

ANNEX III. OPERATING LIFETIME AT MINIMUM TEMPERATURE

DME Corporation
Model SRB-406 Battery Pack
Estimated Capacity after Five Years in Service (Life Cycle Profile)
Revision 1
July 17, 2002

Lithium Cell Design Data

The lithium cell has an average self-discharge loss of 1.0 % per year.
The shelf life of the LiMNO₂ cells is ten years.

Regulatory Required Lithium Battery Pack Life

Five years (10 years/2). Battery would have 95 % of rated capacity after five years of self-discharge.

DME Corporation Specified Life

Maximum shelf life 6 months (20° C), followed by a maximum of 4.5 years service life.

Standard Lifetime Test Protocol (all markets)

Cells

Open circuit voltage checks only.

Cell Stack

Open circuit voltage checks only.

Battery Pack

Factory Final Assembly Test

Open circuit voltage checks only.

Beacon Self-Test w/Battery Pack Installed

Maximum of five self-test's during five years of product life. Self-test duration 30 seconds or 2.5 minutes. Current drain per test is 0.08A. This is equivalent to 0.003 AH or 0.05 % of capacity.

Beacon Continuous Current Drain

0.0000004 A. Over five years battery loses 0.3 % capacity due to continuous current drain through CCA's.

Total Precondition Drain

5.0 % capacity loss due to self-discharge
0.3 % capacity due loss to continuous current drain
0.05 % capacity loss due to self-tests

5.35 % Total Capacity Loss
0.227 % Correction Coefficient for Battery-to-Battery Differences (1.65 factor)
5.58 % Corrected Total Capacity

Battery would have 94.42 % of rated capacity after 5 years or 5.28 AH of capacity.

BEACON NOMINAL FREQUENCY

MANUFACTURER: DME CORP

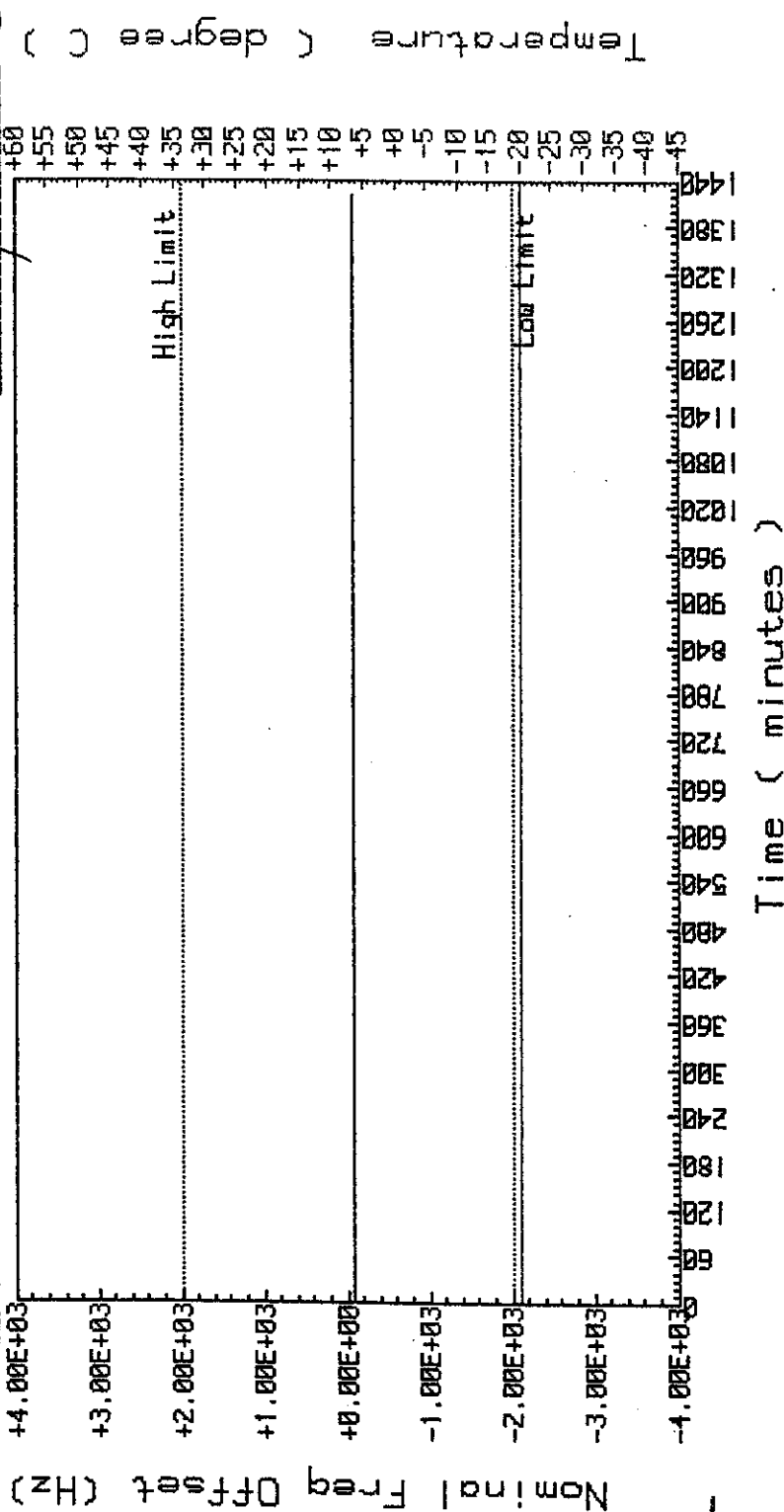
MODEL NUMBER: SRB-406

SERIAL NUMBER: 126978

DATE: 5 Aug 2002

TESTED BY: *[Signature]*

APPROVED: *[Signature]*



BEACON SHORT TERM STABILITY

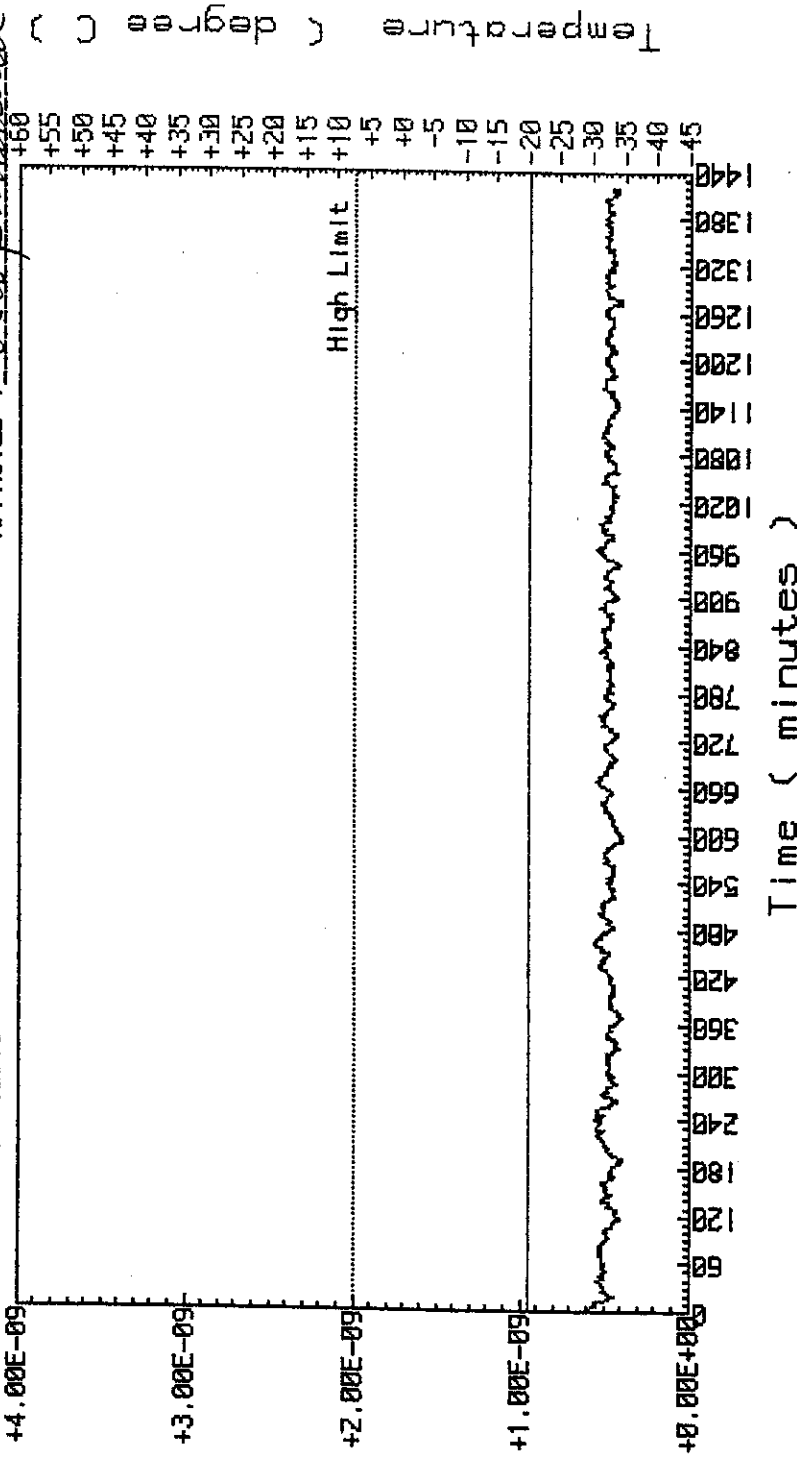
MANUFACTURER: DME CORP
 MODEL NUMBER: SRB-406
 SERIAL NUMBER: 126978

DATE: 5 Aug 2002

TESTED BY: *[Signature]*

APPROVED: *Rosa Barrin*

Short term (part in 10⁹)



BEACON MEDIUM TERM STABILITY

MANUFACTURER: DME CORP

MODEL NUMBER: SRB-406

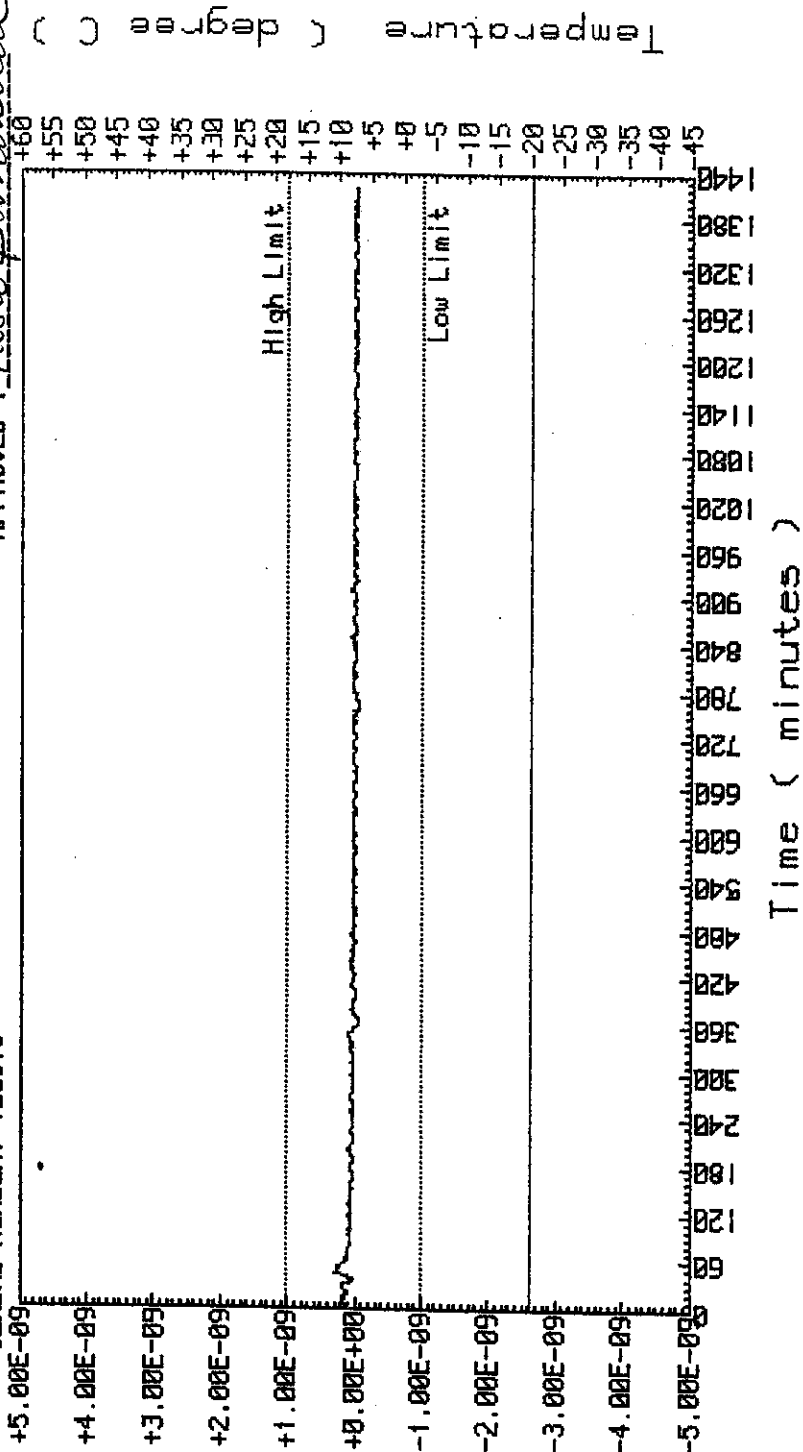
SERIAL NUMBER: 126978

DATE: 5 Aug 2002

TESTED BY: *[Signature]*

APPROVED: *Rosa Barrinuan*

Mean Slope (part in $10^{-9}/m$)



Temperature (degree C)

406 SIGNAL OUTPUT POWER

MANUFACTURER: DME CORP

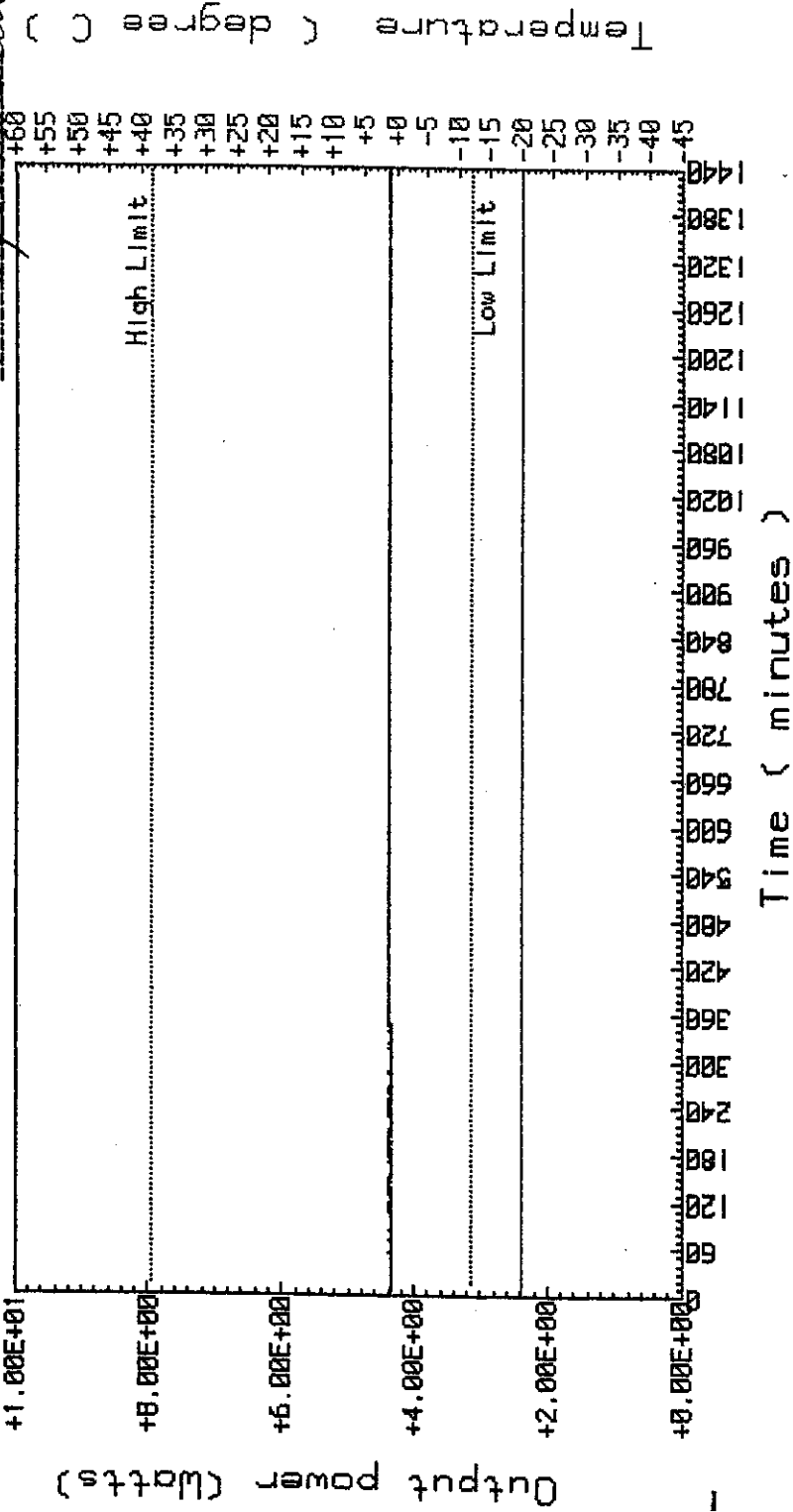
MODEL NUMBER: SRB-406

SERIAL NUMBER: 126978

DATE: 5 Aug 2002

TESTED BY: *[Signature]*

APPROVED: *Rita Harrison*



BEACON MEDIUM TERM STABILITY

MANUFACTURER: DME CORP

MODEL NUMBER: SRB-426

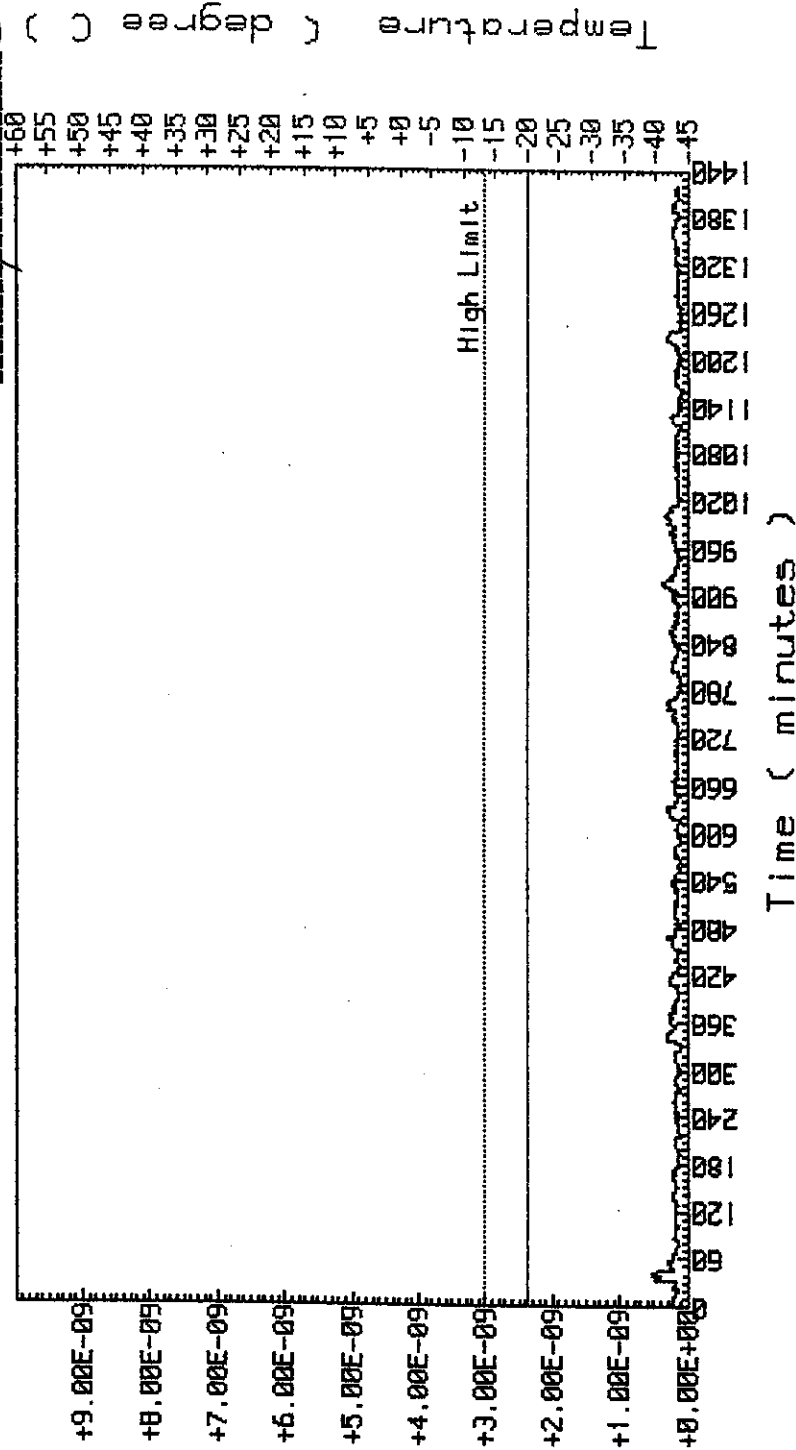
SERIAL NUMBER: 126978

DATE: 5 Aug 2002

TESTED BY: *[Signature]*

APPROVED: *Rosa Barineau*

Root Mean Square Error (part in 10⁹)



**ANNEX IV. FREQUENCY STABILITY TEST
WITH TEMPERATURE GRADIENT**

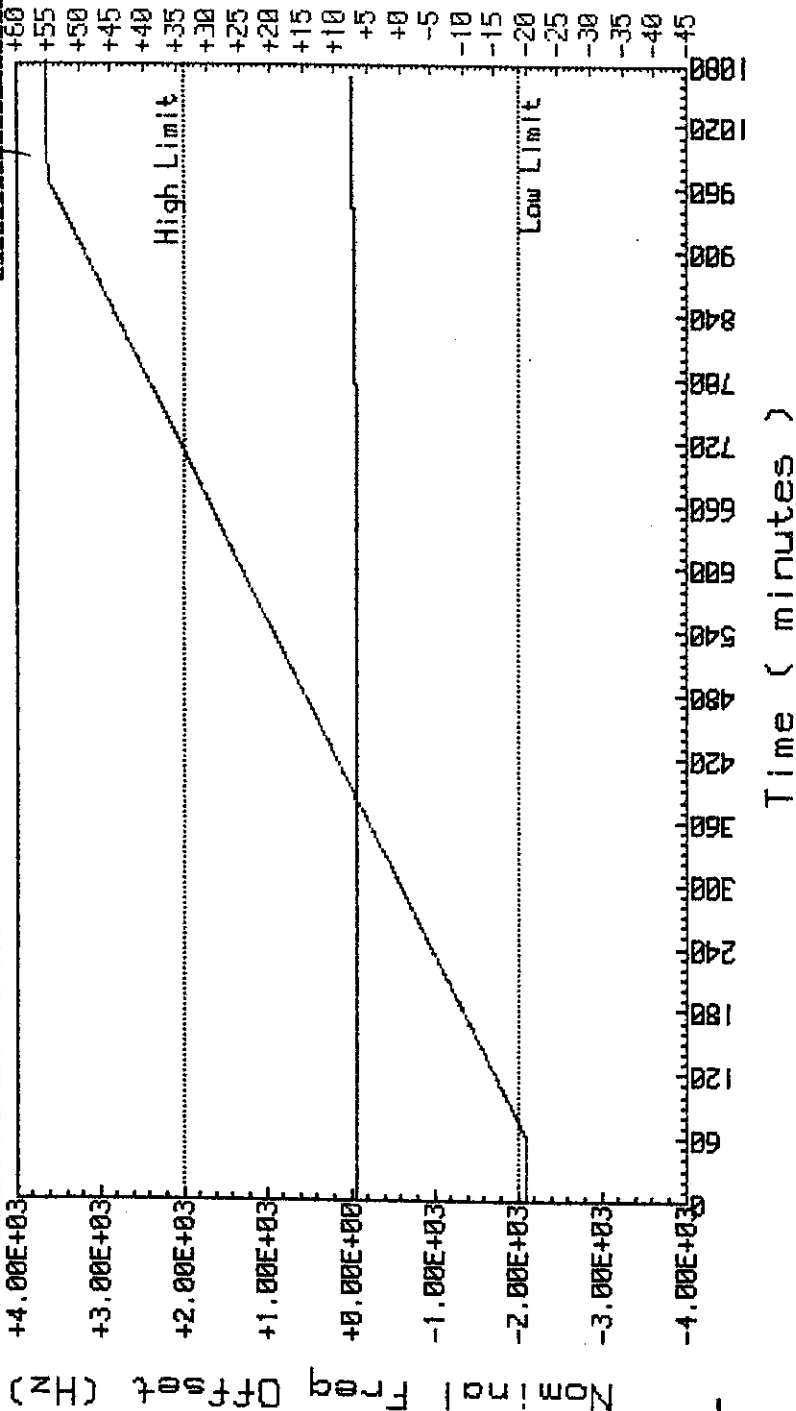
BEACON NOMINAL FREQUENCY

MANUFACTURER: DME CORP
 MODEL NUMBER: SRB-406
 SERIAL NUMBER: 126978

DATE: 7 Aug 2002

TESTED BY: *[Signature]*

APPROVED: *Rosa Parinola*



BEACON SHORT TERM STABILITY

MANUFACTURER: DME CORP

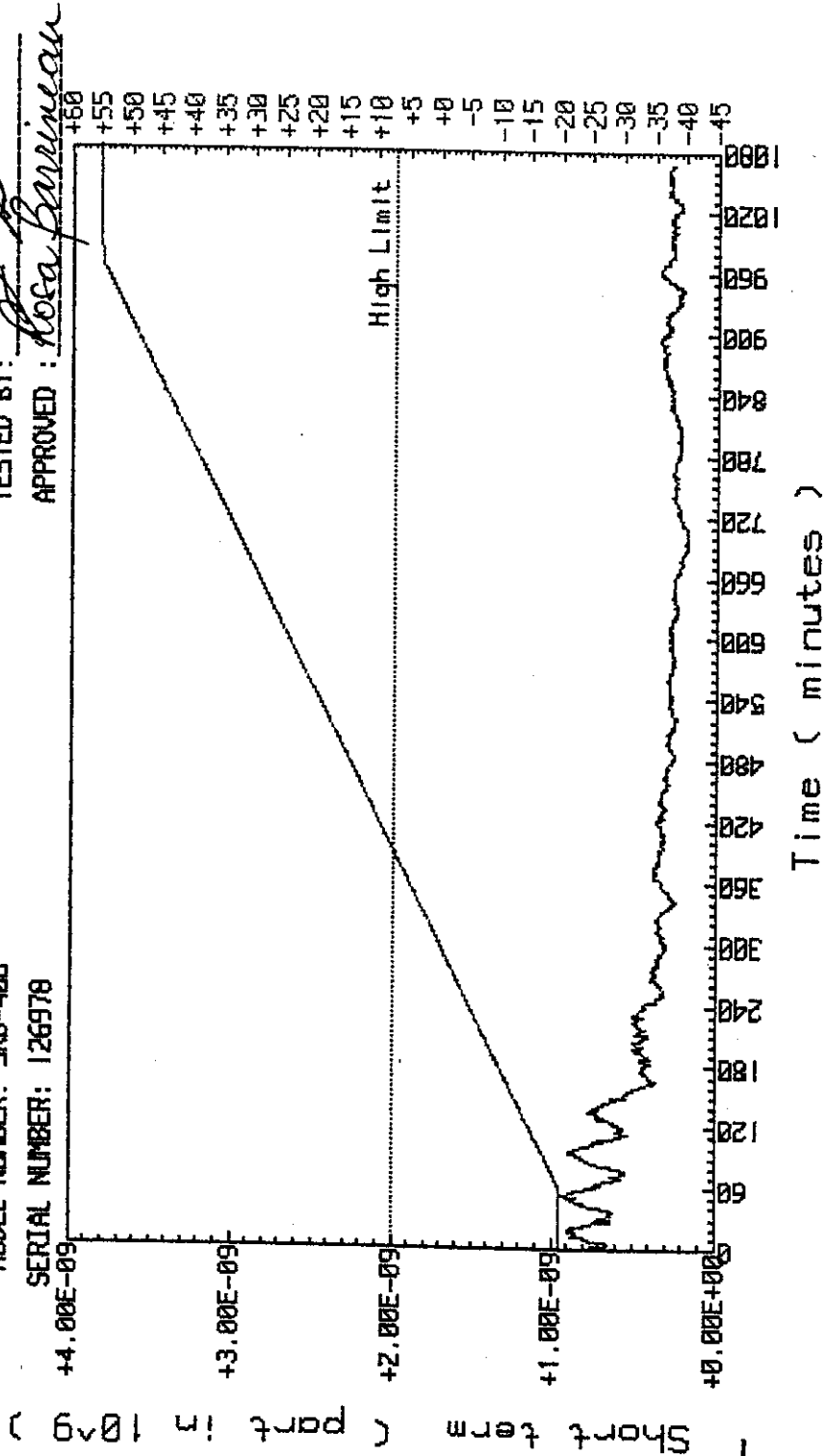
MODEL NUMBER: SRB-406

SERIAL NUMBER: 126978

DATE: 7 Aug 2002

TESTED BY: *[Signature]*

APPROVED: *[Signature]*



BEACON MEDIUM TERM STABILITY

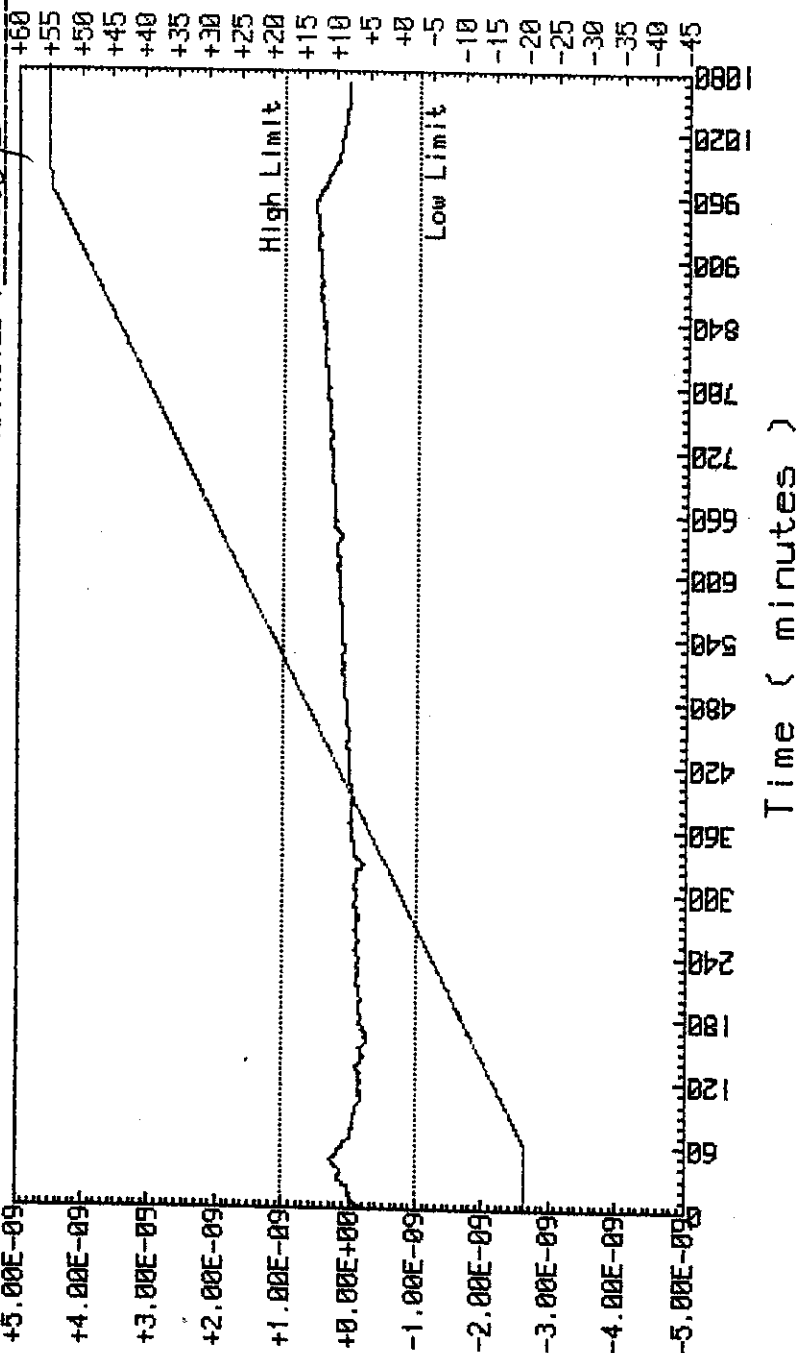
MANUFACTURER: DME CORP
 MODEL NUMBER: SRB-406
 SERIAL NUMBER: 126978

DATE: 7 Aug 2002

TESTED BY: *[Signature]*

APPROVED: *Rosa Barincau*

Mean Slope (part in $10^9/m$)



BEACON MEDIUM TERM STABILITY

MANUFACTURER: DME CORP

MODEL NUMBER: SR8-406

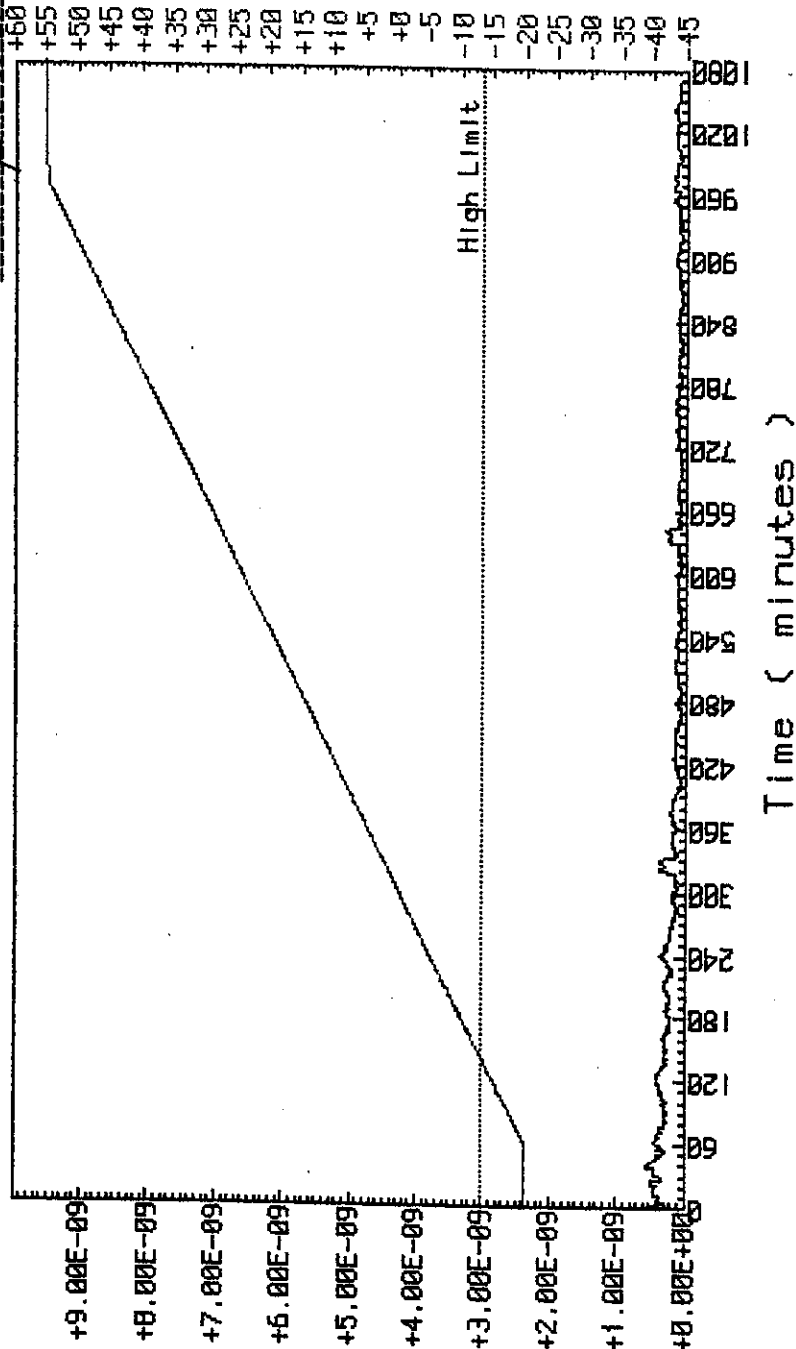
SERIAL NUMBER: 126978

DATE: 7 Aug 2002

TESTED BY: *[Signature]*

APPROVED: *Rosa Barrera*

Ref. freq. var. (part in 10⁹)



406 SIGNAL OUTPUT POWER

MANUFACTURER: DME CORP

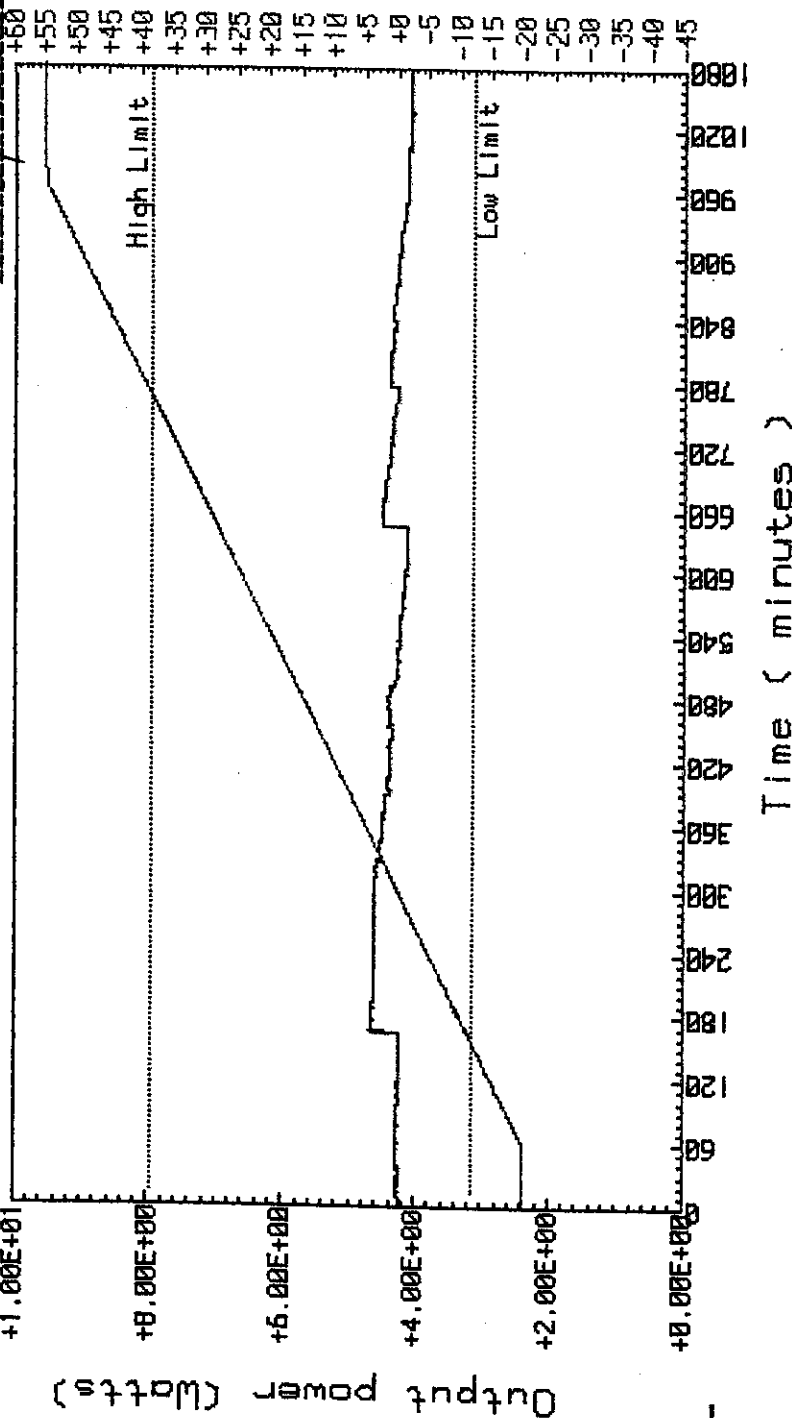
MODEL NUMBER: SRB-406

SERIAL NUMBER: 126978

DATE: 7 Aug 2002

TESTED BY: *[Signature]*

APPROVED: *Ron. Barrigan*



TEMPERATURE GRADIENT TEST BEACON NOMINAL FREQUENCY

MANUFACTURER: DNE CORP

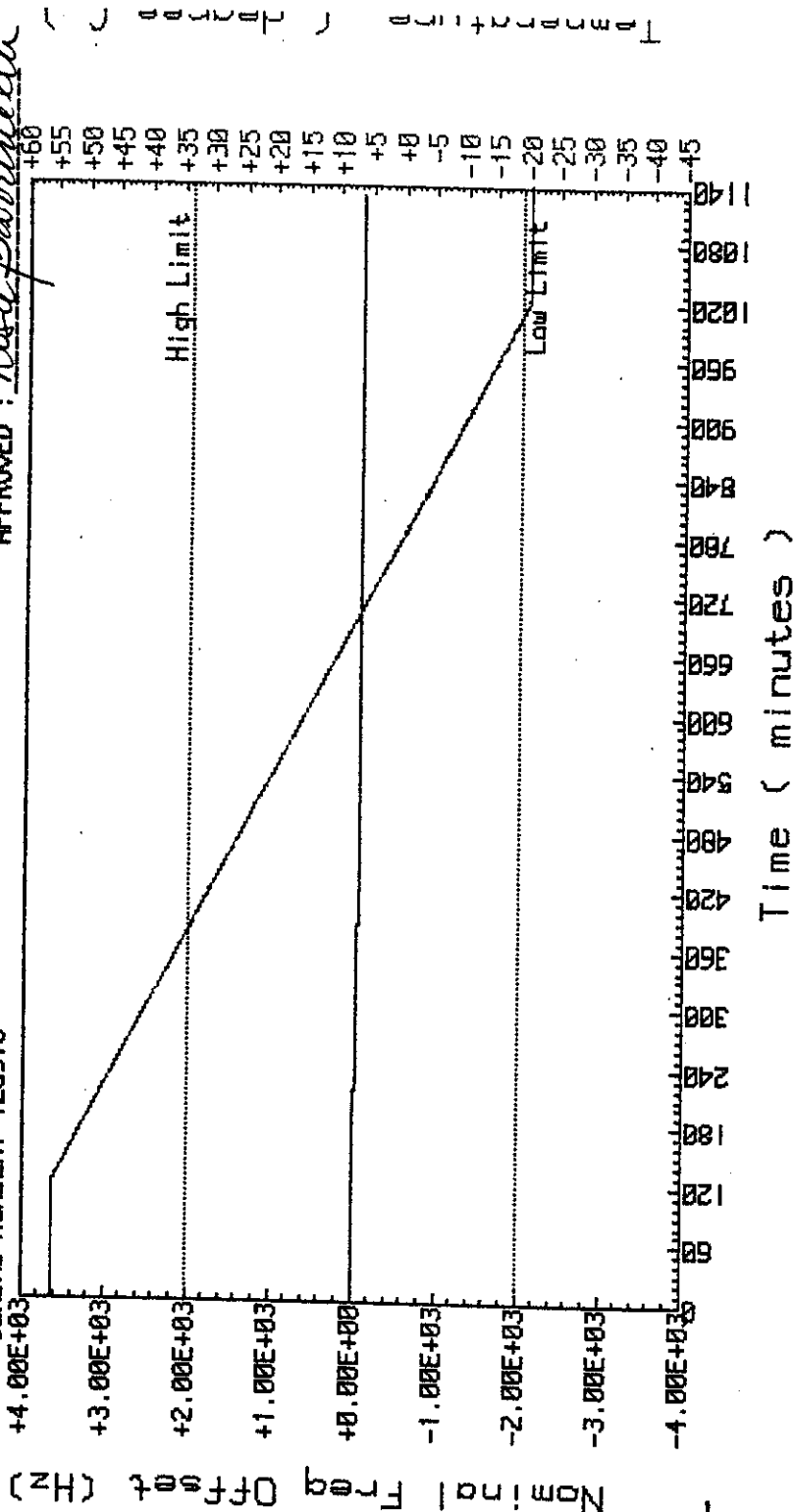
MODEL NUMBER: SRB-406

SERIAL NUMBER: 126978

DATE: 8 Aug 2002

TESTED BY: *[Signature]*

APPROVED: *Rosa Barragan*



TEMPERATURE GRADIENT TEST BEACON SHORT TERM STABILITY

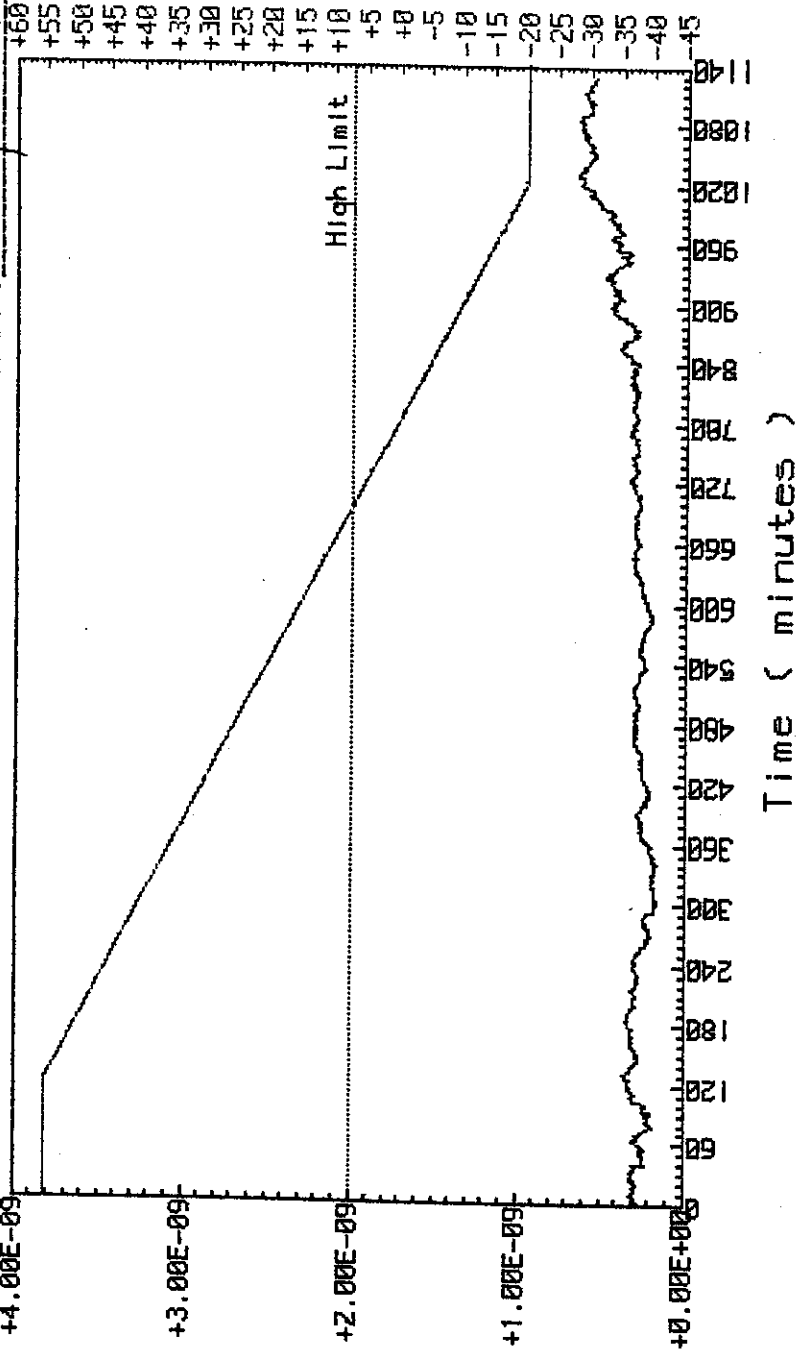
MANUFACTURER: DME CORP
MODEL NUMBER: SRB-406
SERIAL NUMBER: 126978

DATE: 8 Aug 2002

TESTED BY: *[Signature]*

APPROVED: *Rosa Barinova*

Short term (part in 10⁹)



TEMPERATURE GRADIENT TEST BEACON MEDIUM TERM STABILITY

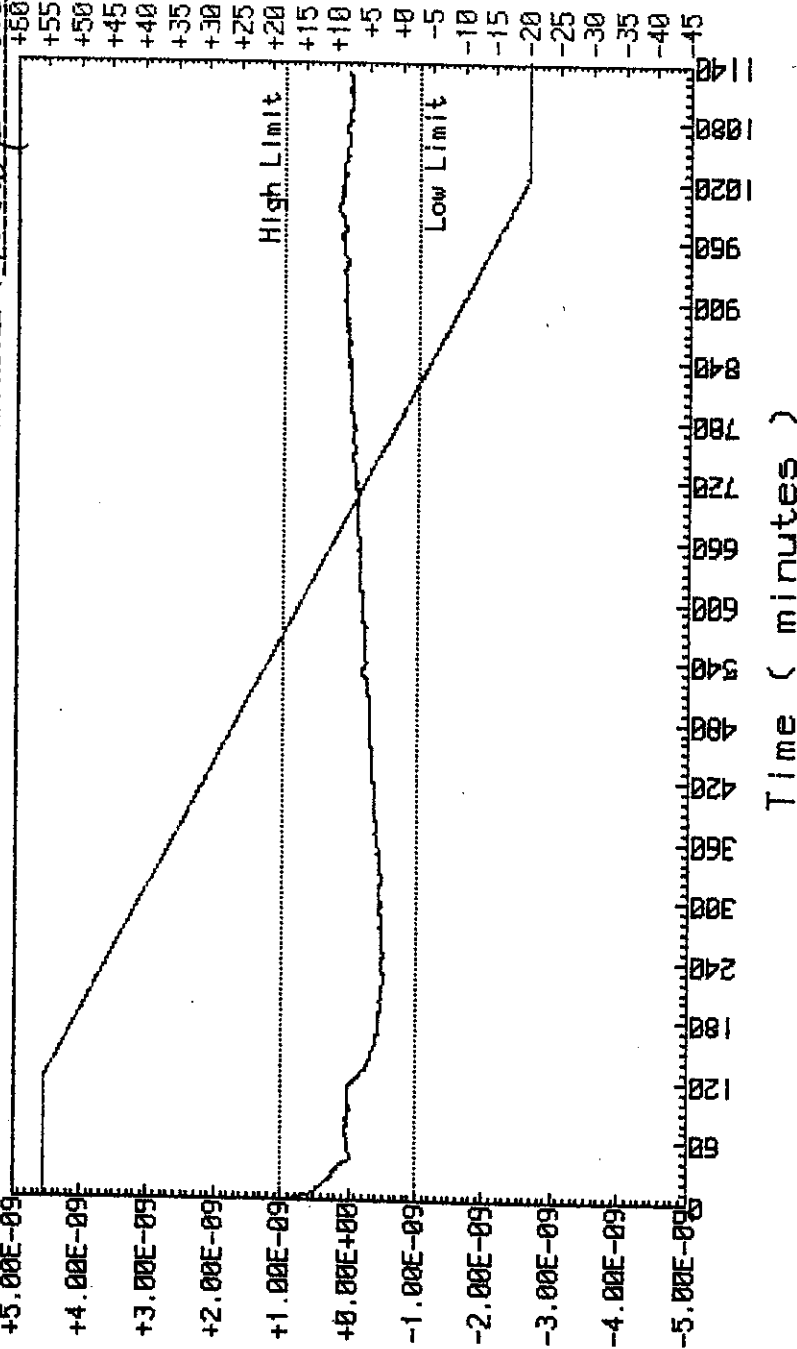
MANUFACTURER: DME CORP
MODEL NUMBER: SFB-406
SERIAL NUMBER: 126978

DATE: 8 Aug 2002

TESTED BY: *[Signature]*

APPROVED: *Rafa Bannineau*

Mean Slope (part in 10⁹/m²)



TEMPERATURE GRADIENT TEST BEACON MEDIUM TERM STABILITY

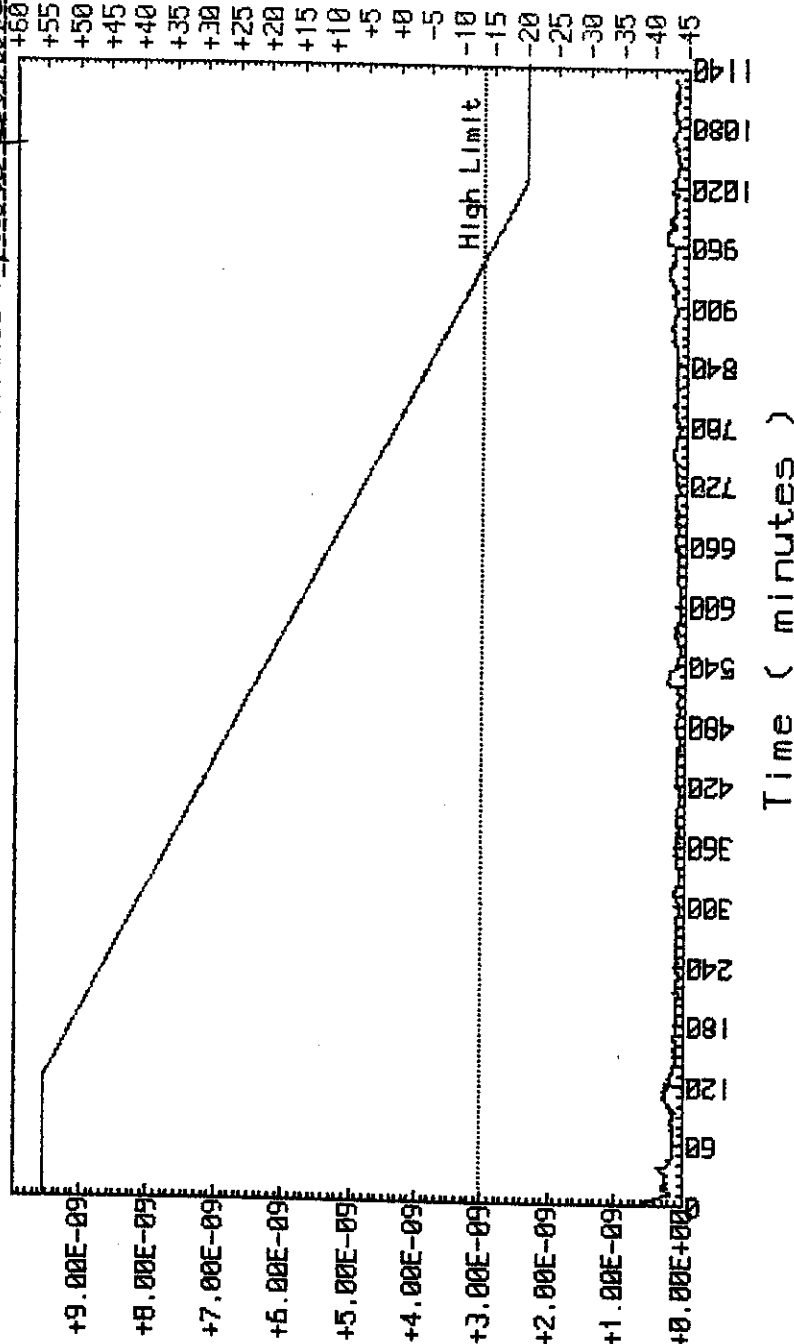
MANUFACTURER: OME CORP
MODEL NUMBER: SRB-406
SERIAL NUMBER: 126978

DATE: 8 Aug 2002

TESTED BY: *[Signature]*

APPROVED: *[Signature]*

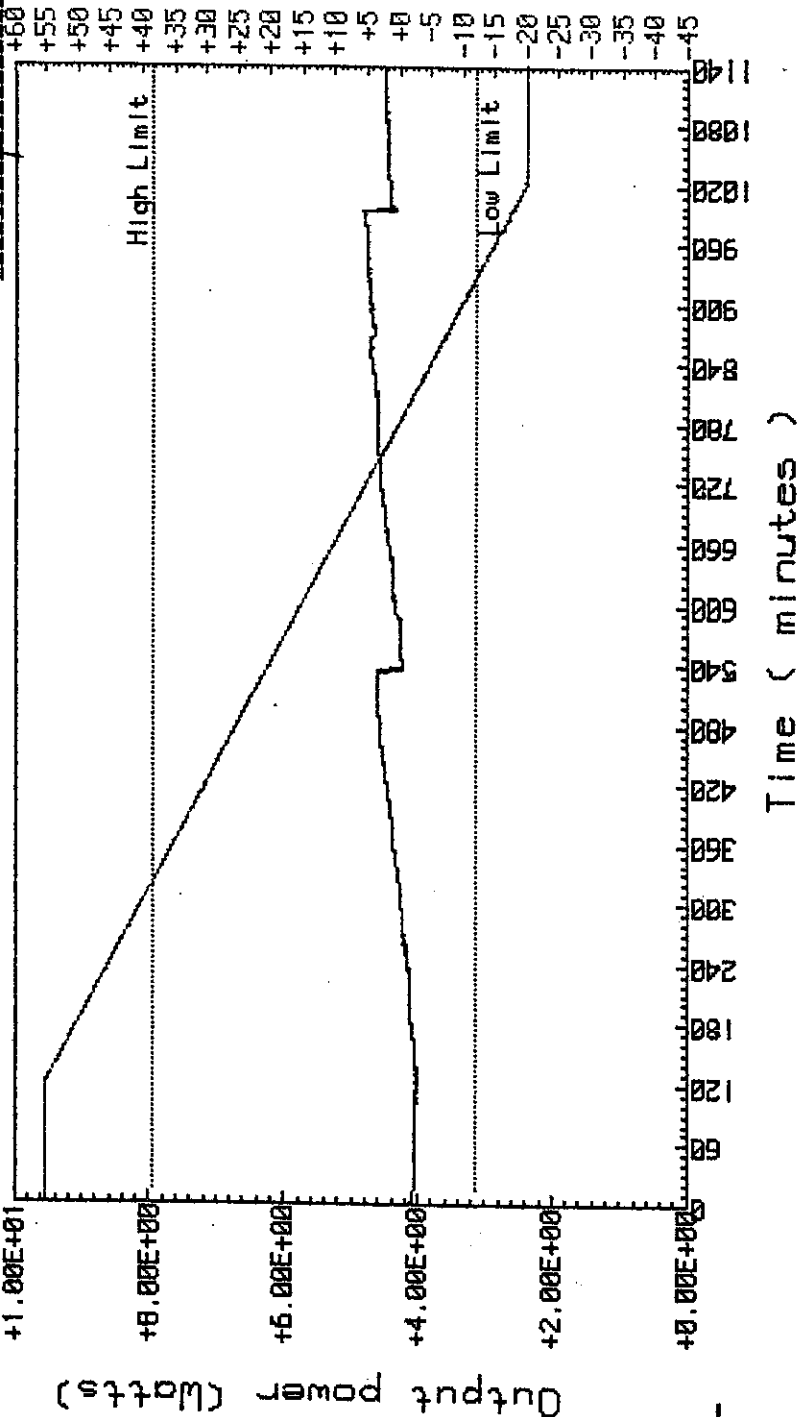
Res. freq. var. (part in 10⁹)



TEMPERATURE GRADIENT TEST 406 SIGNAL OUTPUT POWER

MANUFACTURER: DME CORP
MODEL NUMBER: SRB-406
SERIAL NUMBER: 126978

DATE: 8 Aug 2002
TESTED BY: *[Signature]*
APPROVED: *Rosa Barrinjan*



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ANNEX V. SATELLITE QUALITATIVE TESTS									
SIRF: The set of 10th V. 4.1 Headers: 1. Mod. 2. Freq. 3. 4. Wild. 5. Rcv. 6. Type. 7. Brn. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 8									

A-V-1

A-Head	A-L-Radius	A-Feares	B-Minor	B-Major	B-Head	B-E-Radius	B-Feares	Window	Conf	IntSol
-68.0349	0	0	0.001951	0.064498	38.71893	0	0	1	3	81640
-72.8858	3	1	0.348844	6.471972	43.57364	6	7	1	3	81642
0	0	0	0	0	0	0	0	0	4	83666
41.83188	3	3	0.342709	5.357237	-70.9594	5	5	1	3	83668
45.99244	0	0	0.001857	0.048148	-75.2863	0	0	1	3	52852
-75.2593	0	0	0.003049	0.078343	45.96168	0	0	1	3	52854
-75.3021	0	0	0.000831	0.021362	46.00864	0	0	1	3	4354
45.96207	0	0	0.001106	0.028648	-75.26	0	0	1	3	4356
41.65992	2	0	0.347796	5.433117	-70.9804	5	5	1	3	16272
40.1082	8	16	0.905748	12.75877	-69.437	12	36	1	3	16274
0	0	0	0	0	0	0	0	0	4	10630
0	0	0	0	0	0	0	0	9	3	10632
40.09403	8	15	0.896126	12.62142	-69.4282	12	35	1	3	41978
59.34751	0	0	6.775602	9.352513	-86.1472	11	199	0	4	52916
59.34339	0	0	6.770458	9.345032	-86.1466	11	198	0	4	4426
59.36838	0	0	6.762603	9.338445	-86.1572	11	198	0	4	16480
49.70134	0	0	5.984623	11.40946	-76.8399	12	214	0	4	16508
67.6866	0	0	8.980357	12.74267	86.48042	15	359	0	4	83676
60.8634	0	0	4.777555	10.47914	-88.4117	11	157	0	4	16510
88.22117	0	0	1.729523	3.881635	64.26538	4	21	0	4	83678
40.11168	8	15	0.89762	12.64467	-69.4379	12	35	1	3	83680
0	0	0	0	0	0	0	0	0	4	42168
37.77646	0	0	11.46687	12.31763	-54.5486	16	443	0	4	42170
0	0	0	0	0	0	0	0	0	4	10808
37.98941	0	0	11.46139	12.30909	-54.6709	16	443	0	4	10810
6.843592	0	0	8.798614	12.13078	-30.7283	14	335	0	4	16538
-16.8119	0	0	8.656004	9.859732	-10.6892	13	268	0	4	83792
59.35132	0	0	6.766286	9.337766	-86.1378	11	198	0	4	83794
-16.804	0	0	8.645392	9.843209	-10.6491	13	267	0	4	42272
59.34164	0	0	6.771904	9.347744	-86.1455	11	198	0	4	42274
-90	0	0	0	0	-90	0	0	0	4	5024
-32.7926	1	1	4.790228	11.16058	4.36729	12	167	0	4	52932
88.21861	0	0	1.728364	3.880848	64.2653	4	21	0	4	31610
40.10893	8	15	0.890123	12.53943	-69.4402	12	35	1	3	31612
88.22063	0	0	1.731393	3.885412	64.26331	4	21	0	4	24096
40.11375	8	15	0.893495	12.58742	-69.4421	12	35	1	3	24098
88.22191	0	0	1.730467	3.883116	64.26189	4	21	0	4	31710
40.11232	8	15	0.899075	12.68508	-69.4351	12	35	1	3	31712
37.91471	0	0	11.45823	12.30573	-54.7079	16	443	0	4	24190
40.10705	8	16	0.905663	12.75758	-69.4349	12	36	1	3	24192
-16.8051	0	0	8.643525	9.840834	-10.648	13	267	0	4	31826
59.35947	0	0	6.764897	9.341782	-86.1655	11	198	0	4	31828
-16.7947	0	0	8.666	9.867028	-10.8523	13	268	0	4	24306
59.36207	0	0	6.754775	9.325119	-86.1544	11	197	0	4	24308
37.81548	0	0	11.45567	12.30288	-54.7126	16	442	0	4	33248
40.10178	8	15	0.895855	12.61753	-69.4293	12	35	1	3	33250
-16.7856	0	0	8.651284	9.853944	-10.6975	13	267	0	4	33344
59.36444	0	0	6.773126	9.353156	-86.1659	11	199	0	4	33346
-16.7947	0	0	8.647812	9.848075	-10.6814	13	267	0	4	23120
59.35762	0	0	6.772573	9.350988	-86.1612	11	198	0	4	23122
37.96862	0	0	11.46812	12.31666	-54.6961	16	443	0	4	53786
40.10454	8	15	0.893553	12.58674	-69.434	12	35	1	3	53788
37.92913	0	0	11.47048	12.31947	-54.6661	16	443	0	4	5416
40.09599	8	15	0.896687	12.63017	-69.4348	12	35	1	3	5418
37.749	0	0	11.47189	12.32072	-54.6766	16	444	0	4	82528
40.10538	8	15	0.894431	12.59898	-69.4345	12	35	1	3	82530
37.95274	0	0	11.46411	12.31237	-54.6699	16	443	0	4	17462
-16.7971	0	0	8.665114	9.865415	-10.6475	13	268	0	4	53938

APPENDIX B. ANTENNA CHARACTERISTICS

TABLE B-1. VERTICAL PROBE ANTENNA POLARIZATION

Test Item: DME Sample #0010

Date: 05/16/02

Serial No:

Frequency: 406.028 MHz

Probe Antenna Polarization: Vertical

Received Signal Level

AZ \ EL	10	20	30	40	50
0	-16.17	-13.33	-16.83	-15.17	-19.00
30	-16.17	-14.67	-14.33	-14.33	-18.83
60	-15.67	-13.67	-14.00	-14.67	-21.83
90	-15.83	-14.67	-13.17	-15.00	-18.67
120	-17.33	-15.17	-14.17	-14.67	-19.17
150	-17.83	-14.83	-14.00	-15.33	-19.00
180	-18.00	-15.17	-13.50	-15.50	-19.00
210	-17.33	-14.67	-14.00	-14.00	-19.50
240	-16.83	-14.33	-13.83	-14.50	-19.00
270	-17.00	-14.00	-14.17	-15.00	-18.33
300	-16.00	-13.00	-14.33	-14.50	-18.67
330	-16.33	-13.17	-14.00	-14.17	-19.67

TABLE B-2. HORIZONTAL PROBE ANTENNA POLARIZATION

Test Item: DME Sample #0010

Date: 05/16/02

Serial No:

Frequency: 406.028

Probe Antenna Polarization: Horizontal

Received Signal Level

AZ \ EL	10	20	30	40	50
0	-48.00	-50.50	-47.50	-39.50	-39.00
30	-35.50	-45.33	-41.33	-39.33	-33.33
60	-36.67	-46.00	-42.83	-42.17	-34.83
90	-48.33	-49.50	-34.00	-42.67	-30.17
120	-31.17	-44.67	-37.50	-49.50	-41.00
150	-38.00	-40.00	-37.83	-37.00	-39.33
180	-48.00	-39.00	-43.83	-37.50	-38.83
210	-43.33	-35.00	-33.83	-39.33	-39.17
240	-44.67	-35.83	-44.33	-34.00	-31.00
270	-39.83	-45.67	-37.00	-42.67	-31.67
300	-35.67	-32.33	-38.33	-47.33	-32.50
330	-36.17	-37.17	-40.17	-38.50	-39.67

TABLE B-3. TOTAL EFFECTIVE RADIATED POWER (dBm)

Test Item: DME Sample #0010

Date: 05/16/02

Serial No:

Frequency: 406.028 MHz

Total Effective Radiated Power (dBm)

EL	10		20		30		40		50	
AZ	ERP	gain	ERP	gain	ERP	gain	ERP	gain	ERP	gain
0	35.33	-1.47	38.17	1.37	34.67	-2.13	36.35	-0.45	32.54	-4.26
30	35.38	-1.42	36.83	0.03	37.18	0.38	37.18	0.38	32.82	-3.98
60	35.86	-0.94	37.83	1.03	37.51	0.71	36.84	0.04	29.88	-6.92
90	35.67	-1.13	36.83	0.03	38.37	1.57	36.51	-0.29	33.13	-3.67
120	34.35	-2.45	36.33	-0.47	37.35	0.55	36.83	0.03	32.36	-4.44
150	33.71	-3.09	36.68	-0.12	37.52	0.72	36.20	-0.60	32.54	-4.26
180	33.50	-3.30	36.35	-0.45	38.00	1.20	36.03	-0.77	32.54	-4.26
210	34.18	-2.62	36.87	0.07	37.54	0.74	37.51	0.71	32.05	-4.75
240	34.68	-2.12	37.20	0.40	37.67	0.87	37.05	0.25	32.77	-4.03
270	34.52	-2.28	37.50	0.70	37.35	0.55	36.51	-0.29	33.37	-3.43
300	35.55	-1.25	38.55	1.75	37.19	0.39	37.00	0.20	33.01	-3.79
330	35.21	-1.59	38.35	1.55	37.51	0.71	37.35	0.55	31.87	-4.93

Antenna gain is based on measured power output of 4.8 watts or 36.8dBm.

There was a loss of 0 dBm due to battery discharge.

ERPmaxEOL = ERPmax - ERPLOSS = 38.55 - (0) = 38.55 dBm = 7.16 watts

ERPminEOL = ERPmin - ERPLOSS = 32.05 - (0) = 32.05 dBm = 1.6 watts

NOTE: These values do NOT include the range instrumentation accuracy of +/-2.45 dB

Points meeting ERP specification (all cuts) - 58 of 60 = 97%

VPOL at least 10dB over HPOL response for 60 points (100%)

HPOL at least 10dB over VPOL response for 0 points (0%)

Less than 10dB difference in VPOL/HPOL response for 0 points (0%)

Therefore, the beacon antenna is vertically polarized.

APPENDIX C. SUMMARY OF 406-MHz BEACON TEST RESULTS

TABLE C1. SUMMARY OF 406MHz BEACON TEST RESULTS

PARAMETERS TO BE MEASURED DURING TEST	RANGE OF SPECIFICATIONS	UNIT	TEST RESULTS		
			T _{min} (-20 °C)	T _{amb} (25 °C)	T _{max} (55 °C)
1. POWER OUTPUT					
• Transmitter power output	35 – 39	dBm	36.3	36.3	36.0
• Power output rise time	<5	Ms	0.97	0.98	1.0
• Power output 1 ms before burst	must be <-10 dBm	✓	✓	✓	✓
2. DIGITAL MESSAGE					
• bit sync	15 bits *1*	✓	✓	✓	✓
• frame sync	9 bits (000101111)	✓	✓	✓	✓
• format flag	1 bit	data bit	0	0	0
• protocol flag	1 bit	data bit	1	1	1
• identification/position data	59 bits	✓	✓	✓	✓
• BCH code	21 bits	✓	✓	✓	✓
• emerg. code/nat. use/supplem. data	6 bits	data bits	111110	111110	111110
• additional data/BCH (if applicable)	32 bits	✓	N/A	N/A	N/A
• position error (if applicable)	< 5	km	N/A	N/A	N/A
3. DIGITAL MESSAGE GENERATOR					
• repetition rate**:					
minimum T _R	47.5	seconds	48.8	48.8	48.8
maximum T _R	52.5	seconds	51.4	51.5	51.5
• bit rate:					
minimum f _b	396	bits/sec.	402.8	401.4	401.3
maximum f _b	404	bits/sec.	403.1	401.5	401.5
• total transmission time:					
short message =	435.6 – 444.4	ms	440.0	440.8	440.8
long message (optional) =	514.8 – 525.2	ms	N/A	N/A	N/A
• unmodulated carrier					
minimum T ₁	158.4	ms	159.3	159.6	159.6
maximum T ₁	161.6	ms	159.6	159.7	159.7
• first burst delay	>47.5	seconds	253	253	255
4. MODULATION					
• Biphase-L		✓	✓	✓	✓
• rise time	50 – 250	ms	172.2	178.2	164.2
• fall time	50 – 250	ms	167.8	159.8	161.8
• phase deviation: positive	+(1.0 to 1.2)	radians	1.12	1.10	1.09
• phase deviation: negative	-(1.0 to 1.2)	radians	-1.13	-1.07	-1.16
• symmetry measurement	<0.05	✓	0.02	0.02	0.02

TABLE C1. SUMMARY OF 406MHz BEACON TEST RESULTS (CONTINUED)

PARAMETERS TO BE MEASURED DURING TEST	RANGE OF SPECIFICATIONS	UNIT	TEST RESULTS		
			T _{min} (-20 °C)	T _{amb} (25 °C)	T _{max} (55 °C)
5. 406 MHz TRANSMITTED FREQUENCY					
• nominal value	406.023 – 406.027 or 406.027 – 406.029****)	MHz	406.02793	406.02792	406.02798
• short-term stability	$\leq 2 \times 10^{-9}$	/100ms	5.61E-10	2.81E-10	2.2E-10
• medium-term stability - slope - residual frequency variation	(-1 to +1) x 10 ⁻⁹ $\leq 3 \times 10^{-9}$	/minute	-4.1E-12 1.6E-10	6.04E-10 2.56E-10	2.78E-10 1.43E-10
6. SPURIOUS EMISSIONS**** (into 50 ohms)					
• in-band (406.0 – 406.1 MHz)	see spurious emission mask in C/S T.001	✓	✓	✓	✓
7. 406 MHz VSWR CHECK after open circuit, short circuit, then while VSWR is 3:1, measure:					
• nominal transmitted frequency	406.023 – 406.027 or 406.027 – 406.029****)	MHz	406.02793	406.02793	406.02798
Modulation:					
• rise time	50 – 250	ms	172.2	170.2	164.2
• fall time	50 – 250	ms	167.8	165.8	161.8
• phase deviation: positive	+(1.0 to 1.2)	radians	1.12	1.10	1.09
• phase deviation: negative	-(1.0 to 1.2)	radians	-1.13	-1.07	-1.16
• symmetry measurement	≤ 0.05	✓	✓	✓	✓
• digital message	must be correct	✓	✓	✓	✓
8. SELF-TEST MODE (if applicable)					
• frame sync	9 bits (011010000)	✓	N/A	N/A	N/A
• format flag	1/0	bit	N/A	N/A	N/A
• single radiated burst	$\leq 440/520$ (+1%)	ms	N/A	N/A	N/A
• default position data (if applicable)	must be correct	✓	N/A	N/A	N/A
• description provided	See supplemental data C-2	✓	N/A	N/A	N/A
• design data provided on protection against repetitive self-test mode transmissions	protection provided	✓	N/A	N/A	N/A
• single burst verification	one burst	✓	N/A	N/A	N/A
• provides for beacon 15 Hex ID	must be correct	✓	N/A	N/A	N/A

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TABLE C1. SUMMARY OF 406MHz BEACON TEST RESULTS (CONTINUED)

PARAMETERS TO BE MEASURED DURING TEST	RANGE OF SPECIFICATIONS	UNIT	TEST RESULTS
11. TEMPERATURE GRADIENT**** (5° C/hr) - transmitted frequency: - nominal value - short-term stability: - medium-term stability: - slope - residual frequency variation - transmitter power output - digital message	406.023 – 406.027 or 406.027 – 406.029**** $\leq 2 \times 10^{-9}$ $(-1 \text{ to } +1) \times 10^{-9}$ $\leq 3 \times 10^{-9}$ 35 - 39 must be correct	MHz /100ms /minute dBm ✓	406.02800 9.0E-10 8.5E-10 5.0 E-10 36.2 ✓
12. LONG-TERM FREQUENCY STABILITY data provided	406.20 – 406.030 or 406.23 – 406.30****	MHz ✓	See app A, Annex IV
13. PROTECTION AGAINST CONTINUOUS TRANSMISSION description provided	≤ 45	seconds ✓	See Tab E
14. SATELLITE QUALITATIVE TESTS**** results provided	successfully located by satellites/LUT		See app A, Annex V
15. ANTENNA CHARACTERISTICS - polarization - VSWR - ERP_{max} EOL - ERP_{min} EOL - azimuth gain variation at 40° elevation angle	linear or RHCP ≤ 1.5 ≤ 20 ≤ 1.6 ≤ 3	✓ ✓ - watts watts dB	✓ 1.4 7.16 1.6 1.3
16. BEACON CODING SOFTWARE - sample message provided for each coding option of the applicable coding protocol types - sample message provided, if applicable, with encoded positions at least 5 km apart - sample self-test message provided for each coding option of the applicable coding protocol types	must be correct (attach to report) must be correct (attach to report) must be correct (attach to report)	✓ ✓ ✓	✓ (No additional protocols) N/A N/A

TABLE C1. SUMMARY OF 406MHz BEACON TEST RESULTS (CONTINUED)

PARAMETERS TO BE MEASURED DURING TEST	RANGE OF SPECIFICATIONS	UNIT	TEST RESULTS
17. NAVIGATION SYSTEM*** (as applicable)			
• position data default values	must be correct	✓	N/A
• position acquisition time	<30 / 1	minutes	N/A
• encoded position data update interval	>20	minutes	N/A
• position data input update interval (as applicable)	20 / 1	minutes	N/A
• delta offset			
- position direction	must be correct	✓	N/A
- negative direction	must be correct	✓	N/A
- overrange to 2 times coarse res.	must be correct	✓	N/A
• last valid position:			
- retained after navigation input lost	240 (± 5)	✓	N/A
- cleared when beacon reactivated	must be correct	✓	N/A
• design data provided on protection against beacon degradation due to navigation device, interface or signal failure or malfunction	no degradation	✓	N/A

* The tick mark ✓ can be used where indicated to record that the requirement is met (no value needs to be shown).

** If $(T_{Rmax} - T_{Rmin}) = 1$ second, the manufacturer must provide a technical explanation, as described in section A3.1.1.

*** From 1 January 2000, new 406 MHz beacon models submitted for type approval can be set to transmit at 406.028 MHz ± 1 kHz. The transmitted frequency shall not vary more than +2 kHz/-5 kHz from 406.0028 MHz in 5 years. It shall not vary more than 2 parts in 10⁹ in 100 ms. After 1 January 2002, all new beacon models submitted for type approval must be set at the frequency 406.028 MHz ± 1 kHz and satisfy the above stability requirements.

**** Attach graphs of test results for test numbers 6, 9, 10, and 11 and a summary table of results for test number 14, and if applicable, test number 17.

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APPENDIX D. DISTRIBUTION

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