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# Report On

FCC and Industry Canada Testing of the  
Iridium Core 9523N

In accordance with FCC 47 CFR Part 15B and ICES-003

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FCC ID: Q639523N

IC: 4629A-9523N

Document 75932207 Report 05 Issue 3

November 2015



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**DATED**

30 November 2015

**This report has been up-issued to Issue 3 to include an amended Declaration of Build Status.**

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**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 47 CFR Part 15B and ICES-003. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

G Lawler



**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            | Declaration of Build Status .....                     | 6              |
| 1.4            | Product Information .....                             | 7              |
| 1.5            | Test Conditions .....                                 | 7              |
| 1.6            | Deviations from the Standard .....                    | 7              |
| 1.7            | Modification Record .....                             | 7              |
| <b>2</b>       | <b>TEST DETAILS .....</b>                             | <b>8</b>       |
| 2.1            | Radiated Emissions .....                              | 9              |
| <b>3</b>       | <b>TEST EQUIPMENT USED .....</b>                      | <b>13</b>      |
| 3.1            | Test Equipment Used .....                             | 14             |
| 3.2            | Measurement Uncertainty .....                         | 15             |
| <b>4</b>       | <b>ACCREDITATION, DISCLAIMERS AND COPYRIGHT .....</b> | <b>16</b>      |
| 4.1            | Accreditation, Disclaimers and Copyright .....        | 17             |



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## **SECTION 1**

### **REPORT SUMMARY**

FCC and Industry Canada Testing of the  
Iridium Core 9523N  
In accordance with FCC 47 CFR Part 15B and ICES-003



## 1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC and Industry Canada Testing of the Iridium Core 9523N to the requirements of FCC 47 CFR Part 15B and ICES-003.

|                                |                                                                                                                                                                         |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Objective                      | To perform FCC and Industry Canada Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out. |
| Manufacturer                   | Iridium Satellite LLC                                                                                                                                                   |
| Model Number(s)                | 9523N                                                                                                                                                                   |
| Serial Number(s)               | 27                                                                                                                                                                      |
| Number of Samples Tested       | 1                                                                                                                                                                       |
| Test Specification/Issue/Date  | FCC 47 CFR Part 15B (2014)<br>ICES-003 (2012)                                                                                                                           |
| Incoming Release Date          | Declaration of Build Status<br>13 October 2015                                                                                                                          |
| Disposal Reference Number Date | Held Pending Disposal<br>Not Applicable<br>Not Applicable                                                                                                               |
| Order Number Date              | 31734<br>5 October 2015                                                                                                                                                 |
| Start of Test                  | 25 October 2015                                                                                                                                                         |
| Finish of Test                 | 27 October 2015                                                                                                                                                         |
| Name of Engineer(s)            | G Lawler                                                                                                                                                                |
| Related Document(s)            | ANSI C63.4 (2014)                                                                                                                                                       |



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## 1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15B and ICES-003 is shown below.

| Section | Specification Clause |          | Test Description   | Result | Comments/Base Standard |
|---------|----------------------|----------|--------------------|--------|------------------------|
|         | Part 15B             | ICES-003 |                    |        |                        |
| Idle    |                      |          |                    |        |                        |
| 2.1     | 15.109               | 6.2      | Radiated Emissions | Pass   |                        |



### 1.3 DECLARATION OF BUILD STATUS

| MAIN EUT                                                                      |                                                                                                        |  |  |
|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--|--|
| MANUFACTURING DESCRIPTION                                                     | Voice and data satellite transceiver module.                                                           |  |  |
| MANUFACTURER                                                                  | Iridium Satellite LLC                                                                                  |  |  |
| TYPE                                                                          | 9523N                                                                                                  |  |  |
| PART NUMBER                                                                   | IRIDN0125                                                                                              |  |  |
| SERIAL NUMBER                                                                 | 024, 027, 030, 031                                                                                     |  |  |
| HARDWARE VERSION                                                              | Rev B/V1 at modification state: P1638-CN-024 V0.8                                                      |  |  |
| SOFTWARE VERSION                                                              | DB15006                                                                                                |  |  |
| TRANSMITTER FREQUENCY OPERATING RANGE (MHz)                                   | 1616MHz to 1626.5MHz                                                                                   |  |  |
| RECEIVER FREQUENCY OPERATING RANGE (MHz)                                      | 1616MHz to 1626.5MHz                                                                                   |  |  |
| COUNTRY OF ORIGIN                                                             | UK                                                                                                     |  |  |
| INTERMEDIATE FREQUENCIES                                                      | 200kHz, 400kHz, 600kHz, 800kHz, 16.8MHz reference clock                                                |  |  |
| ÉMISSION DESIGNATOR(S):<br>(i.e. G1D, GXW)                                    | 41K7Q7W                                                                                                |  |  |
| MODULATION TYPES:<br>(i.e. GMSK, QPSK)                                        | DE-QPSK/DE-BPSK                                                                                        |  |  |
| HIGHEST INTERNALLY GENERATED FREQUENCY                                        | 3252MHz                                                                                                |  |  |
| OUTPUT POWER (W or dBm)                                                       | 6.607W (38.2dBm)                                                                                       |  |  |
| FCC ID                                                                        | Q639523N                                                                                               |  |  |
| INDUSTRY CANADA ID                                                            | 4629A-9523N                                                                                            |  |  |
| TECHNICAL DESCRIPTION (a brief description of the intended use and operation) | Module for the transmission and reception of voice and data to and from the Iridium satellite network. |  |  |
| BATTERY/POWER SUPPLY                                                          |                                                                                                        |  |  |
| MANUFACTURING DESCRIPTION                                                     |                                                                                                        |  |  |
| MANUFACTURER                                                                  |                                                                                                        |  |  |
| TYPE                                                                          |                                                                                                        |  |  |
| PART NUMBER                                                                   |                                                                                                        |  |  |
| VOLTAGE                                                                       |                                                                                                        |  |  |
| COUNTRY OF ORIGIN                                                             |                                                                                                        |  |  |
| MODULES (if applicable)                                                       |                                                                                                        |  |  |
| MANUFACTURING DESCRIPTION                                                     |                                                                                                        |  |  |
| MANUFACTURER                                                                  |                                                                                                        |  |  |
| TYPE                                                                          |                                                                                                        |  |  |
| POWER                                                                         |                                                                                                        |  |  |
| FCC ID                                                                        |                                                                                                        |  |  |
| COUNTRY OF ORIGIN                                                             |                                                                                                        |  |  |
| INDUSTRY CANADA ID                                                            |                                                                                                        |  |  |
| EMISSION DESIGNATOR                                                           |                                                                                                        |  |  |
| DHSS/FHSS/COMBINED OR OTHER                                                   |                                                                                                        |  |  |
| ANCILLARIES (if applicable)                                                   |                                                                                                        |  |  |
| MANUFACTURING DESCRIPTION                                                     |                                                                                                        |  |  |
| MANUFACTURER                                                                  |                                                                                                        |  |  |
| TYPE                                                                          |                                                                                                        |  |  |
| PART NUMBER                                                                   |                                                                                                        |  |  |
| SERIAL NUMBER                                                                 |                                                                                                        |  |  |
| COUNTRY OF ORIGIN                                                             |                                                                                                        |  |  |

Signature

Date 13/10/2015

Declaration of Build Status Serial Number



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## **1.4 PRODUCT INFORMATION**

### **1.4.1 Technical Description**

The Equipment Under Test (EUT) was an Iridium Core 9523N. 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 an external DC supply via a test interface board. The nominal voltage conditions declared by the manufacturer were as follows:

$$V_{\text{bat}} = 3.7 \text{ V DC}$$

$$V_{\text{boost}} = 27.0 \text{ V DC}$$

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

Industry Canada Company Address Code  
IC2932B-1 Octagon House, Fareham Test Laboratory

## **1.6 DEVIATIONS FROM THE STANDARD**

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

## **1.7 MODIFICATION RECORD**

Modification 0 - No modifications were made to the test sample during testing.



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## **SECTION 2**

### **TEST DETAILS**

FCC and Industry Canada Testing of the  
Iridium Core 9523N  
In accordance with FCC 47 CFR Part 15B and ICES-003



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## **2.1 RADIATED EMISSIONS**

### **2.1.1 Specification Reference**

FCC 47 CFR Part 15B, Clause 15.109  
ICES-003, Clause 6.2

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

9523N S/N: 27 - Modification State 0

### **2.1.3 Date of Test**

25 October 2015 & 27 October 2015

### **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 test was performed in accordance with ANSI C63.4, Clause 8 and ICES-003, Clause 6.2.

#### Remarks

The EUT is not supplied with a dedicated antenna therefore the receiver antenna terminal was connected to a 50  $\Omega$  load during testing.

The plots shown in this report are of the characterisation sweep that was performed of the EUT. All final measurements were performed with the procedure defined in ANSI C63.4, clause 8.

All final measurements were assessed against the Class B emission limits in FCC 47 CFR Part 15, Clause 15.109 and ICES-003, Clause 6.2.

### **2.1.6 Environmental Conditions**

|                     |               |
|---------------------|---------------|
| Ambient Temperature | 20.1 - 20.3°C |
| Relative Humidity   | 34.0 - 53.0%  |

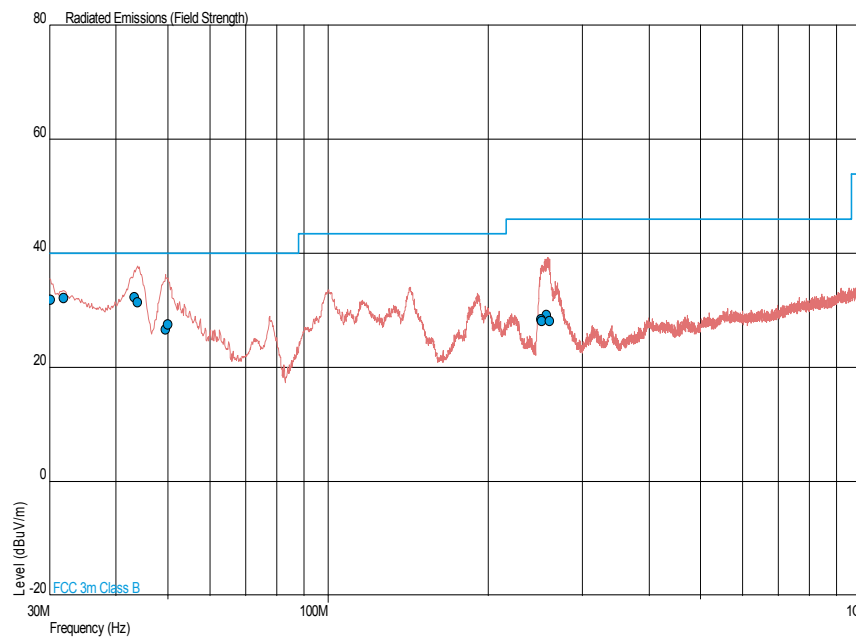


## 2.1.7 Test Results

### Idle, 30 MHz to 1 GHz Results

| Frequency (MHz) | Quasi-Peak Level (dB $\mu$ V/m) | Quasi-Peak Level ( $\mu$ V/m) | Quasi-Peak Margin (d $\mu$ V/m) | Quasi-Peak Margin ( $\mu$ V/m) | Angle (°) | Height (m) | Polarisation |
|-----------------|---------------------------------|-------------------------------|---------------------------------|--------------------------------|-----------|------------|--------------|
| 30.135          | 31.9                            | 39.4                          | -8.1                            | -60.6                          | 112       | 3.38       | Horizontal   |
| 31.872          | 32.2                            | 40.7                          | -7.8                            | -59.3                          | 155       | 2.90       | Horizontal   |
| 43.284          | 32.3                            | 41.2                          | -7.7                            | -58.8                          | 19        | 1.00       | Vertical     |
| 43.904          | 31.5                            | 37.6                          | -8.5                            | -62.4                          | 58        | 1.00       | Vertical     |
| 49.625          | 26.6                            | 21.4                          | -13.4                           | -78.6                          | 360       | 1.00       | Vertical     |
| 50.066          | 27.5                            | 23.7                          | -12.5                           | -76.3                          | 45        | 1.38       | Vertical     |
| 251.306         | 28.4                            | 26.3                          | -17.6                           | -173.7                         | 82        | 1.00       | Vertical     |
| 251.857         | 28.1                            | 25.4                          | -17.9                           | -174.6                         | 192       | 1.04       | Horizontal   |
| 257.211         | 29.2                            | 28.8                          | -16.8                           | -171.2                         | 208       | 1.00       | Horizontal   |
| 260.355         | 28.1                            | 25.4                          | -17.9                           | -174.6                         | 45        | 1.00       | Vertical     |

### Idle, 30 MHz to 1 GHz Plot





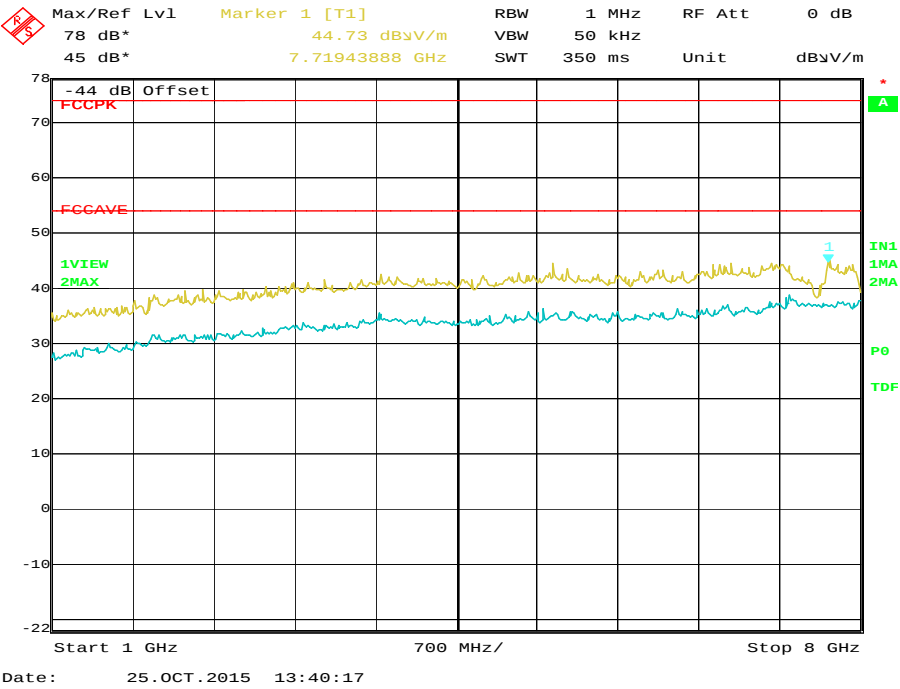
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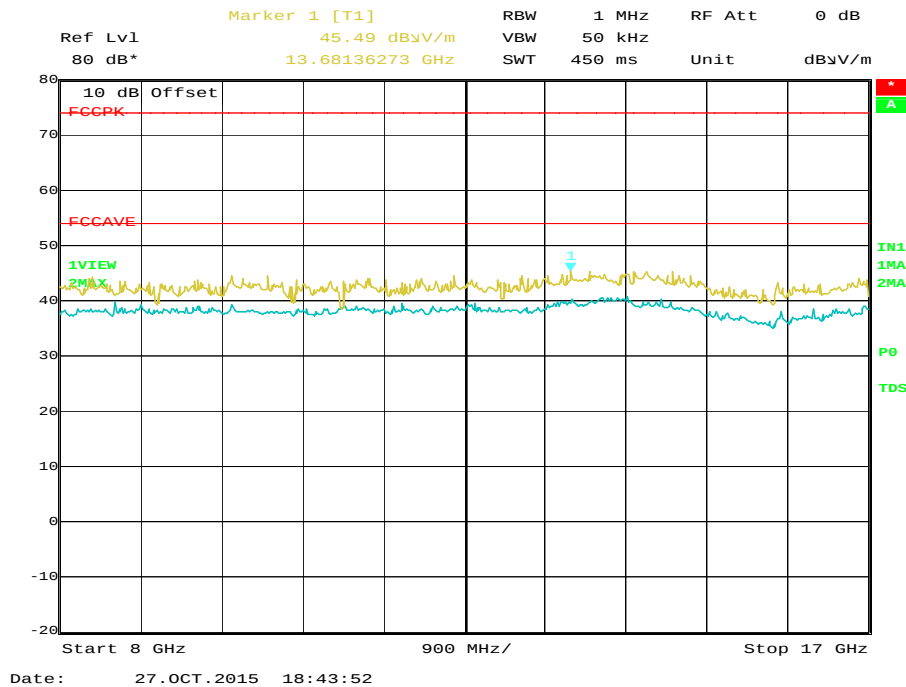
Idle, 1 GHz to 17 GHz Results

| Frequency (MHz) | Average Level (dBµV/m) | Peak Level (dBµV/m) | Average Level (µV/m) | Peak Level (µV/m) | Angle (deg) | Height (m) | Polarisation |
|-----------------|------------------------|---------------------|----------------------|-------------------|-------------|------------|--------------|
| *               |                        |                     |                      |                   |             |            |              |

\*No emissions were detected within 10 dB of the limit.

Idle, 1 GHz to 8 GHz Plot



Idle, 8 GHz to 17 GHz PlotFCC 47 CFR Part 15, Limit Clause 15.109Class B

| Frequency of Emission (MHz) | Field Strength ( $\mu$ V/m) |
|-----------------------------|-----------------------------|
| 30 to 88                    | 100.0                       |
| 88 to 216                   | 150.0                       |
| 216 to 960                  | 200.0                       |
| Above 960                   | 500.0                       |

ICES-003, Limit Clause 6.2Class B

| Frequency of Emission (MHz) | Quasi-Peak (dB $\mu$ V/m) |
|-----------------------------|---------------------------|
| 30 to 88                    | 40.0                      |
| 88 to 216                   | 43.5                      |
| 216 to 960                  | 46.0                      |
| 960 to 1000                 | 54.0                      |

| Frequency of Emission (MHz) | Field Strength (dB $\mu$ V/m) |               |
|-----------------------------|-------------------------------|---------------|
|                             | Linear Average Detector       | Peak Detector |
| Above 1000                  | 54.0                          | 74.0          |



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### **SECTION 3**

#### **TEST EQUIPMENT USED**



### 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 - Radiated Emissions</b>  |                             |                            |        |                             |                 |
| Antenna (Double Ridge Guide, 1GHz-18GHz) | EMCO                        | 3115                       | 234    | 12                          | 29-Apr-2016     |
| Antenna (Double Ridge Guide, 1GHz-18GHz) | EMCO                        | 3115                       | 235    | 22                          | 28-Nov-2015     |
| Antenna (Bilog)                          | Schaffner                   | CBL6143                    | 287    | 24                          | 3-Feb-2016      |
| Power Supply Unit                        | Farnell                     | H60-25                     | 1092   | -                           | O/P Mon         |
| Pre-Amplifier                            | Phase One                   | PS04-0086                  | 1533   | 12                          | 30-Jul-2016     |
| Screened Room (5)                        | Rainford                    | Rainford                   | 1545   | 36                          | 20-Dec-2017     |
| Turntable Controller                     | Inn-Co GmbH                 | CO 1000                    | 1606   | -                           | TU              |
| Power Supply                             | Hewlett Packard             | 6104A                      | 1948   | -                           | TU              |
| EMI Test Receiver                        | Rohde & Schwarz             | ESIB26                     | 2028   | 12                          | 16-Jun-2016     |
| Hygrometer                               | Rotronic                    | A1                         | 2138   | 12                          | 3-Dec-2015      |
| Multimeter                               | Iso-tech                    | IDM101                     | 2417   | 12                          | 29-Sep-2016     |
| Filter (Hi Pass)                         | Lorch                       | 9HP7-7000-SR               | 2833   | 12                          | 5-Feb-2016      |
| Power Supply                             | Farnell                     | LT30-2                     | 2903   | -                           | TU              |
| Amplifier (1 - 8GHz)                     | Phase One                   | PS06-0060                  | 3175   | 12                          | 11-Aug-2016     |
| Signal Generator: 10MHz to 20GHz         | Rohde & Schwarz             | SMR20                      | 3475   | 12                          | 18-Feb-2016     |
| EMI Test Receiver                        | Rohde & Schwarz             | ESU40                      | 3506   | 12                          | 27-Oct-2015     |
| 7m Armoured RF Cable                     | SSI Cable Corp.             | 1501-13-13-7m<br>WA(-)     | 3600   | -                           | TU              |
| 9m RF Cable (N Type)                     | Rhophase                    | NPS-2303-9000-<br>NPS      | 3791   | -                           | TU              |
| Tilt Antenna Mast                        | maturo GmbH                 | TAM 4.0-P                  | 3916   | -                           | TU              |
| Mast Controller                          | maturo GmbH                 | NCD                        | 3917   | -                           | TU              |
| Suspended Substrate<br>Highpass Filter   | Advance Power<br>Components | 11SH10-<br>3000/X18000-O/O | 4412   | 12                          | 24-Mar-2016     |
| 2m K-Type Cable (Rx)                     | Scott Cables                | KPS-1501-2000-<br>KPS      | 4527   | -                           | TU              |
| 0.5m SMA Cable (Rx)                      | Scott Cables                | SLSLL18-SMSM-<br>00.50M    | 4528   | 6                           | 19-Feb-2016     |

TU – Traceability Unscheduled

O/P MON – Output Monitored with Calibrated Equipment



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### 3.2 MEASUREMENT UNCERTAINTY

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

|                    |                                                                |
|--------------------|----------------------------------------------------------------|
| Test Discipline    | MU                                                             |
| Radiated Emissions | 30 MHz to 1 GHz: $\pm 5.1$ dB<br>1 GHz to 40 GHz: $\pm 6.3$ dB |



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## **SECTION 4**

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



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#### 4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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