Report On

FCC Testing of the
Inmarsat Global Ltd IsatPhone2
In accordance with FCC CFR 47 Part 15B and ICES-003

COMMERCIAL-IN-CONFIDENCE

FCC ID: YCT-ISATPHONE2
IC ID: 8944A-ISATPHONE2

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REPORT ON

FCC Testing of the
Inmarsat Global Ltd IsatPhone2
In accordance with FCC CFR 47 Part 15B and ICES-003

Document 75924065 Report 15 Issue 1

February 2014

PREPARED FOR

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APPROVED BY

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Authorised Signatory

DATED 06 February 2014

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);

N Rousell G Lawler

Product Service

CONTENTS

Product Service

SECTION 1

REPORT SUMMARY

FCC Testing of the
Inmarsat Global Ltd IsatPhone2
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1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC Testing of the Inmarsat Global Ltd IsatPhone2 to the requirements of FCC CFR 47 Part 15B and ICES-003.

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	Inmarsat Global Ltd
Model Number(s)	IsatPhone2
Serial Number(s)	IX40100471 IX40100452
Number of Samples Tested	2
Test Specification/Issue/Date	FCC CFR 47 Part 15B (2013) ICES-003 (2012)
Incoming Release Date	Declaration of Build Status 03 February 2014
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	57-00098-01 18 December 2013
Start of Test	29 January 2014
Finish of Test	29 January 2014
Name of Engineer(s)	N Rousell G Lawler
Related Document(s)	ANSI C63.4 (2003)

Product Service

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	IC			
AC Powered and GPS Active with Phihong AC/DC Adapter					
2.1	15.107	6.1	AC Line Conducted Emissions	Pass	
2.2	15.109	6.2	Radiated Emissions	Pass	

Product Service

1.3 DECLARATION OF BUILD STATUS

MAIN EUT		
MANUFACTURING DESCRIPTION	Inmarsat GMR2+ Satellite Phone	
MANUFACTURER	Inmarsat	
TYPE	IsatPhone2	
PART NUMBER	NA	
SERIAL NUMBER	IX401IX40100452	
HARDWARE VERSION	1302	
SOFTWARE VERSION	5.0.0	
TRANSMITTER OPERATING RANGE	GMR 2+ 1626.5 – 1660.5 1668 - 1675MHz BT 2402 – 2480 MHz	
RECEIVER OPERATING RANGE	GMR2+ 1518 – 1559 MHz BT 2402 – 2480 MHz GPS 1575.42MHz	
INTERMEDIATE FREQUENCIES	110.592 MHz	
EMISSION DESIGNATOR(S): **(i.e. G1D, GXW)**	G1D	
MODULATION TYPES: **(i.e. GMSK, QPSK)**	GMR 2+ TX: GMSK RX:OQPSK	
HIGHEST INTERNALLY GENERATED FREQUENCY	3350MHz	
HIGHEST INTERNALLY GENERATED FREQUENCY IN RECEIVE IDLE MODE	3118MHz	
OUTPUT POWER (W or dBm)	GMR2+ +33.5dBm BT +3.8dBm	
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	GMR2+ Satellite Phone for Inmarsat satellite network system	
FCC ID	YCT-ISATPHONE2	
IC ID	8944A-ISATPHONE2	
BATTERY/POWER SUPPLY		
MANUFACTURING DESCRIPTION	Li-Ion Battery	AC-Charger
MANUFACTURER	VARTA	Phihong
TYPE	Li-Ion 3180mAh	PSC12R-050(CEL)-R
PART NUMBER	56426702098	
VOLTAGE	3.7V	5V
SERIAL NUMBER	NA	NA
ANCILLARIES (if applicable)		
MANUFACTURING DESCRIPTION	Headset	
MANUFACTURER	TopDen	
TYPE	Mono headset with 2.5mm plug	
PART NUMBER	TS628D-168-4	
SERIAL NUMBER	NA	

Signature Held on file

Date 03 February 2014

Note: This document has been prepared to enable manufacturers with no mechanism for producing their own Declaration of Build Status, to declare the build state of the equipment submitted for test.

No responsibility will be accepted by TÜV SÜD Product Service as to the accuracy of the information declared in this document by the manufacturer.

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Inmarsat Global Ltd IsatPhone2. 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 3.7 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.

Product Service

SECTION 2

TEST DETAILS

FCC Testing of the
Inmarsat Global Ltd IsatPhone2
In accordance with FCC CFR 47 Part 15B and ICES-003

2.1 AC LINE CONDUCTED EMISSIONS

2.1.1 Specification Reference

FCC CFR 47 Part 15B, Clause 15.107
ICES-003, Clause 6.1

2.1.2 Equipment Under Test and Modification State

IsatPhone2 S/N: IX40100471 - Modification State 0

2.1.3 Date of Test

29 January 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 set up on a test table 800mm above a horizontal ground plane. A vertical ground plane was also required and was placed 400mm from the EUT.

The EUT was powered through a Line Impedance Stabilisation Network (LISN) which was bonded to the ground plane. The EUT was located so that the distance between the EUT and the LISN is no less than 800mm. The cable between the mains input of the EUT and the LISN was 1m.

A preliminary profile of the Conducted Emissions was obtained over the frequency range 150kHz to 30MHz. Any points of interest were noted for formal measurements.

During formal measurements, the measuring receiver was tuned to the emission of interest where Quasi – Peak and Average measurements were performed in a 9kHz Video and Resolution Bandwidth.

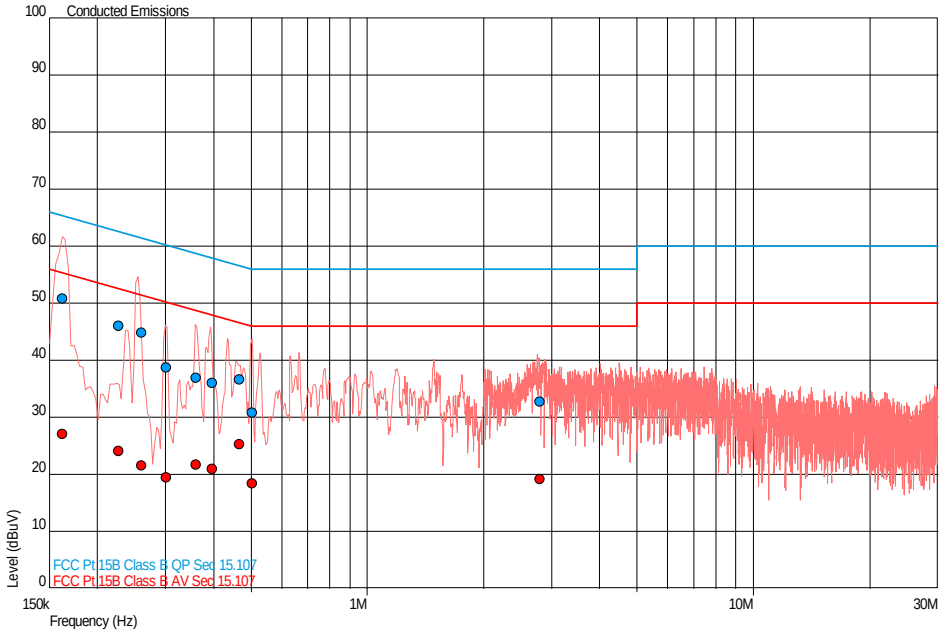
2.1.6 Environmental Conditions

Ambient Temperature	23.6°C
Relative Humidity	26.0%

Product Service

2.1.7 Test Results

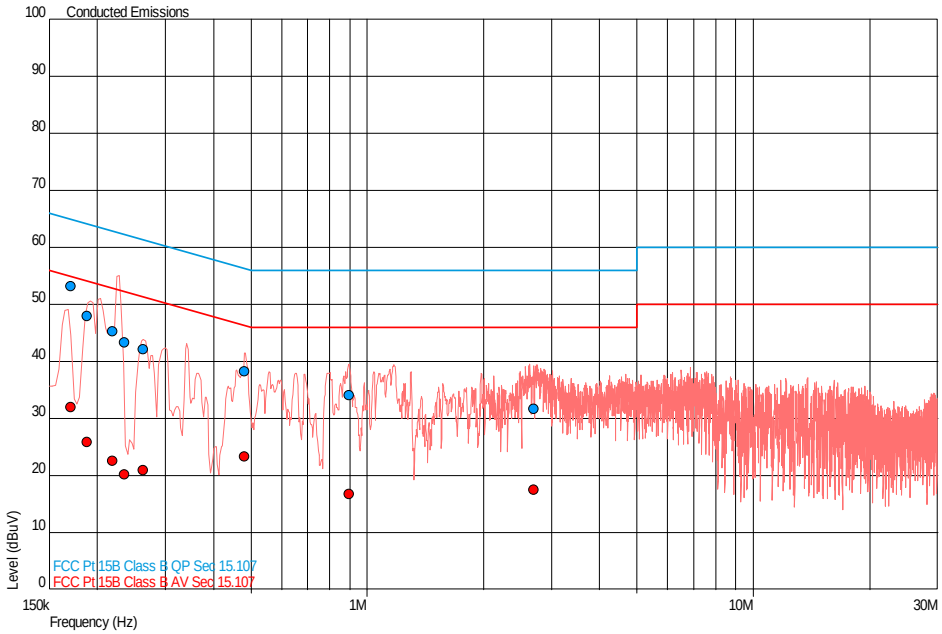
Live Line



Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.162	50.8	65.4	-14.6	27.0	55.4	-28.3
0.227	46.0	62.6	-16.6	24.1	52.6	-28.5
0.261	44.9	61.4	-16.5	21.6	51.4	-29.8
0.302	38.8	60.2	-21.4	19.4	50.2	-30.7
0.360	36.9	58.7	-21.9	21.7	48.7	-27.1
0.396	36.0	57.9	-21.9	20.9	47.9	-27.0
0.466	36.7	56.6	-19.9	25.3	46.6	-21.3
0.502	30.9	56.0	-25.1	18.5	46.0	-27.5
2.794	32.8	56.0	-23.2	19.1	46.0	-26.9

Product Service

Neutral Line



Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.171	53.3	64.9	-11.7	31.9	54.9	-23.0
0.188	47.9	64.1	-16.2	25.9	54.1	-28.3
0.219	45.3	62.9	-17.6	22.6	52.9	-30.3
0.235	43.3	62.3	-18.9	20.3	52.3	-32.0
0.263	42.1	61.3	-19.2	20.9	51.3	-30.4
0.481	38.3	56.3	-18.0	23.4	46.3	-23.0
0.899	34.2	56.0	-21.8	16.8	46.0	-29.2
2.701	31.7	56.0	-24.3	17.6	46.0	-28.4

2.2 RADIATED EMISSIONS

2.2.1 Specification Reference

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

2.2.2 Equipment Under Test and Modification State

IsatPhone2 S/N: IX40100471 - Modification State 0

2.2.3 Date of Test

29 January 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

A preliminary profile of the Spurious Radiated Emissions was obtained up to the 5th harmonic of the EUT's highest internally generated fundamental frequency. For frequencies from 30 MHz to 18 GHz the EUT was placed on a test table 800mm above the ground plane. For frequencies above 18 GHz, the EUT height was increased by 200mm to a height of 1000mm. This was to ensure the beam width of the measuring antenna gives sufficient vertical coverage of the EUT.

During characterisation the turntable azimuth was adjusted from 0 to 360 degrees with the measuring antenna in one polarity. It was then repeated for the other polarity. Any frequencies of interest were noted for formal measuring later. The distance from the measuring antenna to the boundary of the EUT was 3m. Above 18 GHz this distance may be reduced to 1 m.

During formal measurement the spectrum analyser was tuned to the frequency of the emission. The turntable azimuth was adjusted from 0 to 360 degrees to determine the point at which the maximum emission level occurred. Then the height of the measuring antenna was adjusted from a height of 1 m to 4 m to determine the height at which the maximum emission level occurred. Once the point of maximum emission had been determined the emission was measured. Emissions in the 30 MHz to 1 GHz range were measured using a CISPR Quasi – Peak detector function in a 120 kHz bandwidth. Emissions in the range 1 GHz to 40 GHz require Peak and Average measurements. The Peak measurements were made using a peak detector with 1 MHz Resolution and Video bandwidths. The average measurements employed a peak detector with a Resolution bandwidth of 1 MHz and a Video bandwidth of 10 Hz. Where measurements were made at a 1m measuring distance,10dB was added to the specification limit.

2.2.6 Environmental Conditions

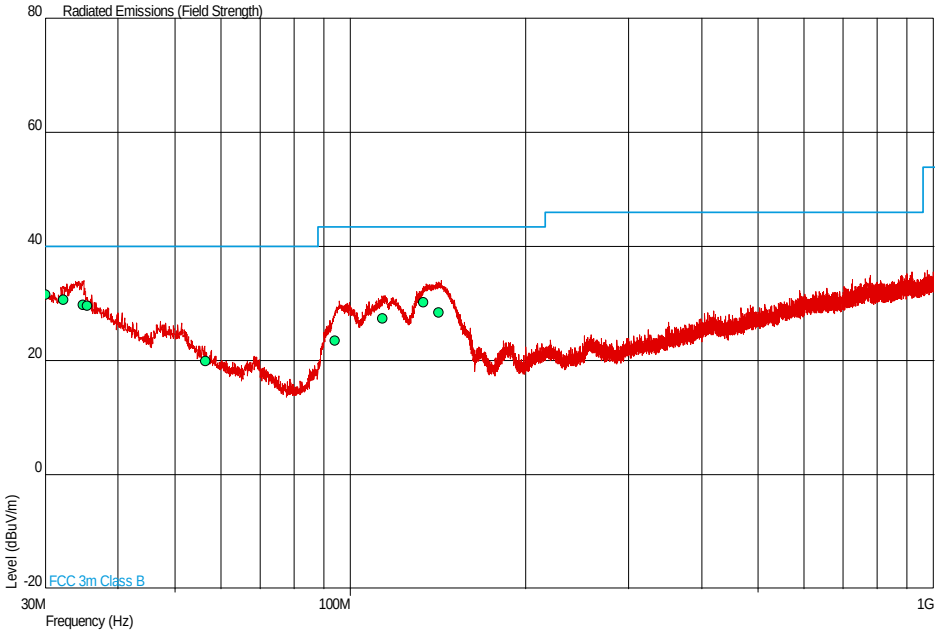
Ambient Temperature	23.3°C
Relative Humidity	26.0%

Product Service

2.2.7 Test Results

Channel 1

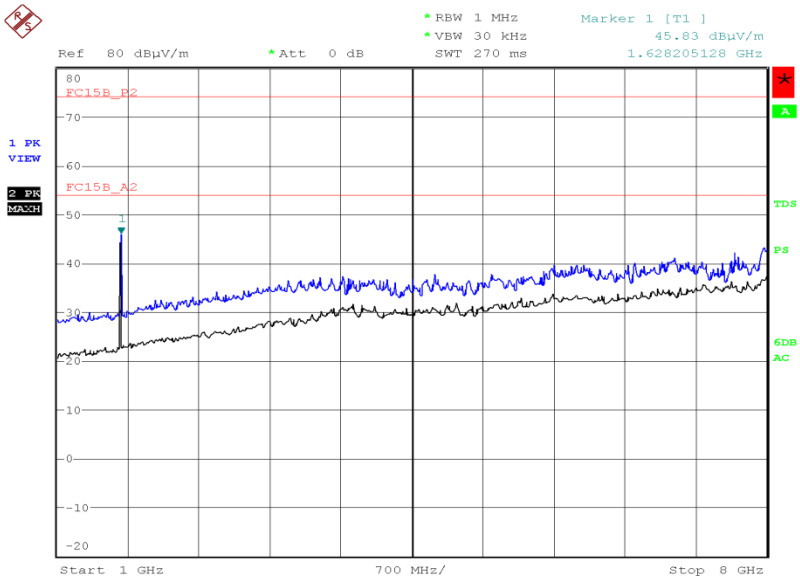
30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.087	31.5	37.6	40.0	100	-8.5	62.4	59	1.35	Vertical
32.231	30.6	33.9	40.0	100	-9.4	66.1	288	1.82	Vertical
34.850	29.8	30.9	40.0	100	-10.2	69.1	56	1.00	Vertical
35.476	29.6	30.2	40.0	100	-10.4	69.8	360	1.00	Vertical
56.441	20.0	10.0	40.0	100	-20.0	90.0	195	1.00	Vertical
94.107	23.5	15.0	43.5	150	-20.0	135.0	205	1.00	Vertical
113.682	27.4	23.4	43.5	150	-16.1	126.6	1	1.00	Vertical
133.580	30.2	32.4	43.5	150	-13.3	117.6	360	1.00	Vertical
141.872	28.4	26.3	43.5	150	-15.1	123.7	0	1.00	Vertical

Product Service

1 GHz to 8 GHz



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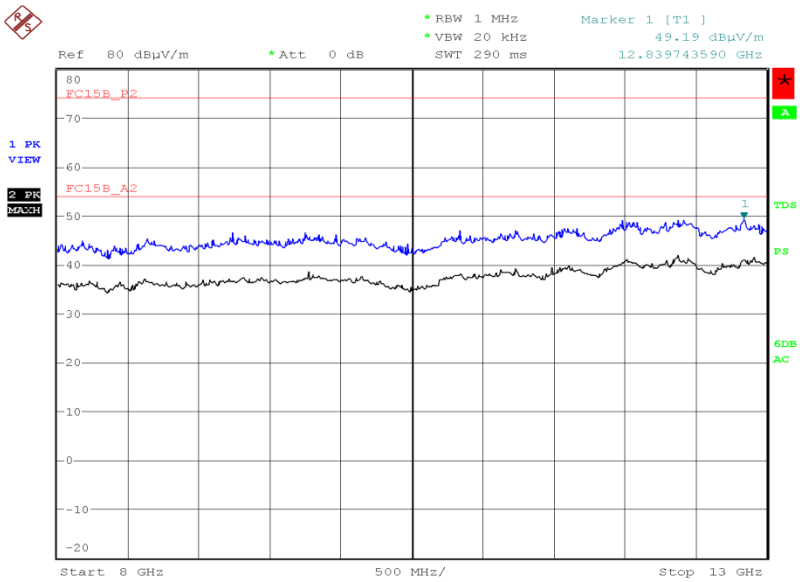
8 GHz to 13 GHz



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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
Section 2.1– AC Line Conducted Emissions					
LISN	Rohde & Schwarz	ESH2-Z5	17	12	1-Aug-2014
LISN (1 Phase)	Chase	MN 2050	336	12	28-Mar-2014
Screened Room (5)	Rainford	Rainford	1545	24	23-Jan-2015
Transient Limiter	Hewlett Packard	11947A	2377	12	13-Feb-2014
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Oct-2014
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
Section 2.2 - Radiated Emissions					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	3-Apr-2014
Antenna (Bilog)	Schaffner	CBL6143	287	24	18-Jan-2014
Pre-Amplifier	Phase One	PS04-0086	1533	12	19-Dec-2014
Screened Room (5)	Rainford	Rainford	1545	24	23-Jan-2015
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	10-Jun-2015
Amplifier (1 - 8GHz)	Phase One	PS06-0060	3175	12	9-Aug-2014
Amplifier (8 - 18GHz)	Phase One	PS06-0061	3176	12	9-Aug-2014
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Oct-2014
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	1-Oct-2014

TU – Traceability Unscheduled

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
AC Line Conducted Emissions	±3.2 dB

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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).