAR level was less than 0.8 w/kg for the highest output channels and the other default channels within the divided block were ≤ 100 MHz apart. For the default channels that were ≤ 200 MHz apart SAR measurement was performed only on the highest output channel as the SAR level was less than 0.4 w/kg.
4. Sample IMEI: 004401114094796 used
5. Sample IMEI 004401114094788 used