1.1 Frequency stability test

1.1.1 General

This test was performed to measure frequency stability of transmitter RF carrier. Specification test limits are given in Table 1.1.1. The test results are provided in Table 1.1.2.

Table 1.1.1 Frequency stability limits

Assigned frequency, MHz	Maximum allowed frequency displacement	
	ppm	Hz
1930.0125		
1960.0000		
1989.9875		

1.1.2 Test procedure

1.1.2.1 The EUT was set up as shown in Figure 1.1.1, energized and its proper operation was checked.

1.1.2.2 The EUT power was turned off. Temperature within test chamber was set to +30˚C and a period of time sufficient to stabilize all of the oscillator circuit components was allowed.

1.1.2.3 The EUT was powered on and carrier frequency was measured at start up moment and then every minute until frequency had been stabilized or 10 minutes elapsed whichever reached the last. The EUT was powered off.

1.1.2.4 The above procedure was repeated at 0˚C and at the lowest test temperature.

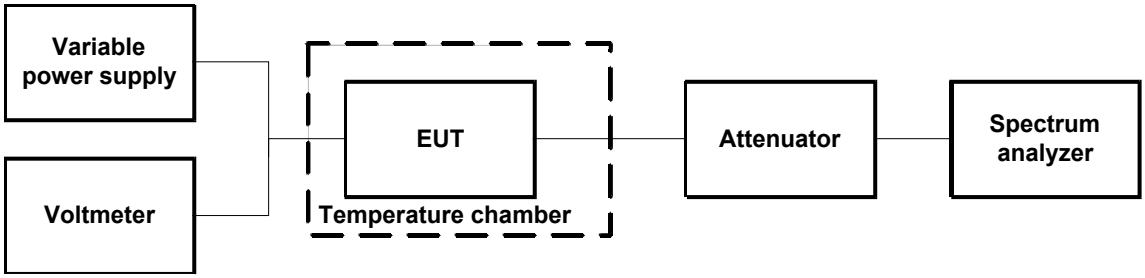
1.1.2.5 The EUT was powered on and carrier frequency was measured at start up moment and at the end of stabilization period at the rest of test temperatures and voltages. The EUT was powered off.

1.1.2.6 Frequency displacement was calculated and compared with the limit as provided in Table 1.1.2.

Frequency stability tested for two cases:

MA1200 unit tested with MA1000 system including the MA1000 RHU.
MA1200 unit tested with MA1000 system, in which the MA1200 optical module is placed instead of the MA1000 RHU.

Figure 1.1.1 Frequency stability test setup



.1Frequency s

Photograph 1.1.1 Frequency stability test setup

Table 1.1.2.1 Frequency stability test results

MA1200 tests results (with MA1200 optical module)

OPERATING FREQUENCY:	1930 – 1990 MHz
NOMINAL POWER VOLTAGE:	48 V
TEMPERATURE STABILIZATION PERIOD:	20 min
POWER DURING TEMPERATURE TRANSITION:	Off
SPECTRUM ANALYZER MODE:	Counter
RESOLUTION BANDWIDTH:	100 Hz
VIDEO BANDWIDTH:	Off
MODULATION:	Unmodulated

T, °C	Voltage, V	Frequency, MHz							Max frequency drift, Hz		Limit, Hz	Margin, Hz	Verdict
		Start up	1st min	2nd min	3rd min	4th min	5th min	10th min	Positive	Negative			
Low frequency, 1930.0125 MHz													
-30	nominal	1930.0117	1930.0117	1930.0117	1930.0117	1930.0117	1930.0117	1930.0117	0	0			
-20	nominal	1930.0117	NA	NA	NA	NA	NA	1930.0117	0	0			
-10	nominal	1930.0117	NA	NA	NA	NA	NA	1930.0117	0	0			
0	nominal	1930.0117	1930.0117	1930.0117	1930.0117	1930.0117	1930.0117	1930.0117	0	0			
10	nominal	1930.0117	NA	NA	NA	NA	NA	1930.0117	0	0			
20	+15%	1930.0117	NA	NA	NA	NA	NA	1930.0117	0	0			
20	nominal	1930.0117	NA	NA	NA	NA	NA	1930.0117	0	0			
20	-15%	1930.0117	NA	NA	NA	NA	NA	1930.0117	0	0			
30	nominal	1930.0117	1930.0117	1930.0117	1930.0117	1930.0117	1930.0117	1930.0117	0	0			
40	nominal	1930.0117	NA	NA	NA	NA	NA	1930.0117	0	0			
50	nominal	1930.0117	NA	NA	NA	NA	NA	1930.0117	0	0			
Mid frequency, 1960.0 MHz													
-30	nominal	1959.99917	1959.99917	1959.99917	1959.99917	1959.99917	1959.99917	1959.99917	0	0			
-20	nominal	1959.99917	NA	NA	NA	NA	NA	1959.99917	0	0			
-10	nominal	1959.99917	NA	NA	NA	NA	NA	1959.99917	0	0			
0	nominal	1959.99917	1959.99917	1959.99917	1959.99917	1959.99917	1959.99917	1959.99917	0	0			
10	nominal	1959.99917	NA	NA	NA	NA	NA	1959.99917	0	0			
20	+15%	1959.99917	NA	NA	NA	NA	NA	1959.99917	0	0			
20	nominal	1959.99917	NA	NA	NA	NA	NA	1959.99917	0	0			
20	-15%	1959.99917	NA	NA	NA	NA	NA	1959.99917	0	0			
30	nominal	1959.99917	1959.99917	1959.99917	1959.99917	1959.99917	1959.99917	1959.99917	0	0			
40	nominal	1959.99917	NA	NA	NA	NA	NA	1959.99917	0	0			
50	nominal	1959.99917	NA	NA	NA	NA	NA	1959.99917	0	0			
High frequency, 1989.987,5 MHz													
-30	nominal	1989.98668	1989.98668	1989.98668	1989.98668	1989.98668	1989.98668	1989.98668	0	0			
-20	nominal	1989.98668	NA	NA	NA	NA	NA	1989.98668	0	0			
-10	nominal	1989.98668	NA	NA	NA	NA	NA	1989.98668	0	0			
0	nominal	1989.98668	1989.98668	1989.98668	1989.98668	1989.98668	1989.98668	1989.98668	0	0			
10	nominal	1989.98668	NA	NA	NA	NA	NA	1989.98668	0	0			
20	+15%	1989.98668	NA	NA	NA	NA	NA	1989.98668	0	0			
20	nominal	1989.98668	NA	NA	NA	NA	NA	1989.98668	0	0			
20	-15%	1989.98668	NA	NA	NA	NA	NA	1989.98668	0	0			
30	nominal	1989.98668	1989.98668	1989.98668	1989.98668	1989.98668	1989.98668	1989.98668	0	0			
40	nominal	1989.98668	NA	NA	NA	NA	NA	1989.98668	0	0			
50	nominal	1989.98668	NA	NA	NA	NA	NA	1989.98668	0	0			

***** - Reference frequency

Reference numbers of test equipment used

HL 0255	HL 0026	HL 2358	HL 0493				

Full description is given in Appendix A.

Table 1.1.3.2 Frequency stability test results

MA1200 tests results (with MA1000 RHU)

OPERATING FREQUENCY:	1930 – 1990 MHz
NOMINAL POWER VOLTAGE:	48 V
TEMPERATURE STABILIZATION PERIOD:	20 min
POWER DURING TEMPERATURE TRANSITION:	Off
SPECTRUM ANALYZER MODE:	Counter
RESOLUTION BANDWIDTH:	100 Hz
VIDEO BANDWIDTH:	Off
MODULATION:	Unmodulated

T, °C	Voltage, V	Frequency, MHz							Max frequency drift, Hz		Limit, Hz	Margin, Hz	Verdict
		Start up	1st min	2nd min	3rd min	4th min	5th min	10th min	Positive	Negative			
Low frequency, 1930.0125 MHz													
-30	nominal	1930.0117	1930.0117	1930.0117	1930.0117	1930.0117	1930.0117	1930.0117	0	0			
-20	nominal	1930.0117	NA	NA	NA	NA	NA	1930.0117	0	0			
-10	nominal	1930.0117	NA	NA	NA	NA	NA	1930.0117	0	0			
0	nominal	1930.0117	1930.0117	1930.0117	1930.0117	1930.0117	1930.0117	1930.0117	0	0			
10	nominal	1930.0117	NA	NA	NA	NA	NA	1930.0117	0	0			
20	+15%	1930.0117	NA	NA	NA	NA	NA	1930.0117	0	0			
20	nominal	1930.0117	NA	NA	NA	NA	NA	1930.0117	0	0			
20	-15%	1930.0117	NA	NA	NA	NA	NA	1930.0117	0	0			
30	nominal	1930.0117	1930.0117	1930.0117	1930.0117	1930.0117	1930.0117	1930.0117	0	0			
40	nominal	1930.0117	NA	NA	NA	NA	NA	1930.0117	0	0			
50	nominal	1930.0117	NA	NA	NA	NA	NA	1930.0117	0	0			
Mid frequency, 1960.0 MHz													
-30	nominal	1959.99917	1959.99917	1959.99917	1959.99917	1959.99917	1959.99917	1959.99917	0	0			
-20	nominal	1959.99917	NA	NA	NA	NA	NA	1959.99917	0	0			
-10	nominal	1959.99917	NA	NA	NA	NA	NA	1959.99917	0	0			
0	nominal	1959.99917	1959.99917	1959.99917	1959.99917	1959.99917	1959.99917	1959.99917	0	0			
10	nominal	1959.99917	NA	NA	NA	NA	NA	1959.99917	0	0			
20	+15%	1959.99917	NA	NA	NA	NA	NA	1959.99917	0	0			
20	nominal	1959.99917	NA	NA	NA	NA	NA	1959.99917	0	0			
20	-15%	1959.99917	NA	NA	NA	NA	NA	1959.99917	0	0			
30	nominal	1959.99917	1959.99917	1959.99917	1959.99917	1959.99917	1959.99917	1959.99917	0	0			
40	nominal	1959.99917	NA	NA	NA	NA	NA	1959.99917	0	0			
50	nominal	1959.99917	NA	NA	NA	NA	NA	1959.99917	0	0			
High frequency, 1989.987,5 MHz													
-30	nominal	1989.98668	1989.98668	1989.98668	1989.98668	1989.98668	1989.98668	1989.98668	0	0			
-20	nominal	1989.98668	NA	NA	NA	NA	NA	1989.98668	0	0			
-10	nominal	1989.98668	NA	NA	NA	NA	NA	1989.98668	0	0			
0	nominal	1989.98668	1989.98668	1989.98668	1989.98668	1989.98668	1989.98668	1989.98668	0	0			
10	nominal	1989.98668	NA	NA	NA	NA	NA	1989.98668	0	0			
20	+15%	1989.98668	NA	NA	NA	NA	NA	1989.98668	0	0			
20	nominal	1989.98668	NA	NA	NA	NA	NA	1989.98668	0	0			
20	-15%	1989.98668	NA	NA	NA	NA	NA	1989.98668	0	0			
30	nominal	1989.98668	1989.98668	1989.98668	1989.98668	1989.98668	1989.98668	1989.98668	0	0			
40	nominal	1989.98668	NA	NA	NA	NA	NA	1989.98668	0	0			
50	nominal	1989.98668	NA	NA	NA	NA	NA	1989.98668	0	0			

* - Reference frequency

Reference numbers of test equipment used

HL 0255	HL 0026	HL 2358	HL 0493				

Full description is given in Appendix A.