

Test Report used with SILICON POWER MOS FET NE5510279A

TEST PROCEDURES AND TEST SITE DESCRIPTION

DATE: 7-7-2003

DESCRIPTION: 22CH FRS/GMRS RADIO
UNI-NO.: UT896ZH
FCC ID: AMWUT896
MODEL: GMRS750

RF Output (ERP): 0.85W / 0.06W
Frequency: 95A 462.55 - 462.725MHz
95B 462.5625 - 467.715MHz

NOTE: Some of Test Data are omitted due to final power
MOS FET change.

1. DC Voltage & Current into Final Device

2.1033(C)(8)

To measure the DC Voltage and Current into Final Amplifying Device, the measuring equipment was connected to the actual P.C.Board of the transmitter.

FCC limits: Not specified

Test Results: Refer to test data

2. RF Output Power

2.1046 & 95.639

The unit was tuned-up in accordance with the alignment procedure stated in the EXHIBIT-6, and was loaded into a 50-ohm resistive termination. The unit was powered through its normally supplied power cable by a DC power supply. Power supply voltage was set to nominal voltage at the power supply terminals with the transmitter off.

The unit was operated for three consecutive test cycles of 15 minutes standby and 5 minutes in transmitting. At the end of the third 5 minutes period, the RF output power is measured. During the test, no components of the emission spectrum exceed the limit specified in the applicable rule part for occupied bandwidth or emission limitations.

FCC limits: 0.5 W ERP for FRS and 5W ERP for GMRS

Test Results: Refer to test data

3. Modulation Characteristics (Audio Roll-off)

2.1047

To measure the audio roll-off filter response, an audio frequency oscillator and AF VTVM were connected to the actual P.C.Board of the transmitter. AF VTVM and an oscilloscope monitored the output of the audio filter. An AF input level was maintained was maintained constant at least 10 dB below the saturation level at maximum response frequency. The measurement was made under the above conditions by varying the frequency between 1 kHz and 100 kHz.

FCC limits: 3 kHz - 20 kHz: $-60 \log_{10} (F/3)$ dB

Test Results: Test is omitted due to final power MOS FET change.

4. Modulation Characteristics (Audio Frequency Response) 2.1047

The audio frequency response was measured in accordance with TIA/EIA Specification 603. Operate the unit under the standard test conditions and monitor the output with a modulation or a calibrated test receiver. The input required to produce 30 percent modulation level was measured.

5. Modulation Characteristics (Modulation Limiting) 2.1047 & 95.637(a)

The transmitter shall be adjusted for full rated system deviation, 1000 Hz and reference it as 0dB input. With modulation frequencies of 300, 1000 and 3000 Hz respectively, vary the audio input to a level 20dB above that required at 100 Hz to produce 60% of rated system deviation. This is required for both up to and down modulation. Record the percent of full system deviation obtained as a function of input level.

FCC limits: +/-2.5 kHz deviation

Test Results: Test is omitted due to final power MOS FET change.

6. Occupied Bandwidth 2.1049(c)(1) & 95.635(b)(1)(3)(7)

The spectrum of the modulated carrier was monitored by a panoramic method capable of 60dB amplitude range. The unit was modulated with a 2500 Hz audio signal at an input level 16dB above that required for 50% of maximum system deviation.

In case the CTCSS tone or digital coded data modulation is indicated for this transmitter, a representative measurement data for this operation is also presented.

Since the total deviation of the unit is designed as 2.3 kHz Dev., the deviation of 2500Hz audio signal was set to 1.9 kHz Dev., as the maximum deviation of tone or digital coded signal was continuously set to 0.4 kHz Dev.

At first, tone or digital signal was disabled and set the 2500 Hz audio signal to 0.95 kHz deviation (= 50% of 1.9 kHz deviation). Then, the input level of 2500Hz audio signal was increased by 16dB. In this condition, the tone or digital coded signal was then enabled and imposed with 2500Hz audio signal.

FCC limits: a) -25dB (50 - 100% of assigned frequency)
b) -35dB (100 - 250% of assigned frequency)
c) $43 + 10\log_{10}$ (RF output power in Watts) dB
or 80dB, whichever is lesser attenuation
for more than 250% of assigned frequency

Test Results: Refer to test data

7. Spurious & Harmonic Emission at Antenna Terminal 2.1051

Spurious radiations are the radio frequency voltage or power generated within the equipment and appearing at the equipment's output terminals when properly loaded with its characteristic non-radiating load.

The unit was modulated with a 2500 Hz tone at an input level 16dB greater than that required 50% modulation. The spectrum was scanned from the lowest frequency generated in the equipment to the tenth harmonic of the carrier.

FCC limits: $43 + 10\log_{10}$ (RF output power in Watts) dB

Test Results: Refer to test data.

8. Field Strength of Spurious & Harmonic Radiation 2.1053

Measurement Procedure & Test Site Description

Field strength measurements of radiated spurious emissions were made on a 3-meter range maintained by Uniden Corporation in Japan. Complete description and measurement data of this test site have been placed on file with the Commission. The equipment was scanned for radiated emissions in a scheduled enclosure prior to open field-testing.

For each spurious or harmonic frequency, the antenna was raised and lowered to obtain a maximum reading on the Spectrum Analyzer with antenna horizontally polarized. Then the turntable, on which the equipment under test was placed, was rotated a minimum of 360 degree to further increase the reading on the Spectrum Analyzer. This procedure was repeated with the antenna vertically polarized.

FCC limits: $43 + 10\log_{10}$ (RF output power in Watts) dB

Test Results: Refer to test data

9. Frequency Stability (Temperature)

2.1055(a)(2)

Frequency measurement was performed at the extremes of throughout the range -20 °C to +50 °C and at intervals of not more than 10 degrees C throughout the range. A period of time sufficient to stabilize all of the components in the equipment was allowed prior to frequency measurement.

The frequency of the unit was measured by extracting a sample of the carrier and measuring its center frequency by equipment having a degree accuracy at least 10 times that of the minimum to be measured.

FCC limits: 0.00025%, 2.5 ppm /0.0005%, 5.0 ppm

Test Results: Test is omitted due to final power MOS FET change.

10. Frequency Stability (Voltage)

2.1055(a)(2)

Frequency measurement was performed at the extremes of throughout the range 85% and 115% of the nominal voltage. Extracting a sample of the carrier and measuring its center frequency by equipment having degree accuracy at least 10 times that of the minimum to be measured measured the frequency of the unit.

FCC limits: 0.00025%, 2.5 ppm /0.0005%, 5.0 ppm

Test Results: Test is omitted due to final power MOS FET change.

1. RF Output Power & DC Voltage and Current into
Final Amplifying Device

2.1033(C)(8)

MEASURED FREQUENCY (MHz)	OUTPUT POWER (50 Ω TERMINATED) (Watts)	TX FINAL TRANSISTOR	
		DRAIN VOLTAGE (V)	DRAIN CURRENT (A)
462.5625 (GMRS CH1)	0.62	6.00	0.55
462.5625 (GMRS CH1 BOOST)	1.17	6.00	0.72
467.5625 (FRS CH8)	0.09	6.00	0.31

2. RF Output Power

2.1046

MEASURED FREQUENCY (MHz)	OUTPUT POWER (50 Ω TERMINATED) (Watts)	OUTPUT POWER (ERP) (Watts)
462.5625 (GMRS CH1)	0.62	0.46
462.5625 (GMRS CH1 BOOST)	1.17	0.85
467.5625 (FRS CH8)	0.09	0.06

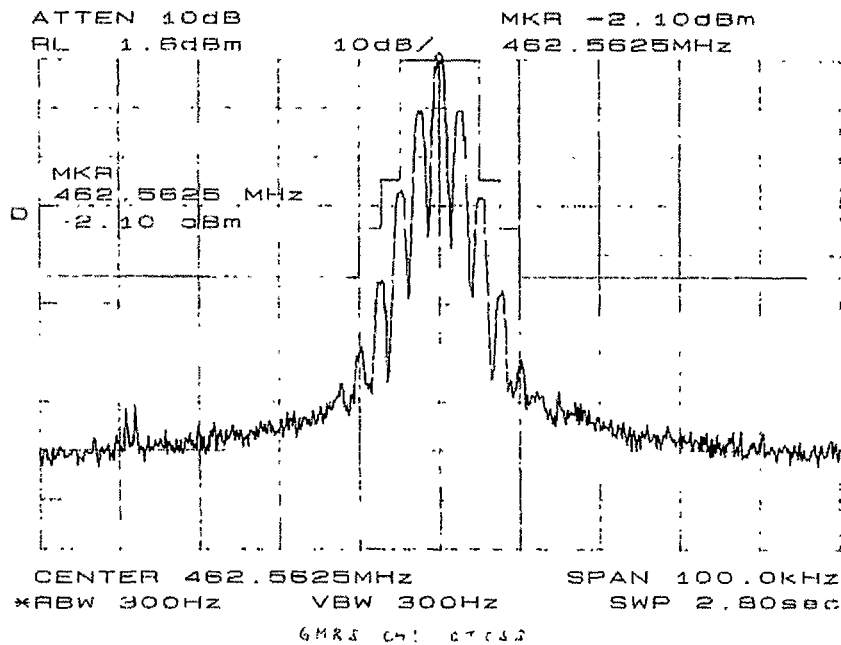
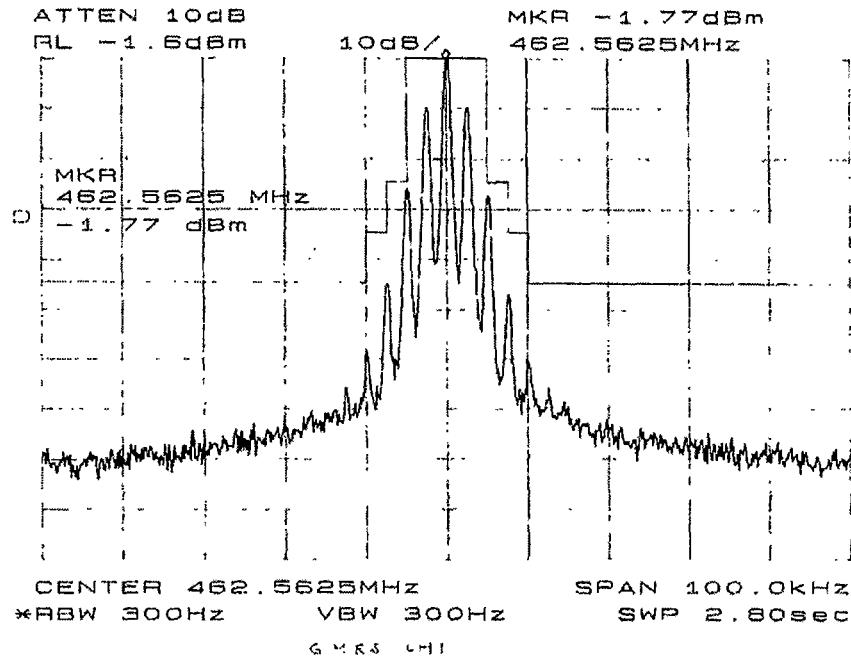
Note:

- a) OUTPUT POWER (50 Ω TERMINATED) was measured by opening the enclosure.
- b) ERP was measured based on substitution method using with standard dipole antenna.

6. OCCUPIED BANDWIDTH

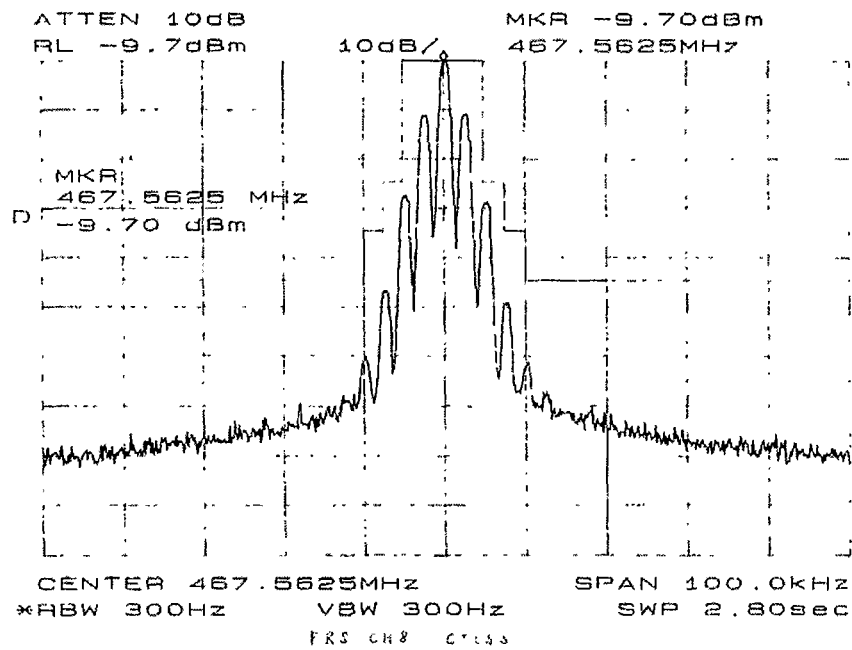
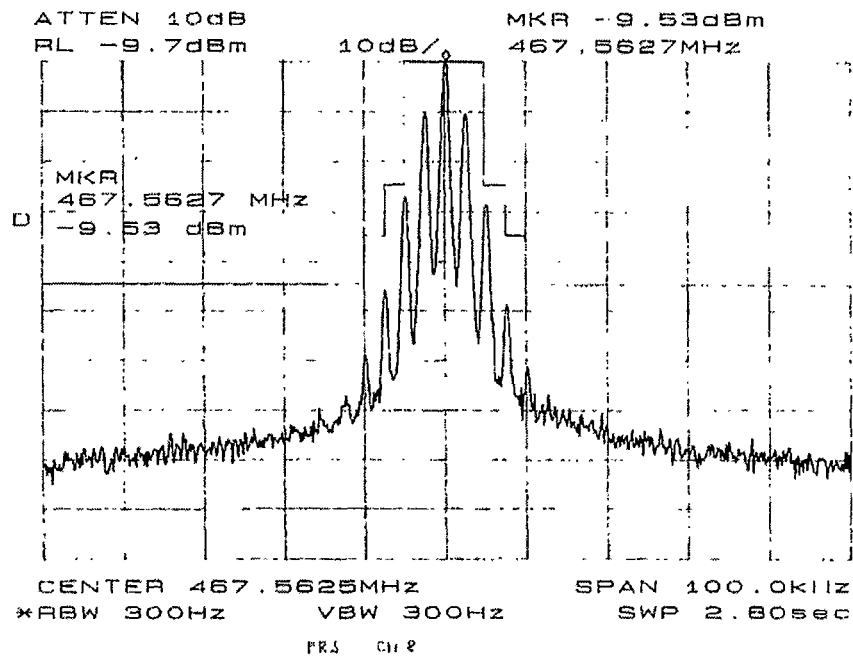
2.1049(c)(1) & 95.635(b)(1)(3)(7)

GMRS(CH1) 0.7W



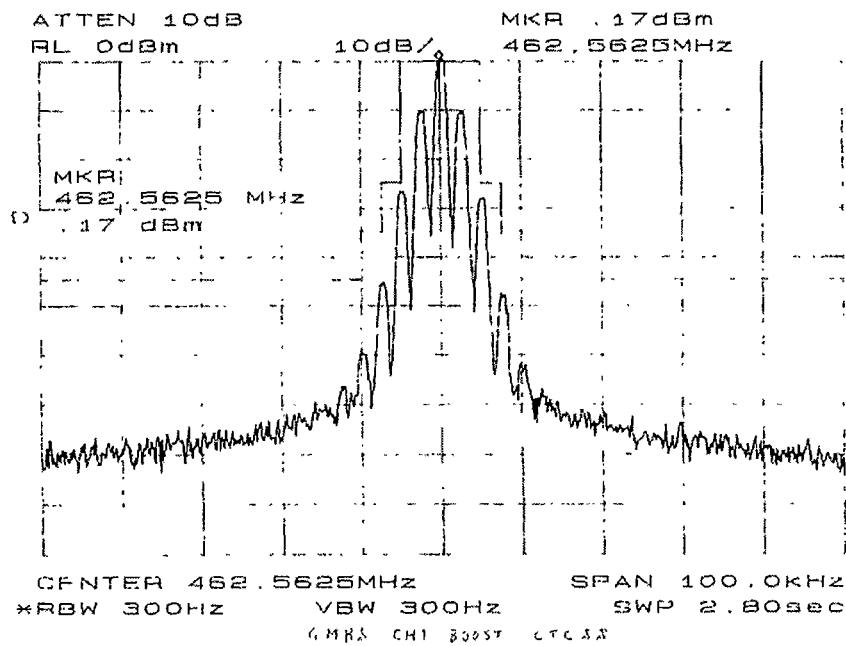
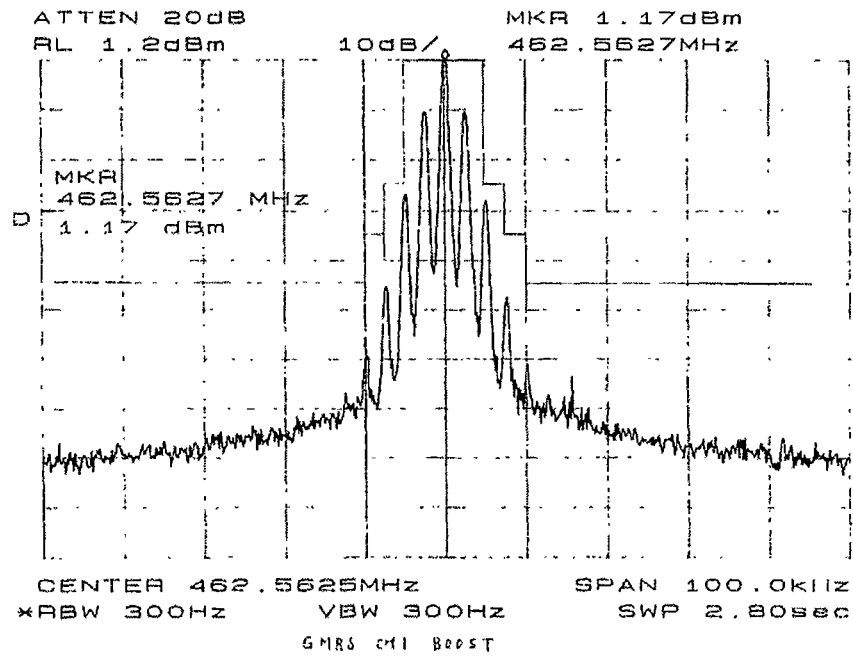
CTCSS

FRS(CH8) 0.1W



CTCSS

GMRS (CH1) BOOST 1.2W



CTCSS

7. SPURIOUS & HARMONICS EMISSION AT ANTENNA TERMINAL

2.1051

Harmonics of Carrier	462.5625MHz GMRS [dBc]	462.5625MHz Boos [dBc]	467.5625MHz FRS [dBc]
1	-	-	-
2	-71.6	-83.5	-81.1
3	-79.1	-85.1	-87.3
4	-76.8	<-90	-84.5
5	-78.7	-89.0	-86.5
6	-87.7	<-90	<-90
7	<-90	<-90	<-90
8	<-90	<-90	<-90

NOTE: The measurement was performed by opening the enclosure.

8-1. FIELD STRENGTH OF SPURIOUS & HARMONICS RADIATION

2.1053 & 95.635(b)(7)

GMRS (CH1) BOOST

TX: 462.5625 MHz

EMISSIONS (MHz)	EUT, PLACED V/H	ANT, POLARITY V/H	SPURIOUS SUPPRESSION [dBc]	FCC LIMIT [dBc]	MARGIN [dB]
462.5625	V	V	-	-	-
462.5625	V	H	-	-	-
462.5625	H	V	-	-	-
462.5625	H	H	-	-	-
925.1250	V	V	58.9	36.2	-
925.1250	V	H	46.3	36.2	10.1
925.1250	H	V	51.3	36.2	15.1
925.1250	H	H	46.9	36.2	10.7
1387.6875	V	V	45.5	36.2	9.3
1387.6875	V	H	59.4	36.2	-
1387.6875	H	V	50.3	36.2	14.1
1387.6875	H	H	50.0	36.2	13.8
1850.2500	V	V	51.3	36.2	15.1
1850.2500	V	H	40.3	36.2	14.1
1850.2500	H	V	50.9	36.2	14.7
1850.2500	H	H	53.4	36.2	17.2

Note: All spurious emissions note reported were attenuated
by at least 20 dB below the FCC limit.

8-2. FIELD STRENGTH OF SPURIOUS & HARMONICS RADIATION

2.1053 & 95.635(b)(7)

GMRS (CH1)

TX: 462.5625 MHz

EMISSIONS (MHz)	EUT, PLACED V/H	ANT, POLARITY V/H	SPURIOUS SUPPRESSION [dBc]	FCC LIMIT [dBc]	MARGIN [dB]
462.5625	V	V	-	-	-
462.5625	V	H	-	-	-
462.5625	H	V	-	-	-
462.5625	H	H	-	-	-
925.1250	V	V	44.3	34.8	9.5
925.1250	V	H	57.6	34.8	-
925.1250	H	V	50.0	34.8	15.2
925.1250	H	H	45.5	34.8	10.7
1387.6875	V	V	45.0	34.8	10.2
1387.6875	V	H	58.3	34.8	-
1387.6875	H	V	49.3	34.8	14.5
1387.6875	H	H	49.4	34.8	14.6
1850.2500	V	V	50.5	34.8	15.7
1850.2500	V	H	50.2	34.8	15.4
1850.2500	H	V	50.5	34.8	15.7
1850.2500	H	H	52.6	34.8	17.8

Note: All spurious emissions note reported were attenuated
by at least 20 dB below the FCC limit.

8-3. FIELD STRENGTH OF SPURIOUS & HARMONICS RADIATION

2.1053 & 95.635(b)(7)

FRS (CH8)

TX: 467.5625 MHz

EMISSIONS (MHz)	EUT, PLACED V/H	ANT, POLARITY V/H	SPURIOUS SUPPRESSION [dBc]	FCC LIMIT [dBc]	MARGIN [dB]
467.5625	V	V	-	-	-
467.5625	V	H	-	-	-
467.5625	H	V	-	-	-
467.5625	H	H	-	-	-
935.1250	V	V	36.1	27.7	8.4
935.1250	V	H	45.3	27.7	-
935.1250	H	V	41.4	27.7	13.7
935.1250	H	H	37.2	27.7	9.5
1402.6875	V	V	40.7	27.7	13.0
1402.6875	V	H	52.7	27.7	-
1402.6875	H	V	43.9	27.7	16.2
1402.6875	H	H	44.9	27.7	17.2
1870.2500	V	V	44.8	27.7	17.1
1870.2500	V	H	45.7	27.7	18.0
1870.2500	H	V	44.2	27.7	16.5
1870.2500	H	H	46.4	27.7	18.7

Note: All spurious emissions note reported were attenuated
by at least 20 dB below the FCC limit.