



# TEST REPORT

**Test Report No. : UL-RPT-RP11066287JD15A**

**Manufacturer** : Flextronics International Sweden AB  
**Model No.** : SR0020-W  
**FCC ID** : 2AIP8I  
**Technology** : UMTS Band II  
**Test Standard(s)** : FCC Parts 24.232(c) & 24.235

1. This test report shall not be reproduced in full or partial, without the written approval of UL VS LTD.
2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 1.0.

**Date of Issue:** 23 June 2016

**Checked by:**

Ian Watch  
Senior Engineer, Radio Laboratory

**Company Signatory:**

pp

Steven White  
Service Lead, Radio Laboratory,  
UL VS LTD



This laboratory is accredited by UKAS.  
The tests reported herein have been  
performed in accordance with its terms  
of accreditation.

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## UL VS LTD

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## **1. Customer Information / Manufacturer Information**

### **1.1. Customer Information**

|                      |                                                        |
|----------------------|--------------------------------------------------------|
| <b>Company Name:</b> | Sirin Labs AG                                          |
| <b>Address:</b>      | Muhlentalstrasse 2<br>8200 Schaffhausen<br>Switzerland |

### **1.2. Manufacturer Information**

|                           |                                                  |
|---------------------------|--------------------------------------------------|
| <b>Manufacturer Name:</b> | Flextronics International Sweden AB              |
| <b>Address:</b>           | Datalinjen 3A<br>SE – 583 30 Linköping<br>Sweden |

## **2. Summary of Testing**

### **2.1. General Information**

|                                 |                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>Specification Reference:</b> | 47CFR24                                                                                                            |
| <b>Specification Title:</b>     | Code of Federal Regulations Volume 47 (Telecommunications):<br>Part 24 Subpart E (Personal Communication Services) |
| <b>Site Registration:</b>       | 209735                                                                                                             |
| <b>Location of Testing:</b>     | UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park,<br>Basingstoke, Hampshire, RG24 8AH, United Kingdom |
| <b>Test Dates:</b>              | 06 May 2016 to 20 May 2016                                                                                         |

### **2.2. Summary of Test Results**

| <b>FCC Reference<br/>(47CFR)</b>                                                                                                                                                                                             | <b>Measurement</b>                                                     | <b>Result</b>                                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Part 24.232(c)                                                                                                                                                                                                               | Transmitter Output Power (EIRP)                                        |  |
| Part 2.1049                                                                                                                                                                                                                  | Transmitter Occupied Bandwidth                                         |  |
| Part 2.1055/24.235                                                                                                                                                                                                           | Transmitter Frequency Stability<br>(Temperature and Voltage Variation) |  |
| <b>Key to Results</b><br> = Complied  = Did not comply |                                                                        |                                                                                     |

### **2.3. Methods and Procedures**

|                   |                                                                                 |
|-------------------|---------------------------------------------------------------------------------|
| <b>Reference:</b> | ANSI/TIA-603-D-2010                                                             |
| <b>Title:</b>     | Land Mobile Communications Equipment, Measurements and performance<br>Standards |
| <b>Title:</b>     | FCC KDB 971168 D01 v02r02, October 17 2014                                      |
| <b>Reference:</b> | Measurement Guidance for Certification of Licensed Digital Transmitters         |

### **2.4. Deviations from the Test Specification**

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

### **3. Equipment Under Test (EUT)**

#### **3.1. Identification of Equipment Under Test (EUT)**

|                            |                                         |
|----------------------------|-----------------------------------------|
| Brand Name:                | SOLARIN                                 |
| Model Number:              | SR0020-W                                |
| Test Sample Serial Number: | 0108 ( <i>Conducted Sample #2</i> )     |
| Test Sample IMEI:          | 357232070003189                         |
| Hardware Version:          | TP1                                     |
| Software Version:          | LRC1TA.1.0.2.3                          |
| Handset Cover Material:    | Technical leather with titanium coating |
| FCC ID:                    | 2AIP8I                                  |

#### **3.2. Description of EUT**

The equipment under test was a Mobile device supporting Cellular, WLAN, BT, BTLE, RFID & GPS technologies.

#### **3.3. Modifications Incorporated in the EUT**

No modifications were applied to the EUT during testing.

**3.4. Additional Information Related to Testing**

|                              |                     |                |                         |
|------------------------------|---------------------|----------------|-------------------------|
| Technology Tested:           | UMTS1900            |                |                         |
| Type of Radio Device:        | Transceiver         |                |                         |
| Mode:                        | UMTS FDD II         |                |                         |
| Modulation Type:             | QPSK / 8PSK         |                |                         |
| Channel Spacing:             | 5 MHz               |                |                         |
| Power Supply Requirement(s): | Nominal             | 3.9 V          |                         |
|                              | Minimum             | 3.5 V          |                         |
|                              | Maximum             | 4.4 V          |                         |
| Maximum Output Power (EIRP): | Voice (12.2 kbit/s) | 22.5 dBm       |                         |
|                              | HSDPA Sub-Test 2    | 23.7 dBm       |                         |
|                              | HSUPA Sub-Test 3    | 23.8 dBm       |                         |
| Transmit Frequency Range:    | 1850 to 1910 MHz    |                |                         |
| Transmit Channels Tested:    | Channel ID          | Channel Number | Channel Frequency (MHz) |
|                              | Bottom              | 9262           | 1852.4                  |
|                              | Middle              | 9400           | 1880.0                  |
|                              | Top                 | 9538           | 1907.6                  |

**3.5. Support Equipment**

No support equipment was used to exercise the EUT during testing.

## **4. Operation and Monitoring of the EUT during Testing**

### **4.1. Operating Modes**

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

- Constantly transmitting at full power on bottom, middle and top channels as required.
- Occupied bandwidth and EIRP tests were performed with the EUT in voice, HSDPA (Sub-tests 1 to 4) or HSUPA (Sub-tests 1 to 5) modes.

### **4.2. Configuration and Peripherals**

The EUT was tested in the following configuration(s):

- The EUT was connected to a Rohde and Schwarz CMW500 GSM/GPRS/EGPRS system simulator, operating in a transceiver mode.
- Conducted measurements were performed using a conducted sample supplied by the customer. Short 4-wire DC flying leads were connected internally to the device in place of the battery, and exiting through a hole in the casing. These leads were then extended through a connector interface to a laboratory DC power supply.
- The EUT RF conducted port was a temporary SMA connector that was connected internally in place of the PCB antenna. The loss of the internal connection to the connector was accounted for in calculations.
- For the conducted tests in this report, the antenna port measured was identified by the manufacturer as Antenna #2.

## **5. Measurements, Examinations and Derived Results**

### **5.1. General Comments**

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 6. Measurement Uncertainty* for details.

In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All equipment was within the calibration period on the date of testing.

## 5.2. Test Results

### 5.2.1. Transmitter Output Power (EIRP)

#### Test Summary:

|                   |                 |            |             |
|-------------------|-----------------|------------|-------------|
| Test Engineer:    | David Doyle     | Test Date: | 20 May 2016 |
| Test Sample IMEI: | 357232070003189 |            |             |

|                   |                                     |
|-------------------|-------------------------------------|
| FCC Reference:    | Part 24.232(c)                      |
| Test Method Used: | KDB 971168 Sections 5.1.1 and 5.2.1 |

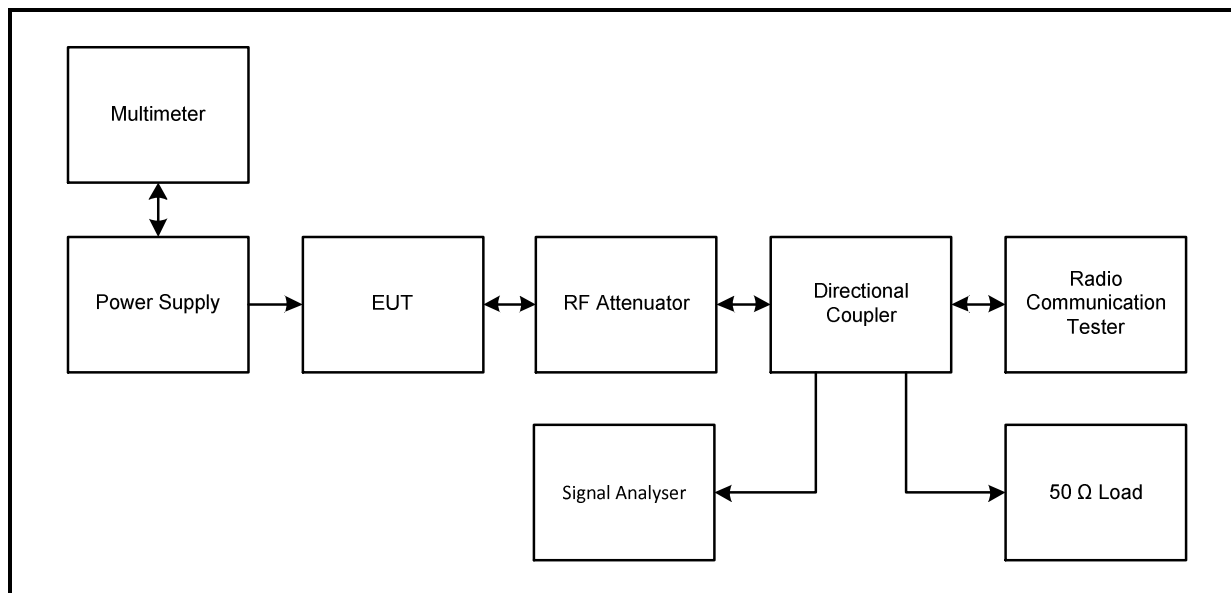
#### Environmental Conditions:

|                        |    |
|------------------------|----|
| Temperature (°C):      | 26 |
| Relative Humidity (%): | 36 |

#### Note(s):

1. All modes were compared on each channel and the highest power recorded was subtracted from the limit to show the margin.
2. The signal analyser was connected to the RF port on the EUT via the coupled port on an RF directional coupler using suitable attenuation and RF cables. An RF level offset was entered on the signal analyser to compensate for the loss of the coupler, attenuators and RF cables. The through port on the RF coupler was connected to an R&S CMW 500 Radio Communications Tester.
3. The customer stated a maximum antenna gain of -1.5 dBi.
4. The antenna gain was added to the conducted output power to obtain the EIRP.

#### Test setup:



**Transmitter Output Power (EIRP) (continued)****Results: Peak EIRP / HSDPA and Voice**

| Modes                                 |         | HSDPA       |             |             |             | Voice       |             |             |          |
|---------------------------------------|---------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------|
| Sub-test                              |         | 1           | 2           | 3           | 4           | 12.2 kbit/s |             |             |          |
| Band                                  | Channel | Power (dBm) | Power (dBm) | Power (dBm) | Power (dBm) | Power (dBm) | Limit (dBm) | Margin (dB) | Result   |
| 1900                                  | 9262    | 22.1        | 23.1        | 23.3        | 23.1        | 22.5        | 38.5        | 15.2        | Complied |
|                                       | 9400    | 22.0        | 23.7        | 23.5        | 22.8        | 22.2        | 38.5        | 14.8        | Complied |
|                                       | 9538    | 21.8        | 22.5        | 22.4        | 22.4        | 21.9        | 38.5        | 16.0        | Complied |
| $\beta_c$                             |         | 2           | 11          | 15          | 15          |             |             |             |          |
| $\beta_d$                             |         | 15          | 15          | 8           | 4           |             |             |             |          |
| $\Delta ACK, \Delta NACK, \Delta CQI$ |         | 8           | 8           | 8           | 8           |             |             |             |          |

**Results: Peak EIRP / HSUPA**

| Modes                                 |         | HSUPA       |             |             |             |             |             |             |          |
|---------------------------------------|---------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------|
| Sub-test                              |         | 1           | 2           | 3           | 4           | 5           |             |             |          |
| Band                                  | Channel | Power (dBm) | Power (dBm) | Power (dBm) | Power (dBm) | Power (dBm) | Limit (dBm) | Margin (dB) | Result   |
| 1900                                  | 9262    | 22.8        | 23.3        | 23.3        | 22.1        | 23.3        | 38.5        | 15.2        | Complied |
|                                       | 9400    | 22.5        | 22.3        | 23.8        | 22.2        | 22.9        | 38.5        | 14.7        | Complied |
|                                       | 9538    | 22.2        | 22.1        | 22.6        | 21.8        | 22.5        | 38.5        | 15.9        | Complied |
| $\beta_c$                             |         | 10          | 6           | 15          | 2           | 15          |             |             |          |
| $\beta_d$                             |         | 15          | 15          | 9           | 15          | 1           |             |             |          |
| $\Delta ACK, \Delta NACK, \Delta CQI$ |         | 8           | 8           | 8           | 8           | 8           |             |             |          |

**Transmitter Output Power (EIRP) (continued)****Results: RMS EIRP / HSDPA and Voice**

| Modes                                 |         | HSDPA       |             |             |             | Voice       |             |             |          |
|---------------------------------------|---------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------|
| Sub-test                              |         | 1           | 2           | 3           | 4           | 12.2 kbit/s |             |             |          |
| Band                                  | Channel | Power (dBm) | Power (dBm) | Power (dBm) | Power (dBm) | Power (dBm) | Limit (dBm) | Margin (dB) | Result   |
| 1900                                  | 9262    | 16.3        | 15.4        | 15.1        | 14.8        | 17.6        | 38.5        | 20.9        | Complied |
|                                       | 9400    | 16.2        | 15.5        | 15.1        | 14.8        | 17.3        | 38.5        | 21.2        | Complied |
|                                       | 9538    | 15.9        | 14.8        | 14.4        | 14.3        | 16.9        | 38.5        | 21.6        | Complied |
| $\beta_c$                             |         | 2           | 11          | 15          | 15          |             |             |             |          |
| $\beta_d$                             |         | 15          | 15          | 8           | 4           |             |             |             |          |
| $\Delta ACK, \Delta NACK, \Delta CQI$ |         | 8           | 8           | 8           | 8           |             |             |             |          |

**Results: RMS EIRP / HSUPA**

| Modes                                 |         | HSUPA       |             |             |             |             |             |             |          |
|---------------------------------------|---------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------|
| Sub-test                              |         | 1           | 2           | 3           | 4           | 5           |             |             |          |
| Band                                  | Channel | Power (dBm) | Power (dBm) | Power (dBm) | Power (dBm) | Power (dBm) | Limit (dBm) | Margin (dB) | Result   |
| 1900                                  | 9262    | 16.4        | 15.9        | 16.4        | 16.4        | 16.6        | 38.5        | 21.9        | Complied |
|                                       | 9400    | 16.3        | 15.7        | 16.3        | 16.2        | 16.4        | 38.5        | 22.1        | Complied |
|                                       | 9538    | 15.9        | 15.3        | 15.9        | 16.0        | 15.9        | 38.5        | 22.5        | Complied |
| $\beta_c$                             |         | 10          | 6           | 15          | 2           | 15          |             |             |          |
| $\beta_d$                             |         | 15          | 15          | 9           | 15          | 1           |             |             |          |
| $\Delta ACK, \Delta NACK, \Delta CQI$ |         | 8           | 8           | 8           | 8           | 8           |             |             |          |

**Transmitter Output Power (EIRP) (continued)****Test Equipment Used:**

| Asset No. | Instrument           | Manufacturer    | Type No.      | Serial No.  | Date Calibration Due  | Cal. Interval (Months) |
|-----------|----------------------|-----------------|---------------|-------------|-----------------------|------------------------|
| M2002     | Thermohygrometer     | Testo           | 608-H1        | 45041825    | 02 Apr 2017           | 12                     |
| A2504     | Directional Coupler  | AtlanTecRF      | CDC-003060-10 | 13122501839 | Calibrated before use | -                      |
| A2845     | Attenuator           | Radiall         | R411.806.121  | 24325927    | Calibrated before use | -                      |
| A2844     | Attenuator           | Radiall         | R411.806.121  | 23404066    | Calibrated before use | -                      |
| M1835     | Signal Analyser      | Rohde & Schwarz | FSV30         | 103050      | 26 Feb 2017           | 12                     |
| M1269     | Multimeter           | Fluke           | 179           | 90250210    | 13 May 2017           | 12                     |
| S0577     | DC Power Supply      | TTi             | CPX400S       | 436670      | Calibrated before use | -                      |
| M199      | Power Meter          | Rohde & Schwarz | NRVS          | 827023/075  | 11 Apr 2018           | 24                     |
| M1267     | Thermal Power Sensor | Rohde & Schwarz | NRV-Z52       | 100155      | 15 Apr 2018           | 24                     |
| M1802     | Signal Generator     | Rohde & Schwarz | SMU200A       | 103607      | 16 Feb 2018           | 24                     |

**5.2.2. Transmitter Occupied Bandwidth****Test Summary:**

|                   |                 |            |             |
|-------------------|-----------------|------------|-------------|
| Test Engineer:    | David Doyle     | Test Date: | 20 May 2016 |
| Test Sample IMEI: | 357232070003189 |            |             |

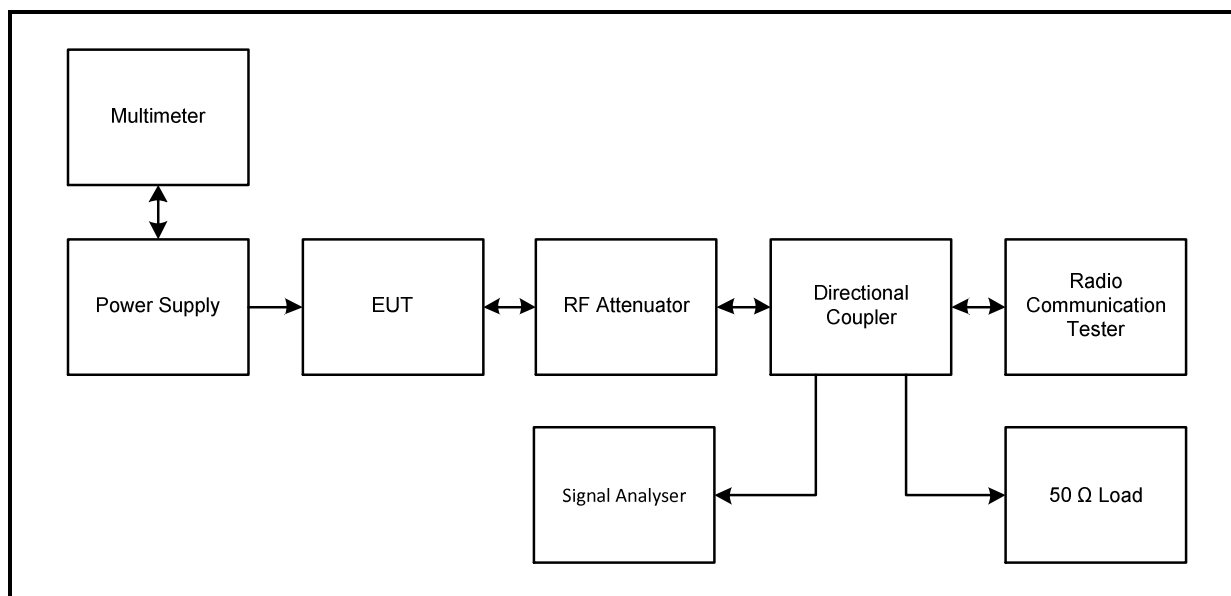
|                   |                        |
|-------------------|------------------------|
| FCC Reference:    | Part 2.1049            |
| Test Method Used: | KDB 971168 Section 4.2 |

**Environmental Conditions:**

|                        |    |
|------------------------|----|
| Temperature (°C):      | 26 |
| Relative Humidity (%): | 36 |

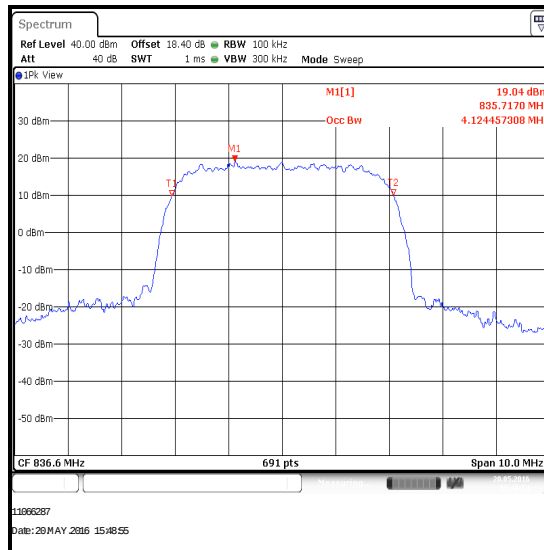
**Note(s):**

1. Occupied bandwidth (99% bandwidth) was measured using a signal analyser occupied bandwidth function.
2. The signal analyser was connected to the RF port on the EUT via the coupled port on an RF directional coupler using suitable attenuation and RF cables. An RF level offset was entered on the signal analyser to compensate for the loss of the coupler, attenuators and RF cables. The through port on the RF coupler was connected to an R&S CMW 500 Radio Communications Tester.

**Test setup:**

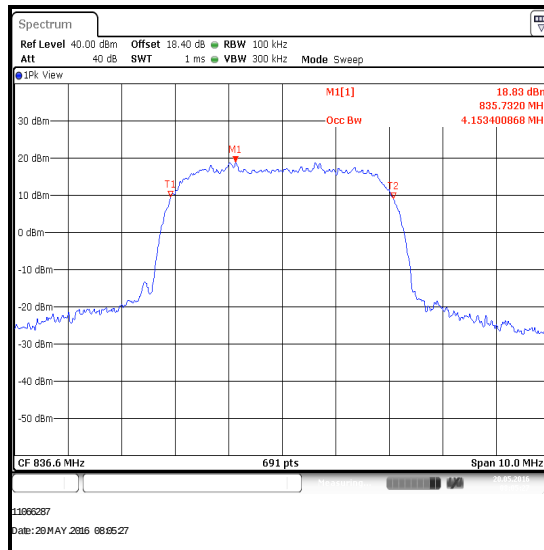
**Transmitter Occupied Bandwidth (continued)****Results: Voice/ 12.2 kbit/s**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle  | 836.6           | 4124.457                 |

**Middle Channel**

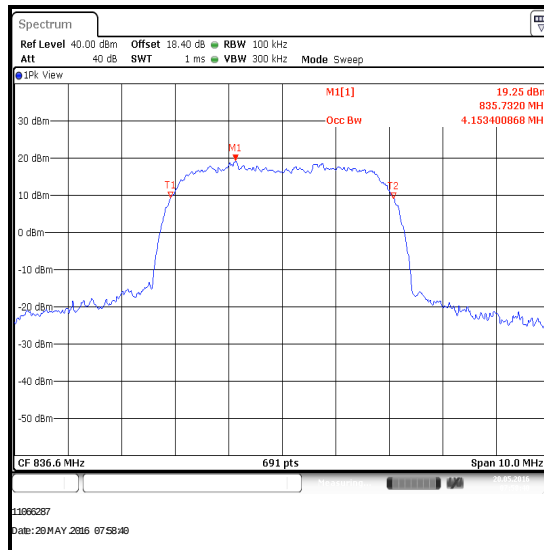
**Transmitter Occupied Bandwidth (continued)****Results: HSDPA Sub-Test 1**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle  | 836.6           | 4153.401                 |

**Middle Channel**

**Transmitter Occupied Bandwidth (continued)****Results: HSDPA Sub-Test 2**

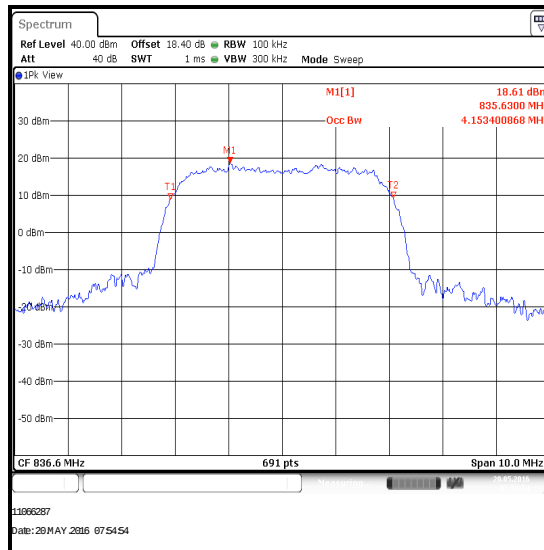
| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle  | 836.6           | 4153.401                 |

**Middle Channel**

### Transmitter Occupied Bandwidth (continued)

### Results: HSDPA Sub-Test 3

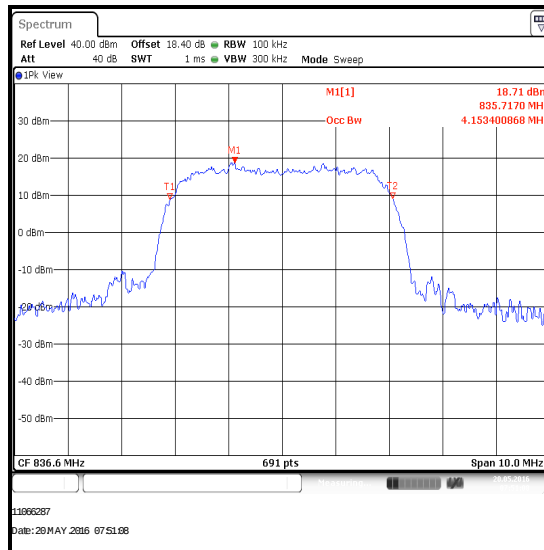
| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle  | 836.6           | 4153.401                 |



### Middle Channel

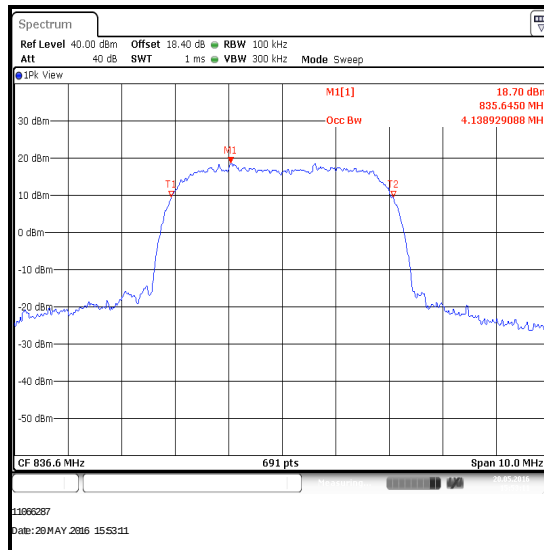
**Transmitter Occupied Bandwidth (continued)****Results: HSDPA Sub-Test 4**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle  | 836.6           | 4153.401                 |

**Middle Channel**

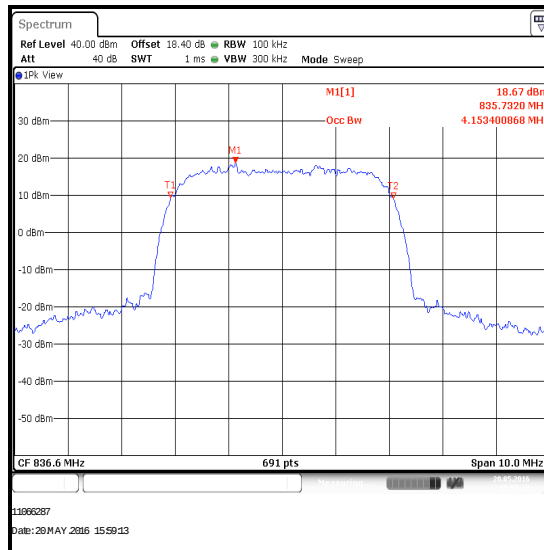
**Transmitter Occupied Bandwidth (continued)****Results: HSUPA Sub-Test 1**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle  | 836.6           | 4138.929                 |

**Middle Channel**

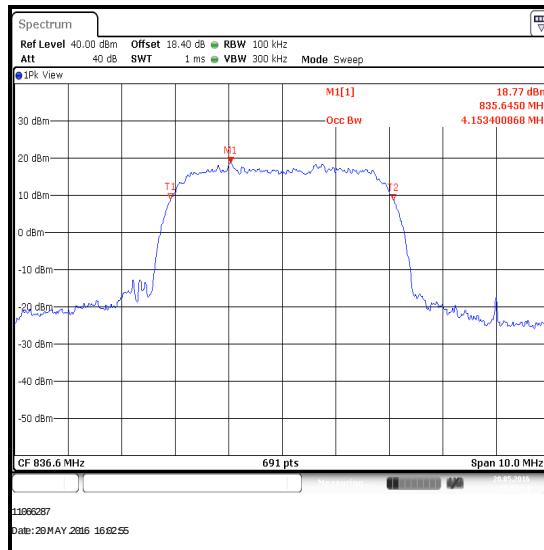
**Transmitter Occupied Bandwidth (continued)****Results: HSUPA Sub-Test 2**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle  | 836.6           | 4153.401                 |

**Middle Channel**

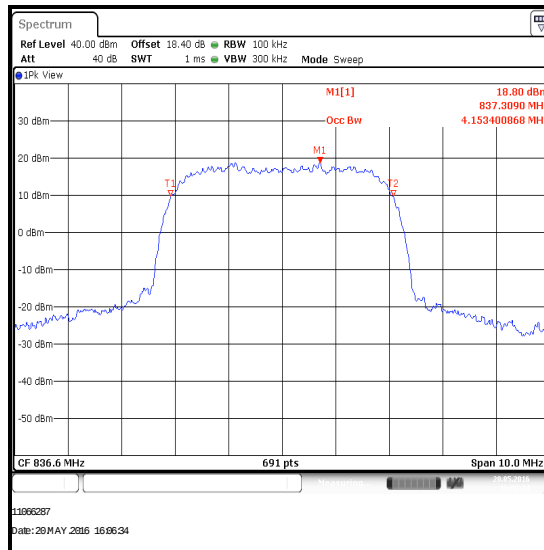
**Transmitter Occupied Bandwidth (continued)****Results: HSUPA Sub-Test 3**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle  | 836.6           | 4153.401                 |

**Middle Channel**

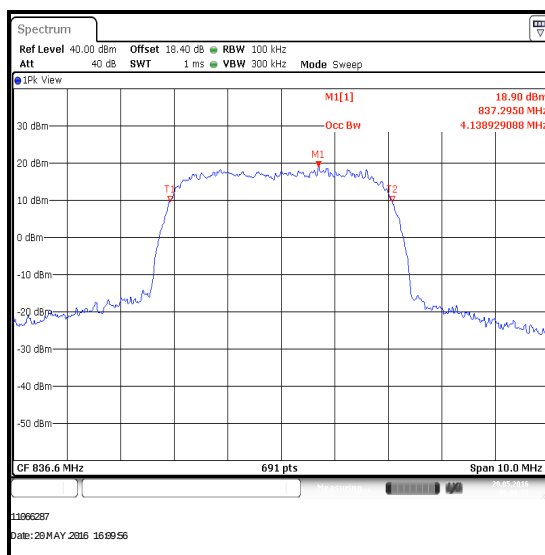
**Transmitter Occupied Bandwidth (continued)****Results: HSUPA Sub-Test 4**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle  | 836.6           | 4153.401                 |

**Middle Channel**

**Transmitter Occupied Bandwidth (continued)****Results: HSUPA Sub-Test 5**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle  | 836.6           | 4138.929                 |

**Middle Channel****Test Equipment Used:**

| Asset No. | Instrument           | Manufacturer    | Type No.      | Serial No.  | Date Calibration Due  | Cal. Interval (Months) |
|-----------|----------------------|-----------------|---------------|-------------|-----------------------|------------------------|
| M2002     | Thermohygrometer     | Testo           | 608-H1        | 45041825    | 02 Apr 2017           | 12                     |
| A2504     | Directional Coupler  | AtlanTecRF      | CDC-003060-10 | 13122501839 | Calibrated before use | -                      |
| A2845     | Attenuator           | Radiall         | R411.806.121  | 24325927    | Calibrated before use | -                      |
| A2844     | Attenuator           | Radiall         | R411.806.121  | 23404066    | Calibrated before use | -                      |
| M1835     | Signal Analyser      | Rohde & Schwarz | FSV30         | 103050      | 26 Feb 2017           | 12                     |
| M1269     | Multimeter           | Fluke           | 179           | 90250210    | 13 May 2017           | 12                     |
| S0577     | DC Power Supply      | TTi             | CPX400S       | 436670      | Calibrated before use | -                      |
| M199      | Power Meter          | Rohde & Schwarz | NRVS          | 827023/075  | 11 Apr 2018           | 24                     |
| M1267     | Thermal Power Sensor | Rohde & Schwarz | NRV-Z52       | 100155      | 15 Apr 2018           | 24                     |
| M1802     | Signal Generator     | Rohde & Schwarz | SMU200A       | 103607      | 16 Feb 2018           | 24                     |

**5.2.3. Transmitter Frequency Stability (Temperature Variation)****Test Summary:**

|                   |                 |            |             |
|-------------------|-----------------|------------|-------------|
| Test Engineer:    | Stefan Ho       | Test Date: | 09 May 2016 |
| Test Sample IMEI: | 357232070003189 |            |             |

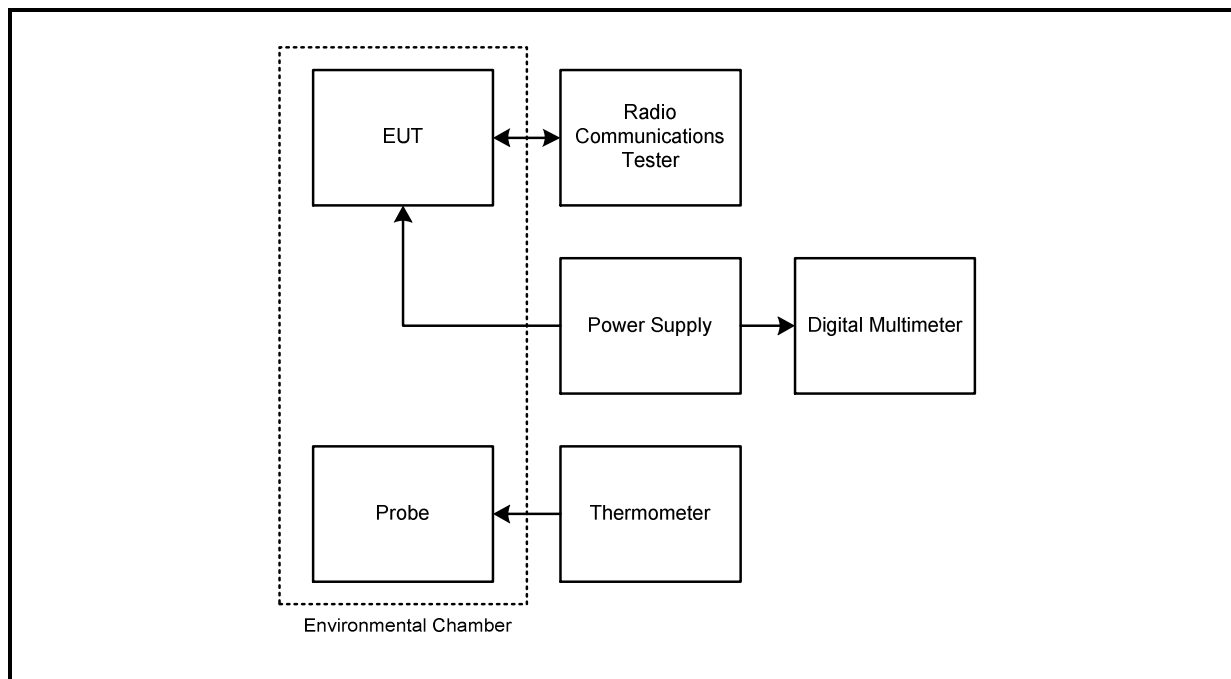
|                   |                                                                          |
|-------------------|--------------------------------------------------------------------------|
| FCC Reference:    | Parts 2.1055 & 24.235                                                    |
| Test Method Used: | KDB 971168 Section 9.0, ANSI TIA-603-D Section 2.2.2 and FCC Part 2.1055 |
| Test Mode:        | RMC                                                                      |

**Environmental Conditions:**

|                                |    |
|--------------------------------|----|
| Ambient Temperature (°C):      | 24 |
| Ambient Relative Humidity (%): | 35 |

**Note(s):**

1. A dummy battery was placed on the EUT and the dummy battery cables connected to a bench power supply set to the nominal battery voltage of 3.9 V.
2. Frequency error was measured using a calibrated Rohde & Schwarz CMW 500 Universal Radio Communications Tester in accordance with current Rohde & Schwarz application notes. The EUT was connected by suitable RF cables to the CMW 500. A bi-directional communications link was established between the EUT and CMW 500. The frequency meter value was recorded.
3. Temperature was monitored throughout the test with a calibrated digital thermometer.

**Test setup:**

**Transmitter Frequency Stability (Temperature Variation) (continued)****Results: Bottom Channel (1852.4 MHz)**

| Temperature (°C) | Frequency Error (Hz) | Measured Frequency (MHz) | Lower Band Edge Limit (MHz) | Margin (MHz) | Result   |
|------------------|----------------------|--------------------------|-----------------------------|--------------|----------|
| -30              | 14                   | 1852.400014              | 1850.0                      | 2.400014     | Complied |
| -20              | 7                    | 1852.400007              | 1850.0                      | 2.400007     | Complied |
| -10              | 9                    | 1852.399991              | 1850.0                      | 2.399991     | Complied |
| 0                | 12                   | 1852.399988              | 1850.0                      | 2.399988     | Complied |
| 10               | 9                    | 1852.399991              | 1850.0                      | 2.399991     | Complied |
| 20               | 7                    | 1852.399993              | 1850.0                      | 2.399993     | Complied |
| 30               | 7                    | 1852.400007              | 1850.0                      | 2.400007     | Complied |
| 40               | 9                    | 1852.400009              | 1850.0                      | 2.400009     | Complied |
| 50               | 11                   | 1852.400011              | 1850.0                      | 2.400011     | Complied |

**Results: Top Channel (1907.6 MHz)**

| Temperature (°C) | Frequency Error (Hz) | Measured Frequency (MHz) | Upper Band Edge Limit (MHz) | Margin (MHz) | Result   |
|------------------|----------------------|--------------------------|-----------------------------|--------------|----------|
| -30              | 12                   | 1907.599988              | 1910.0                      | 2.400012     | Complied |
| -20              | 6                    | 1907.600006              | 1910.0                      | 2.399994     | Complied |
| -10              | 12                   | 1907.600012              | 1910.0                      | 2.399988     | Complied |
| 0                | 11                   | 1907.600011              | 1910.0                      | 2.399989     | Complied |
| 10               | 10                   | 1907.600010              | 1910.0                      | 2.399990     | Complied |
| 20               | 9                    | 1907.600009              | 1910.0                      | 2.399991     | Complied |
| 30               | 7                    | 1907.600007              | 1910.0                      | 2.399993     | Complied |
| 40               | 7                    | 1907.599993              | 1910.0                      | 2.400007     | Complied |
| 50               | 9                    | 1907.599991              | 1910.0                      | 2.400009     | Complied |

**Transmitter Frequency Stability (Temperature Variation) (continued)****Test Equipment Used:**

| Asset No. | Instrument                  | Manufacturer                | Type No.   | Serial No.  | Date Calibration Due  | Cal. Interval (Months) |
|-----------|-----------------------------|-----------------------------|------------|-------------|-----------------------|------------------------|
| M1659     | Thermohygrometer            | JM Handelpunkt              | 30.5015.13 | None stated | 02 Apr 2017           | 12                     |
| M1859     | Wideband Radio Comms Tester | Rohde & Schwarz             | CMW500     | 145920      | 12 Jun 2016           | 12                     |
| M1674     | Environmental Chamber       | Espec Corporation           | SU-241     | 92013139    | Calibrated before use | -                      |
| M1249     | Thermometer                 | Fluke                       | 52II       | 88800049    | 27 May 2016           | 12                     |
| S021      | Dual DC power supply        | Thurlby Thandar Instruments | CPX200     | 061034      | Calibrated before use | -                      |
| M1229     | Multimeter                  | Fluke                       | 179        | 87640015    | 21 Apr 2017           | 12                     |

**5.2.4. Transmitter Frequency Stability (Voltage Variation)****Test Summary:**

|                          |                 |                   |             |
|--------------------------|-----------------|-------------------|-------------|
| <b>Test Engineer:</b>    | Stefan Ho       | <b>Test Date:</b> | 06 May 2016 |
| <b>Test Sample IMEI:</b> | 357232070003189 |                   |             |

|                          |                                                                          |
|--------------------------|--------------------------------------------------------------------------|
| <b>FCC Reference:</b>    | Parts 2.1055 & 24.235                                                    |
| <b>Test Method Used:</b> | KDB 971168 Section 9.0, ANSI TIA-603-D Section 2.2.2 and FCC Part 2.1055 |
| <b>Test Mode:</b>        | RMC                                                                      |

**Environmental Conditions:**

|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 20 |
| <b>Relative Humidity (%):</b> | 33 |

**Note(s):**

1. A dummy battery was placed on the EUT and the dummy battery cables connected to a bench power supply.
2. Frequency error was measured using a calibrated Rohde & Schwarz CMW 500 Universal Radio Communications Tester in accordance with current Rohde & Schwarz application notes. The EUT was connected by suitable RF cables to the CMW 500. A bi-directional communications link was established between the EUT and CMW 500. The frequency meter value was recorded.
3. Voltage was monitored throughout the test with a calibrated digital voltmeter.

**Results: Bottom Channel (1852.4 MHz)**

| Supply Voltage (V) | Frequency Error (Hz) | Measured Frequency (MHz) | Lower Band Edge Limit (MHz) | Margin (MHz) | Result   |
|--------------------|----------------------|--------------------------|-----------------------------|--------------|----------|
| 3.5                | 6                    | 1852.400006              | 1850.0                      | 2.400006     | Complied |
| 4.4                | 6                    | 1852.400006              | 1850.0                      | 2.400006     | Complied |

**Results: Top Channel (1907.6 MHz)**

| Supply Voltage (V) | Frequency Error (Hz) | Measured Frequency (MHz) | Upper Band Edge Limit (MHz) | Margin (MHz) | Result   |
|--------------------|----------------------|--------------------------|-----------------------------|--------------|----------|
| 3.5                | 7                    | 1907.600007              | 1910.0                      | 2.399993     | Complied |
| 4.4                | 6                    | 1907.599994              | 1910.0                      | 2.400006     | Complied |

**Transmitter Frequency Stability (Voltage Variation) (continued)****Test Equipment Used:**

| Asset No. | Instrument                  | Manufacturer                | Type No.   | Serial No.  | Date Calibration Due  | Cal. Interval (Months) |
|-----------|-----------------------------|-----------------------------|------------|-------------|-----------------------|------------------------|
| M1659     | Thermohygrometer            | JM Handelspunkt             | 30.5015.13 | None stated | 02 Apr 2017           | 12                     |
| M1859     | Wideband Radio Comms Tester | Rohde & Schwarz             | CMW500     | 145920      | 12 Jun 2016           | 12                     |
| S021      | Dual DC power supply        | Thurlby Thandar Instruments | CPX200     | 061034      | Calibrated before use | -                      |
| M1251     | Multimeter                  | Fluke                       | 175        | 89170179    | 26 May 2016           | 12                     |

## **6. Measurement Uncertainty**

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document "approximately" is interpreted as meaning "effectively" or "for most practical purposes".

| Measurement Type       | Range            | Confidence Level (%) | Calculated Uncertainty |
|------------------------|------------------|----------------------|------------------------|
| Conducted Output Power | 1850 to 1910 MHz | 95%                  | $\pm 1.13$ dB          |
| Frequency Stability    | 1850 to 1910 MHz | 95%                  | $\pm 23$ Hz            |
| Occupied Bandwidth     | 1850 to 1910 MHz | 95%                  | $\pm 3.92$ %           |

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

**7. Report Revision History**

| Version Number | Revision Details |        |                 |
|----------------|------------------|--------|-----------------|
|                | Page No(s)       | Clause | Details         |
| 1.0            | -                | -      | Initial Version |

--- END OF REPORT ---