

MBS 1000-2
ANNEX-2 to test report# EMC_624FCC-25_2004_SAT
GLONASS BAND
NOISE AND SPURIOUS
TESTS

050-801-0009 R01

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1 Purpose

The purpose of this test is to determine the noise and spurious emissions of the MBS1000-2 in the GLONASS band (1525MHz to 1610 MHz). The measurements are shown in the following plots, as well as the specification limits. The specification limits are shown for a 10dBi antenna, approximately 5 dB higher gain than the antenna used with the MBS1000-2, providing a worst case result.

The measurements shown were made with the transmitter tuned to its lowest frequency (1626.5 MHz) to provide worst-case measurements.

2 Test Equipment

Following is a list of test equipment used.

- **HP Spectrum Analyzer 4396A** with frequency range from 2Hz to 1.8GHz.
S/N: 3241J00153 calibrated by WESTCAN
Calibration Date: 21 July 2003 Calibration Due: 21 July 2004
- **HP Spectrum analyzer 70000 series** with IF and RF plug-ins for frequencies up to 22GHz. S/N: 2731A01233 calibrated by AGILENT
Calibration Date: 2 Sept 2003 Calibration Due: 2 Sept 2005
- **Boonton 4220** digital RF power meter with ± 0.1 dB accuracy.
S/N: 25502BA calibrated by WESTCAN
Calibration Date: 16 July 2003 Calibration Due: 16 July 2004
- **HP 8648B RF signal generator** with frequency range from 0.1 to 2000 MHz.
S/N: 3426A00299 calibrated by WESTCAN
Calibration Date: 30 July 2003 Calibration Date: 30 July 2004
- **MDS Data Hub Simulator**, a Wireless Matrix propriety test set generating valid MDS frames for calibrating noise, fading, synchronization and frequency stability.
- **Narda Coaxial Directional Coupler** -30dB Model No. 3042B-30
- **K & L Microwave Tunable Bandreject Filter** Model 3TNF-1000/2000-N/N
- **Thermotron temperature chamber** for testing between -40°C to +60°C.
- **GW Dual Power Supply Model:** GPC-1850

3 Test Results: All measurements are performed as per RSS170, 6.3 and 25.216

Noise and Spurious: $1525\text{MHz} < f < 1559\text{MHz}$

The setup for this measurement is shown in figure 1. The Tunable Notch Filter is used to notch the transmitter carrier at 1626.5 MHz to increase the effective dynamic range of the measurement. An external low noise amplifier is used to lower the noise floor of the spectrum analyzer.

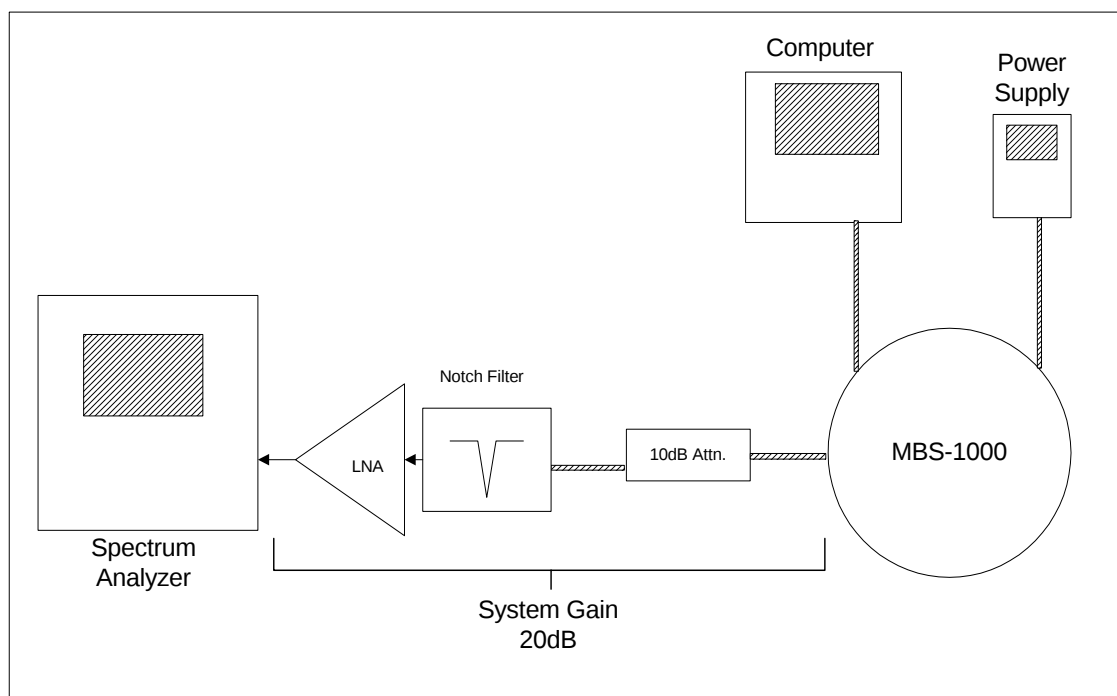


Figure 1. Test set up for Noise and Spurious Emissions 1525-1610MHz.

Noise and Spurious: $1525\text{MHz} < f < 1559\text{MHz}$

Figure 2 shows the plot for spurious emissions from 1525 MHz to 1559 MHz.

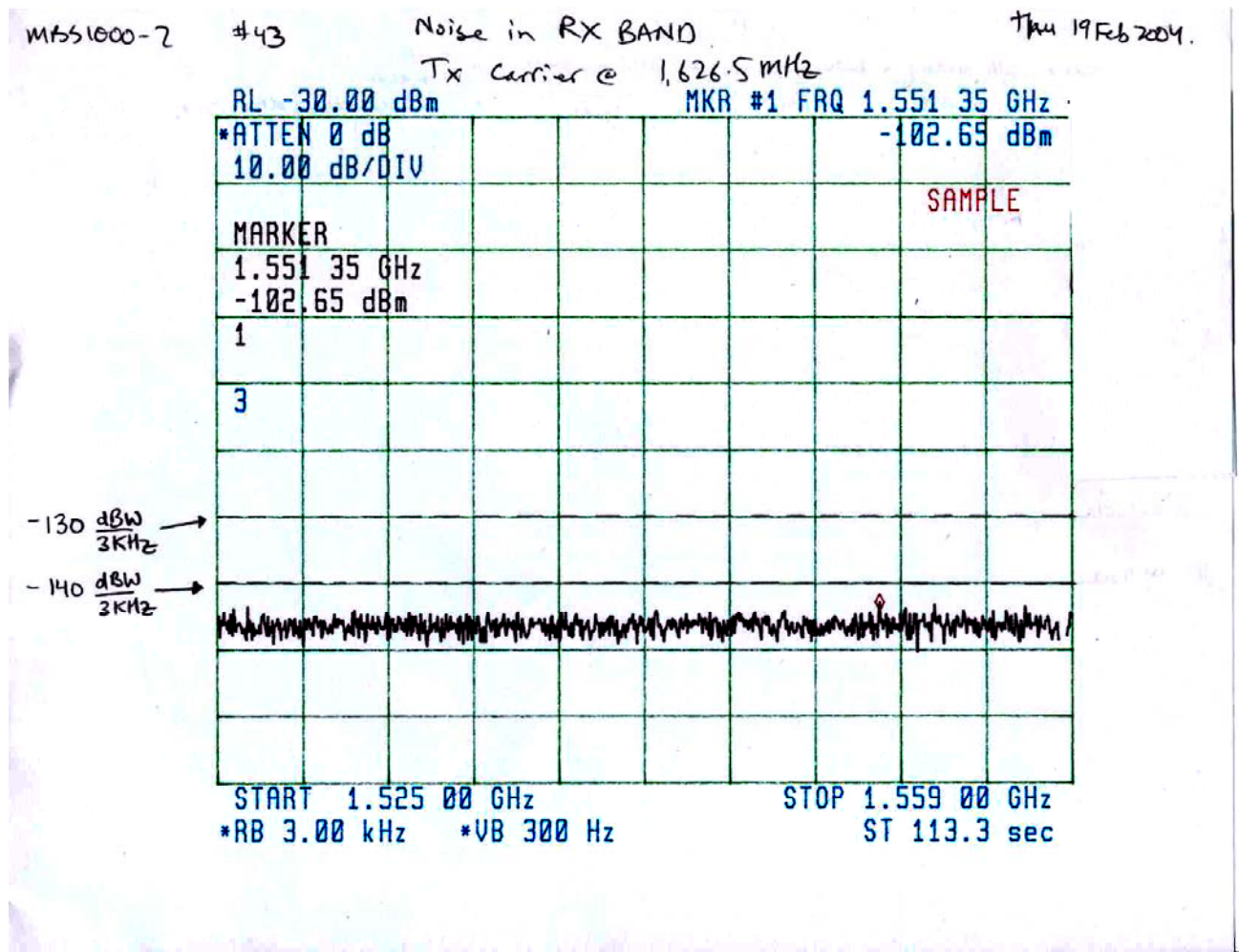


Figure 2

Limit for noise EIRP= $-130\text{dBW}/3\text{KHz} = -100\text{dBm}/3\text{KHz}$

$-100\text{dBm} + 20\text{dB (system gain)} - 10\text{dBi (max antenna gain)} = -90\text{dBm}/3\text{KHz}$

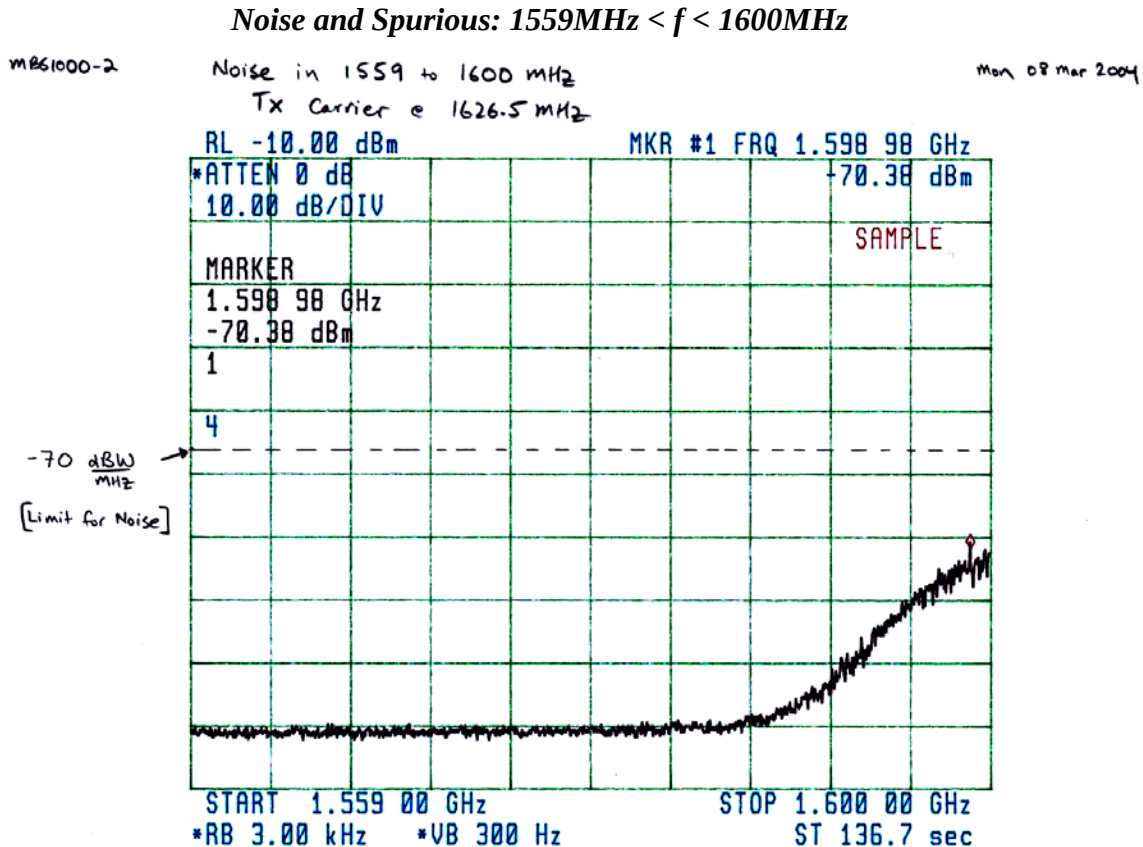


Figure 3

Limit for noise EIRP = **-70dBW/MHz** = -40dBm/MHz

Noise limit = -40dBm + 20dB (system gain) - 10dBi (max antenna gain) - 25.22dB (3KHz to 1MHz BW conversion) = **-55dBm/3KHz**

Noise and Spurious: $1600\text{MHz} < f < 1610\text{MHz}$

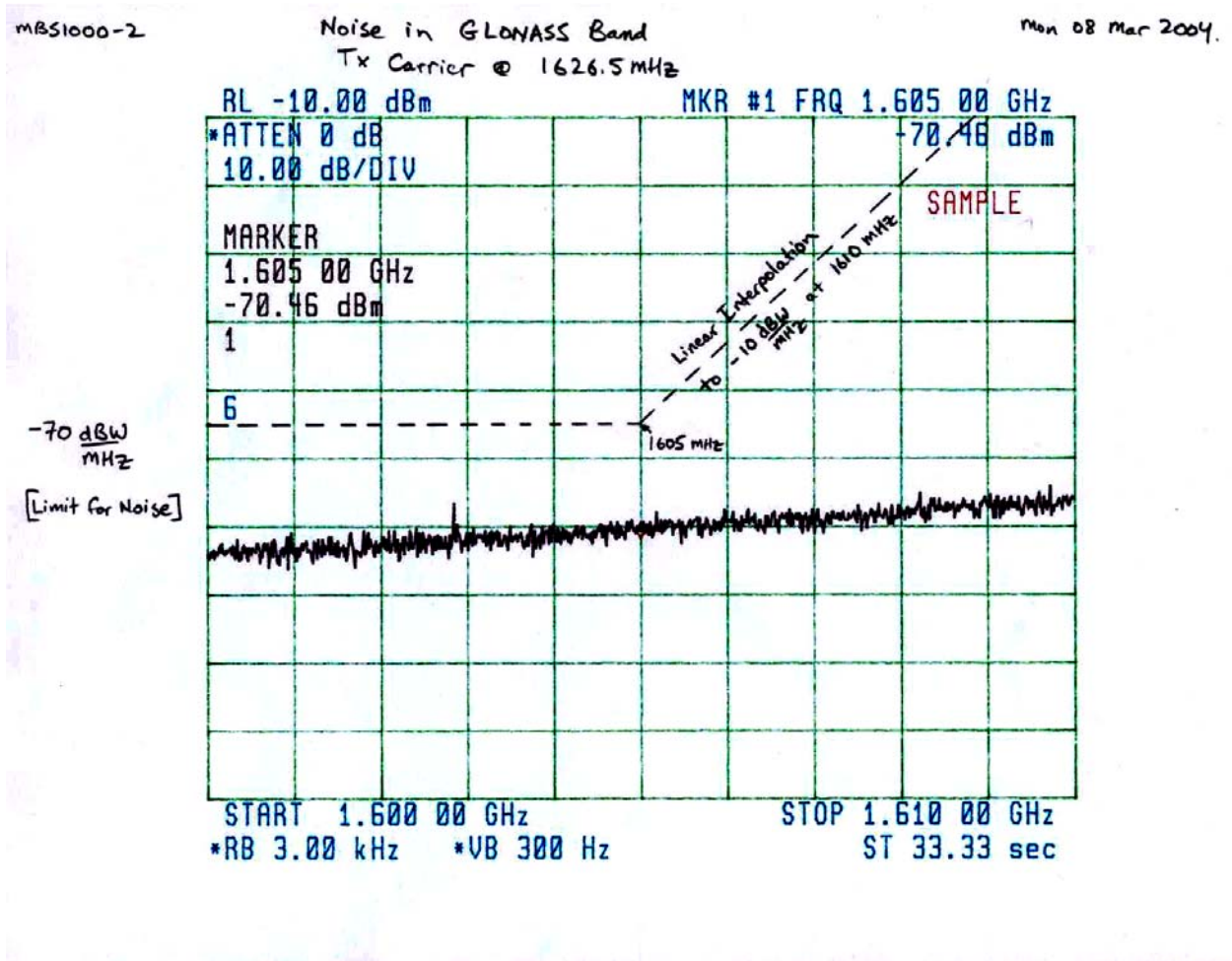


Figure 4

Limit for noise EIRP = -70dBW/MHz = -40dBm/MHz (up to 1605MHz)

Noise limit = $-40\text{dBm} + 20\text{dB}$ (system gain) -10dBi (max antenna gain) -25.22dB (3KHz to 1MHz BW conversion) = -55dBm/3KHz

Note: The limit of -80dBW/MHz apply up to 1605MHz

3 Conclusions

As shown in figures 2 to 4, no spurious or noise were found to exceed the specification limits.

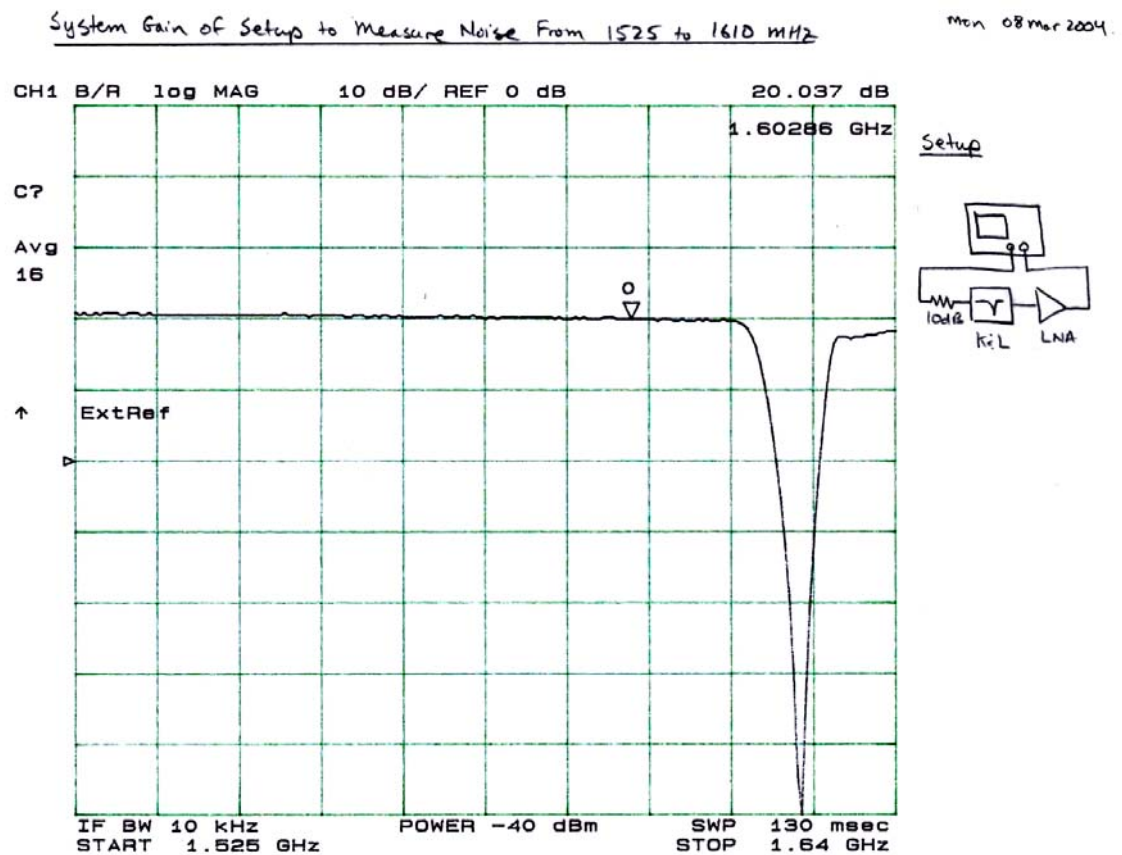
Appendix 1. System Gain Amplifier /Notch/ Attenuator

Figure 5. System Gain

Appendix 2. K & L Microwave Notch Filter

