REPORT ON

Telital SAT 550 Dual Mode Portable Mobile Earth Station designed to work on the Satellite Personal Communications Network operated by Globalstar

Report No: WZ 605505-1 August 1999

BABT PRODUCT SERVICE

BABT Product Service Ltd
Segensworth Road
Fareham, Hampshire
United Kingdom PO15 5RH
Tel : +44(0)1329 443322
Fax: +44(0)1329 443421

REPORT ON Telital SAT 550 Dual Mode Portable Mobile Earth Station designed to work on the Satellite Personal Communications Network operated by Globalstar

Report No: WZ 605505-1

20th August 1999

PREPARED FOR: Telital S.p.A.
Viale Stazione di Prosecco, 5/b
34010 - Sgonico (Trieste)
ITALY

APPROVED BY: 2nd September 1999

C Parry
Laboratory Manager

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Note: The test results reported herein relate only to the item tested, as identified above and on the Status Page

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EXECUTIVE SUMMARY

Testing of a Telital SAT 550 Dual Mode Portable Mobile Earth Station designed to work on the Satellite Personal Communications Network operated by Globalstar

Project Engineer : J Lea

1.1 STATUS

1.1.1	MANUFACTURING DESCRIPTION	Dual Mode GSM/Globalstar SAT 550 Portable
1.1.2	APPLICANT	Telital S.p.A.
1.1.3	CLASS	Globalstar Class II (Portable terminal)
1.1.4	MANUFACTURER	Telital Manufacturing S.p.A.
1.1.5	TYPE OR MODEL NUMBER	SAT 550
1.1.6	HARDWARE REVISION	Rev 0
1.1.7	SOFTWARE VERSIONS	6.00 (GSM) 4.1.03.07E (GS)
1.1.8	SERIAL NUMBERS (IMEIs)	004400160141444 (FCC Part 25.202(d) only) 004400160141204 (all other FCC tests)
1.1.9	TEST SPECIFICATIONS	FCC CFR 47 Part 15 Subpart B; 1998 FCC CFR 47 Part 25; 1998 FCC 98-338
1.1.10	BABT PRODUCT SERVICE LTD. REGISTRATION NUMBER	WZ 605505
1.1.11	RECEIPT OF TEST SAMPLES	13th May 1999
1.1.12	START OF TEST	13th May 1999
	FINISH OF TEST	6th August 1999

1.2 SUMMARY

1.2.1 The Telital SAT 550 submitted for testing is a dual mode portable device designed to work on the Globalstar Satellite Personal Communications Network and the GSM 900 Network. It is a Globalstar Class 2 portable device. This testing is only applicable to the device operating in Globalstar mode.

1.2.2 All testing was performed at BABT Product Service Ltd, Titchfield, England. All tests performed yielded results that were compliant with the requirements of the FCC specifications.

1.2.3 The following Federal Communications Commissions (FCC) parts are covered by this test report:-

Part 15.107 (Class B) Conducted Emissions
Part 15.109 (Class B) Radiated Emission Limits.
Part 25.202 (d) Frequency Tolerance.
Part 25.202 (f) Emission Limitations.
Part 25.213 (b) Protection of the radio navigation-satellite service.
FCC 98-338 Section 25.200 Interim equipment authorisation Part (c)

Details of test methods can be found in Section 2.3, Test Conditions, of this report.

Part 25.202 (d) Frequency Tolerance was performed using SAT 550 test sample, International Mobile station Equipment Identity (IMEI) 004400160141444. All other tests were performed on SAT 550 test sample IMEI 004400160141204.

1.2.4 The following Federal Communications Commissions (FCC) parts require a declaration from the applicant in support of the overall FCC application. The following declarations are provided in the supporting documentation:-

Part 25.136 (a)
Part 25.136 (b)
Part 25.202 (a)(4)
Part 25.213 (a)(1)

1.2.5 Specific Absorption Rate testing is not covered by this report.

1.2.6 Photographs are not included in this test report as they were supplied separately in supporting documentation.

TEST DETAILS

Telital SAT 550 Dual Mode Portable Mobile Earth Station designed to work on the Satellite Personal Communications Network operated by Globalstar

Test Engineers: **A. Guy**
S. C. Hartley
J. M. Lea
S. Wells

2.1 TEST EQUIPMENT

2.1.1 The following Laboratory Test Equipment (LTE) was used.

Instrument Description	Manufacturer	Model Number	BABT PS INV No.
Turntable Controller	HD	HD 050	4051
Turntable	HD	DS 405	4052
Biconical Antenna	R&S	HUF-Z3	2207
Log Periodic Antenna	R&S	HUF-Z2	2206
Double Ridge Guide Horn Antenna	EMCO	3115	3549
Double Ridge Guide Horn Antenna	EMCO	3115	3777
Dipole Antenna	EMCO	3121C-DB4	2322
Quad Mode Dual Power Supply	TTI	PL 330 QMD	4077
Power Splitter	W	1506 A	4038
10dB Attenuator	W	46-10-43	EMC1985
High Pass Filter	LM	5HP7-2500-SR	3998
Notch Filter	LM	6CN-1610.73/ X2-SM/SM	3996
Bandstop Filter	LM	7BR4-1620.5/ X13-S	3997
FSEM 20 Spectrum Analyser	R&S	1080.1505	4034
Digital Volt Meter	F	79 III	3789
SWM.02 Signal Generator 10 MHz to 18 GHz	R&S	814.7016.02	2477
SMX Signal Generator 100 kHz to 1 GHz	R&S	826.4517.52	2478
Milliohmeter	HP	4338B	EMC 2537
Hygromer	R	A1	4066
Spectrum Analyser	HP	8568B	184
Quasi-Peak Adaptor	HP	85650A	1302
RF Preselector	HP	85685A	1370
Computer	HP	310	-
LISN	Chase	MN2050	1269
Spectrum Monitor	R&S	EZM	1416
Biconical Antenna	A	94455-1	422
Log Periodic Antenna	AR	AT1000	829
Biconical Antenna	A	94455-1	618
Log Periodic Antenna	AR	AT1000	956
Pulse limiter	R&S	ESH 3 Z-2	1502
Transient Limiter	HP	11947A	-
Automatic Turntable & Controller	EMCO	1060	1322
Automatic Antenna Mast & Controller	EMCO	1050	1321
Printer	HP	THINK JET	-
Plotter	HP	7550A	-
Atomic Frequency Standard	EFRATOM	FRK	EMC2152
Temperature Chamber	HV	VM 04/100	1755
Temperature Chamber	MI	MINI-P-MEGH-F	3037

2.1 **TEST EQUIPMENT** continued

2.1.1 continued…

Key of Manufacturers

A	Ailtech
AR	Amplifier Research
F	Fluke
HD	Heinrich Diesel
HP	Hewlett Packard
HV	Heraeus Vötsch
LC	Le Croy
LM	Lorch Microwave
MI	Montford Instruments
R&S	Rohde and Schwarz
R	Rotronic
TTI	Thurlby Thandar Instruments
W	Weinschel

2.1.1 The Special Test Equipment (STE) used in the testing was a proprietary Anritsu MT8803G Globalstar User Terminal tester. This was used to set all the test modes required during the testing where a carrier on mode was required. This equipment was not used in any testing requiring calibrated measurements. The Anritsu MT 8803G was set to 'Service option 2001' for all CARRIER ON testing with the maximum data rate (9600 bits/s). This produces maximum power and maximum modulation.

Part Number:	MT8803G
Serial Number:	MB10788

2.1.2 The following equipment was also used at BABT Product Service Ltd for the testing of the MES for the characterisation of Part 25.202 (f) radiated emission testing:
Hemford fully lined Anechoic Chamber, External dimensions: length 10 metres x width 5 metres x height 5 metres. Absorption material details: All walls, ceiling and floor are lined with Emmerson & Cummins Eccosorb type VHP-36-NRL.

2.2 **TEST SOFTWARE**

2.2.1 The following was used to control the Anritsu MT8803G Globalstar User Terminal tester on all tests.

Tester version:	v2.1.2
DDSP version	v1.6

2.3 TEST CONDITIONS

2.3.1 The sample submitted for testing consisted of a dual mode SAT 550 GSM 900 and Globalstar hand portable and an AC adapter / charger. All testing was performed with the AC adapter connected with the exception FCC Part 25.202 (d) Frequency Tolerance testing at extremes where only SAT 550 was tested.

2.3.2 Part 15.107 Conducted Emission Test Methods

The test was performed in accordance with ANSI C63.4.

All Conducted Emission Measurements were undertaken within the Characterisation Chamber. Conducted Emission measurements were undertaken on the Live and Neutral Lines.

The emissions were formally measured using a Quasi-Peak Detector which meets the CISPR requirements. The details of the highest emissions were then recorded in the Job Log Book. Details of the highest emissions for the Live and Neutral Lines are presented in Tables 1(a) and 1(b) respectively.

The Conducted Emission measurements were made using a Hewlett Packard Spectrum Analyser, Preselector and Quasi-Peak Adaptor.

The EUT was connected to a 110V 60Hz supply via a Chase Line Impedance Stabilisation Network (LISN).

2.3.3 Part 15.109 Radiated Emission Test Methods

The test was performed in accordance with ANSI C63.4.

A preliminary profile of the Radiated Electric Field emissions was obtained by placing the SAT 550 in a Characterisation Chamber; measurements were taken at a 3m distance. Measurements of emissions from the SAT 550 were obtained with the measurement antenna in Horizontal and Vertical Polarisations. The characterisation produced a list of the highest emissions, their bearing and associated antenna polarisation. The product was operated in a CARRIER OFF stand-by mode where it was not in receipt of the Globalstar network.

The EUT was connected to a 110V 60Hz supply via a Chase LISN.

The product was then transferred to the Open Field Site and placed on a remotely controlled turntable. Using the information from the preliminary profiling exercise, a search was made of the frequency spectrum from 30MHz to 13 GHz (greater than 5 times the highest frequency generated by the product). The list of the highest emissions was then confirmed or updated under Open Site conditions. These emissions were then formally measured using a Quasi-Peak Detector which met the CISPR 16 requirements. The readings were maximised by adjusting the antenna height, polarisation and turntable azimuth, in accordance with the specification. The details of these highest emissions were then recorded in the Job Log Book. Details of the highest emissions are presented in Table 2 in the results section of this report. The Radiated Electric Field emission measurements were made using a Hewlett Packard Spectrum Analyser, Preselector and Quasi-Peak detector.

2.3 **TEST CONDITIONS** continued

2.3.4 Part 25.202(d) Frequency Tolerance Test Methods

Testing was performed in accordance with FCC Equipment Authorisation Procedure Part 2.1055. Frequency tolerance measurements were recorded from -30°C to +50°C in 10°C steps.
The test power source voltages used (as declared by the manufacturer) were:

Higher Extreme: 7.4 Volts DC
Lower Extreme: 7.0 Volts DC

Testing was performed on the bottom, middle and top carrier frequencies of the device. This equates to Globalstar Channel 1 at 1610.73 MHz, Globalstar Channel 7 at 1618.11 MHz and Globalstar Channel 13 at 1625.49 MHz. The SAT 550 was placed in a Thermal Chamber. A temperature stabilisation period of ≥ 1 hour was used prior to any frequency tolerance measurements being made. The SAT 550 was put in a conversation mode with the Globalstar Anritsu test set at maximum carrier power. Measurements were made on a spectrum analyser with an external frequency reference derived from an Atomic Frequency Standard. The details of these test results are presented in Table 3 in the results section of this report

2.3.5 Part 25.202(f) Emission Limitation Test Methods

Testing was performed in accordance with FCC Equipment Authorisation Procedure Part 2.1057 (Frequency spectrum to be investigated). Emission Limitation measurements were recorded from 9 kHz to 16.5 GHz (the tenth harmonic of the highest fundamental frequency of the product). Conducted emission measurements were performed on the antenna ports from 9 kHz to 30 MHz in accordance with FCC Equipment Authorisation Procedure Part 2.1051 (Measurements required: Spurious emissions at the antenna terminals). Conducted emission measurements were performed in this frequency range as this is an industry standard method for measuring emissions from antenna ports. Radiated emissions were measured from 30 MHz to 16.5 GHz. A preliminary profile of the Radiated EIRP emission measurements were obtained by placing the SAT 550 in a Characterisation Chamber; measurements were taken at a 3m distance. Measurements of emissions from the SAT 550 were obtained with the measurement antenna in Horizontal and Vertical Polarisations. The characterisation produced a list of the highest emissions, their bearing and associated antenna polarisation.

The EUT was connected to a 110V 60Hz supply via a Chase LISN with a 50Ω termination on the RF conducted port.

Testing was performed on the bottom, middle and top carrier frequencies of the device. This equates to Globalstar Channel 1 at 1610.73 MHz, Globalstar Channel 7 at 1618.11 MHz and Globalstar Channel 13 at 1625.49 MHz. A communications link was established with the Globalstar Anritsu MT 8803G Test Set. The Anritsu MT 8803G was set to 'Service option 2001' for all CARRIER ON testing with the maximum data rate (9600 bits/s). This produces maximum power and maximum modulation.

The Authorised bandwidth of a Globalstar device is 16.5 MHz (1610 MHz to 1626.5 MHz). The limit ranges for each of the Globalstar channels under test were calculated using this Authorised bandwidth figure. The following limit tables were produced:-

2.3 **TEST CONDITIONS** continued

2.3.5 Part 25.202(f) Emission Limitation Test Methods continued

Globalstar Channel 1, Frequency = 1610.73 MHz.

Frequency Range	Limit (dBc)
9 kHz to 1569.48 MHz	-39*
1569.48 MHz to 1594.23 MHz	-35
1594.23 MHz to 1602.48 MHz	-25
1602.48 MHz to 1618.98 MHz	No Requirement
1618.98 MHz to 1627.23 MHz	-25
1627.23 MHz to 1651.98 MHz	-35
1651.98 MHz to 16.1073 GHz	-39*

* -[43 + 10 $\log_{10}$(device power in Watts = 0.4)]

Globalstar Channel 7, Frequency = 1618.11 MHz.

Frequency Range	Limit (dBc)
9kHz to 1576.86 MHz	-39*
1576.86 MHz to 1601.61 MHz	-35
1601.61 MHz to 1609.86 MHz	-25
1609.86 MHz to 1626.36 MHz	No Requirement
1626.36 MHz to 1634.61 MHz	-25
1634.61 MHz to 1659.36 MHz	-35
1659.36 MHz to 16.1811 GHz	-39*

* -[43 + 10 $\log_{10}$(device power in Watts = 0.4)]

Globalstar Channel 13, Frequency = 1625.49 MHz.

Frequency Range	Limit (dBc)
9 kHz to 1584.24 MHz	-39*
1584.24 MHz to 1608.99 MHz	-35
1608.99 MHz to 1617.24 MHz	-25
1617.24 MHz to 1633.73 MHz	No Requirement
1633.73 MHz to 1641.99 MHz	-25
1641.99 MHz to 1666.74 MHz	-35
1666.74 MHz to 16.2549 GHz	-39*

* -[43 + 10 $\log_{10}$(device power in Watts = 0.4)]

Conducted emission measurements were performed from 9kHz to 30 MHz with direct connection to the antenna port in line with recognised industry practice. Testing was performed using a Rohde and Schwarz FSEM 20 Spectrum Analyser connected via a power splitter to both the SAT 550 and the Anritsu MT 8803G Globalstar test set. All measurements were performed taking an allowance for the path losses of any cabling, attenuation and the power splitter.

The product was then transferred to the Open Field Site and placed on a remotely controlled turntable. Using the information from the preliminary profiling of the product, a search was made of the frequency spectrum from 30 MHz to 16.5 GHz. The list of the highest emissions was then confirmed or updated under Open Field Site conditions. These emissions were then formally measured as an EIRP measurement. The readings were maximised by adjusting the antenna height, polarisation and turntable azimuth, in accordance with the specification. The harmonics of the fundamentals were measured and if found greater than the noise floor were measured. All measurements were taken using antenna substitution techniques. The details of these highest emissions were then recorded in the Job Log Book. Details of the highest emission levels are presented in Tables 4(a), 4(b) 4(c) and 4(d) in the results section of this report.

2.3 **TEST CONDITIONS** continued

2.3.6 Part 25.213(b) Radiated Emission Test Methods

The product was set up in the Open Field Site and placed on a remotely controlled turntable. Using the information from the preliminary profiling exercise, a search was made of the frequency spectrum from 1574.397 MHz to 1576.443 MHz. The list of the highest emission levels was then confirmed or updated under Open Site conditions. These emissions were then formally measured as an EIRP measurement. The readings were maximised by adjusting the antenna height, polarisation and turntable azimuth, in accordance with the specification. All measurements were taken using substitution techniques. The frequency band under test was video averaged over 20 milliseconds at the maximised position.

The EUT was connected to a 110V 60Hz supply via a Chase LISN with a 50Ω termination on the RF conducted port.

Testing was performed on the bottom, middle and top carrier frequencies of the device. This equates to Globalstar Channel 1 at 1610.73 MHz, Globalstar Channel 7 at 1618.11 MHz and Globalstar Channel 13 at 1625.49 MHz. A communications link was established with the Globalstar Anritsu MT 8803G Test Set. The Anritsu MT 8803G was set to 'Service option 2001' for all CARRIER ON testing with the maximum data rate (9600 bits/s). This produces maximum power and maximum modulation.

2.3.7 FCC 98-338 Section 25.200 Interim equipment authorisation (c)

The product was set up in the Open Field Site and placed on a remotely controlled turntable. Using the information from the preliminary profiling exercise, a search was made of the frequency spectrum from 1559 MHz to 1605 MHz. The list of the highest emissions was then confirmed or updated under Open Site conditions. These emissions were then formally measured as an EIRP measurement. The readings were maximised by adjusting the antenna height, polarisation and turntable azimuth, in accordance with the specification. All measurements were taken using antenna substitution techniques. The frequency band under test was video averaged over 20 milliseconds at the maximised position in a 1 MHz bandwidth. A search was also conducted using a 500 Hz measurement bandwidth.

The EUT was connected to a 110V 60Hz supply via a Chase LISN with a 50Ω termination on the RF conducted port.

Testing was performed on the bottom, middle and top carrier frequencies of the device. This equates to Globalstar Channel 1 at 1610.73 MHz, Globalstar Channel 7 at 1618.11 MHz and Globalstar Channel 13 at 1625.49 MHz. A communications link was established with the Globalstar Anritsu MT 8803G Test Set. The Anritsu MT 8803G was set to 'Service option 2001' for all CARRIER ON testing with the maximum data rate (9600 bits/s). This produces maximum power and maximum modulation.

2.4 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems, in accordance with the recommendations of the United Kingdom Accreditation Service (UKAS - our ISO Guide 25 and EN 45001 measurement accreditation body) document NIS 81 Edition 1, May 1994 are :-

For Radiated Emission, Quasi-Peak Measurements taken in Zero Span using the Hewlett Packard Spectrum Analyser, Preselector and Quasi-Peak Adaptor:-

Frequency	$\pm 2 \times 10^{-7}$ x Centre Frequency (up to 1 GHz) $\pm 2 \times 10^{-6}$ x Centre Frequency (above 1 GHz)
Amplitude	+4.45dB (30-200MHz; 3m Measurements) -4.42dB (30-200MHz; 3m Measurements) +4.80dB (200-1000MHz; 3m Measurements) -3.81dB (200-1000MHz; 3m Measurements) ±3.0dB (1 GHz to 13GHz; 3m Measurements)

For Radiated Emission measurements using the Rohde and Schwarz FSEM 20 Spectrum Analyser, also EIRP measurements and antenna substitution methods:-

Frequency	$\pm 2 \times 10^{-7}$ x Centre Frequency (30 MHz to 16.5 GHz)
Amplitude	±2.7dB (30 MHz to 16.5 GHz)

For Conducted Emission measurements using the Rohde and Schwarz FSEM 20 Spectrum Analyser and antenna substitution methods:-

Frequency	$\pm 2 \times 10^{-7}$ x Centre Frequency (9 kHz to 30 MHz)
Amplitude	±1.4 dB (9 kHz to 30 MHz)

For Frequency Tolerance Measurements using the Rohde and Schwarz FSEM 20 Spectrum Analyser, Atomic (Rubidium-derived) Frequency Standard and Thermal Chamber:-

Frequency	±50 Hz (3.1×10^{-8} x Centre Frequency)
Temperature	±2.0 °C (worst case on Thermal Chamber)

Telital SAT 550 Dual Mode Portable Mobile Earth Station designed to work on the Satellite Personal Communications Network operated by Globalstar

SECTION 2.5

TEST RESULTS

(Pages 15 to 19)

2.5 TEST RESULTS

2.5.1 Part 15.107 Conducted Emission Test Results

Equipment Designation : Unintentional Radiator.

The SAT 550 met the Class B requirements of FCC Part 15 Subpart B for Conducted Emissions.

Conducted Emissions Live Line : A search was made of the frequency spectrum from 450kHz to 30MHz. The levels of the seven highest emissions were measured in accordance with the specification and are presented in Table 1(a) below :-

Frequency	Measured Level	Cable Loss	Sensor Factor	Absolute Level		Spec Limit	
MHz	dBµV	dB	dB	dBµV	µV	dBµV	µV
0.453	21.9	0.0	10.0	31.9	39.4	48	250
0.474	21.2	0.0	10.0	31.2	36.3	48	250
0.498	19.5	0.0	10.0	29.5	29.9	48	250
0.521	18.3	0.0	10.0	28.3	26.0	48	250
0.565	15.0	0.0	10.0	26.0	20.0	48	250
0.575	15.5	0.0	10.0	25.5	18.8	48	250
3.345	18.4	0.0	10.0	28.4	26.3	48	250

Table 1 (a), Part 15.107 Conducted Emission Test Results (Live Line)

Conducted Emissions Neutral Line : A search was made of the frequency spectrum from 450kHz to 30MHz. The levels of the ten highest emissions were measured in accordance with the specification and are presented in Table 1(b) below :-

Frequency	Measured Level	Cable Loss	Sensor Factor	Absolute Level		Spec Limit	
MHz	dBµV	dB	dB	dBµV	µV	dBµV	µV
0.451	21.0	0.0	10.2	31.2	36.3	48	250
0.463	20.3	0.0	10.2	30.5	33.5	48	250
0.473	20.1	0.0	10.2	30.3	32.7	48	250
0.486	19.1	0.0	10.2	29.3	29.2	48	250
2.918	18.5	0.0	10.3	28.8	27.5	48	250
3.218	19.8	0.0	10.3	30.1	32.0	48	250
3.335	20.4	0.0	10.3	30.7	34.3	48	250
3.454	19.4	0.0	10.3	29.7	30.6	48	250
3.513	19.5	0.0	10.3	29.8	30.9	48	250
3.572	19.4	0.0	10.2	29.6	30.2	48	250

Table 1 (b), Part 15.107 Conducted Emission Test Results (Neutral Line)

2.5 **TEST RESULTS** continued

2.5.1 Part 15.109 Radiated Emission Test Results

Equipment Designation : Unintentional Radiator.

The SAT 550 met the Class B requirements of FCC Part 15 Subpart B for Radiated Electric Field Emissions.

The emissions have been measured at 3 m.

Open Field Results : The levels of the thirteen highest emissions measured in accordance with the specification are presented in Table 2 below :-

Frequency	Pol	Hgt	Azm	Level at 3 m	Amplifier Gain* and Cable Loss	Antenna Factor	F.S at 3m		Spec Limit	
MHz	H/V	cm	deg	dBµV	dB	dB	dBµV/m	µV/m	dBµV/m	µV/m
49.142	V	105	2	21.4	1.2	11.2	33.8	49.0	40	100
112.251	V	105	110	21.3	1.8	9.2	32.3	41.2	43.5	150
112.745	V	105	92	20.0	1.8	9.2	31.0	35.5	43.5	150
113.306	V	105	59	21.0	1.8	9.1	31.9	39.4	43.5	150
113.768	V	105	67	22.5	1.8	9.1	33.4	46.8	43.5	150
114.261	V	105	73	23.2	1.8	9.1	34.1	50.7	43.5	150
114.763	V	105	75	23	1.8	9.0	33.8	49.0	43.5	150
2263.100	V	100	220	51.8	-33.8	28.3	46.3	206.5	54	500
2274.600	H	100	215	51.5	-33.8	28.3	46.0	199.5	54	500
4541.100	V	102	125	43.7	-29.7	32.8	46.8	218.8	54	500
4541.200	H	106	192	36.7	-29.7	32.8	39.8	97.7	54	500
6778.800	V	100	54	34.2	-28.5	35.7	41.4	117.5	54	500
6790.000	V	104	265	39.3	-28.5	35.7	46.5	211.3	54	500

Table 2, Part 15.109 Radiated Emission Test Results

* Amplifier required for frequencies above 1 GHz.

ABBREVIATIONS FOR ABOVE TABLE

H	Horizontal Polarisation	V	Vertical Polarisation
Pol	Polarisation	Hgt	Height
deg	Degree	Azm	Azimuth
Spec	Specification	F S	Field Strength

Procedure Test Performed in accordance with ANSI C63.4.

2.5 **TEST RESULTS** continued

2.5.2 Part 25.202 (d) Frequency Tolerance

The SAT 550 met requirements of FCC Part 25.202 (d) frequency Tolerance that the carrier frequency shall be maintained within 0.001 percent of the reference frequency.

The results of the testing are shown below.

Globalstar Channel Number	Carrier Frequency MHz	Temperature °C	High Voltage (7.4Vdc) Frequency Tolerance kHz	Low Voltage (7.0 Vdc) Frequency Tolerance kHz	Frequency Tolerance Limit kHz
1	1610.73	+50	-0.390	-0.270	±16.1073
7	1618.11	+50	-0.310	-0.330	±16.1811
13	1625.49	+50	-0.330	-0.210	±16.2549
1	1610.73	+40	-0.150	-0.150	±16.1073
7	1618.11	+40	-0.150	-0.130	±16.1811
13	1625.49	+40	-0.090	-0.090	±16.2549
1	1610.73	+30	-0.210	-0.310	±16.1073
7	1618.11	+30	-0.330	-0.210	±16.1811
13	1625.49	+30	-0.270	-0.430	±16.2549
1	1610.73	+20	-0.511	-0.490	±16.1073
7	1618.11	+20	-0.470	-0.470	±16.1811
13	1625.49	+20	-0.330	-0.450	±16.2549
1	1610.73	+10	-0.430	-0.470	±16.1073
7	1618.11	+10	-0.350	-0.370	±16.1811
13	1625.49	+10	-0.370	-0.370	±16.2549
1	1610.73	0	-0.330	-0.250	±16.1073
7	1618.11	0	-0.350	-0.370	±16.1811
13	1625.49	0	-0.490	-0.511	±16.2549
1	1610.73	-10	-0.170	-0.210	±16.1073
7	1618.11	-10	-0.150	-0.250	±16.1811
13	1625.49	-10	-0.130	-0.170	±16.2549
1	1610.73	-20	+0.952	+0.691	±16.1073
7	1618.11	-20	+0.651	+0.591	±16.1811
13	1625.49	-20	+0.490	+0.410	±16.2549
1	1610.73	-30	+1.333	+1.333	±16.1073
7	1618.11	-30	+1.373	+1.352	±16.1811
13	1625.49	-30	+1.152	+1.273	±16.2549

Table 3, Part 25.202 (d) Frequency Tolerance Results

2.5 **TEST RESULTS** continued

2.5.3 Part 25.202 (f) Conducted and Radiated Emission Test Results

The SAT 550 met the Class B requirements of FCC Part 25.202 (f) for Conducted and Radiated Emissions.

(a) Conducted Emissions were measured from 9 kHz to 30 MHz with a direct connection onto the SAT 550 antenna port. No Emissions were found with a level greater than 20 dB below the specification limit.

(b) EIRP Radiated Emissions were measured at 3 m.

Open Field Results : The levels of the highest emissions measured in accordance with the specification are presented in Tables 4(a), 4(b), 4(c) and 4(d) below :-

Fundamental Carrier Power measurements

Globalstar Channel Number	Frequency (MHz)	Polarity H/V	EIRP (dBW/4kHz)
1	1610.73	V	-23.8
7	1618.11	V	-24.5
13	1625.49	V	-25.0

Table 4(a), Part 25.202 (f) Radiated Emission (carrier power measurements)

Globalstar Channel 1 Results (Carrier Frequency = 1610.73 MHz)

Frequency (MHz)	Polarity H/V	EIRP (dBW/4kHz)	Calculated EIRP limit (dBW/4kHz)
208.000	H	-97.1	-62.8
221.000	H	-98.9	-62.8
2266.888	V	-91.9	-62.8
4533.776	V	-92.0	-62.8

Table 4(b), Part 25.202 (f) Radiated Emissions (Globalstar Channel 1 Test Results)

Globalstar Channel 7 Results (Carrier Frequency = 1618.11 MHz)

Frequency (MHz)	Polarity H/V	EIRP (dBW/4kHz)	Calculated EIRP limit (dBW/4kHz)
2266.888	V	-91.9	-62.8
4533.776	V	-92.0	-62.8

Table 4(c), Part 25.202 (f) Radiated Emissions (Globalstar Channel 7 Test Results)

2.5 **TEST RESULTS** continued

2.5.3 Part 25.202 (f) Conducted and Radiated Emission Test Results continued

Globalstar Channel 13 Results (Carrier Frequency = 1625.49 MHz)

Frequency (MHz)	Polarity H/V	EIRP (dBW/4kHz)	Calculated EIRP limit (dBW/4kHz)
2266.888	V	-91.9	-62.8
4533.776	V	-92.0	-62.8

Table 4(d), Part 25.202 (f) Radiated Emissions (Globalstar Channel 13 Test Results)

2.5.4 Part 25.213 (b) Radiated Emission Test Results

The SAT 550 met the requirements of FCC Part 25.213 (b) for radiated emissions. No emissions were found in the frequency range of 1574.397 MHz to 1576.443 MHz at a level within 10 dB of the specification limit of -70 dBW/MHz for broadband emissions. No discrete spurious (narrow band) emissions were detected in the same range.

2.5.5 FCC 98-338 Section 25.200 Interim equipment authorisation (c)

The SAT 550 met the requirement of FCC 98-338 Section 25.200 Interim equipment authorisation part (c). . No emissions were found in the frequency range of 1559 MHz to 1605 MHz at a level within 10 dB of the specification limit of -70 dBW/MHz for broadband emissions. No discrete spurious (narrow band) emissions were detected in the same range.

2.6 **FCC SITE COMPLIANCE LETTER**

FEDERAL COMMUNICATIONS COMMISSION
7435 Oakland Mills Road
Columbia, MD 21046
Telephone: 301-725-1585 (ext-218)
Facsimile: 301-344-2050

March 26, 1998

IN REPLY REFER TO
31040/SIT
1300F2

TUV Product Service Limited
Segensworth Road, Titchfield
Fareham, Hampshire PO15 5RH, UK

Attention: K. F. Archer

Re: Measurement facility located at above address
(3 and 10 meter site)

Gentlemen:

Your submission of the description of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC Rules. The description has, therefore, been placed on file and the name of your organization added to the Commission's list of facilities whose measurement data will be accepted in conjunction with applications for certification or notification under Parts 15 or 18 of the Commission's Rules. Our list will also indicate that the facility complies with the radiated and AC line conducted test site criteria in ANSI C63.4-1992. Please note that this filing must be updated for any changes made to the facility, and at least every three years the data on file must be certified as current.

Per your request, the above mentioned facility has been also added to our list of those who perform these measurement services for the public on a fee basis. This list is updated monthly and is available on the Laboratory's Public Access Link (PAL) at 301-725-1072, and also on the Internet at the FCC Website www.fcc.gov/oet/info/database/testsite/.

Sincerely,

Thomas W. Phillips
Electronics Engineer
Customer Service Branch