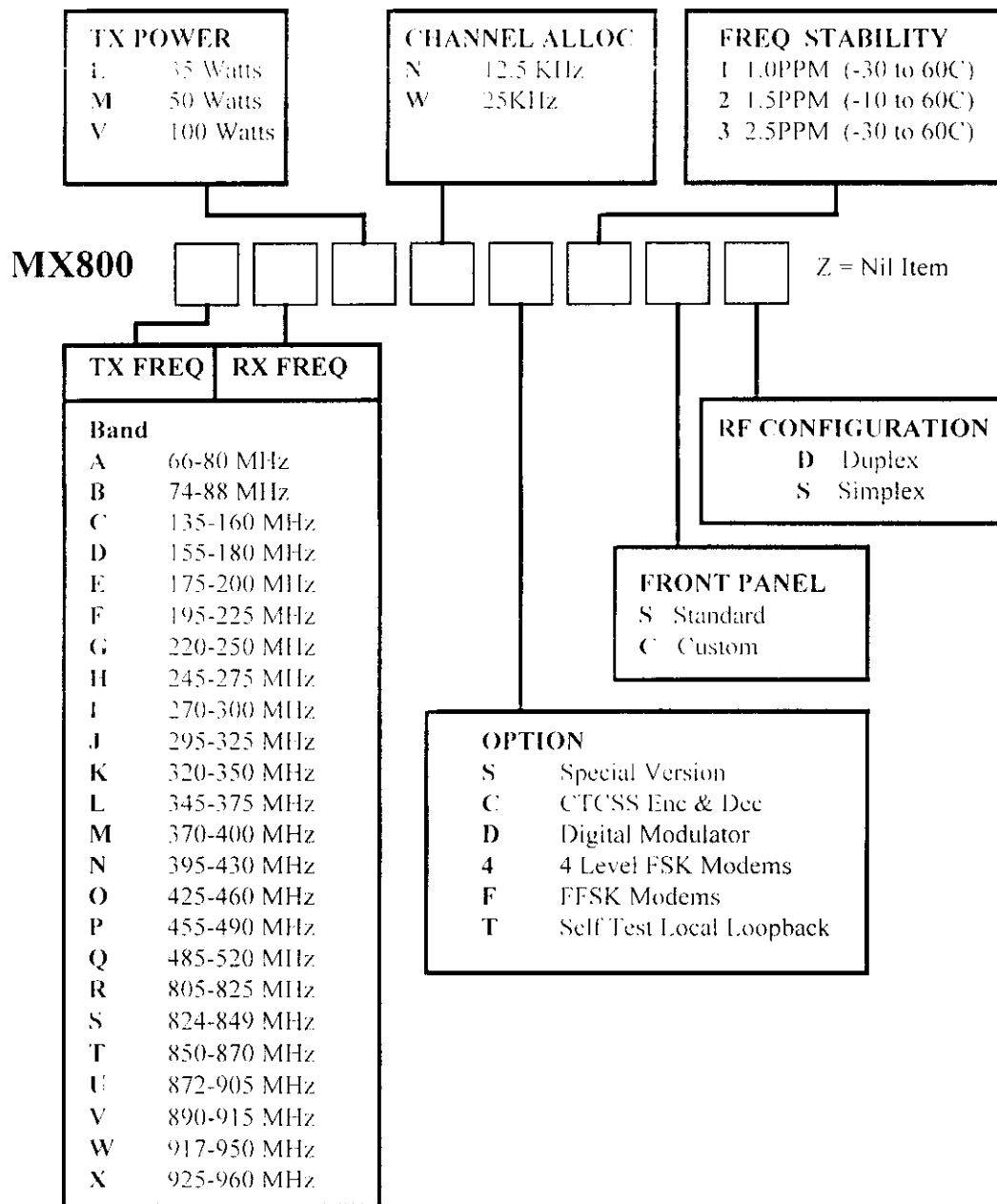


Appendix D Model # Configuration Guide

Revised 16th July 1997 rev 1.2

Consult Spectra Engineering for availability details on specific configurations and options.



FCC ID: **NSTMX800-217**
2.983 (d)(6)

MX800 DATA SHEET

RF PERFORMANCE TEST RESULTS FOR MX800 BASE STATION

MX800 TYPE: 12.5KHz CHANNEL SPACING, 50WATT, 220 MHz BAND.

MODEL # MX800FFHNZ3CD

Date 18th August 97

Serial # 97034726

TESTED AND MEASURED IN ACCORDANCE WITH INTERNATIONAL STANDARDS TIA/EIA-603

This data sheet is issued to provide an outline of the typical performance expected from the product. All results shown are actual measurements taken from a production unit. It is not to form any part of contract or order and is only issued for informational purposes. This document is copyright and may not be reproduced or published unless agreed to in writing by Spectra Engineering. To be read in conjunction with TIA/EIA-603 standard for further explanation of tests and limits.

1. Test conditions as noted:

All standard VF filters are on, DC-FM is not installed. Standard Tx and Rx VF line levels are -10dBm at 600 ohms. Tx 195-225MHz, Rx 195-225MHz.

2. DESCRIPTION AND RESULTS OF MEASUREMENT

2.1 Methods of Measurement for Receivers

2.1.1 N.A.

2.1.2 Conducted Spurious Emission

2.1.2.1 Definition: The conducted spurious emission is energy that is generated or amplified in a receiver and appears at the receiver's antenna terminals.

EIA requirement: <-57dBm

Result:

-92dBm (LO= 307MHz)

2.1.4 Reference Sensitivity

2.1.4.1 Definition: The reference sensitivity is the level of receiver input signal at a specified frequency with specified modulation which will result in the standard SINAD at the output of the receiver.

EIA requirement: <-107dBm

Result:

-119.5dBm for 12dB SINAD @ 217MHz.

2.1.5 Signal Displacement Bandwidth

2.1.5.1 Definition: The signal (frequency) displacement bandwidth is the input signal frequency displacement that reduces the SINAD produced by a signal 6dB in excess of the reference sensitivity, to the standard SINAD.

EIA requirement: >40% of 2.5KHz system dev. ie >1KHz

Result:

2KHz

2.1.6 Adjacent Channel Rejection

2.1.6.1 Definition: The adjacent channel rejection is the ratio of the level of an unwanted input signal that causes the SINAD produced by a wanted signal 3dB in excess of the reference sensitivity to be reduced to the standard SINAD, to the reference sensitivity.

EIA requirement: >60 dB

Result:

76dB

2.1.7 Offset Channel Selectivity

2.1.7.1 Definition: The offset channel selectivity is the ratio of an unwanted signal that causes the SINAD produced by a signal 3dB in excess of the reference sensitivity to be degraded to the standard SINAD, to the reference sensitivity.

EIA requirement: >20dB (800MHz Band ONLY)

Result:

2.1.8 Spurious Response Rejection

2.1.8.1 Definition: The spurious response rejection is the ability of a receiver to prevent single unwanted signals from causing a degradation to the reception of a desired signal. It is expressed as the ratio of the level of a single unwanted input signal that causes the SINAD produced by a wanted signal 3dB in excess of the reference sensitivity to be degraded to the standard SINAD, to the reference sensitivity.

EIA requirement: >70dB

Result:

First IF image for $F_c @ 217\text{MHz} = >100\text{dB}$

Second IF image = 97dB

Half first IF response = >100dB

2.1.9 Intermodulation Rejection

2.1.9.1 Definition: The intermodulation rejection is the ability of a receiver to prevent two unwanted signals, with a specific frequency relation to the wanted signal frequency, from causing degradation to the reception of a desired signal. It is expressed as a ratio of the level of two equal level unwanted signals that cause the SINAD produced by the wanted signal 3dB in excess of the reference sensitivity to be degraded to the standard SINAD, to the reference sensitivity.

EIA Requirement: >70dB

Result:

81dB

2.1.10 Audio Frequency Response

2.1.10.1 Definition: The audio frequency response denotes the degree of closeness to which the audio output of a receiver follows a 6dB per octave deemphasis curve with constant frequency deviation over a given continuous frequency range.

EIA requirement: Per graph, 6dB / octave +1,-3dB

Result:

Within +0.3dB, -0.2dB of a 6dB per octave curve from 500Hz to 2500Hz.

Additional sub tone filtering of -32dB @ 150Hz

2.1.11 Hum and noise Ratio

2.1.11.1 Definition: The hum and noise ratio is the ratio of the rated output power to the residual output power in the absence of modulation, both measured at standard input signal level.

EIA requirement: >34dB

Result:

45dB. Squelched = -59dBm

2.1.12 Audio Distortion

2.1.12.1 Definition: The audio distortion is the voltage ratio, usually expressed as a percentage of the RMS value of the complete signal at the output of the receiver.

EIA Requirement: <5%

Result:

1%

2.1.13 Audio Squelch Sensitivity

2.1.13.1 Definition: The audio squelch sensitivity of a receiver is the minimum signal level from a standard input signal source, which when modulated at standard test modulation, will open the receiver squelch.

EIA Requirement: (mobiles only)

Threshold squelch sensitivity is <8dB SINAD

Minimum tight squelch sensitivity is >15dB SINAD

Maximum tight squelch sensitivity is <=10dB greater than the reference sensitivity

Result:

Threshold squelch sensitivity is <3dB SINAD

Minimum tight squelch sensitivity is 17dB SINAD

Maximum tight squelch sensitivity adjustable to 1uV

2.1.14 Squelch Blocking

2.1.14.1 Definition: Squelch blocking is the tendency of the receiver squelch circuit to close in the presence of modulation of the input signal.

EIA Requirement: Squelch does not close

Result: Pass

2.1.15 Receiver Attack time

2.1.15.1 Definition: Receiver attack time is the time required to produce audio power output after application of a modulated signal.

EIA Requirement: <150mS

Result: 20mS

2.1.16 Receiver closing time

2.1.16.1 Definition: The receiver closing time is that period of time between removal of an input signal and squelch closure.

EIA Requirement: <250mS

Result: 100mS

2.1.17 thru 2.1.20 N.A.

2.2 Methods of Measurement for Transmitters

2.2.1 Carrier Output Power Rating

2.2.1.1 Definition: The carrier power output rating for a transmitter for this service is the power available at the output terminals of the transmitter when the output terminals are connected to the standard transmitter load.

EIA Requirement: Power and duty cycle as nominated by the manufacturer

Result:

50 Watts RF power output into 50 ohm load for 100% duty cycle.

2.2.2 Carrier Frequency Stability

2.2.2.1 Definition: The carrier frequency stability is the stability of the transmitter to maintain an assigned carrier frequency.

EPA Requirement: 1.5PPM for 851-866MHz. 1.0PPM for 866-869MHz.

Result: <2.5PPM installed

2.2.3 Modulation Limiting

2.2.3.1. Definition: Modulation limiting refers to the transmitter circuit's ability to limit the transmitter from producing deviations in excess of a rated system deviation.

EIA Requirement: <2.5KHz peak deviation

Result: 2.1KHz

2.2.4 Carrier Attack Time

2.2.4.1 Definition: Transmitter carrier attack time is the time required to produce 50% of steady-state carrier output power after changing the state of the transmitter from standby to transmit.

EIA Requirement: <100mS

Result:

Standard 50mS. With Tx VCO on continuous 4mS

2.2.5 Audio Sensitivity

2.2.5.1 Definition: The audio sensitivity is the input RMS voltage level that must be applied to the input terminals of the dummy microphone circuit to produce the standard test modulation. Any microphone automatic gain control must be disabled.

EIA Requirement: As nominated by manufacturer.

Result: Standard line level is -10dBm 600 ohms impedance

2.2.6 Audio Frequency Response

2.2.6.1 The audio frequency response is the degree of closeness to which the frequency deviation of the transmitter follows a prescribed characteristic.

EIA requirement: Per graph, 6dB / octave +1,-3dB

Result:

Within +0.4dB, -0.5dB of a 6dB per octave curve from 500Hz to 2500Hz.

Additional filtering of -30dB @ 150Hz for sub tone systems.

2.2.7 Audio Distortion

2.2.7.1 Definition: The audio distortion is the voltage ratio, usually expressed as a percentage of the RMS value of the desired signal of the transmitter demodulated output to the RMS value of the complete signal at the output of the transmitter's demodulator.

EIA Requirement: <10%

Result: 1%

2.2.8 FM Hum and Noise Ratio

2.2.8.1 Definition: The FM hum and noise is the ratio of the standard test modulation to the residual frequency modulation measured by the test receiver. This is to be performed with ant audio compression / expansion circuit disabled.

EIA Requirement: >34dB

Result: 40dB

2.2.9 AM Hum and Noise Ratio

2.2.9.1 Definition: AM hum and noise on the carrier is the ratio of the DC voltage detected from an unmodulated carrier to the detected peak AC voltage.

EIA Requirement: >34dB

Result: >60dB

2.2.10 Acoustic Microphone Sensitivity

2.2.10.1 Definition: Acoustic microphone sensitivity is the acoustic sound pressure level which will produce 60% modulation of the transmitter.

EIA Requirement: As nominated by manufacturer.

N.A. for microphone.

Result: Standard line level is -10dBm 600 ohms impedance

2.2.11 Sideband Spectrum

2.2.11.1 Definition: The term transmitter Sideband Spectrum denotes the sideband energy produced at a discrete frequency separation from the carrier up to the test bandwidth due to all sources of unwanted noise within the transmitter in a modulated condition.

EIA Requirement: Per table

Result: Pass.

2.2.12. Radiated Spurious Emissions

N.A.

2.2.13 Conducted Spurious Emissions

2.2.13.1 Definition: Conducted spurious emissions are emissions at the antenna terminals on a frequency or frequencies which are outside a band sufficient to ensure transmissions of information of required quality for the class of communication desired.

EIA Requirement: <-58dBc

Result: -95dBc

2.2.14 Adjacent Channel Power Ratio

2.2.14.1 Definition: The adjacent channel power ratio is that part of the total output power of a transmitter under defined conditions and modulation, which falls within a specified passband centered on the nominal frequency of either of the adjacent channels. This ratio is the sum of the mean power produced by the modulation plus the hum and noise of the transmitter to carrier power.

Two methods of measurement are described. One uses a measuring receiver and the other uses a digital spectrum analyzer.

The digital spectrum analyzer method can be used for all cases when a detector correction factor, F_n , is applied. Typically this factor is between 0 dB and 2.5 dB for a mixture of sinusoidal components and thermal noise.

EIA Requirement: >60dBc

Result: >72dB

2.2.15 Audio Low Pass Filter Response

2.2.15.1 Definition: The Audio Low Pass Filter Response is the frequency response of the post limiter low pass filter circuit above 3000 Hz.

EIA Requirement: Per table

Result: Pass

2.2.16 Intermodulation Attenuation

2.2.16.1. Definition: Intermodulation attenuation is the capability of a transmitter to avoid the generation of signals in the non-linear elements caused by the presence of the carrier and an interfering signal entering the transmitter via the antenna. It is specified as the ratio, in dB, of the power level of the third order intermodulation product to the carrier power level.

EIA Requirement: >40dB

Result: With no Tx isolator = 25dB. Add isolator to achieve >40dB.

2.2.17 Average Radiated Power Output

2.2.17.1 Definition: The average radiated power of a licensed device is the equivalent power required, when delivered to a half-wave dipole antenna, to produce at a distant point the same average received power as produced by the licensed device.

N.A. for Base stations.

2.2.18. Transmitter Stability into VSWR

2.2.18.1 Definition: Transmitter stability into VSWR is the ability of a transmitter not to produce any spurious greater than allowed for the conducted spurious emissions when operated in a load different from the standard load.

EIA Requirement: <-58dBc

Result: No change in spurious levels.

2.2.19. Transient Frequency Behaviour

2.2.19.1 Definition: Transient frequency behavior is a measure of the difference as a function in time, of the actual transmitter frequency to the assigned

transmitter frequency when the transmitted RF output power is switched on or off.

EIA Requirement: Per limit graphs

Results: Easily exceeds requirement

End of applicable tests.

Tuning/Alignment Instructions

FCC ID: NSTMX800-217

The tuning and alignment instructions are found on Page 18 of the User Manual.

Note: As this radio is almost entirely configured by software, there are no facilities for manual fine tuning.

Circuit Descriptions

FCC ID: NSTMX800-217

Complete circuit descriptions of the major components of this radio are found on Page 13 of the User Manual.