



Product Service

---

**Choose certainty.  
Add value.**

# Report On

FCC Testing of the  
Sharp Quad-band LTE(B1 /B3/ B19/ B21), and Tri-band WCDMA(FDD  
I/ VI /XIX) Dual mode hand held Mini Phablet with Bluetooth, ANT+, W-  
LAN, NFC and GPS  
In accordance with FCC CFR 47 Part 15C (FeliCa)

COMMERCIAL-IN-CONFIDENCE

FCC ID: APYHRO00216

Document 75928438 Report 06 Issue 1

January 2015



Product Service

TÜV SÜD Product Service, Octagon House, Concorde Way, Segensworth North,  
Fareham, Hampshire, United Kingdom, PO15 5RL  
Tel: +44 (0) 1489 558100. Website: [www.tuv-sud.co.uk](http://www.tuv-sud.co.uk)

COMMERCIAL-IN-CONFIDENCE

**REPORT ON**

FCC Testing of the  
Sharp Quad-band LTE(B1 /B3/ B19/ B21), and Tri-band  
WCDMA(FDD I/ VI /XIX) Dual mode hand held Mini Phablet with  
Bluetooth, ANT+, W-LAN, NFC and GPS  
In accordance with FCC CFR 47 Part 15C (FeliCa)

Document 75928438 Report 06 Issue 1

January 2015

**PREPARED FOR**

Sharp Communication Compliance Limited  
Inspired  
Easthamstead Road  
Bracknell  
Berkshire  
RG12 1NS

**PREPARED BY**

**Natalie Bennett**  
Senior Administrator, Project Support

**APPROVED BY**

**Ryan Henley**  
Authorised Signatory

**DATED**

13 January 2015

---

**ENGINEERING STATEMENT**

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 15C. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

J Tuckwell

G Lawler



M Russell

**CONTENTS**

| <b>Section</b> |                                                        | <b>Page No</b> |
|----------------|--------------------------------------------------------|----------------|
| <b>1</b>       | <b>REPORT SUMMARY .....</b>                            | <b>3</b>       |
| 1.1            | Introduction .....                                     | 4              |
| 1.2            | Brief Summary of Results .....                         | 5              |
| 1.3            | Product Technical Description .....                    | 6              |
| 1.4            | Product Information .....                              | 6              |
| 1.5            | Test Conditions .....                                  | 6              |
| 1.6            | Deviations from the Standard .....                     | 6              |
| 1.7            | Modification Record .....                              | 6              |
| <b>2</b>       | <b>TEST DETAILS .....</b>                              | <b>7</b>       |
| 2.1            | Field Strength of any Emission .....                   | 8              |
| 2.2            | Occupied Bandwidth .....                               | 12             |
| 2.3            | Frequency Stability Under Temperature Variations ..... | 14             |
| <b>3</b>       | <b>TEST EQUIPMENT USED .....</b>                       | <b>16</b>      |
| 3.1            | Test Equipment Used .....                              | 17             |
| 3.2            | Measurement Uncertainty .....                          | 18             |
| <b>4</b>       | <b>ACCREDITATION, DISCLAIMERS AND COPYRIGHT .....</b>  | <b>19</b>      |
| 4.1            | Accreditation, Disclaimers and Copyright .....         | 20             |



Product Service

## **SECTION 1**

### **REPORT SUMMARY**

FCC Testing of the  
Sharp Quad-band LTE(B1 /B3/ B19/ B21), and Tri-band WCDMA(FDD I/ VI /XIX) Dual mode  
hand held Mini Phablet with Bluetooth, ANT+, W-LAN, NFC and GPS  
In accordance with FCC CFR 47 Part 15C (FeliCa)



Product Service

## 1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC Testing of the Sharp Quad-band LTE(B1 /B3/ B19/ B21), and Tri-band WCDMA(FDD I/ VI /XIX) Dual mode hand held Mini Phablet with Bluetooth, ANT+, W-LAN, NFC and GPS to the requirements of FCC CFR 47 Part 15C.

|                               |                                                                                                                                                     |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Objective                     | To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out. |
| Manufacturer                  | Sharp Corporation                                                                                                                                   |
| Serial Number(s)              | IMEI 004401115303402<br>IMEI 004401115303410                                                                                                        |
| Number of Samples Tested      | 2                                                                                                                                                   |
| Test Specification/Issue/Date | FCC CFR 47 Part 15C (2013)                                                                                                                          |
| Disposal                      | Held Pending Disposal                                                                                                                               |
| Reference Number              | Not Applicable                                                                                                                                      |
| Date                          | Not Applicable                                                                                                                                      |
| Order Number                  | 10377                                                                                                                                               |
| Date                          | 02 December 2014                                                                                                                                    |
| Start of Test                 | 26 November 2014                                                                                                                                    |
| Finish of Test                | 12 December 2014                                                                                                                                    |
| Name of Engineer(s)           | J Tuckwell<br>G Lawler<br>M Russell                                                                                                                 |
| Related Document(s)           | ANSI C63.10: 2009                                                                                                                                   |



Product Service

## 1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 15C is shown below.

| Section | Spec Clause         | Test Description                                 | Result | Comments/Base Standard |
|---------|---------------------|--------------------------------------------------|--------|------------------------|
| FeliCa  |                     |                                                  |        |                        |
| 2.1     | 15.225 (a)(b)(c)(d) | Field Strength of any Emission                   | Pass   |                        |
| 2.2     | 15.225, 15.215 (c)  | Occupied Bandwidth                               | Pass   |                        |
| 2.3     | 15.225 (e)          | Frequency Stability Under Temperature Variations | Pass   |                        |



Product Service

### 1.3 PRODUCT TECHNICAL DESCRIPTION

Please refer to the Model Description Form, referenced to FCC ID: APYHRO00216.

### 1.4 PRODUCT INFORMATION

#### 1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sharp Quad-band LTE(B1 /B3/ B19/ B21), and Tri-band WCDMA(FDD I/ VI /XIX) Dual mode hand held Mini Phablet with Bluetooth, ANT+, W-LAN, NFC and GPS. A full technical description can be found in the manufacturer's documentation.

### 1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure.

The EUT was powered from a 4.0 V DC supply.

FCC Measurement Facility Registration Number  
90987 Octagon House, Fareham Test Laboratory

### 1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standard or test plan were made during testing.

### 1.7 MODIFICATION RECORD

| Modification State                         | Description of Modification still fitted to EUT | Modification Fitted By | Date Modification Fitted |
|--------------------------------------------|-------------------------------------------------|------------------------|--------------------------|
| <b>Serial Number: IMEI 004401115303402</b> |                                                 |                        |                          |
| 0                                          | As supplied by manufacturer.                    | N/A                    | N/A                      |
| 1                                          | Adjusted display driver parameters in firmware  | M Russell              | 11/12/2014               |
| <b>Serial Number: IMEI 004401115303410</b> |                                                 |                        |                          |
| 0                                          | As supplied by manufacturer.                    | N/A                    | N/A                      |

The table above details modifications made to the EUT during the test programme. The modifications incorporated during each test are recorded on the appropriate test pages.



Product Service

## **SECTION 2**

### **TEST DETAILS**

FCC Testing of the  
Sharp Quad-band LTE(B1 /B3/ B19/ B21), and Tri-band WCDMA(FDD I/ VI /XIX) Dual mode  
hand held Mini Phablet with Bluetooth, ANT+, W-LAN, NFC and GPS  
In accordance with FCC CFR 47 Part 15C (FeliCa)



## **2.1 FIELD STRENGTH OF ANY EMISSION**

### **2.1.1 Specification Reference**

FCC CFR 47 Part 15C, Clause 15.225 (a)(b)(c)(d)

### **2.1.2 Equipment Under Test and Modification State**

S/N: IMEI 004401115303402 - Modification State 0 and 1

### **2.1.3 Date of Test**

3 December 2014 & 12 December 2014

### **2.1.4 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.1.5 Test Procedure**

The EUT was placed on a remotely controlled turntable within a semi-anechoic chamber. Measurements of the Fundamental Frequency and any Spurious Radiated Emissions were measured as described below.

A preliminary profile of the Spurious Radiated Emissions was obtained over the range 9 kHz to 1 GHz.

During characterisation the turntable azimuth is adjusted from 0 to 360 degrees with the measuring antenna in one polarity. It is then repeated for the other polarity. Any frequencies of interest are noted for formal measurement later. The distance from the measuring antenna to the boundary of the EUT is 3m.

During formal measurement the spectrum analyser is tuned to the frequency of the emission. The turntable azimuth is adjusted from 0 to 360 degrees to determine the point at which the maximum emission level occurs. Once the point of maximum emission has been determined the emission is measured. All emissions over the range 9 kHz to 1 GHz were measured with a CISPR Quasi - Peak detector function.

The measurement bandwidths were as follows: for emissions in the range 9 kHz to 150 kHz a 200 Hz Resolution Bandwidth was used. For emissions in the range 150 kHz to 30 MHz a 10 kHz Resolution Bandwidth was used. For emissions in the range 30 MHz to 1GHz a 120 kHz Resolution Bandwidth was used.

To determine compliance with the specification, the level of the measured spurious emissions was compared to the limits in FCC 15.225 and 15.209. The level of the fundamental was compared to the limits in FCC 15.225.

### **2.1.6 Environmental Conditions**

|                     |             |
|---------------------|-------------|
| Ambient Temperature | 19.1-19.9°C |
| Relative Humidity   | 32.0%       |

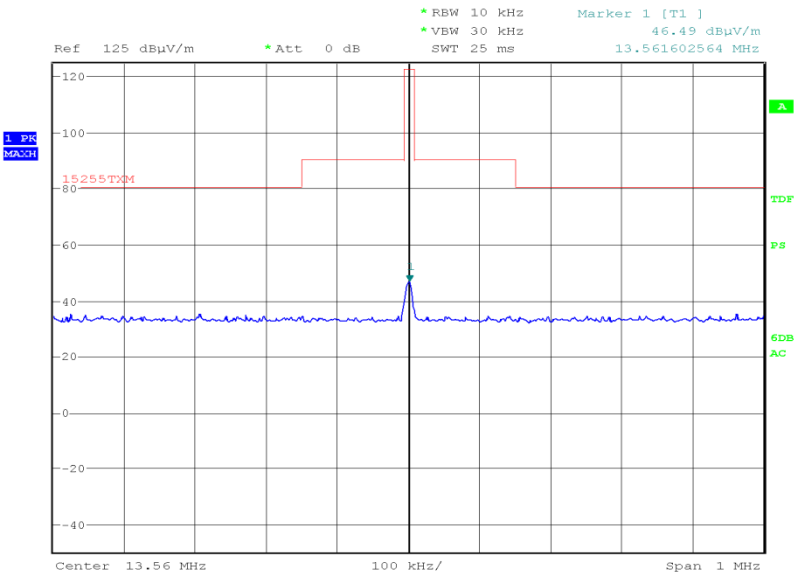


Product Service

2.1.7 Test Results

4.0 V DC Supply

Carrier



Date: 3.DEC.2014 21:33:46

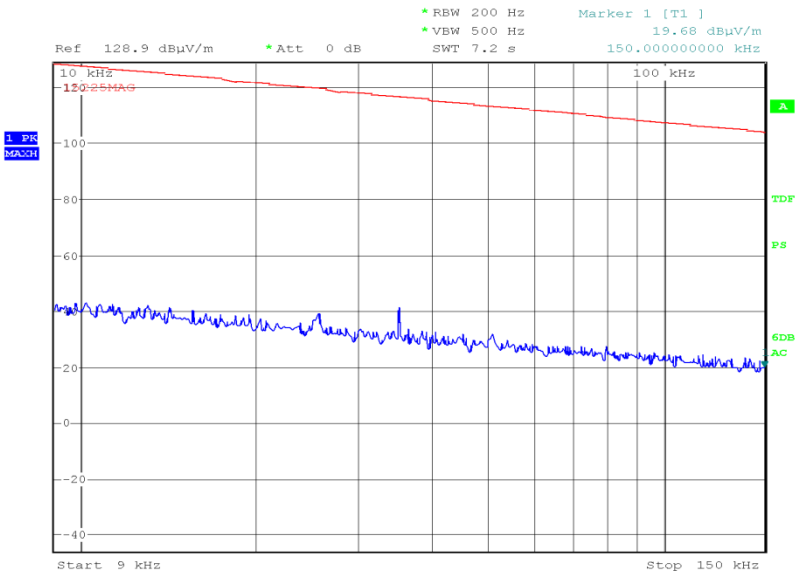
| Frequency (MHz) | QP Level (dBμV/m) at 3m | QP Level (μV/m) at 3m* | QP Limit (dBμV/m) at 3m | QP Limit (μV/m) at 30m* | Angle (deg) | Height (m) | Polarity |
|-----------------|-------------------------|------------------------|-------------------------|-------------------------|-------------|------------|----------|
| 13.56           | 45.76                   | 193.20                 | 124                     | 15848.93                | 356         | 1.5        | Face On  |

\*Measurements were made at 3m and the limits extrapolated from 30m to 3m, using the guidance defined in ANSI C63.10, clause 5.3.2.



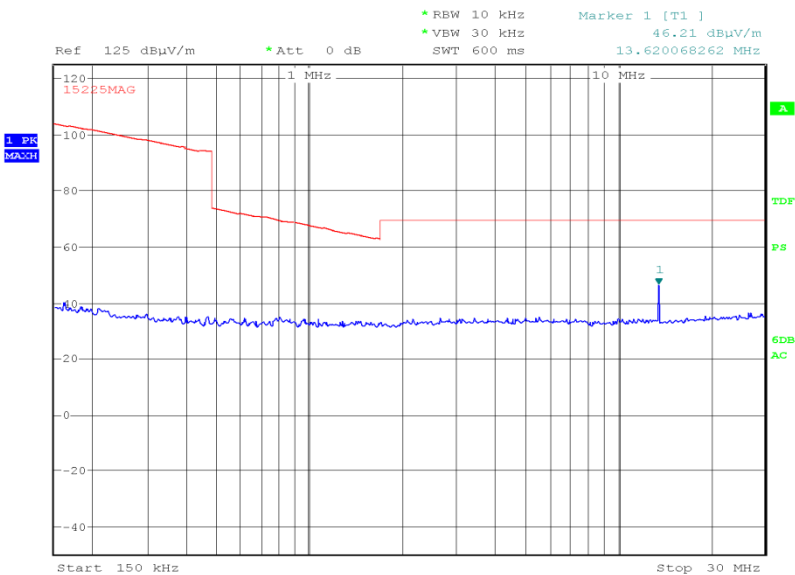
Product Service

9 kHz to 150 kHz

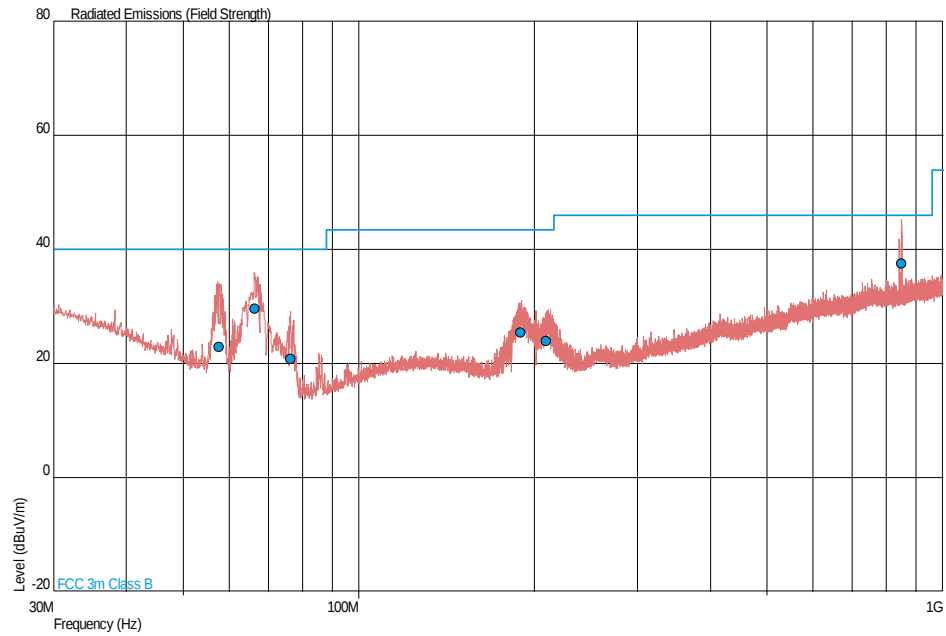


Date: 3.DEC.2014 21:16:08

150 kHz to 30 MHz



Date: 3.DEC.2014 21:27:24

30 MHz to 1 GHz

| Frequency (MHz) | QP Level (dBuV/m) | QP Level (uV/m) | QP Limit (dBuV/m) | QP Limit (uV/m) | QP Margin (dBuV/m) | QP Margin (uV/m) | Angle (Deg) | Height (m) | Polarity |
|-----------------|-------------------|-----------------|-------------------|-----------------|--------------------|------------------|-------------|------------|----------|
| 57.601          | 23.0              | 14.1            | 40.0              | 100             | -17.0              | -85.9            | 360         | 1.00       | Vertical |
| 66.307          | 29.6              | 30.2            | 40.0              | 100             | -10.4              | -69.8            | 8           | 1.73       | Vertical |
| 76.409          | 20.8              | 11.0            | 40.0              | 100             | -19.2              | -89.0            | 59          | 1.00       | Vertical |
| 189.226         | 25.5              | 18.8            | 43.5              | 150             | -18.0              | -131.2           | 214         | 1.04       | Vertical |
| 209.748         | 23.9              | 15.7            | 43.5              | 150             | -19.6              | -134.3           | 195         | 1.00       | Vertical |
| 850.806         | 37.5              | 75.0            | 46.0              | 200             | -8.5               | -125.0           | 311         | 1.00       | Vertical |



Product Service

## **2.2 OCCUPIED BANDWIDTH**

### **2.2.1 Specification Reference**

FCC CFR 47 Part 15C, Clause 15.225, 15.215 (c)

### **2.2.2 Equipment Under Test and Modification State**

S/N: IMEI 004401115303410 - Modification State 0

### **2.2.3 Date of Test**

26 November 2014

### **2.2.4 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.2.5 Test Procedure**

The EUT was connected to a spectrum analyser via a test jig. The EUT was transmitting at maximum power with normal modulation. The resultant trace was displayed on screen and the peak point of the trace was measured and the markers positioned to give the -20 dBc points of the displayed spectrum.

### **2.2.6 Environmental Conditions**

|                     |        |
|---------------------|--------|
| Ambient Temperature | 22.7°C |
| Relative Humidity   | 38.3%  |

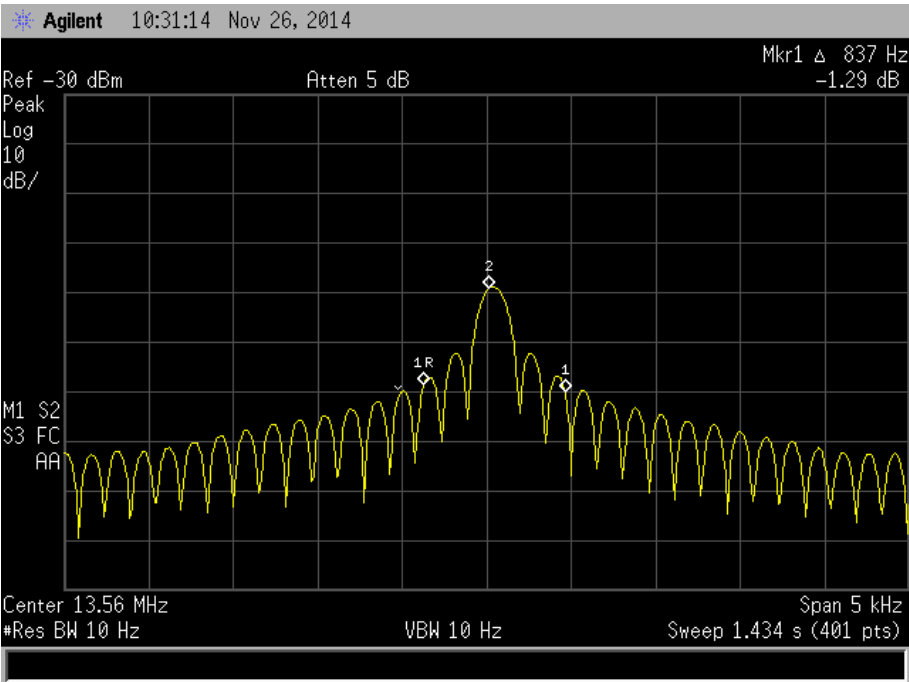


Product Service

2.2.7 Test Results

4.0 V DC Supply

|                 |                      |
|-----------------|----------------------|
| Frequency (MHz) | 20 dB Bandwidth (Hz) |
| 13.56           | 837                  |





Product Service

## **2.3 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS**

### **2.3.1 Specification Reference**

FCC CFR 47 Part 15C, Clause 15.225 (e)

### **2.3.2 Equipment Under Test and Modification State**

S/N: IMEI 004401115303410 - Modification State 0

### **2.3.3 Date of Test**

26 November 2014

### **2.3.4 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.3.5 Test Procedure**

The EUT was placed on a test jig inside a temperature chamber. The test jig was connected to a spectrum analyser via a cable. The spectrum analyser was set to 10 Hz RBW and VBW and the entire fundamental was displayed on screen. The upper and lower -20 dBc points were identified and the mid-point between these points was calculated and recorded as the frequency error. This error was then calculated in percent and recorded in the table below. The measurement was repeated with the temperature adjusted between -20°C and +50°C in 10° steps as per 15.225 (e).

### **2.3.6 Environmental Conditions**

|                     |        |
|---------------------|--------|
| Ambient Temperature | 22.7°C |
| Relative Humidity   | 38.3%  |



### 2.3.7 Test Results

#### RFID

| Temperature Interval (°C) | Voltage  | Test Frequency (MHz) | Deviation (%) |
|---------------------------|----------|----------------------|---------------|
| -20                       | 4.0 V DC | 13.56                | 0.00044       |
| -10                       | 4.0 V DC | 13.56                | 0.00052       |
| 0                         | 4.0 V DC | 13.56                | 0.00005       |
| +10                       | 4.0 V DC | 13.56                | 0.00046       |
| +20                       | 4.0 V DC | 13.56                | 0.00037       |
| +30                       | 4.0 V DC | 13.56                | 0.00011       |
| +40                       | 4.0 V DC | 13.56                | -0.00004      |
| +50                       | 4.0 V DC | 13.56                | -0.00010      |

#### Limit Clause

The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  of the operating frequency.



Product Service

### **SECTION 3**

#### **TEST EQUIPMENT USED**



Product Service

### 3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

| Instrument                                                            | Manufacturer            | Type No.               | TE No. | Calibration Period (months) | Calibration Due |
|-----------------------------------------------------------------------|-------------------------|------------------------|--------|-----------------------------|-----------------|
| <b>Section 2.1 - Field Strength of any Emission</b>                   |                         |                        |        |                             |                 |
| Turntable Controller                                                  | Inn-Co GmbH             | CO 1000                | 1606   | -                           | TU              |
| Antenna (Bilog)                                                       | Chase                   | CBL6143                | 2904   | 24                          | 10-Jun-2015     |
| Compliance 5 Emissions                                                | Schaffner               | C5e Software V.5.00.00 | 3275   | -                           | N/A - Software  |
| EMI Test Receiver                                                     | Rohde & Schwarz         | ESU40                  | 3506   | 12                          | 27-Oct-2015     |
| Antenna (Active Loop, 9kHz-30MHz)                                     | Rohde & Schwarz         | HFH2-Z2                | 3633   | 24                          | 11-Jul-2016     |
| Tilt Antenna Mast                                                     | maturo GmbH             | TAM 4.0-P              | 3916   | -                           | TU              |
| Mast Controller                                                       | maturo GmbH             | NCD                    | 3917   | -                           | TU              |
| <b>Section 2.2 - Occupied Bandwidth</b>                               |                         |                        |        |                             |                 |
| RF Coupler                                                            | TUV SUD Product Service | RFC1                   | 414    | -                           | TU              |
| Spectrum Analyser                                                     | Agilent Technologies    | E7405A                 | 1410   | 12                          | 15-Oct-2015     |
| Climatic Chamber                                                      | TAS                     | Micro 225              | 2892   | -                           | O/P Mon         |
| <b>Section 2.3 - Frequency Stability Under Temperature Variations</b> |                         |                        |        |                             |                 |
| RF Coupler                                                            | TUV SUD Product Service | RFC1                   | 414    | -                           | TU              |
| Spectrum Analyser                                                     | Agilent Technologies    | E7405A                 | 1410   | 12                          | 15-Oct-2015     |
| Hygrometer                                                            | Rotronic                | I-1000                 | 2829   | 12                          | 27-Oct-2015     |
| Thermocouple Thermometer                                              | Fluke                   | 51                     | 3173   | 12                          | 04-Dec-2015     |
| Hygrometer                                                            | Rotronic                | I-1000                 | 3220   | 12                          | 24-Jul-2015     |

TU – Traceability Unscheduled

O/P MON – Output Monitored with Calibrated Equipment



Product Service

### 3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

| Test Discipline                                  | MU                           |
|--------------------------------------------------|------------------------------|
| Frequency Stability Under Temperature Variations | $\pm 3.54$ Hz                |
| Field Strength of any Emission                   | 9 kHz to 1 GHz: $\pm 5.1$ dB |
| Occupied Bandwidth                               | $\pm 45.21$ Hz               |



Product Service

## **SECTION 4**

### **ACCREDITATION, DISCLAIMERS AND COPYRIGHT**



Product Service

#### 4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA  
(Not UKAS Accredited).

This report must not be reproduced, except in its entirety, without the written permission of  
TÜV SÜD Product Service

© 2015 TÜV SÜD Product Service