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Report On

FCC and Industry Canada Testing of the
Iridium Communications Inc 9602N
In accordance with FCC CFR 47 Part 15B and ICES-003

COMMERCIAL-IN-CONFIDENCE

FCC ID: Q639603N
IC: 4629A-9603N

Document 75928154 Report 02 Issue 2

November 2014



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PREPARED FOR

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PREPARED BY

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APPROVED BY

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DATED

27 November 2014

This report has been up issued to Issue 2 and should be read in place of Issue 1. This report has been up issued to Issue 2 because the applicant updated the application form.

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

Test Engineer(s);

C McKean





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SECTION 1

REPORT SUMMARY

FCC and Industry Canada Testing of the
Iridium Communications Inc 9602N
In accordance with FCC CFR 47 Part 15B and ICES-003



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1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC and Industry Canada Testing of the Iridium Communications Inc 9602N to the requirements of FCC CFR 47 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 Communications Inc
Model Number(s)	9602N
Serial Number(s)	0000000018
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15B (2013) ICES-003 (2012)
Incoming Release Date	Application Form 10 October 2014
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	25823 01 October 2014
Start of Test	13 November 2014
Finish of Test	13 November 2014
Name of Engineer(s)	C McKean
Related Document(s)	ANSI C63.4 (2009)



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1.2 BRIEF SUMMARY OF RESULTS

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

Section	Spec Clause		Test Description	Result	Comments/Base Standard
	FCC	ICES			
Idle					
2.1	15.109	6.2	Radiated Emissions	Pass	ANSI C63.4



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1.3 APPLICATION FORM

APPLICATION FORM FOR TESTING TO FCC/INDUSTRY CANADA REQUIREMENTS


APPLICANT'S DETAILS	
COMPANY NAME :	Cambridge Consultants Ltd.
ADDRESS :	Science Park, Milton Road Cambridge England, CB5 0DW
NAME FOR CONTACT PURPOSES :	Jonathan Jones
TELEPHONE NO: +44 1223 392446	FAX NO: +44 1223 423373
E-MAIL: jonathan.jones@cambridgeconsultants.com	

EQUIPMENT INFORMATION			
Model name/number	9602N	Identification/Part number	9602N
Hardware Version	rev A (P2049-CN-001 V0.7)	Software Version	TA14002 Candidate
Manufacturer	Iridium Communications Inc.	Country of Origin	UK
FCC ID	Q639603N	Industry Canada ID	4629A-9603N
Technical description (a brief description of the intended use and operation)			
Satellite short burst data transceiver.			
<u>Supply Voltage:</u>			
[]	AC mains	State AC voltage	V and AC frequency Hz
[X]	DC (external)	State DC voltage 5.0 V	and DC current 2.0 A
[]	DC (internal)	State DC voltage	V and Battery type
<u>Frequency characteristics:</u>			
Transmitter Frequency range	1616 MHz to 1626.5 MHz	Channel spacing	41.667kHz (if channelized)
Receiver Frequency range (if different)	1616 MHz to 1626.5 MHz	Channel spacing	41.667kHz (if channelized)
Designated test frequencies:			
Bottom: 1616.020833 MHz	Middle: 1621.020833 MHz	Top: 1625.979167 MHz	
Intermediate Frequencies : 0.6 MHz			
Highest Internally Generated Frequency : 3252 MHz			
<u>Power characteristics:</u>			
Maximum transmitter power	1.479 W	Minimum transmitter power (if variable)	..... W
[]	Continuous transmission		
[X]	Intermittent transmission	State duty cycle	9.2%
If intermittent, can transmitter be set to continuous transmit test mode? N			
<u>Antenna characteristics:</u>			
[X]	Antenna connector	State impedance	50 ohm
[]	Temporary antenna connector	State impedance	ohm
[]	Integral antenna Type	State gain	dBi
[X]	External Antenna Type	State gain	3.0 dBi
<u>Modulation characteristics:</u>			
[]	Amplitude	[X]	Other
[]	Frequency	Details: DE-QPSK, DE-BPSK	
Can the transmitter operate un-modulated? Y			
ITU Class of emission: 41K7Q7D			
<u>Battery/Power Supply</u>			
Model name/number	.....	Identification/Part number	.....
Manufacturer	.....	Country of Origin	.....
<u>Ancillaries (if applicable)</u>			
Model name/number	.....	Identification/Part number	.....
Manufacturer	.....	Country of Origin	.....
<u>Extreme conditions:</u>			
Maximum temperature	85 °C	Minimum temperature	-40 °C
Maximum supply voltage	5.5 V	Minimum supply voltage	4.5 V



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I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.

Signature: 

Name: Jonathan Jones

Position held: Senior Engineer

Date: 25/11/2014



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1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Iridium Communications Inc 9602N. 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 5.0 V DC supply.

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 Communications Inc 9602N
In accordance with FCC CFR 47 Part 15B and ICES-003



2.1 RADIATED EMISSIONS

2.1.1 Specification Reference

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

2.1.2 Equipment Under Test and Modification State

9602N S/N: 0000000018 - Modification State 0

2.1.3 Date of Test

13 November 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

A test environment and testing arrangement meeting the specification of ANSI C63.4 was used during all testing. The Equipment Under Test (EUT) was set upon a non-conducting platform at an elevation of 80 cm above a horizontal reference ground plane.

The horizontal reference ground plane encompasses a turntable which is used to adjust the azimuth of the EUT. An antenna positioner is used to elevate the measuring antenna above the horizontal reference ground plane whereby the antenna elevation is adjustable between 1 m and 4 m.

Exploratory radiated emissions measurements were made by azimuth emissions searches over a range of 0° and 360°. These exploratory radiated emissions measurements were made using a peak detector over a frequency range of 30 MHz to 18 GHz, with the measuring antenna in both vertical and horizontal polarizations.

At least six of the greatest peak emissions, frequency positions were selected from the exploratory radiated emissions measurements for further evaluation as final measuring points.

To ascertain the azimuth and measuring antenna polarization that yields the highest peak emission level, each final measurement frequency was investigated by continuous azimuth emissions searching with the measuring antenna in both vertical and horizontal polarizations. For each final measurement frequency, the respective peak emission azimuth and measuring antenna polarization was used during a measuring antenna elevation search from 1 m to 4 m. Each final measurement frequency was then measured with the EUT azimuth, measuring antenna height and polarization that yielded the greatest peak emission level.

Final measurement points over the frequency range of 30 MHz to 1 GHz were measured using a quasi-peak detector. Final measurement points over the frequency range of 1 GHz and 18 GHz were measured using peak and average methods. Peak measurements were made using a peak detector with 1 MHz resolution and video bandwidths. Average measurements were made using a resolution bandwidth of 1 MHz and a video bandwidth of 30 kHz.



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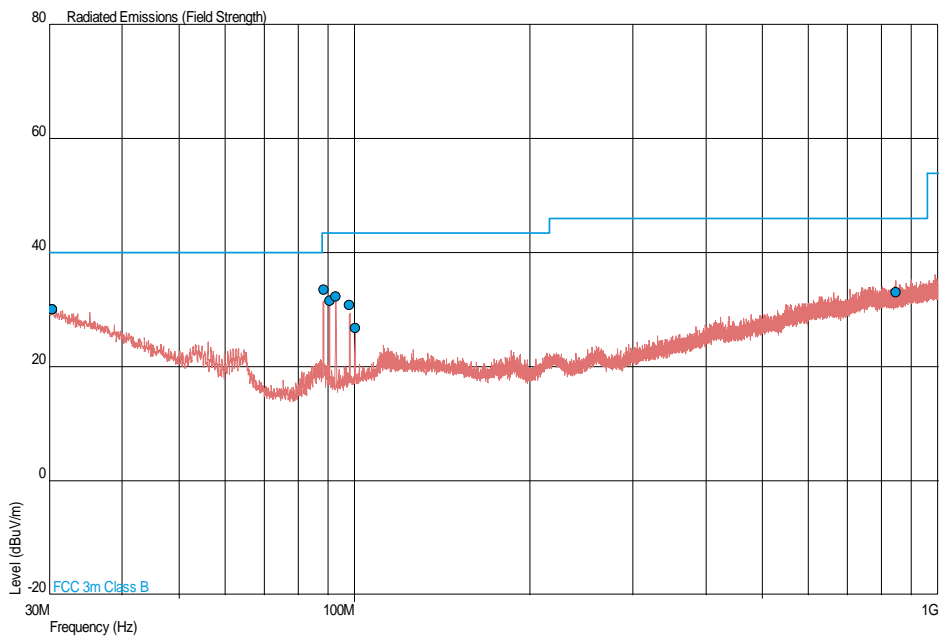
All final measurements were assessed against the Class B emission limits in Clause 15.109 of FCC CFR 47 FCC Part 15 and ICES-003 Clause 6.2.

2.1.6 Environmental Conditions

Ambient Temperature 19.6°C
 Relative Humidity 48.0%

2.1.7 Test Results

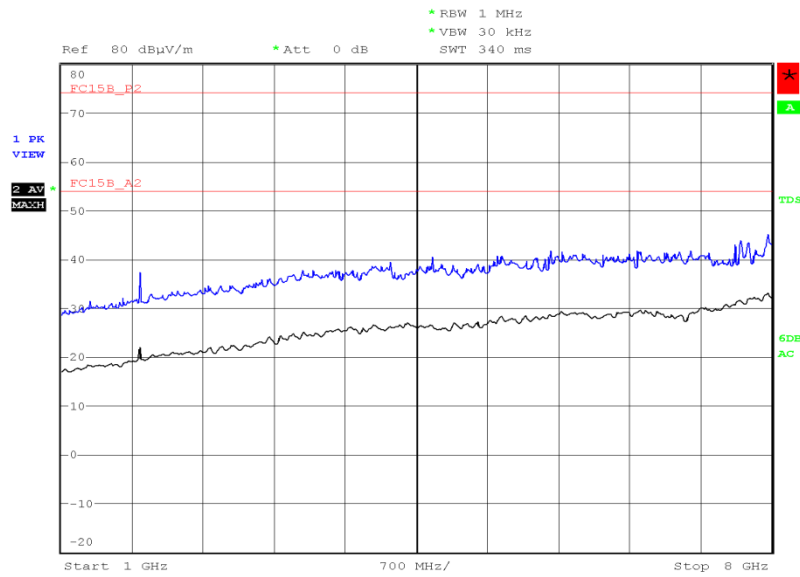
30 MHz to 1 GHz



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
30.338	30.1	32.0	40.0	100	-9.9	-68.0	133	1.00	Vertical
30.340	30.1	32.0	40.0	100	-9.9	-68.0	287	1.03	Horizontal
88.492	33.5	47.3	43.5	150	-10.0	-102.7	360	1.00	Vertical
90.689	31.5	37.6	43.5	150	-12.0	-112.4	249	1.00	Vertical
92.898	32.3	41.2	43.5	150	-11.2	-108.8	322	1.09	Vertical
98.174	30.8	34.7	43.5	150	-12.7	-115.3	75	1.02	Vertical
100.288	26.7	21.6	43.5	150	-16.8	-178.4	132	1.00	Vertical
845.665	33.1	45.2	46.0	200	-12.9	-104.8	330	1.25	Vertical

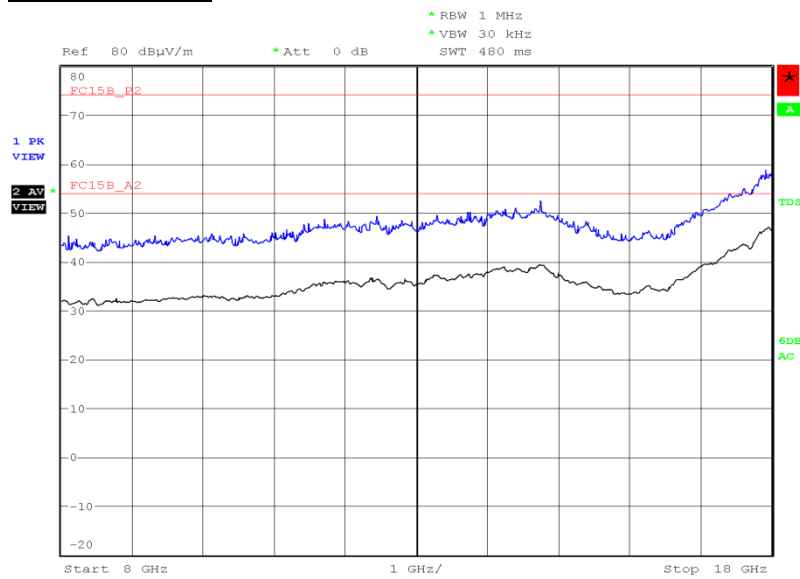


1 GHz to 8 GHz



Date: 13.NOV.2014 14:43:47

8 GHz to 18 GHz



Date: 13.NOV.2014 15:28:26

No emissions were detected within 10 dB of the limit.



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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
Section 2.1 - Radiated Emissions					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	2-May-2015
Dual Power Supply Unit	Thurlby	PL320	288	-	TU
Pre-Amplifier	Phase One	PS04-0086	1533	12	19-Dec-2014
Screened Room (5)	Rainford	Rainford	1545	24	10-Jan-2015
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	10-Jun-2015
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	27-Oct-2015
'3.5mm' - '3.5mm' RF Cable (1m)	Rhophase	3PS-1803-1000-3PS	3697	12	28-Feb-2015
Tilt Antenna Mast	matur GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	matur GmbH	NCD	3917	-	TU
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	1-Oct-2015

TU – Traceability Unscheduled



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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	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB



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SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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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).

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